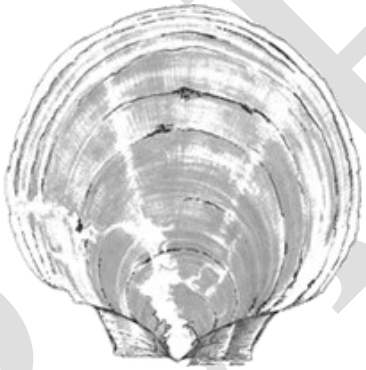
Review of the Atlantic Sea Scallop Limited Access General Category IFQ Program, 2016 – 2023



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New England Fishery Management Council

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1 EXECUTIVE SUMMARY

The New England Fishery Management Council (Council) created the Limited Access General Category Individual Fishing Quota (LAGC IFQ) through Amendment 11 to the Atlantic Sea Scallop Fishery Management Plan (FMP). As a Limited Access Privilege Program (LAPP) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the LAGC IFQ program is subject to periodic program reviews. A 3-year review of the LAGC IFQ program was completed in 2014[1], and a 5-year review was completed in 2016[2].

The scope of this program review was informed by the MSA guidance, NOAA Fisheries Guidance for Conducting Review of Catch Share Programs, NOAA Fisheries Catch Share Policy, and the goals and objectives of Amendment 11 (Section 2). The Council's Scallop Advisory Panel, and Scallop Committee also provided input on the scope of this report. A formal technical work group consisted of staff from the Northeast Fisheries Science Center (NEFSC), Greater Atlantic Regional Fisheries Office (GARFO), and Council. The report considers "baseline" information from fishing years (FY) 2007 – 2009 when appropriate and focuses analyses over the eight year period from FY 2016 – FY 2023. In accordance with guidance documents and the goals of Amendment 11, this program review addresses the following questions:

Has the LAGC IFQ Fishery:

1. Resulted in benefits to the Nation, including the evaluation of biological, economic, and social criteria in such decision making?
2. Preserved the ability for vessels to participate in the general category fishery at different levels? Has the IFQ program prevented excessive shares?
3. Controlled capacity, controlled mortality, and promoted fishery conservation and management?
4. Promoted safety, compliance, and enforcement?

Amendment 11 transitioned the general category component from an open access fishery to limited access. Vessels with at least 1,000 lb. of landings history during a qualifying year (2000 – 2004) were eligible for an IFQ permit and "contribution factor" (allocation), while general category vessels that did not qualify for an IFQ permit were eligible for Northern Gulf of Maine scallop permits, or incidental catch permits.

The primary goal of the LAGC IFQ program is to control capacity and mortality in the general category scallop fishery to prevent overfishing of the scallop resource. Through Amendment 11, the Council intended to preserve the ability for vessels to participate in the general category fishery at different levels. The Councils' vision of the general category fishery is to have a fleet made up of relatively small vessels, with possession limits to maintain the historical character of this fleet and provide opportunities to various participants including vessels from smaller coastal communities.

[1] LAGC IFQ Fishery Program Review (2010 – 2013)

[2] LAGC IFQ Fishery Program Review (2010 – 2015)

This evaluation of the LAGC IFQ program is considered in five elements, including: aggregate trends during the 2016-2023 fishing years; economic performance and net benefits; distributional analyses related to diversity and concentration; conservation and management; and safety, compliance, and enforcement.

In general, the LAGC IFQ program has been relatively successful in achieving the goals of controlling capacity and mortality and promoting fishery conservation and management. Overall, this review concludes that the LAGC IFQ program continues to result in the greatest net benefit to the nation relative to the baseline period (2007-2009), however, the economic benefits do not appear to be equally distributed across participants. Lease-only LAGC IFQ fishermen (fishermen who have limited, or no allocation, who rely on leasing quota to fish) and crew members appear to be predominantly bearing an increasing burden of lease costs, while increasing consolidation of quota allocations may be negatively affecting the ability for fishermen to participate in the LAGC IFQ fishery at different levels.

The LAGC IFQ component continues to see positive conservation outcomes, with relatively stable catch rates and total landings. The LAGC IFQ fishery has not exceeded its sub-ACL since the implementation of the IFQ program. While the LAGC IFQ component has often been attributed to greater than 5.5% of scallop fishery catches of flatfish stocks with scallop sub-ACLs, the overall magnitude of bycatch is relatively low.

The evaluation of safety of the LAGC IFQ program suggested that the average age of LAGC IFQ vessels has increased in this review period, while the length of LAGC IFQ trips has increased. Both of these factors suggest that the safety of LAGC IFQ fishermen has decreased due to the elevated risk of older vessels experiencing mechanical failure or accidents while fishing longer trips, further from shore. The evaluation of LAGC IFQ compliance and enforcement was limited due to the lack of available enforcement data from the NOAA Office of Law Enforcement, however, individual quota overages were relatively few over this period and there were no overall quota overages, and compliance with the Vessel Monitoring System (VMS) pre-landing reporting requirement was high.

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3 PURPOSE, NEED, AND SCOPE OF THE SCALLOP LAGC IFQ REVIEW

The Magnuson-Stevens Act (MSA) § 303A (c)(1)(G) requires a detailed review 5 years after the implementation of limited access privilege programs (LAPP) for "determining progress in meeting the goals of the program and this Act, and any necessary modification of the program to meet those goals…". Given this guidance, this IFQ review addresses both the goals of the program as specified in Amendment 11, as well as the general goals of the MSA including those related to limited access privileges as follows:

1. Primary goal of the IFQ program (Amendment 11) was to control capacity and mortality in the general category scallop fishery to prevent overfishing of the scallop resource. Furthermore, the Council's intent also included a desire to preserve the ability for vessels to participate in the general category fishery at different levels with a vision of a fleet "made up of relatively small vessels, with possession limits to maintain the historical character of this fleet and provide opportunities to various participants including vessels from smaller coastal communities." The goals, objectives, and vision statement from Amendment 11 are attached as an appendix to this document.
2. The MSA National Standards require that "all management actions achieve the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and that any allocation of fishing privileges be fair and equitable and reasonably calculated to promote conservation." The goals of the LAPPs as specified in MSA § 303A (c)(1)(A) to (F) include: reducing over-capacity, promoting safety, fishery conservation and management, and social and economic benefits. Furthermore, Section 301(a)(4) indicates that allocation of fishing privileges should be "carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges."

Based on these standards, NOAA catch share policy indicated that the performance report should address the following criteria:

1. The report should review if the allocations (or the IFQ program) resulted in the greatest overall benefit to the Nation, including the evaluation of biological, economic and social criteria in such decision making.
2. Performance measures may include "how fishery stocks responded to management; what were the impacts on fishing communities, participation and entry into the fishery; what happened to prices, revenues and profits; and how recreational fishery access and participation rates changed after program initiation."
3. Performance measures need to be linked back to the initial objectives in a FMP. This means that the performance report should address "if the specific goals of IFQ program as stated in Amendment 11 are met."

3.1 Key Questions Addressed in this Review

As noted in the Section 1, in accordance with those goals specified above, and the NOAA catch share policy, this report addresses the following questions. Has the IFQ program:

1. Resulted in benefits to the Nation, including the evaluation of biological, economic and social criteria in such decision making?

2. Preserved the ability for vessels to participate in the general category fishery at different levels and/or prevented excessive shares?
3. Controlled capacity, controlled mortality, and promoted fishery conservation and management?
4. Promoted fishing safety, compliance, and enforcement?

4 ATLANTIC SEA SCALLOP FISHERY

4.1 Summary of Atlantic Sea Scallop Resource

The Atlantic sea scallop (*Placopecten magellanicus*) is a bivalve mollusk that is distributed along the continental shelf, typically on sand and gravel bottoms from the Gulf of St. Lawrence to North Carolina (Hart and Chute, 2004). The species generally inhabit waters less than 20º C and depths that range from 30-110 m on Georges Bank, 20-80 m in the Mid-Atlantic, and less than 40 m in the near-shore waters of the Gulf of Maine. Although all sea scallops in the US EEZ are managed as a single stock, assessments focus on two main parts of the stock and fishery that contain the largest concentrations: Georges Bank and the Mid-Atlantic, which are combined to evaluate the status of the whole stock. See Section 5.4.1 for more information.

4.2 Summary of Management History

The Council established the Scallop FMP in 1982. A number of Amendments and Framework Adjustments have been implemented since that time to adjust the original plan. Amendment 4 was implemented in 1994 and introduced major changes in sea scallop management, including a limited access program to limit the influx of new vessels and a day-at-sea (DAS) reduction plan to reduce mortality and prevent recruitment overfishing. Limited access vessels were assigned different DAS limits according to which permit category they qualified for: full-time, part-time or occasional. Amendment 4 also created the general category scallop permit for vessels that did not qualify for a limited access permit. Although originally created for an incidental catch of scallops in other fisheries, and for small-scale directed fisheries, the general category fishery and fleet has evolved since its creation in 1994.

Under Amendment 4 the general category scallop fishery was established as an “open access” fishery. Open access means any vessel that wants to apply for a permit can; there were no specific qualifications to receive a general category permit. The main control on mortality for this component of the scallop fishery was a daily possession limit.

Starting in 1999, there was a considerable increase in fishing effort and landings by vessels with general category permits, primarily as a result of resource recovery and higher scallop prices. Landings went from an average of about 200,000 pounds from 1994-2000 to over one million pounds consistently from 2001-2003, and 3-7 million pounds each year from 2004-2006 (NEFMC, 2007). Without additional controls on the general category fishery, there was a great deal of uncertainty with respect to potential fishing mortality from this component of the scallop fishery, thus the potential for overfishing was increased. The Council initiated Amendment 11 to consider a range of measures to control fishing mortality by this component of the fishery, improving the ability of this plan to prevent overfishing of the scallop resource overall.

A control date was implemented for the general category scallop fishery on November 1, 2004 (69 CFR 63341). A control date serves as advance notice to vessels that future access to that fishery may be limited in some way. Specifically, a control date can be used for establishing eligibility criteria for determining levels of future access and is implemented to discourage speculative entry into a fishery while a Council develops a management program to control effort.

The Council began working on Amendment 11 in 2005 and in June 2007. The Council approved Amendment 11 to the Scallop FMP and it was effective on June 1, 2008. To help focus Amendment 11 during development, the Council approved policy guidance as well as a "vision statement" for the general category fishery to help define the scope of issues that would be considered during the amendment. These have been included in this document to help identify potential indicators and evaluate whether the program implemented by Amendment 11 has achieved the goals and objectives set by the Council as well as the vision developed for this fleet.

The policy guidance read:

> *Amendment 11 will focus on addressing capacity in the general category fishery by considering measures that will better control fishing mortality by this component of the fishery. Specifically, the amendment will consider limited entry and implementation of a hard total allowable catch (hard TAC) to prevent overfishing. This amendment will not consider measures that maintain the general category fishery as an open access fishery with input controls as the only mechanism to manage general category effort (i.e. possession limits and crew restrictions).*

4.2.1 Vision for general category fishery adopted under Amendment 11

The Council recognizes that the general category scallop fishery has changed since development and implementation of Amendment 4 in 1994. While some of the participants are the same, many have changed, and fishing behavior has evolved with time. The general category scallop fishery has been and still is very diverse given that this component of the fishery is prosecuted by vessels of different size and gear types. For example, some general category vessels fish for scallops full-time but only seasonally, another component of the fleet lands scallops above incidental levels while fishing for other species, and some are full-time day boat vessels that target scallops year round.

Amendment 11 implemented measures that were designed to control capacity and fishing mortality in the general category scallop fishery. In order to accommodate this diverse fleet, this amendment considered a range of measures that take these differences into account. The action established a limited entry program, a hard TAC (now ACL) and other management measures to control capacity and mortality.

The overall intent of the action was to stabilize capacity and prevent overfishing from the general category fishery. In doing so, the Council's vision for the general category fleet was to maintain the diverse nature and flexibility within this component of the scallop fleet. Specifically, the Council considered measures that were anticipated to control mortality from this component of the fleet, but preserve the ability for vessels to participate in the general category fishery at different levels. In doing so, the Council recognized the importance of this component of the

fishery for small fishing communities, as a component of overall catch for some individual vessel owners, and the value this "dayboat" scallop product has in the scallop market. Overall, the Councils' vision of the general category fishery after Amendment 11 was implemented was to have a fleet made up of relatively small vessels, with possession limits to maintain the historical character of this fleet and provide opportunities to various participants including vessels from smaller coastal communities.

4.2.2 Goals and Objectives of Amendment 11 related to the General Category Fishery

The primary goal of Amendment 11 was to control capacity and fishing mortality in the general category scallop fishery. To achieve this goal, the Council identified the following list of objectives:

1. Allocate a portion of the total available scallop harvest to the general category scallop fishery.
2. Establish criteria to qualify a number of vessels for a limited entry general category permit.
3. Develop measures to prevent the limited entry general category fishery from exceeding their allocation.
4. Develop measures to address incidental catch of scallops while fishing for other species.

Amendment 11 ultimately implemented a limited entry IFQ program for about 340 vessels (Category A LAGC permits). Each qualifying vessel received a "contribution factor" based on their catch history and years in the fishery. Vessels are allocated annual scallop poundage based on their individual contribution factor. Vessels are still subject to a possession limit; Amendment 11 maintained the limit of 400 pounds, but that was increased in a subsequent action to 600 pounds. The fleet of qualifying Category A general category vessels received a total allocation of 5% of the total projected (LA and LAGC) scallop catch each fishing year.[3]

Amendment 11 also established separate limited entry programs for other classes of general category permits. Category B permits are restricted to fishing for scallop in the Northern Gulf of Maine and those vessels qualified under a separate set of criteria with different gear and possession limit restrictions. Category C permits are for vessels permitted to land and sell up to 40 pounds of scallop meat per trip while fishing for other species. There is a target TAC for this permit category of 50,000 pounds per year. Finally, about 40 limited access vessels also qualified for a LAGC IFQ permit under the same qualifying criteria. These vessels are allocated an overall 0.5% of the total projected annual scallop catch, and each permit has an individual contribution factor. These other limited access general category permits will not be evaluated in this report. This report is focused on LAGC IFQ vessels only, Category A permits.

Amendment 11 was implemented before the start of the 2008 fishing year, but there was a transition period for the first two years of the program. For fishing years 2008 and 2009 the fishery was managed under a quarterly hard-TAC equivalent to 10% of the total projected catch

[3] Amendment 15 to the Scallop FMP changed the LAGC IFQ allocation to 5% of the annual catch limit (ACL). The Council has since modified the approach adopted in Amendment 15 to allocated to this component of the fishery, and revert to using 5% of the projected landings for the LAGC IFQ allocation.

for the scallop fishery. The Council developed these interim measures because it was expected to take at least 12 months to implement a limited entry IFQ program. The Council adopted a quarterly TAC based on public comments related to potential derby fishing and safety concerns. The Council selected 10% because that is the value that was used in recent projections for assumed scallop mortality from the general category fishery, and that level of catch had not had substantial impacts on the limited access fleet during that time period. Furthermore, the Council selected a higher value than the long-term allocation of 5% to reduce short-term impacts on vessels that would ultimately qualify for limited entry from additional effort expected under the appeals process.

4.2.3 Summary of changes to the IFQ program since Amendment 11

Since Amendment 11 there have been several adjustments made to the IFQ program. The first action following Amendment 11, Framework 21 allowed partial leasing of general category IFQ allocations during the fishing year. The Council adopted this alternative to increase flexibility for general category qualifiers and to improve overall economic profits of the IFQ program. In addition, the amount of compensation a general category vessel can receive on observed access area trips was limited to 400 pounds per trip. This measure is not directly related to improvements of the IFQ program, but it does help prevent excessive compensation for observed LAGC trips, thus improving overall monitoring for both the LA and LAGC fleets. Limiting the compensation per trip will help the total observer set-aside compensation pool last longer, reducing the chance of the pool running out before the end of the year.

In 2011, the Council approved Framework 23 which again did not consider any specific changes to the IFQ program, but modified one part of the NGOM LAGC permit. This action changed the NGOM management program so that a vessel with a Federal NGOM permit can fish exclusively in state waters and that catch would not apply against the federal NGOM TAC. Vessels could still fish in federal waters, but if they do, all catch from that trip would apply against the federal TAC.

Amendment 15 included changes to the LAGC IFQ program specifically designed to make the IFQ program more effective and efficient for participating vessels. First, a rollover of 15% of the permit holder's original annual allocation will be allowed to a subsequent fishing year to increase flexibility and provide a safety mechanism in the case of a late-season breakdown. Second, the possession limit was increased from 400 to 600 pounds to allow for more efficient harvest of quota, without the increase being large enough to change the nature of this small day-boat fishery and creating competition between the fleets. Third, the maximum amount of quota one vessel can harvest was increased from 2% to 2.5% to be more consistent with the maximum individual ownership value of 5%. Finally, IFQ vessels will be allowed to split the IFQ from their IFQ permit and other fishery permits to facilitate permanent IFQ transfers from vessels with a suite of fishery permits.

In 2012, the Council approved Framework 24 to set fishery specifications for 2013, as well as a handful of other measures. Several were specific to the LAGC IFQ program. One measure designed to improve flexibility and efficient use of LAGC IFQ during the year was to allow LAGC vessels to sub-lease IFQ as well as lease IFQ during the fishing year even if some fishing has occurred. A handful of other measures adjust management for LAGC vessels, but were not

specific to the IFQ program: specific yellowtail flounder accountability measures (YT AMs) for the LAGC fishery; adjustment to the timing of YT AMs in the scallop fishery; expand the observer set-aside program to include LAGC trips in open areas; and modify the observer set-aside TAC so that it is still 1% of the ABC, but it would not be area specific. These last few measures were developed to make LAGC vessels more accountable for bycatch, as well as improve overall monitoring of this fishery.

Framework 25 included proactive and reactive accountability measures for the scallop fishery – including the LAGC IFQ component. A reactive AM for catch overages of southern windowpane flounder requires the use of a maximum 5-row apron and maximum 1.5:1 hanging ratio in an area west of 71° W. The length of the AM is dependent upon how much the sub-ACL is exceeded by. The proactive AM required the use of a maximum 7-row apron in the same areas as the southern windowpane AM area. This proactive AM was subsequently expanded to include the entire fishery in 2015 through FW26.

Frameworks 26, 27, and 28 set fishery specifications for 2015, 2016, and 2017 respectively, as well as several general measures not specific to LAGC IFQ vessels. Framework 28 also began applying spatial management to the specifications setting process for LAGC IFQ allocations. In 2017, Amendment 19 developed a process for setting scallop fishery specifications outside of a framework action, and shifted the start of the fishing year from March 1 to April 1 to better align with management implementation timelines and improve operational efficiency.

In 2018, Framework 29 introduced several changes to the LAGC IFQ program. With the opening of the Nantucket Lightship and Closed Area I via Omnibus Habitat Amendment 2 (OHA2), the LAGC IFQ component was allocated a set number of access area trips directly proportional to the Limited Access fishery's access area allocation. These trips could be fished in any open access area, with closures triggered once area-specific limits were reached. Additionally, the reactive AMs for northern windowpane flounder, Georges Bank yellowtail flounder, and Southern New England yellowtail flounder were modified to create parity with the existing southern windowpane flounder AM, applying to both LA and LAGC IFQ vessels.

Framework 30 set specifications for 2019, and codified the LAGC IFQ allocation as 5.5% of the total allocation. Frameworks 32 (2020), Framework 33 (2021), 34 (2022), and 36 (2023) did not introduce any management changes that directly impacted the LAGC IFQ fishery.

In 2022, Amendment 21 introduced structural changes to the Northern Gulf of Maine (NGOM) management area as described in Section 3.3.1 (Permit Types). For LAGC IFQ vessels, these changes had several key impacts. Firstly, the new TAL-sharing system provided a guaranteed allocation of the NGOM allocation (5% of APL), improving access for LAGC IFQ vessels when scallop biomass is high. Amendment 21 also introduced greater quota flexibility by permitting temporary transfers of quota from LA vessels with IFQ to LAGC IFQ-only vessels, as well as increasing the possession limit to 800 lb. This enabled IFQ participants to lease additional quota annually, improving overall fishery performance and creating more flexibility for smaller operators. Furthermore, observer compensation was adjusted to a prorated system for trips exceeding 24 hours, capping payment at 48 hours, reducing the risk of observer bias and the cost burden on longer trips.

4.3 Summary of the General Category Fishery

4.3.1 Permit Types

The general category permit was first established under Amendment 4 to the Scallop FMP. In 1994 it was established as an "open access" fishery; any vessel could apply for a permit. There were no specific qualifications to receive a permit and the primary control on mortality for this component of the scallop fishery was a daily possession limit.

Since Amendment 11, adopted in FY2008, there are now three types of LAGC permits; LAGC Category A permits which are IFQ permits; LAGC Category B permits which are restricted to fishing in the NGOM; and LAGC Category C permits which are incidental catch permits restricted to 40 pounds of scallop catch. Within the LAGC Category A permits there are two types: vessels that qualified for an IFQ permit that can transfer and lease quota; and limited access scallop vessels that also qualified for a LAGC IFQ permit, but were unable to lease quota until the implementation of Amendment 21. Limited access scallop vessels can also qualify for the other general category permits (NGOM and incidental catch).

Many limited access scallop vessels also hold some type of LAGC permit. For example, in 2011 19 full-time limited access vessels also held LAGC-IFQ permits, another 19 full-time vessels held LAGC-NGOM permits, and about 83 full-time vessels also held LAGC-incidental permits. The number of general category permits declined considerably after 2007 as a result of the Amendment 11 provisions. Before Amendment 11 about 2,500 to 3,000 vessels had open access general category permits, and in 2011 fewer than 700 vessels had one of the four types of limited access general category permits.

Limited entry into the Atlantic sea scallop fishery began in 1994 through Amendment 4 to the FMP. See Table 1 for a summary of the limited access programs in the fishery and information on qualifying criteria. Harvest limits vary within the Scallop FMP by permit category.

Permit Type	Year Created	Action	Qualifying Criteria	Permit Category
Limited Access (Multiple categories)	1994	Amendment 4	One trip with more than 400 pounds in either 1988 or 1989, extended for new vessels under construction	Based on number of days used in 1990, or average of 1985-1990 days
LAGC IFQ	2008	Amendment 11	Possess Open Access GC permit	1,000 pounds landings in a year (FY2000-2004), individual allocation based on best year indexed by # of years active in the fishery
LAGC NGOM	2008	Amendment 11	Possess Open Access GC permit	No landings history required
LAGC Incidental	2008	Amendment 11	Possess Open Access GC permit	No landings history required

Table 2 summarizes the existing harvest limits and the various forms of allocations across permit categories (ex: DAS, IFQ, etc.).

Table 1 - Summary of scallop permit categories and qualifying criteria.

Permit Type	Year Created	Action	Qualifying Criteria	Permit Category
Limited Access (Multiple categories)	1994	Amendment 4	One trip with more than 400 pounds in either 1988 or 1989, extended for new vessels under construction	Based on number of days used in 1990, or average of 1985-1990 days
LAGC IFQ	2008	Amendment 11	Possess Open Access GC permit	1,000 pounds landings in a year (FY2000-2004), individual allocation based on best year indexed by # of years active in the fishery
LAGC NGOM	2008	Amendment 11	Possess Open Access GC permit	No landings history required
LAGC Incidental	2008	Amendment 11	Possess Open Access GC permit	No landings history required

Table 2 - Summary of current harvest limits and allocation types by permit category.

Permit Type	Harvest Limits	Vessel level allocation?	Form of allocation
Limited Access	94.5% of annual projected landing, after set-asides and incidental catch removed	Yes	DAS and access area trips
LAGC IFQ (Cat. A)	5.5% of annual projected landing, after set-asides and incidental catch removed	Yes	IFQ pounds; set # AA trips at fleet level
LAGC NGOM (Cat. B)	Up to TAC for management area, not linked to annual projected landings estimate	No	Harvest in area until LAGC fleet reaches TAC
LAGC Incidental (Cat. C)	Deducted from annual projected landings before allocating to LA and LAGC IFQ	No	Harvest allowed until limit is reached

4.3.1.1 LAGC Category B –Northern Gulf of Maine Permits and Management Area

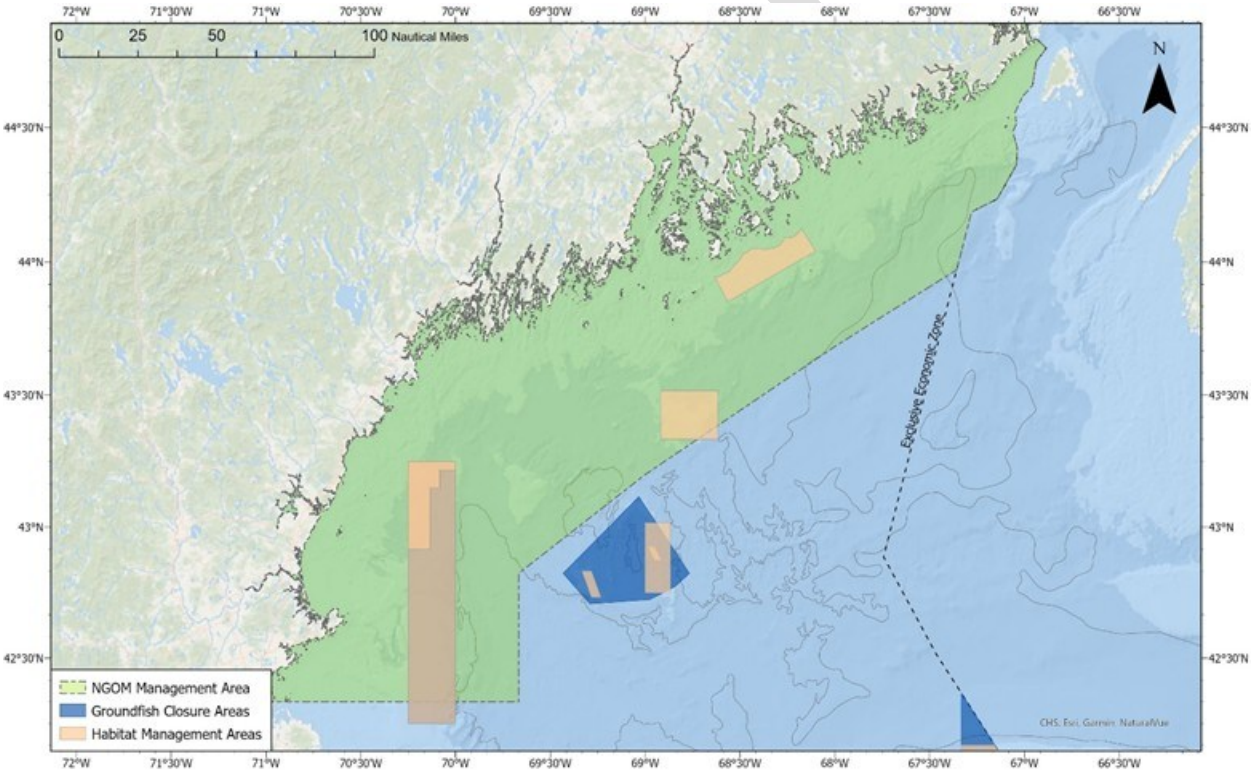
In addition to the IFQ program, Amendment 11 established a permit category and management area in the Gulf of Maine to accommodate a fleet made up of relatively small vessels, with possession limits to maintain the historical character of this fleet and provide opportunities to various participants including vessels from small communities (NEFMC, 2007 Amendment 11).[4] Traditionally, this small-vessel fleet fished only seasonally for scallops in months when primary fisheries (i.e. lobster, groundfish) were slow. This pattern has continued since 2008; for example, NGOM landings have consistently increased in months where Maine lobster landings decrease,

[4] For more information on the Northern Gulf of Maine Management area, see: http://s3.amazonaws.com/nefmc.org/Doc.4a-NGOM-Discussion-Document.pdf

further demonstrating the value of this opportunistic spring fishery. Vessels operating under NGOM permit can only fish within the bounds of the NGOM management area.

Amendment 21 increased the LAGC IFQ possession limit from 600 lb to 800 lb, and restructured the management of the Northern Gulf of Maine (NGOM) by including biomass within the management area into the calculations of the Acceptable Biological Catch (ABC), and Annual Catch Limit (ACL) for the scallop fishery. Previously, NGOM allocations were treated separately and were only included in the Overfishing Limit (OFL) alongside state waters catch estimates. Under Amendment 21, NGOM biomass is included in the ABC and ACL alongside Georges Bank and Mid-Atlantic biomass. Amendment 21 also revised how NGOM allocations are structured. Instead of a hard TAC, a set-aside trigger system was implemented. When the NGOM set-aside exceeds 800,000 pounds, 95% of the excess allocation is directed to the NGOM APL, while 5% is set aside for LAGC IFQ vessels. Additionally, 25,000 lb of NGOM scallops are allocated annually to the Research Set-Aside program. LAGC IFQ vessels can operate in this area, but are required to abide by lower trips limits (200 lb. per trip vs. 800 lb. per trip in other areas), and landings count against the NGOM TAC and the vessel's IFQ.

Figure 1 - The extent of the Northern Gulf of Maine Management Area relative to groundfish closures and habitat management areas.



The NGOM management program has supported general category scallop fishing in the Gulf of Maine after the transition from open access to limited access, though the majority of active permit holders and annual landings have come from LAGC NGOM vessels since FY2012 (Table 3). Table 3 describes the number of vessels with LAGC NGOM permits excluding LA vessels, and the number and percent of LAGC NGOM vessels actively fishing in the management area

from FY2010-FY2015, as well as the number of active NGOM vessels by fishing year. Before FY 2013, combined annual landings by IFQ and NGOM vessels filled a small portion of the NGOM TAC, in several years landing less than 20%. A strong year class of scallops on Platts Bank in FY2013 was followed by an increased LAGC NGOM fishing effort in this area through FY2014. LAGC IFQ vessels have typically focused effort to the southern portion of the management area around Cape Ann. IFQ landings nearly doubled between FY2014 and FY2015, with LAGC IFQ vessels working on aggregations of scallops located in Ipswich Bay and to the east and southeast of Cape Ann. FY 2015 marked the first year that the NGOM TAC was reached (overage of approximately 2,500 lb.). The NGOM management program has also supported general category IFQ and NGOM fishing activity by vessels homeported in Maine, New Hampshire, and Massachusetts (Table 3 &

Table 4). With respect to the preservation of vessel diversity in the general category fishery, the NGOM program has supported continued and increasing scallop landings from the federal fishery by vessels homeported in states bordering the Gulf of Maine.

Table 3 - Total LAGC NGOM permits.

FY	LA with NGOM	NGOM	Active NGOM (excluding LA)	% Active NGOM
2010	68	94	11	12%
2011	71	81	10	12%
2012	68	69	9	13%
2013	68	77	18	23%
2014	70	75	22	29%
2015	71	72	29	40%
2016	74	77	37	48%
2017	72	74	36	49%
2018	70	80	40	50%
2019	69	81	45	56%
2020	69	89	46	52%
2021	70	106	48	45%
2022	94	111	102	92%
2023	108	130	107	82%

Table 4 - Trips and landings from the NGOM by IFQ vessels from FY2010 - FY2023. Landings in pounds.

	MA		ME		NH	
FY	Trips	Landings	Trips	Landings	Trips	Landings
2010-2012	164	11,168	78	7,000	30	4,388
2013	99	9,337	154	19,734	208	22,057
2014	135	13,112	111	24,263	204	20,496
2015	310	41,858	97	12,845	252	24,031
2016	235	42,533	245	44,059	76	12,668
2017	89	17,380	164	28,999	21	3,760
2018	178	32,759	520	94,626	28	5,354
2019	173	32,759	513	113,340	60	11,459
2020	180	29,535	793	155,569	-	1,804
2021	121	19,678	635	113,677	-	-
2022	774	154,215	1998	408,948	106	20,703
2023	457	95,488	1188	239,702	78	15,344

4.3.2 Allocations

During the transition period to the IFQ program, a 10% TAC allocation was set aside for the general category fishery, divided quarterly, until the IFQ program could be fully implemented. Framework Adjustment 21, effective in 2010, refined the allocation strategy for the LAGC IFQ fishery. The framework specified that the LAGC IFQ fleet would receive a fixed allocation of 5% of the overall TAC for the scallop fishery, providing stability and predictability for LAGC participants. This fixed percentage allocation was based on historical landings data and aimed to balance the interests of both limited access and general category fleets. In 2011, through Amendment 15, this was changed to 5% of the Annual Catch Limit (ACL) to comply with Magnuson-Stevens Act requirements. In 2019, through Framework Adjustment 30, this allocation changed again to 5% of the Annual Projected Landings (APL) to improve fairness and consistency by allocating based on available landings only.

Under current U.S. federal fisheries policy, a review of quota allocation can be triggered by several mechanisms. These include the use of public interest-based triggers, time-based triggers, and indicator-based triggers[5]. This guidance, formalized as national policy between 2016 and 2017, was designed to support an adaptive approach to quota management by evaluating whether existing allocations continue to meet management objectives. While this review does not formally re-evaluate the fixed allocation percentage of the IFQ program, Table 5 outlines the NEFMC fishery allocation policy and defines the criteria that would be used to evaluate reallocation.

[5] https://www.oig.doc.gov/OIGPublications/OIG-16-045-M.pdf

Table 5 - NEFMC criteria for the evaluation of fishery allocation (Source: NEFMC Operations Handbook)

Category	Sub-category	Evaluation Criteria
Ecological Factors	Target Species Impacts	What are the expected ecological impacts on target species?
	Non-target & Bycatch Impacts	What are the expected ecological impacts on other fisheries? What is the status of non-target species? What are the expected impacts on bycatch and bycatch mortality of both non-target species and protected species?
	Ecosystem and Habitat Impacts	What are the impacts on the marine ecosystem? On habitat? On the ecological community (e.g., predator-prey dynamics)?
Economic Factors	Economic Efficiency	Can economic efficiency be improved?
	Economic Impact	What are the economic impacts of potential changes in allocation (e.g., revenue, cost, employment)?
Social Factors	Fairness and Equity	Is the allocation fair and equitable among user groups, including permit types?
	Environmental Justice	Are there disproportionate adverse effects on low-income and/or minority groups?
	Community Dependence	What is the importance of fishery resources to fishing communities?
	Sector Engagement & Dependence	What is the individual, local, and regional dependence and engagement in each sector?
	Vulnerability & Adaptive Capacity	What is the community's vulnerability and adaptive capacity?
	Other Social Impacts	Are there other relevant social impacts (e.g., intergenerational access, infrastructure reliance)?
Indicators of Performance and Change	Catch & Landings Trends	What are the trends in catch/landings by sector or permit type?
	Stock Status	What is the current status of the fishery resources?
	Species Distribution	Has the geographic or seasonal distribution of the species changed in ways that impact access or equity?
	Data Quality	What is the quality and availability of information for each sector or group?

5 EVALUATION OF THE LAGC IFQ PROGRAM

5.1 Introduction

The Limited Access General Category (LAGC) IFQ program was fully implemented in Fishing Year (FY) 2010. This report provides an assessment of the economic performance of the LAGC IFQ fishery over the eight-year period from FY2016 to FY2023, excluding limited access vessels that also hold an LAGC IFQ permit (i.e., combination permit holders). The previous IFQ review covered FY2010 through FY2015. This section focuses on IFQ-only vessels receiving 5% of the total allowable catch (TAC), and examines quota allocations, vessel participation (both active and latent), vessel characteristics and fleet capacity, landings, revenue, prices, overall economic

performance, quota transfers (permanent and temporary leasing), employment, and equity considerations related to quota distribution from 2010 to 2023. Comparisons are made between the economic performance of the IFQ fishery during 2010–2015 and 2016–2023, as well as with the period prior to IFQ implementation where possible.

Section 5.2 presents the aggregate trends in the IFQ fishery during the 2016-2023 fishing years. Section 5.2.1 analyzes changes in IFQ allocations and landings while Section 5.2.2 presents trends in IFQ fishing effort. Section 5.2.3shows comparative trends in scallop revenue for the Limited Access and IFQ fisheries, and Section 5.2.4 details trends in vessel characteristics compared to the Limited Access fleet.

Section 5.3 provides an assessment of the program's effect on net benefits to the nation mainly from an economical perspective consistent with NMFS' Economic Guidelines for conducting cost-benefit analyses[6]. Section 5.3.2 provides a range of comparative analyses to evaluate the impacts of the program on various facets of the fishery. An analysis of ex-vessel scallop prices and the predicted price premium associated with the IFQ program is given in Section 5.3.2.1. Section 5.3.2.2 then uses two scenario analyses to evaluate the impacts of the IFQ program on producer surplus and profits compared to the pre-Amendment 11 period and the reference period of 2010-2015. Section 5.3.4 then evaluates trends in leasing and transfers. This analysis includes permanent transfers (5.3.4.1), temporary transfers, and lease prices (5.3.4.2). Section 5.3.5 aims to analyze trends in employment and crew shares. In this section, we are provided with how the number of crew positions as well as crew income has changed over time and in comparison to the reference period. Lastly, Section 5.3.6 looks at permits and affiliations. This includes an analysis of permits, landings, and quota by vessel in Section 5.3.6.1 and an analysis of affiliations and distribution of landings by quota activity in Section 5.3.6.2.

In Section 5.4, a variety of distributional analyses are presented. The Herfindahl Index is used in Section 5.4.2 to measure species diversity of IFQ vessel landings and their reliance on revenue from scallop landings. Revenue and revenue reliance by active affiliation is then described in Section 5.4.3. Although not an analysis, Section 5.4.4 discusses the participation in other fisheries by IFQ permitted vessels and how these patterns can be identified through the use of the Herfindahl Index. Section 5.4.5 then analyzes the Gini coefficients and Lorenze Curves to describe trends in the distribution of quota allocation and wealth within the fishery. Section 5.4.6 describes trends in the geographic distribution of IFQ vessels, landings, and revenue. Finally, Sections 5.4.7 and 5.4.8 provide the analysis and results of two different crew surveys. Section 5.4.7 is a comparative analysis of crew surveys in both the LAGC IFQ fishery and other fisheries that evaluates trends across three different survey waves spanning from 2012-2024. This analysis, however, does not differentiate LA from IFQ-only vessels and represents the scallop fishery as a whole relative to non-scallop fisheries. Conversely, Section 5.4.8 provides an analysis of a crew survey specific to the IFQ scallop fishery. The survey was conducted in 2025 by Northern Economics, Inc. and the Gulf of Maine Research Institute to examine social and wellbeing outcomes in the LAGC IFQ scallop fishery. Although it falls outside the formal review period, it provides important contextual insight into participant experiences under the IFQ program.

[6] http://www.nmfs.noaa.gov/op/pds/documents/01/111/01-111-05.pdf, p.7

Section 5.4.1 provides assesses the effect of the LAGC IFQ program on conservation and management objectives, including information from the most recent stock assessment (Section 5.5.1), allocations and landings (Section 5.5.2), LPUE (Section 5.5.3), and bycatch of allocated groundfish stocks (Section 5.5.4). In each section, metrics from 2016-2023 are compared to the review and pre-IFQ period. Section 5.6 includes a summary of the number of permits with quota overages by year (Section 5.6.1), the compliance rate for the pre-trip notification requirement (Section 5.6.2), and average vessel age and length of fishing trips by region from 2016-2023 (Section 5.6.3).

Section 6 summarizes the answers to the key questions listed in Section 3. Beginning with net benefits to the nation, Section 6.1 outlines if the LAGC IFQ program has overall provided net benefits to the nation. "Net benefits" in this report includes both net economic benefits and distributional impacts. Section 6.2 summarizes participation in the fishery and whether the program has prevented excessive shares. Section 6.3 then outlines if the program has controlled fishery capacity and fishing mortality as well as whether it has promoted fishery conservation and management. Whether the program has promoted safety, compliance, and enforcement is covered in Section 6.4. Finally, 6.5 discusses any future data and research needs that have been identified in this report.

5.2 Aggregate Trends during 2016-2023 fishing years

5.2.1 IFQ allocations and landings

During FY2016–2023, IFQ allocations remained unchanged at 5% for IFQ-only permits and 0.5% for combination permit holders (i.e., those also holding limited access permits). The IFQ allocation peaked at 4.08 million pounds in FY2016 but has since declined to approximately 1.15 million pounds in FY2023. On average, IFQ allocations during 2016–2023 were about 7% lower than those in the previous review period (2010–2015). Since 2020, annual allocations have consistently fallen below the average allocation observed during 2010–2015. These recent declines are primarily attributed to poor resource conditions and weak scallop recruitment. For example, the FY2023 allocation is approximately 75% lower than the peak in FY2016.

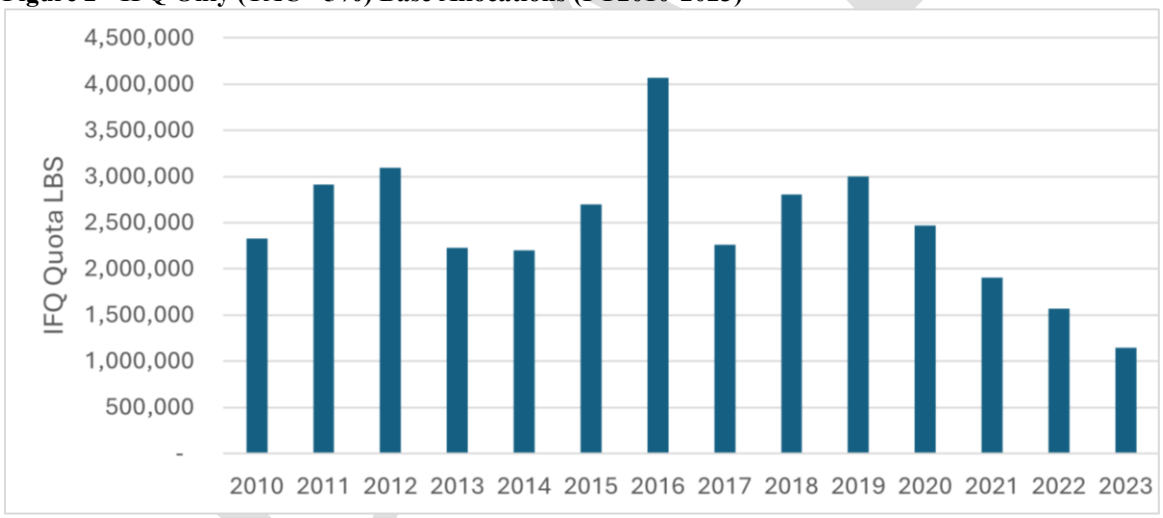
Scallop landings in the IFQ fleet have generally fluctuated with quota allocations. During the current review period, landings exceeded 85% of the allocated quota, compared to over 88% in the previous review period. In three of the eight years from FY2016–2023, scallop landings exceeded the allocated quota, compared to only one instance during FY2010–2015. Annual LAGC IFQ landings in exceedance of the allocation are due to the use of carryover quota, and do not constitute a quota overage. Table 6 and Figure 2 present IFQ allocations (with an allocation index) and corresponding scallop landings from 2010 through 2023.

Table 6 - IFQ Only (TAC =5%) Base Allocations (FY2010-2023)

FY	IFQ Allocation (lb) BASE TOTAL (Default + Adjustment)	Scallop landings (lb)	Scallop landings as % of the Base Total	IFQ Allocation Index (Base 2010-2015=1.0)
2010	2,334,720	2,145,686	91.9%	Base=1.00
2011	2,918,800	2,753,974	94.4%	
2012	3,103,900	2,839,193	91.5%	
2013	2,233,630	2,269,159	101.6%	
2014	2,209,080	2,096,962	94.9%	
2015	2,708,050	2,386,824	88.1%	
2016	4,077,850	3,496,599	85.7%	1.58
2017	2,268,150	2,580,512	113.8%	0.88
2018	2,813,790	2,803,845	99.6%	1.09
2019	3,006,090	2,571,269	85.5%	1.16
2020	2,473,470	2,464,945	99.7%	0.96
2021	1,908,820	2,026,435	106.2%	0.74
2022	1,575,390	1,544,146	98.0%	0.61
2023	1,146,220	1,164,730	101.6%	0.44

*Annual LAGC IFQ landings in exceedance of the IFQ allocation reflect carryover quota

Figure 2 - IFQ Only (TAC =5%) Base Allocations (FY2010-2023)



5.2.2 IFQ fishing effort

Table 7 – IFQ allocation, landings, revenue, and fishing effort (Source: CAMS)

Year	Quota Allocation (lb)	Aggregate Landings (lb)	Aggregate scallop revenue (nominal $)	Aggregate non-scallop revenue (nominal $)	Affiliations	Active vessels	Trips	Days at sea
2007-2009	4,471,262	4,027,993	26,273,892	628,891	700	271	10,218	8,367
2010	2,559,370	2,269,580	19,988,731	1,351,367	321	157	6,261	4,466
2011	3,201,880	2,912,063	30,420,965	1,564,814	283	152	6,666	4,693
2012	3,405,000	3,044,251	31,251,682	1,313,952	263	143	5,942	4,467
2013	2,454,856	2,390,846	28,727,309	518,510	262	139	4,938	4,107
2014	2,423,145	2,194,218	28,706,022	667,390	254	145	4,687	4,428
2015	2,971,831	2,548,837	32,482,515	571,288	255	149	5,284	5,184
2016	4,473,179	3,764,230	45,797,546	607,133	264	161	7,239	7,519
2017	2,489,019	2,675,922	30,299,982	189,587	258	146	5,026	4,820
2018	5,445,418	2,926,586	28,731,563	151,816	258	134	5,343	4,773
2019	6,770,396	2,736,962	27,963,319	155,883	249	120	5,095	4,445
2020	5,138,975	2,537,579	31,845,960	97,689	245	122	4,878	4,775
2021	3,591,773	2,122,983	38,081,902	168,595	225	126	4,092	4,471
2022	3,015,924	1,547,889	25,624,415	65,553	221	110	2,854	3,120
2023	2,286,194	1,183,129	16,930,428	59,171	224	102	2,349	2,981

Figure 3 – Total number of trips taken by permit type.

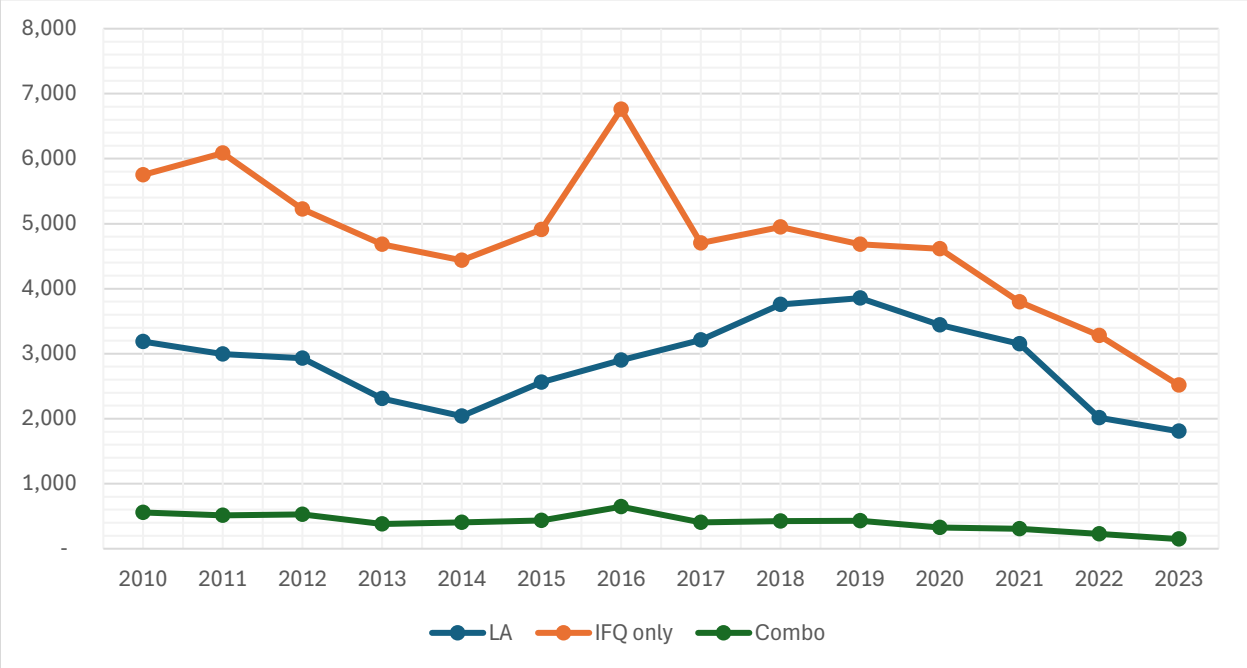


Figure 4 - Total Days at Sea by permit type.

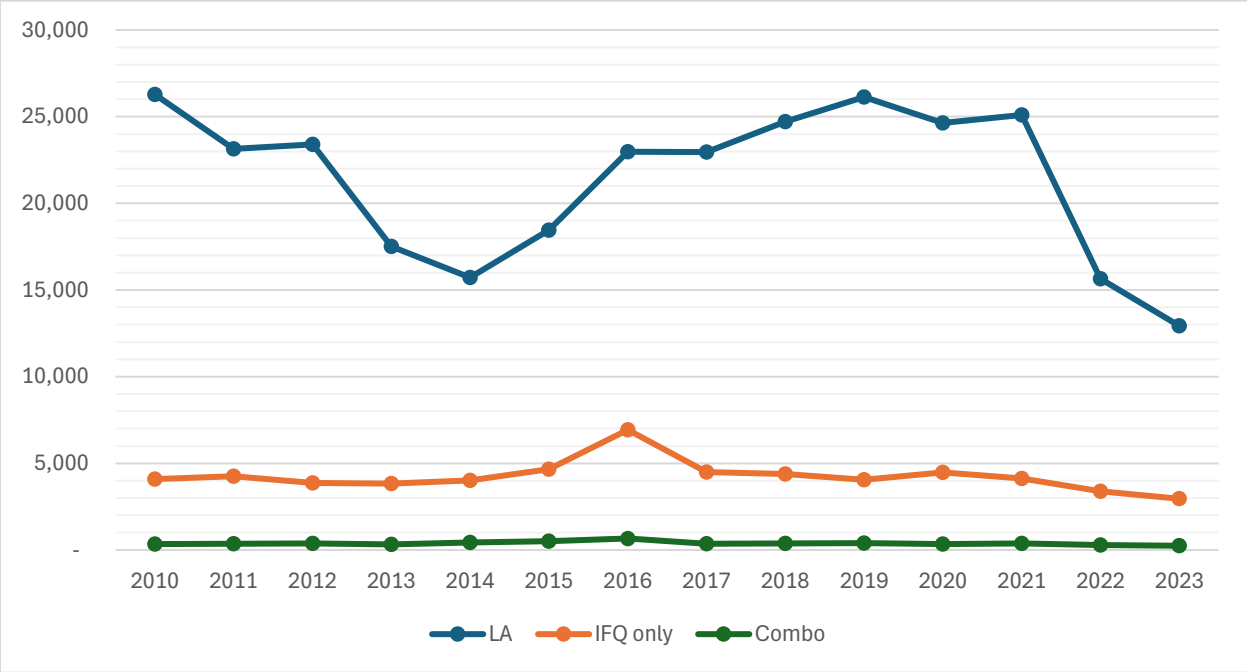
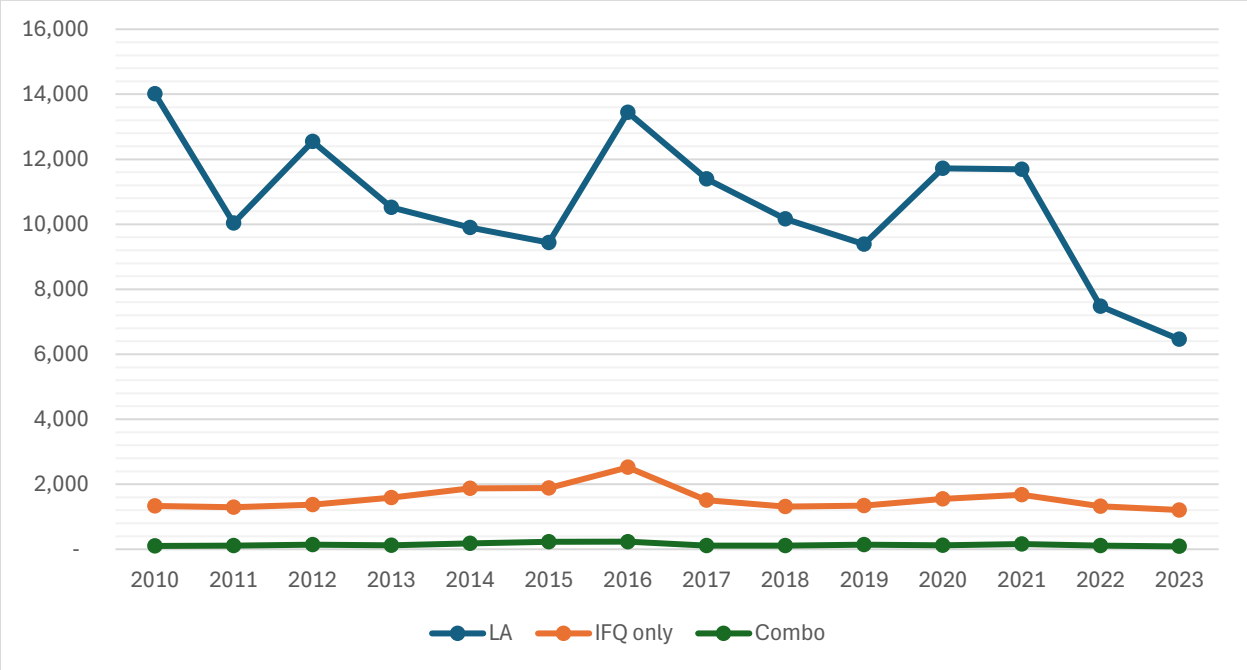


Figure 5 – Total Days Fished by permit type.



5.2.3 Comparative trends in scallop revenue for IFQ and LA fisheries (2016-2023)

Since the last review period, IFQ landings peaked at 3.44 million pounds (
Table 8) in 2016 but declined by about 66% to 1.23 million pounds in 2023. IFQ revenue followed a similar trend, peaking at approximately $54 million in 2016 and falling to about $18 million in 2023, a decline of 66%. However, average IFQ revenue during 2016–2023 declined by only about 2% relative to the 2010–2015 base period. The IFQ Revenue Index remained within 15% of the base for most years between 2016 and 2023, although it varied significantly in some years. For example, IFQ revenue was 54% higher in 2016 and 47% lower in 2023 compared to the base period. The average annual revenue for the IFQ fleet was $34.08 million during 2016–2023, slightly below the $34.74 million average during 2010–2015.

Figure 6 - Total scallop fleet revenue by permit type (mil. 2023 dollars).

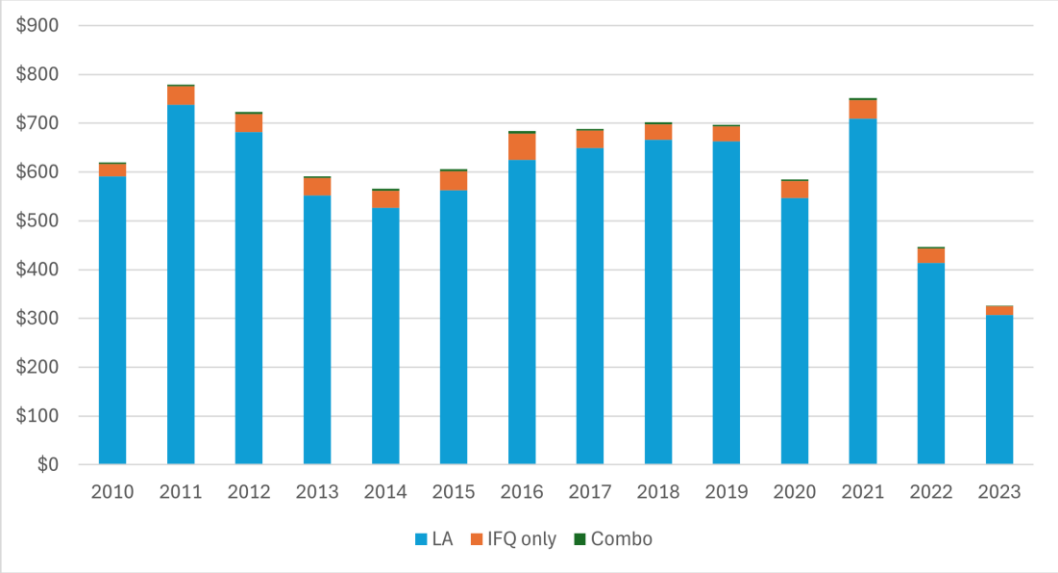


Figure 7 - Scallop prices for the LA and LAGC IFQ fisheries (2023 $/lb). IFQ price weighted by volume share of landings between IFQ-only and LA with IFQ combo vessels.

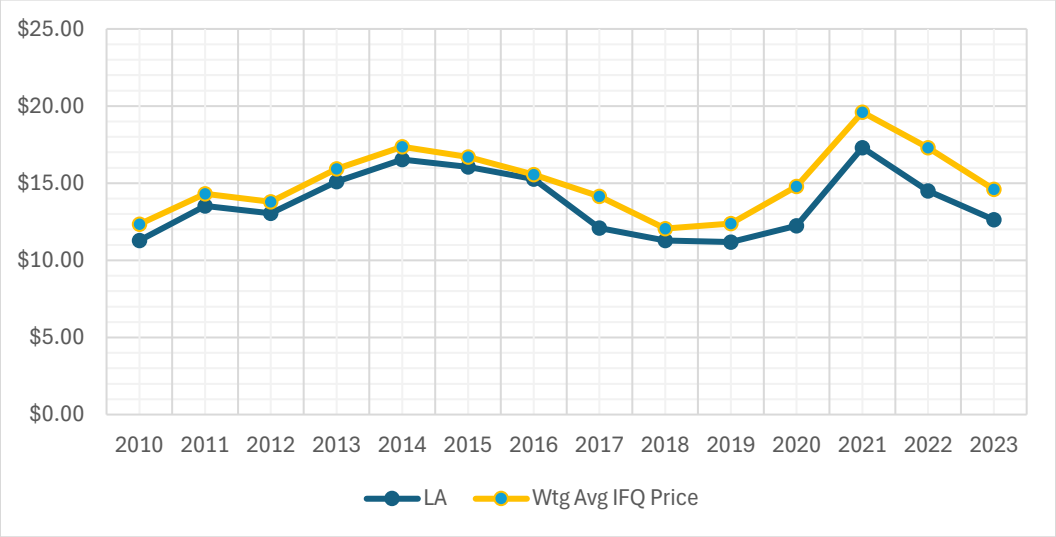


Table 8 - Landings and Revenues for the LA and IFQ Fleets; and the Revenue Indices

FY	Landings (mil. Lb)			Revenue (mil 2023$)			IFQ Revenue Index (Base 2010-2015=1.0)	LA Revenue Index (Base 2010-2015=1.0)
	LA	IFQ only	Combo	LA	IFQ only	Combo		
2010	52.363	2.078	0.219	$591.374	$25.544	$2.826	Base=1.00	Base = 1.00
2011	54.581	2.635	0.275	$737.863	$37.591	$4.035		
2012	52.248	2.693	0.286	$681.536	$37.015	$4.072		
2013	36.613	2.222	0.207	$552.548	$35.246	$3.434		
2014	31.906	2.008	0.242	$527.178	$34.755	$4.319		
2015	35.052	2.289	0.250	$563.079	$38.269	$4.144		
2016	40.906	3.440	0.404	$624.674	$53.637	$6.147	1.54	1.026
2017	53.685	2.466	0.266	$649.517	$35.179	$3.483	1.01	1.067
2018	58.978	2.680	0.273	$666.062	$31.918	$3.696	0.92	1.094
2019	59.273	2.461	0.276	$663.044	$30.569	$3.323	0.88	1.089
2020	44.674	2.364	0.209	$546.583	$35.016	$3.053	1.01	0.898
2021	40.990	1.949	0.221	$709.390	$37.979	$4.545	1.09	1.165
2022	28.558	1.731	0.170	$413.832	$29.942	$2.968	0.86	0.680
2023	24.326	1.228	0.103	$307.075	$18.381	$1.056	0.53	0.504
Avg 2010-15	**43.794**	**2.321**	**0.247**	**608.930**	**$34.737**	**$3.805**		
Avg 2016-23	**43.924**	**2.290**	**0.240**	**572.522**	**$34.078**	**$3.534**		
% Change from Base	**0.30%**	**-1.33%**	**-2.54%**	**-5.98%**	**-1.90%**	**-7.13%**		

5.2.4 Vessel Characteristics and Trends in Comparison to the Limited Access Fleet

The number of active vessels in the IFQ fleet has slowly declined by about 29% during 2016-2023. However, the number of active vessels within the LA and combination permit holder fleets have remained about the same (Table 9).

Along with the number of active vessels in the fleet, the average vessel horsepower (VHP), gross tonnage (GRT), and vessel length of active LAGC IFQ vessels fluctuated annually from 2016 to 2023. Overall, active LAGC IFQ vessels were smaller compared to limited access vessels with lower horsepower and gross tonnage. The average vessel length, horsepower, and crew size in a trip for the IFQ fleet in the previous review period (2010-2015) and current review period (2016-2023) are about similar, but gross tonnage is slightly lower by 6% during 2016-2023. During 2016-2023, the average size of vessels in the IFQ fleet was about 54 feet with a GRT of 51 tons in capacity and 429 horsepower. IFQ vessels had an average crew size of 2.6. The average vessel size, GRT, and VHP slightly declined during 2016-23 relative to the period 2010-15 (Table 11).

Because fishing power (i.e. VHP, GRT, and vessel length) varied annually at the individual vessel level, an index was used to describe trends in the capacity across the entire fleet. This fleet capacity index was created by multiplying the number of vessels by mean length, gross tonnage, and horsepower for active vessels. The fleet capacity is then indexed by referencing to the average of base years (2010-2015). IFQ fleet capacity has overall declined between 2010-15 and 2016-23 by 15.4% primarily as a result of the IFQ quotas and fleet consolidation. Fleet capacity increased during 2016 primarily due to an increase in scallop resources and allocation in that

year, but it has declined for most of the years since then. While the fleet capacity is reduced noticeably during 2016-23, average revenue declined only slightly by about 2% (Table 10).

Table 9 - Number of active vessels in the scallop fleets (2010-2023).

Fishing Year	LA	IFQ only	Combo
2010	350	140	41
2011	348	135	40
2012	348	115	40
2013	346	117	40
2014	347	126	40
2015	346	121	40
2016	345	137	40
2017	346	133	40
2018	344	127	40
2019	346	105	40
2020	346	111	40
2021	347	113	40
2022	341	100	39
2023	344	91	39

Table 10 - Fleet Capacity and Scallop Revenue Indices for the IFQ Fleet (2010-2023)

FY	Composite Fleet Capacity = (No. of Boats * AvgGRT * AvgLen * AvgHP)	Fleet Capacity Index (Base = Avg Capacity in 2010-15=1.0)	IFQ Revenues from scallop and their Indices		
			Revenue (in mil 2023$)	Revenue Index (Base=2010)	Revenue Index (Base= Avg 2010-15)
2010	193,252,028	**1.00**	25.544	**1.00**	1.00
2011	176,545,728		37.591	1.47	
2012	124,740,638		37.015	1.45	
2013	147,714,764		35.246	1.38	
2014	155,249,815		34.755	1.36	
2015	157,827,106		38.269	1.50	
2016	178,690,563	1.12	53.637	2.10	1.54
2017	174,391,244	1.10	35.179	1.38	1.01
2018	143,313,546	0.90	31.918	1.25	0.92
2019	114,528,717	0.72	30.569	1.20	0.88
2020	129,993,434	0.82	35.016	1.37	1.01
2021	127,321,678	0.80	37.979	1.49	1.09
2022	103,843,909	0.65	29.942	1.17	0.86
2023	105,588,154	0.66	18.381	0.72	0.53
Avg 2010-15	**159,221,680**		**37.736**		
Avg 2016-23	**134,708,906**		**37.078**		
% Change in 2016-23	**-15.54%**		**-1.90%**		

Table 11 - Average GRT, HP, and length for active LAGC IFQ vessels.

FY	Length			GRT			VHP			VTR-reported Crew		
	LA	IFQ only	Combo	LA	IFQ only	Combo	LA	IFQ only	Combo	LA	IFQ only	Combo
2010	79.8	56.0	73.3	141.1	58.6	112.7	754.7	420.8	588.1	6.5	2.4	3.4
2011	79.8	55.1	73.2	141.2	55.4	110.8	756.7	428.4	568.1	6.6	2.6	4.2
2012	79.6	52.8	73.4	141.3	48.8	113.0	757.1	420.8	578.7	6.6	2.7	4.2
2013	79.3	54.5	72.8	142.5	53.9	114.9	763.3	429.6	586.1	6.4	2.7	4.0
2014	79.2	54.1	73.9	142.1	53.2	118.0	755.9	428.7	598.0	6.4	2.5	4.4
2015	79.2	54.1	73.1	142.2	54.3	115.1	755.0	444.4	581.0	6.5	2.7	4.3
2016	79.2	54.7	74.3	142.2	54.2	120.7	755.5	440.4	599.0	6.5	2.9	4.4
2017	79.4	54.5	74.7	142.8	54.2	120.5	755.5	444.1	601.8	6.6	2.7	4.4
2018	79.4	52.8	72.8	142.8	49.6	118.0	761.0	430.5	601.2	6.7	2.5	4.5
2019	79.5	52.8	73.2	143.2	47.9	114.3	759.5	431.5	592.2	6.8	2.6	4.1
2020	79.8	53.5	73.8	144.0	50.2	118.4	765.5	436.1	587.1	6.7	2.7	4.3
2021	79.7	53.3	73.1	144.1	50.2	117.4	763.6	421.6	605.9	6.7	2.7	3.9
2022	80.0	52.8	73.8	145.2	47.6	118.7	773.6	413.4	589.5	6.6	2.5	3.9
2023	79.9	53.9	73.9	144.9	52.4	122.2	766.6	410.6	596.1	6.4	2.5	3.9
Avg 2010-15	**79.5**	**54.4**	**73.3**	**141.7**	**54.0**	**114.1**	**757.1**	**428.8**	**583.3**	**6.5**	**2.6**	**4.1**
Avg 2016-23	**79.6**	**53.5**	**73.7**	**143.7**	**50.8**	**118.8**	**762.6**	**428.5**	**596.6**	**6.6**	**2.6**	**4.2**
% Change in 2016-23	0.19%	-1.67%	0.56%	1.35%	-6.00%	4.08%	0.72%	-0.06%	2.27%	1.84%	1.93%	2.71%

5.3 Economic Performance and Net Benefits

5.3.1 Introduction

This section provides an assessment of the program's effect on net benefits to the nation mainly from an economic perspective consistent with NMFS' Economic Guidelines for conducting cost-benefit analyses[7]. The objective of the cost-benefit analysis is to evaluate the net economic benefits arising from changes in consumer and producer benefits that are expected to occur with implementation of a regulatory action. As the NMFS Guidelines for the Economic Analysis of the Fishery Management Action (NMFS, 2007) state "the proper comparison is '*with the action' to 'without the action'* rather than to *'before and after the action,*' since certain changes may occur even without action and should not be attributed to the regulation." However, Guidelines for Conducting Review of Catch Share Programs suggests that the baseline considered for analyses of CSPs should be an appropriate number of years prior to the implementation of the CSP, and not what would have been likely to occur in the absence of the CSP. In this regard, the guidance indicates that "A baseline period of at least 3 years is preferable, but this may be modified depending on circumstances surrounding the creation and implementation of each program." [8]

However, the complexity of the measures included in Amendment 11 as well as changes in scallop prices, fuel costs, scallop stock biomass, and other factors external to this fishery make the comparison to previous years challenging. A straightforward evaluation of the costs and benefits relative to the pre-program period would not only reflect the impacts of the IFQ program, but it would also capture the effects of the reduction in overall TAC to 5% of the increase in scallop prices in general and fluctuations in annual IFQ allocations in response to changes in scallop stock biomass. Gradual implementation of some aspects of the IFQ program during the two years prior to full implementation in 2010 further compounds this issue. For these reasons, a semi-quantitative analysis was executed on of the likely impacts of the IFQ program on economic benefits based on some scenario analyses holding prices, landings and costs constant to identify the economic impacts attributable to the IFQ program alone. Section 5.3.2.5 provides a multi-factor productivity analysis of the fishery, holding prices and input costs constant at the pre-Amendment levels. Section 5.3.7 summarizes the results of the analyses in terms of the impacts of the program on net economic benefits and profits and evaluates these changes in terms of the goals and objectives of the Amendment and FMP.

However, as indicated in the NOAA Fisheries' Guidelines for Conducting Review of Catch Share Programs[9], net benefits are not exclusively economic in nature, but also include potential economic, environmental, public health and safety, and other advantages, distributive impacts,

[7] http://www.nmfs.noaa.gov/op/pds/documents/01/111/01-111-05.pdf, p.7
[8] http://www.nmfs.noaa.gov/op/pds/documents/01/121/01-121-01.pdf

[9] http://www.nmfs.noaa.gov/op/pds/documents/01/121/01-121-01.pdf

and equity (NMFS guidelines[10]). Although some of the distributional impacts of the LAGC IFQ program is evaluated in terms of changes in net revenue per active vessel and affiliation in Section 5.3.3.1 and Section 5.3.3.2, extensive analyses of distributive impacts are provided in Section 5.3.2.40.

5.3.2 Comparison of economic benefits to the previous IFQ review period

After the full implementation of the IFQ program, notable changes have occurred in the active IFQ fleet, scallop landings relative to quota allocations, and per-vessel revenue and landings. While the average fleet size declined by approximately 9% between the 2010–2015 and 2016–2023 periods, IFQ landings and revenue decreased only slightly: about 1.3% and 1.9%, respectively. However, landings and revenue per vessel increased by more than 5% over the same period. Compared to the base period (2010–2015), average revenue during 2016–2023 declined only marginally: about 2% (
Table 8) The active fleet size for general category scallop permit holders was larger during the pre-IFQ period, when vessels operated under a 400-pound trip limit with no seasonal restrictions. Landings and revenues were also higher during that time. Many vessels that operated prior to 2010 exited the fishery after failing to qualify under the IFQ program. As a result, the active IFQ fleet during 2016–2023 was 78% smaller than during 2004–2006, and 64% smaller than during 2007–2009 (Table 10).

Despite the smaller fleet, landings and revenue per active vessel have increased since the implementation of the IFQ program. Average annual landings per vessel during 2016–2023 were approximately 65% higher than the 2004–2006 average and 34% higher than the 2007–2009 average. Similarly, average annual revenue per vessel during 2016–2023 was 144% higher than the 2004–2006 average and 107% higher than the 2007–2009 average. Compared to the 2010–2015 average, per-vessel revenue during 2016–2023 was also 5.2% higher. These trends suggest continued efficiency gains in landings and revenue per vessel following the implementation of the IFQ program and across IFQ review periods (Table 12).

[10] http://www.nmfs.noaa.gov/op/pds/documents/01/121/01-121-01.pdf, p.17

Figure 8 – Total scallop landings (mil. lb.).

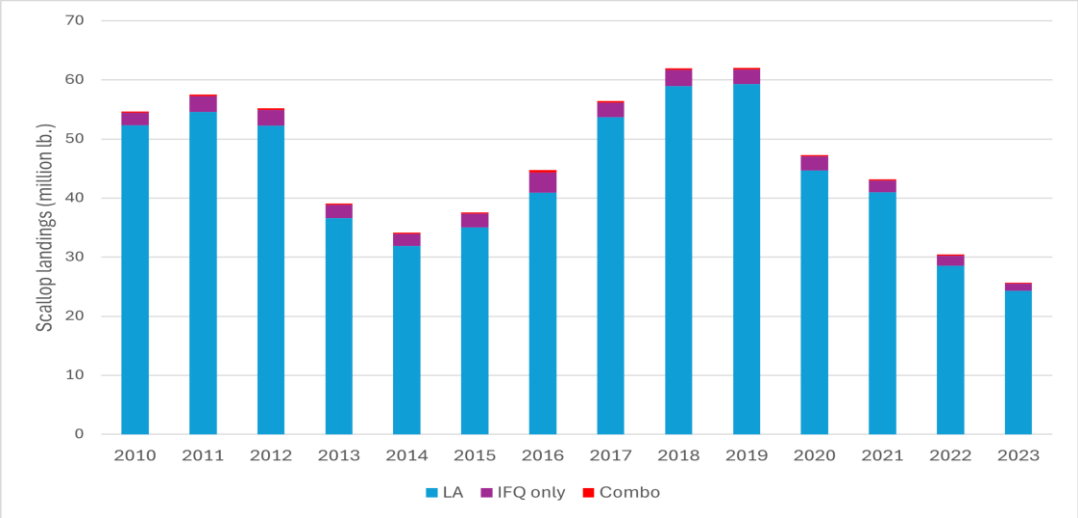


Table 12 - Per Boat Landings and Revenue (w/ Revenue Indices) for the IFQ only Fleet during FY2010-2023.

Fishing Year	No. of Active Vessels	Landings (mil lb)	Revenue (mil. 2023$)	Landings per vessel (lb)	Revenue per vessel (2023$)	IFQ Revenue Index (Base=2010)	IFQ Revenue Index (Base=Avg 2010-15)
2010	140	2.078	$25.544	14,844	$182,458	1.00	1.00
2011	135	2.635	$37.591	19,520	$278,449	1.47	
2012	115	2.693	$37.015	23,420	$321,866	1.45	
2013	117	2.222	$35.246	18,989	$301,244	1.38	
2014	126	2.008	$34.755	15,933	$275,830	1.36	
2015	121	2.289	$38.269	18,919	$316,270	1.50	
2016	137	3.440	$53.637	25,106	$391,513	2.10	1.54
2017	133	2.466	$35.179	18,539	$264,504	1.38	1.01
2018	127	2.680	$31.918	21,103	$251,320	1.25	0.92
2019	105	2.461	$30.569	23,434	$291,137	1.20	0.88
2020	111	2.364	$35.016	21,298	$315,457	1.37	1.01
2021	113	1.949	$37.979	17,245	$336,098	1.49	1.09
2022	100	1.731	$29.942	17,313	$299,417	1.17	0.86
2023	91	1.228	$18.381	13,498	$201,985	0.72	0.53
Avg 2010-15	**126**	**2.321**	**$34.737**	**18,604**	**$279,353**		**1.00**
Avg 2016-23	**115**	**2.290**	**$34.078**	**19,692**	**$293,929**		**0.98**
% Change between 2010-15 and 2016-23	**-8.8%**	**-1.3%**	**-1.9%**	**5.8%**	**5.2%**		**-2.0%**
***Comparison with the Pre-IFQ Period Avg:**							
Avg 2004-2006	**521**	**6.2**	**$62.75**	**11,900**	**$120,448**		
Avg 2007-2009	**320**	**4.7**	**$45.51**	**14,688**	**$142,207**		
% Change between 2004-06 and 2016-23	**-78%**	**-63%**	**-46%**	**65%**	**144%**		
% Change between 2007-09 and 2016-23	**-64%**	**-51%**	**-25%**	**34%**	**107%**		

*Pre-IFQ periods revenues or per boat revenues in 2015 dollars were inflation adjusted to 2023 dollars using CPI factor of 0.754. (Source: IFQ Report 2010-2015)

5.3.2.1 Impacts of the IFQ program on ex-vessel prices

The IFQ fleet has consistently received higher prices compared to the LA fleet. This is likely driven by differences in the market grades of scallop landings between the IFQ and LA fleets, with the IFQ fleet selecting larger market grades and discarding smaller sizes. Their may also be a price premium due to the product freshness, which results from shorter trip durations and direct sales to consumers, restaurants, or niche-market processors, although Ardini and Lee (2018) found this price premium to be minor. Following the implementation of the IFQ program, the average price of scallops increased by approximately $6 per pound. The average price per pound of IFQ scallop landings has remained marginally higher during the 2016–2023 period compared to the base review period (2010–2015), with the average price holding steady around $15 per pound in both periods. The average price per pound of IFQ-caught scallops was about 6% higher than LA-caught scallops during 2010–2015, but this difference has since doubled to just over 12% during 2016–2023 (Table 13).

Table 13 - Scallop Prices (dollars per pound) by Scallop Fleets (2010-2023).

Fishing Year	Scallop Prices (in 2023$)				IFQ Price Premium over LA Price	
	LA	IFQ only	Combo	Weighted Avg IFQ Price	IFQ Price Premium (in 2023$)	% Premium on IFQ Price
2010	$11.29	$12.29	$12.88	12.35	$1.06	9.33%
2011	$13.52	$14.26	$14.70	14.31	$0.79	5.82%
2012	$13.04	$13.74	$14.22	13.79	$0.75	5.71%
2013	$15.09	$15.86	$16.56	15.92	$0.83	5.51%
2014	$16.52	$17.31	$17.83	17.37	$0.85	5.11%
2015	$16.06	$16.72	$16.60	16.71	$0.65	3.99%
2016	$15.27	$15.59	$15.21	15.55	$0.28	1.85%
2017	$12.10	$14.27	$13.08	14.15	$2.05	16.97%
2018	$11.29	$11.91	$13.54	12.06	$0.77	6.79%
2019	$11.19	$12.42	$12.05	12.39	$1.20	10.72%
2020	$12.23	$14.81	$14.60	14.79	$2.56	20.92%
2021	$17.31	$19.49	$20.60	19.60	$2.29	13.27%
2022	$14.49	$17.29	$17.42	17.31	$2.82	19.42%
2023	$12.62	$14.96	$10.30	14.61	$1.99	15.70%
Avg 2010-15	**$14.25**	**$15.03**	**$15.47**	**$15.08**	**$0.82**	**5.91%**
Avg 2016-23	**$13.42**	**$15.09**	**$14.70**	**$15.06**	**$1.64**	**12.39%**
% Change from base 2010-15	**-5.87%**	**0.37%**	**-4.97%**	**-0.10%**		

5.3.2.2 Impacts of the IFQ program on producer surplus (benefit) and profits compared to the pre-amendment period – A scenario analysis

Catch share review guidance requires an assessment of the program's effects on net benefits to the Nation consistent with the NMFS Guidelines for Economic Analyses (NMFS 2007)[11]. This section evaluates economic costs and benefits using scenario analyses to identify to the extent

[11] http://www.nmfs.noaa.gov/op/pds/documents/01/111/01-111-05.pdf

possible the impacts of the IFQ program as distinct from the effects of factors external to the fishery.

Total costs and benefits of the fishery actions are estimated as a sum of producer and consumer surpluses (benefits) taking into account the changes in fishing revenues and costs as a result of the specific management measures. Producer surplus is the difference between the actual price producers receive for a good or service and minimum price they would be willing to accept to produce it, reflecting the benefit to producer from selling a market price higher than what they were willing to sell it at. Consumer surplus is defined as the difference between what consumers are willing to pay for a good or service and what they actually pay, representing the benefit to consumers from purchasing a product at a lower price than they were prepared to pay.

Because the LAGC IFQ fishery landings constitute a small part of the Atlantic sea scallop fishery, price changes are usually external to the LAGC IFQ component although there is some evidence that the LAGC IFQ program might have helped to increase scallop prices received by the LAGC IFQ vessels after 2010 by preventing a derby-style fishery. Since consumer surplus declines as prices increase and landings decline, consumer benefits, in the short-term, could be slightly negative if there were no improvements on the quality of the product due to the LAGC IFQ program. However, it is reasonable to assume that the impacts of the LAGC IFQ program on the consumer surplus were probably marginal, and economic impacts were mostly on the producer surplus from this fishery.

Producer surplus is estimated as the excess of total revenue over the total variable costs minus the opportunity costs of labor and of capital. Because crew members share part of the gross revenue and they pay the trip expenses according to the lay system common in the scallop fishery, producer surplus is equal to sum of rent to vessels and rent to labor. In estimating economic profits, fixed costs of production and opportunity costs of capital are taken out of the boat share of revenues. Fixed costs for scallop fishing include repairs and maintenance, hauling costs, insurance, office expenses and professional fees, interest payments on mortgages and loans, association fees, travel, and vehicle expenses. See Section 5.3.2.5 for a detailed description of the methods used in estimating fixed costs and profits.

In order to have meaningful estimates of benefits, the impact of changes in scallop ex-vessel prices and landings should be treated separately from the impacts of the LAGC IFQ program. Core aspects of the LAGC IFQ program include limited access and individual allocations per vessel combined with transferability. With the implementation of the LAGC IFQ program, the number of active vessels in the fishery declined due to both limited access and transferability measures. Therefore, one way to evaluate economic costs and benefits is to analyze how producer surplus would have changed if the same number vessels that were active during 2007-2009 continued to be active each year during 2010-2015 and during 2016-2023.[12] The period

[12] It would be quite time consuming to estimate this scenario using the individual data by permit prior to and after 2010. Several data issues including changes in permit numbers as vessels are upgraded or transferred to new owners, inaccuracies in the dealer and permit databases and availability of data in terms of MRI for 2010-2015 and 2016-

2007-2009 was chosen as a baseline following the suggestion in the Catch Share Review Guidance, which indicates that "A baseline period of at least 3 years is preferable", as well as to be consistent with the baseline selected for the productivity analyses presented in Section 5.3.2.5 below. [13] However, the implication of this baseline compared to some other period on the results are discussed below.

A simple scenario analysis provided in Table 14 and Table 15 assumes that an average of 320 vessels (equivalent to 2007-2009 average) participated in the LAGC IFQ fishery during 2010-2015, while revenues fluctuated from year to year with the actual change in allocations and prices (Scenario B). It is assumed that total LAGC IFQ allocations were divided among 320 active vessels in proportions resembling actual percentile distribution of quota in each year among qualifiers. In this scenario, each vessel had to take fewer trips due to smaller allocations per vessel, but the total number of scallop trips would stay constant. Furthermore, total trip costs and opportunity costs of labor would not necessarily increase if those 320 vessels have the average vessel characteristics and crew skills equivalent to those vessels that were active in 2010-2015 and 2016-2023 after the implementation of the LAGC IFQ program.

Table 14 presents this simple scenario for the producer surplus and Table 15 for economic profits. Under this scenario, there would be no change in the total fleet costs and opportunity costs of labor, but both fixed costs and opportunity costs of capital would go up due to more capital being tied up in a larger number of vessels. Fixed costs and opportunity costs of capital were estimated for Scenario B with the ratio of 320 to the actual number of vessels that were active in each year during 2010-2015 and 2016-2023. The results show that the estimated producer surplus under the LAGC IFQ program would be 14% to 80% higher compared to scenario B if the reduced TAC were shared among a larger number of participants with no flexibility for leasing or transferring quota except in the fishing year 2010 where the producer surplus is 465% higher relative to 2007-2009. The transferability of quota probably allowed more efficient vessels, and in closer proximity to the fishing grounds, to lease or buy quota from others. If this were the case, the trips would be shorter, and trip and opportunity costs of labor would be lower.

Under Scenario B, fleet profits would probably be negative in the absence of an IFQ program that allowed leasing and transferability of the quota. Fleet profit would be positive only in three years out of 13 years during 2010-2023 with the fleet size (N=320) as in 2007-2009. Even if the TAC was set to a higher value, such as 10% of overall ACL), the profits for the fishery as a whole would be higher under the LAGC IFQ program due to a reduction in the excess capital and lower the fixed costs and opportunity cost of capital in addition to potentially higher price premium for the LAGC IFQ fishery.

2023 but not for before 2010 would complicate estimation and reduce accuracy. It's also not necessary to conduct such as disaggregated analysis by permit to assess if the IFQ program had a positive impact on producer surplus.

[13] http://www.nmfs.noaa.gov/op/pds/documents/01/121/01-121-01.pdf

It must be noted that analyses in Table 14 and Table 15 include just one scenario (Scenario B) out of many. Another scenario would have been fewer vessels participating in the fishery even without the implementation of the LAGC IFQ program due to the 5% limit on total catch. However, a derby fishery may have resulted under that scenario as vessels rush to catch as much as they can before the fishery is closed due to the TAC limits. This would have possibly reduced the prices received by those vessels as the market flooded with catch within a short period of time. Derby fishing could also lead to higher costs compared to a more optimal distribution of effort throughout the year. In fact, the price model results presented in Section 5.3.2.5 showed that the price premium received by the LAGC IFQ fishery increased after 2010 compared to the transition period when fishery was managed by quarterly quotas. Therefore, producer surplus from the LAGC part of the fishery would have been lower for this scenario as well, compared to the levels that were achieved with the implementation of the LAGC IFQ program.

It must also be cautioned that the numerical results of this analysis would change if a different baseline were selected to evaluate the impacts of the LAGC IFQ program on the producer surplus. For example, if the baseline was 2004-2006 when a larger number of vessels (591 vessels equivalent to 2004-2006 average) participated in the LAGC scallop fishery compared to 2007-2009 (an average of 320 vessels) then the LAGC IFQ program would have a larger positive impact on the producer surplus than estimated under the 2007-2009 baseline. This is because when a larger number of vessels participate in the fishery, the capital invested in the vessels and opportunity costs of capital would be higher. The change in profits would be lower as well due to higher fixed costs including insurance, maintenance and other fixed expenses. On the other hand, if the change in the producer surplus was compared to the period 2001-2003 when, on average, about 240 vessels were active in the LAGC fishery, the benefits would be lower compared to the period from 2007 to 2009 during which 320 were active. However, in both cases, producer surplus and net economic benefits under the LAGC IFQ program would be higher compared to the previous years although the increase in benefits would not have been distributed equally.

In summary, analyses provided in this section focused on the economic impacts of the LAGC IFQ program separately from the impacts of a reduction in TAC to 5% and examined how producer surplus and profits would be different if the TAC was shared among a larger number of vessels with no individual allocation and transferability. These analyses indicate that under the LAGC IFQ program, economic benefits (producer surplus) and profits for the LAGC fishery increase compared to the pre-implementation years.

Table 14 - Scenario analyses with the estimated producer surplus (5% TAC, Revenues and costs million dollars and in 2023 dollars).

Fishing year	Number of active vessels	Scallop Revenue (actual values)	Total trip costs	Total Opportunity costs of crew	Total Opportunity costs of capital	Producer surplus	% Change in producer surplus compared to Scenario B
Scenario A: Number of active vessels = Actual numbers							
2010	140	25.544	4.444	2.177	7.385	11.538	465%
2011	135	37.591	5.649	2.329	5.167	24.447	41%
2012	115	37.015	5.168	2.205	3.404	26.238	30%

2013	117	35.246	4.816	2.277	3.852	24.300	38%
2014	126	34.755	4.634	2.196	3.499	24.426	28%
2015	121	38.269	4.173	2.807	3.515	27.774	26%
2016	137	53.637	5.927	4.544	3.871	39.295	15%
2017	133	35.179	4.097	2.702	3.607	24.774	26%
2018	127	31.918	4.070	2.513	3.246	22.088	29%
2019	105	30.569	3.833	2.478	1.994	22.265	22%
2020	111	35.016	3.678	2.890	1.790	26.657	14%
2021	113	37.979	4.397	2.646	2.214	28.722	16%
2022	100	29.942	4.420	2.018	2.039	21.464	26%
2023	91	18.381	3.094	1.723	2.035	11.528	80%
Scenario B: Assumes the number of active vessels equaled average for 2007-2009							
2010	320	25.544	4.444	2.177	16.880	2.04	
2011	320	37.591	5.649	2.329	12.247	17.37	
2012	320	37.015	5.168	2.205	9.471	20.17	
2013	320	35.246	4.816	2.277	10.537	17.62	
2014	320	34.755	4.634	2.196	8.886	19.04	
2015	320	38.269	4.173	2.807	9.295	21.99	
2016	320	53.637	5.927	4.544	9.041	34.13	
2017	320	35.179	4.097	2.702	8.678	19.70	
2018	320	31.918	4.070	2.513	8.179	17.16	
2019	320	30.569	3.833	2.478	6.076	18.18	
2020	320	35.016	3.678	2.890	5.160	23.29	
2021	320	37.979	4.397	2.646	6.270	24.67	
2022	320	29.942	4.420	2.018	6.526	16.98	
2023	320	18.381	3.094	1.723	7.157	6.41	

Table 15 - Scenario analyses with estimated profits (5% TAC, Revenues and costs in mill. $, and in 2023 dollars)

Fishing year	Number of active vessels	Scallop Revenue (actual values)	Total Opportunity costs of capital	Total Fixed Costs	Producer Surplus	Total Profits
Scenario A: Number of active vessels = Actual numbers						
2010	140	25.544	7.385	10.693	11.538	0.845
2011	135	37.591	5.167	10.021	24.447	14.426
2012	115	37.015	3.404	8.368	26.238	17.871
2013	117	35.246	3.852	8.419	24.300	15.881
2014	126	34.755	3.499	9.074	24.426	15.351
2015	121	38.269	3.515	8.641	27.774	19.133
2016	137	53.637	3.871	9.516	39.295	29.779
2017	133	35.179	3.607	9.032	24.774	15.741
2018	127	31.918	3.246	8.465	22.088	13.623
2019	105	30.569	1.994	6.894	22.265	15.371
2020	111	35.016	1.790	7.102	26.657	19.556
2021	113	37.979	2.214	6.660	28.722	22.061
2022	100	29.942	2.039	5.617	21.464	15.847
2023	91	18.381	2.035	4.940	11.528	6.588
Scenario B: Assumes the number of active vessels equaled average for 2007-2009						

2010	320	25.544	16.880	24.442	2.043	(22.40)
2011	320	37.591	12.247	23.754	17.367	(6.39)
2012	320	37.015	9.471	23.284	20.171	(3.11)
2013	320	35.246	10.537	23.026	17.615	(5.41)
2014	320	34.755	8.886	23.046	19.039	(4.01)
2015	320	38.269	9.295	22.852	21.994	(0.86)
2016	320	53.637	9.041	22.228	34.125	11.90
2017	320	35.179	8.678	21.732	19.702	(2.03)
2018	320	31.918	8.179	21.330	17.155	(4.17)
2019	320	30.569	6.076	21.010	18.183	(2.83)
2020	320	35.016	5.160	20.474	23.288	2.81
2021	320	37.979	6.270	18.862	24.666	5.80
2022	320	29.942	6.526	17.974	16.977	(1.00)
2023	320	18.381	7.157	17.371	6.406	(10.96)

5.3.2.3 Economic impacts of overall TAC on the LAGC IFQ and limited access fisheries

The overall share of the LAGC IFQ fishery in total TAC had a large impact on the economic benefits for this fishery compared to pre-implementation levels of Amendment 11. The share of the LAGC IFQ fishery during 2007-2009 averaged about 8% and over 10% during 2005 and 2006 but fluctuated between 2% to 6% during 2001-2004). Setting the LAGC IFQ fishery share at 5% of the total TAC lowered the economic benefits compared to the previous three as well as relative to the prior 6 years but increased the benefits compared to the pre-moratorium levels. For example, if the LAGC TAC was set at 10% instead of 5% combined with an LAGC IFQ program, scallop revenues for this fishery could double. Even if a higher TAC provided incentive for more quota owners to participate in the fishery increasing trip costs, and opportunity costs of labor and capital, producer surplus would be higher relative to the levels under a 5% TAC. This is because costs comprise a relatively small proportion of total revenues in the scallop fishery. The reverse would have been true if the overall TAC was set at lower than 5%. However, a higher quota for the LAGC IFQ fishery would imply a lower share and reduced economic benefits for the limited access component of the scallop fishery. Therefore, impacts of TAC were allocative with probably marginal impacts on the total economic benefits from the Atlantic sea scallop fishery as a whole.

Without an overall TAC, the LAGC IFQ program would not likely have been successful in increasing economic benefits for this fishery. While the reduction in the overall scallop catch allocated to the LAGC fishery had negative impacts on the revenues compared to the levels in the previous three years, in the absence of measures that controlled overall scallop landings by general category vessels, the fishing mortality for the scallop fishery would have continued to increase beyond the target levels if the vessels that qualify for limited access increased the number of trips targeting scallops. This could have negative impacts on both the limited access and the general category vessels as scallop catch per day-at-sea declined and fishing costs per pound of scallops increased. The increase in costs and landings would have reduced producer surplus for the scallop fishery as a whole. Therefore, limiting access to a subset of historical

participants and allocating a separate TAC for the LAGC IFQ fishery probably had positive economic benefits to the scallop fishery and increased the net national benefits over the long-term.

5.3.2.4 Distributional impacts compared to pre-Amendment 11 period

The distributional economic impacts of the LAGC IFQ program were not uniform since some vessels were prevented from access to the general category fishery while those vessels that qualified for the permit benefited. The average number of active vessels in the LAGC fishery declined from 521 in 2004-2006 and 320 in 2007-2009 to about 133 in 2010-2015 while the landings per active vessel increased from 11,588 lb. in 2004-2006 and 15,676 lb. in 2007-2009 to 18,640 lb. in 2010-2015 and 19,692 in 2016-2023 (Table 16). Due to the increase in average landings per vessel combined with the increase in scallop prices by more than 50% after 2010, scallop revenue per active vessel more than doubled in 2010-2015 compared to 2004-2006 levels and increased by 79% compared to the 2007-2010 levels. Similarly, scallop revenue per active vessel nearly tripled in 2016-2023 compared to 2004-2006 levels; increased by 88% compared to the 2007-2010 levels; and increased marginally compared to 2010-2015 level.

Table 16 - Average scallop landings and revenues per vessel

Period	Average scallop revenue per active vessel (in 2023 $)	Average landings per active vessel (lb)	Number of vessels
2004-2006	120,384	11,588	521
2007-2009	156,176	15,676	320
2010-2015	279,353	18,604	126
2016-2023	293,929	19,692	115
Performance for 2010-2015:			
% change from 2004-2006	132%	61%	-76%
% change from 2007-2009	79%	19%	-61%
Performance for 2016-2023:			
% change from 2004-2006	144%	70%	-78%
% change from 2007-2009	88%	26%	-64%
% change from 2010-2015	5%	6%	-8%

5.3.2.5 Changes in the productivity of the LAGC IFQ fishery

Estimation method

This section updates previous productivity estimates found in the NMFS national report on productivity change in catch share fisheries.[14] Productivity here is measured by calculating the total factor productivity (TFP). TFP is defined as a ratio of aggregate outputs to aggregate inputs, and TFP change is the ratio of aggregate output change to aggregate input change during an appropriate time period, which for our purposes is a fishing year. Aggregate output and input changes can be measured through construction of output and input quantity indices, using prices as weights for the different outputs and inputs. Fixed prices for both outputs and inputs are used as weighting factors, and the subsequent TFP measure is called the Lowe index. The numerator in the Lowe index is the value of all landings on all trips in a fishery during a year using a fixed base price, while the denominator is the value of all inputs from all trips in a fishery during a year, using fixed prices on the same trips. In this manner, the construction of the index results in a measure of productivity change at the aggregate fishery level.

For this fishery, productivity estimates are for vessels which used scallop dredge gear to land scallops, held a LAGC A (IFQ) permit, and took an LAGC IFQ scallop trip between fishing years 2007 and 2023. The output quantities contained in the output index include scallops, and other species which were landed during a general category trip. Inputs included vessel capital, labor used (crew times days spent at sea), energy (fuel used on each trip), and materials (ice). Days spent fishing on each trip and crew size data were obtained from vessel logbook records. Vessel physical characteristics, such as length and horsepower, were taken from vessel permit files. Quantities of fuel and ice used on each trip were estimated using regression models.[15] Trip outputs and inputs from each vessel were then aggregated for each year and then summed across

[14] (Walden *et al.* 2014)

[15] Details on the regression models used are available upon request.

vessels in a year to arrive at total output produced from the fishery, and total inputs used producing the output.

Discussion

A five-year average of outputs and inputs from 2010-2015 were used as the baseline years to compare the factor productivity during the 2016-2023 performance evaluation. The TFP is higher during 2016-2023 compared to the base 2010-15. Overall TFP has increased by about 19% during 2016-23 relative to the base period. While output index fell only by 2%, input index fell by 18% during 2016-2023 relative to the base period. The falling input levels were likely caused by the exit of vessels from fishery or falling opportunity costs of capital. The decline in input index is due to exit of vessels through quota consolidation or permanent transfers, therefore, achieved overall gain in the TFP by 19%. One important factor in the increase in productivity in 2011 could be the increase in the possession limit by 50% from 400 lb. to 600 lb. per trip, which must have reduced the inputs per trip especially in terms of fuel and other materials as well the labor used in each trip. Table 17 and Table 18 provide the values of outputs and inputs during both pre-IFQ and IFQ implementation periods. Table 18 provides the TFP, output, and input indices in these periods.

Future productivity gains will depend on whether there is additional fleet consolidation, and how quotas for this fleet change. At some point, productivity gains will be limited as the fleet reaches a stable point in terms of vessel numbers and quotas. After that occurs, productivity gains might still occur if there is further technological innovation. For example, innovations in engine design leading to more fuel-efficient vessels would increase productivity as fuel consumption declines. Spatial shifts in the distribution of scallops could also lead to productivity gains if the resource moved further inshore. Again, vessels would not need to use as much fuel input to harvest the resource, resulting in a productivity gain. Finally, productivity needs to be recognized as just one component of profitability, which is ultimately the most important performance metric for active vessels in this fishery.

Table 17 - Outputs produced and inputs used (exclusive of fixed costs), northeast general category scallop LAGC IFQ program.

FY	Economic values in mil 2023 dollars					
	Output	Energy (Fuel)	Material (Supplies)*	Capital	Labor	Total Inputs (Variable)
2007	$42.04	$10.85	$0.28	$2.65	$6.24	$20.01
2008	$18.32	$3.00	$0.09	$0.94	$2.14	$6.17
2009	$24.04	$4.29	$0.10	$1.04	$2.65	$8.09
2010	$25.54	$2.98	$1.47	$7.38	$2.18	$14.01
2011	$37.59	$3.78	$1.86	$5.17	$2.33	$13.14
2012	$37.01	$3.46	$1.71	$3.40	$2.20	$10.77
2013	$35.25	$3.23	$1.59	$3.85	$2.28	$10.95
2014	$34.75	$3.11	$1.53	$3.50	$2.20	$10.34
2015	$38.27	$2.80	$1.38	$3.51	$2.81	$10.50
2016	$53.64	$3.97	$1.96	$3.87	$4.54	$14.34
2017	$35.18	$2.74	$1.35	$3.61	$2.70	$10.40
2018	$31.92	$2.73	$1.34	$3.25	$2.51	$9.83

2019	$30.57	$2.57	$1.26	$1.99	$2.48	$8.30
2020	$35.02	$2.46	$1.21	$1.79	$2.89	$8.35
2021	$37.98	$2.95	$1.45	$2.21	$2.65	$9.26
2022	$29.94	$2.96	$1.46	$2.04	$2.02	$8.48
2023	$18.38	$2.07	$1.02	$2.04	$1.72	$6.85
Avg 2007-09**	**$28.14**	**$6.05**	**$0.16**	**$1.54**	**$3.68**	**$11.42**
Avg 2010-15	**$34.74**	**$3.23**	**$1.59**	**$4.47**	**$2.33**	**$11.62**
Avg 2016-23	**$34.08**	**$2.81**	**$1.38**	**$2.60**	**$2.69**	**$9.48**

*supplies figures include only the cost for ice during 2007-2009, but it includes ice, water, food, and other materials during 2010-2023 data.
**inflation adjusted economic numbers for pre-IFQ period are from the LAGC IFQ Report 2010-15.

Table 18 - Output, Input and Productivity Indices, LAGC IFQ program.

Fishing Year	Output and Total Inputs (in 2023$)		Total Factor Productivity (TFP)	(Base= Avg 2010-15)			(Base= Avg 2007-09)		
	Output	Total Inputs		TFP Index	Output Index	Input Index	TFP Index	Output Index	Input Index
2007	$42.04	$20.01	2.10				**1.00**	**1.00**	**1.00**
2008	$18.32	$6.17	2.97						
2009	$24.04	$8.09	2.97						
2010	$25.54	$14.01	1.82	**1.00**	**1.00**	**1.00**	0.68	0.91	1.23
2011	$37.59	$13.14	2.86				1.07	1.34	1.15
2012	$37.01	$10.77	3.44				1.28	1.32	0.94
2013	$35.25	$10.95	3.22				1.20	1.25	0.96
2014	$34.75	$10.34	3.36				1.25	1.24	0.91
2015	$38.27	$10.50	3.64				1.36	1.36	0.92
2016	$53.64	$14.34	3.74	1.32	1.54	1.23	1.40	1.91	1.26
2017	$35.18	$10.40	3.38	1.06	1.01	0.90	1.26	1.25	0.91
2018	$31.92	$9.83	3.25	1.03	0.92	0.85	1.21	1.13	0.86
2019	$30.57	$8.30	3.68	1.18	0.88	0.71	1.37	1.09	0.73
2020	$35.02	$8.35	4.19	1.33	1.01	0.72	1.56	1.24	0.73
2021	$37.98	$9.26	4.10	1.4	1.09	0.80	1.53	1.35	0.81
2022	$29.94	$8.48	3.53	1.25	0.86	0.73	1.32	1.06	0.74
2023	$18.38	$6.85	2.68	0.92	0.53	0.59	1.00	0.65	0.60
Avg 2007-09	**$28.14**	**$11.42**	**2.68**				**1.00**	**1.00**	**1.00**
Avg 2010-15	**$34.74**	**$11.62**	**3.06**	**1.00**	**1.00**	**1.00**	**1.14**	**1.23**	**1.02**
Avg 2016-23	**$34.08**	**$9.48**	**3.57**	**1.19**	**0.98**	**0.82**	**1.33**	**1.21**	**0.83**

5.3.3 Trends in net revenue and producer surplus (2016 - 2023)

This section provides an analysis of the trends in economic benefits and profits following the previous review of the LAGC IFQ program in 2016. Evaluating the changes that took place since then makes it possible to identify those impacts attributable mainly to the core aspects of the LAGC IFQ program; Individual allocations per vessel combined with transferability and limited access in addition to some modifications made to the program in 2011 in Amendment 15.

5.3.3.1 Net revenue and producer surplus

For active owners, the net revenue for each year is estimated as the difference between the scallop revenue and trip costs. Trip expenses include food, fuel, oil, ice, water, and supplies and are estimated using the trip cost model and using the observer data from 2001 to 2023 fishing years for Limited Access and LAGC IFQ vessels (Ref. FW39 Economic Appendix). The trip costs per day-at-sea was postulated to be a function of vessel crew size, vessel length and horsepower, fuel prices, and a fixed effect for LAGC IFQ and Limited Access small dredge (SMD) vessels. Annual trip costs were estimated using the day-at-sea data for each LAGC IFQ vessel while fishing for scallops.

Producer surplus is an important component of the net national benefits within a cost/benefit framework. The producer surplus (PS) is defined as the area above the supply curve and below the price line of the corresponding firm and industry, which also equals the sum of rent to vessels and rent to labor. It is estimated as net revenue minus the opportunity costs of capital and labor. Opportunity cost of capital was based on estimated vessel values and evaluated using Moody's Seasoned Baa Corporate Bond Yield. Opportunity costs of labor we estimated using average hourly earnings of production and nonsupervisory employees.

Fleet level net revenue increased by 62% from about $21 million in 2010 to about $34 million in 2015. Net revenue peaked in 2016 to about $48 million but it fell since then by about 68% to $15 million in 2023 (Table 19). Table 20 shows the indices for net revenue for all years during 2016-23 relative to the average of base period 2010-15. Net revenue during 2016-23 exceeded in four out of the eight years in this period relative to the average of base period (2010-15). Net revenue in 2023 is only 51% of the base period average because of reduced quota allocation due to continued poor scallop recruitment coupled with the drop in scallop price in that year. However, the average annual net revenue for the LAGC IFQ fleet during both periods (2010-15 vs 2016-23) has been similar to about $30 million.

During 2010-15, producer surplus increased by 140% from $11.54 million in 2010 to $27.77 million in 2015 (in 2023 dollars). The percentage increase in net fleet revenue and producer surplus exceeded the increase in gross revenue due to the decline in fuel prices by 10%, increase in possession limit from 400 lb. in 2010 to 600 lb. in 2011 and due to the concentration of effort in a smaller number of possibly more efficient vessels. The decline in the number of active vessels from 140 in 2010 to 121 in 2015 also reduced the total opportunity costs of capital in the LAGC IFQ fishery. The increase in possession limit to 600 lb. per trip after 2010 also helped lower trip costs. As was discussed in Section 0, LAGC IFQ prices for scallops exceeded the prices for the limited access fishery after the implementation of the LAGC IFQ program in 2010.

During 2016-2023, producer surplus decreased from $39.29 million in 2016 to $11.53 million in 2023 (in 2023 dollars). However, the producer surplus on average has increased by 6.4% during 2016-23 relative to the base period 2010-15. The increase in the possession limit to 800 lb. per trip in 2022 also helped further reduce trip costs. Relative to the base, producer surplus increased by 17.2% but decreased by 4.4% during 2020-23.

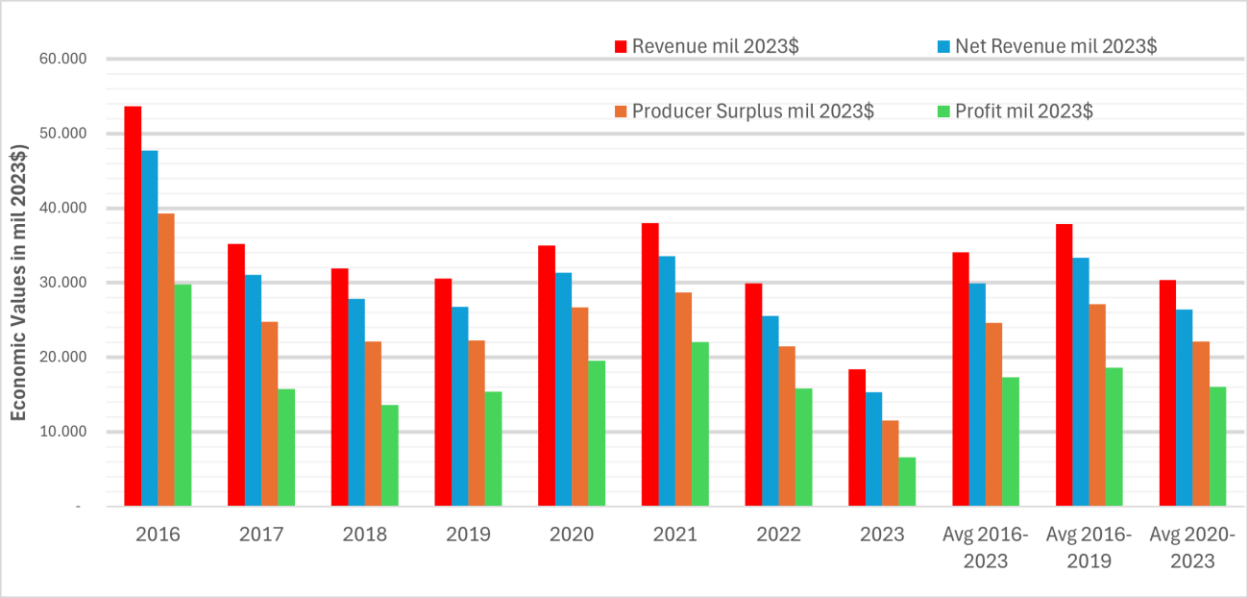
Table 19 - Economic Performance of the LAGC IFQ only Fleet during IFQ Implementation (2010-2023).

Fishing Year	Landings (mil. lb)	Revenue (mil. 2023$)	Trip Cost (mil 2023$)	Opp. Cost of Capital (mil 2023$)	Opp. Cost of Labor (mil 2023$)	Net Revenue (mil 2023$)	Producer Surplus (mil 2023$)
2010	2.078	25.544	4.444	7.385	2.177	21.101	11.538
2011	2.635	37.591	5.649	5.167	2.329	31.942	24.447
2012	2.693	37.015	5.168	3.404	2.205	31.846	26.238
2013	2.222	35.246	4.816	3.852	2.277	30.430	24.300
2014	2.008	34.755	4.634	3.499	2.196	30.120	24.426
2015	2.289	38.269	4.173	3.515	2.807	34.096	27.774
2016	3.440	53.637	5.927	3.871	4.544	47.710	39.295
2017	2.466	35.179	4.097	3.607	2.702	31.082	24.774
2018	2.680	31.918	4.070	3.246	2.513	27.847	22.088
2019	2.461	30.569	3.833	1.994	2.478	26.737	22.265
2020	2.364	35.016	3.678	1.790	2.890	31.338	26.657
2021	1.949	37.979	4.397	2.214	2.646	33.582	28.722
2022	1.731	29.942	4.420	2.039	2.018	25.522	21.464
2023	1.228	18.381	3.094	2.035	1.723	15.286	11.528
Avg 2010-2015	**2.321**	**34.736**	**4.814**	**4.470**	**2.332**	**29.922**	**23.120**
Avg 2016-2023	**2.290**	**34.078**	**4.190**	**2.599**	**2.689**	**29.888**	**24.599**
Avg 2016-2019	**2.761**	**37.826**	**4.482**	**3.179**	**3.059**	**33.344**	**27.106**
Avg 2020-2023	**1.818**	**30.329**	**3.897**	**2.020**	**2.319**	**26.432**	**22.093**
% Change Relative to Base (Avg 2010-2015):							
Avg 2016-2023	**-1.34%**	**-1.9%**	**-13.0%**	**-41.8%**	**15.3%**	**-0.1%**	**6.4%**
Avg 2016-2019	**18.98%**	**8.9%**	**-6.9%**	**-28.9%**	**31.2%**	**11.4%**	**17.2%**
Avg 2020-2023	**-21.66%**	**-12.7%**	**-19.0%**	**-54.8%**	**-0.5%**	**-11.7%**	**-4.4%**

Table 20 - Economic Performance Indices with reference to the Base 2010-2015.

Fishing Year	Landings (mil. Lb)	Revenue (mil. 2023$)	Trip Cost (mil 2023$)	Opp. Cost of Capital (mil 2023$)	Opp. Cost of Labor (mil 2023$)	Net Revenue (mil 2023$)	Producer Surplus (mil 2023$)
2010	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
2011							
2012							
2013							
2014							
2015							
2016	1.48	1.54	1.23	0.87	1.95	1.59	1.70
2017	1.06	1.01	0.85	0.81	1.16	1.04	1.07
2018	1.15	0.92	0.85	0.73	1.08	0.93	0.96
2019	1.06	0.88	0.80	0.45	1.06	0.89	0.96
2020	1.02	1.01	0.76	0.40	1.24	1.05	1.15
2021	0.84	1.09	0.91	0.50	1.13	1.12	1.24
2022	0.75	0.86	0.92	0.46	0.87	0.85	0.93
2023	0.53	0.53	0.64	0.46	0.74	0.51	0.50

Figure 9 - Scallop Revenue, Net Revenue, Producer Surplus and Profit in the LAGC IFQ Fleet (excluding LA with LAGC IFQ).



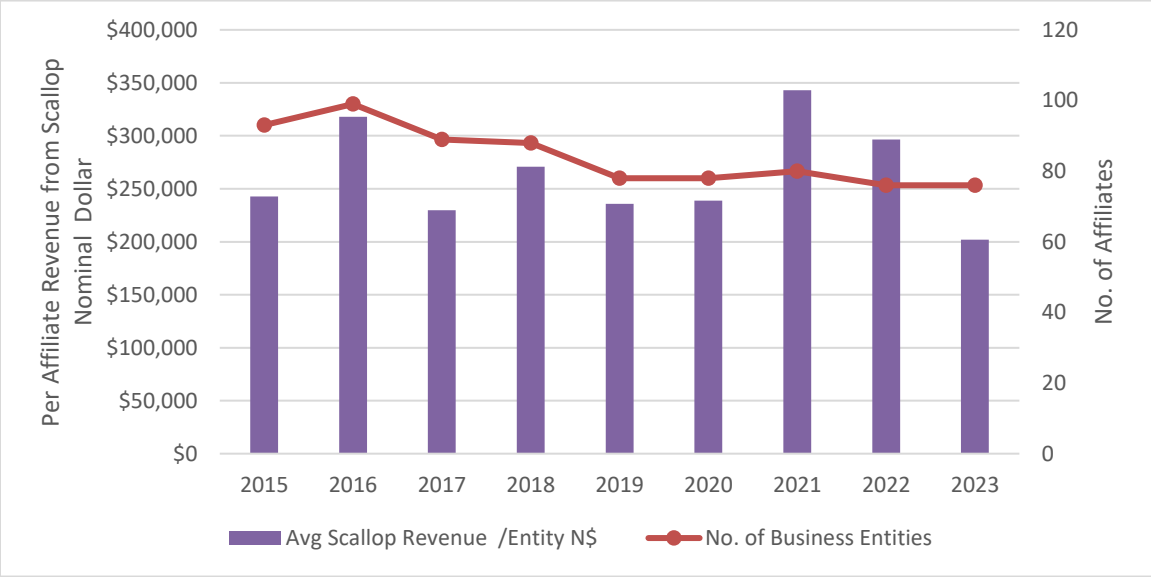
5.3.3.2 Net revenue per active vessel and affiliation

Since the implementation of Amendment 11 in 2010, there has been a decline both in the number of active vessels and the number of affiliations resulting in a larger share per vessel and affiliation. Active affiliations include vessels that participate in the LAGC IFQ fishery as well as CPH permits that are owned by the same affiliation and lease out their quotas. Average net revenue per active vessel increased from about $151,000 in 2010 to about $282,000 in 2015. It peaked at $391,000 in 2016 but fell to $257,000 in 2023. The average net revenue per vessel

increased by 6.83% during 2016-23 compared to the base period 2010-15 (Figure 10). Average nominal revenue per active affiliation increased from about $242,000 in 2015 to about $318,000 in 2016. It peaked to $342,000 in 2021 but declined to about $202,000 in 2023 (Figure 11).

Figure 10 - Average net scallop revenue per active LAGC IFQ vessel (net of trip costs).

Figure 11 - Average scallop revenue per LAGC IFQ affiliation.



A large part of this increase can be attributed to the overall rise in total fleet revenue, as discussed above. Additionally, the concentration of effort through leasing and permanent transfers contributed to higher revenues for individual affiliations. Since the implementation of the LAGC IFQ program in 2010, this consolidation of ownership has led to increased revenue per affiliate. However, these gains were not distributed evenly across all affiliations.

5.3.3.3 Trend in Profits in the IFQ implementation period (2010–2023)

This section provides an estimate of economic profit, calculated as revenue minus both explicit (monetary) and implicit (opportunity) costs. Fixed costs for scallop fishing include expenses such as repairs and maintenance, upgrades, mooring and hauling, insurance, office and professional fees, interest on mortgages and loans, association dues, travel, and vehicle costs. To estimate fixed costs in 2023 dollars, this analysis relies on periodic cost surveys conducted by the Social Services Branch of NEFSC in 2011/12 (n=7), 2013 (n=4), 2016 (n=4), and 2022 (n=9). These surveys covered approximately 93 scallop vessels with limited access and LAGC IFQ permits, of which 27 were LAGC IFQ-only boats.

Due to the limited sample size, fixed costs for LAGC IFQ-only permits were averaged across survey years and applied uniformly across all years in the analysis. These averages were adjusted for inflation and subtracted from producer surplus to estimate annual economic profit for the fleet. However, it is important to note that actual profits likely vary by vessel, as fixed cost estimates and crew share formulas were derived from a small subset of respondents. As a result, the figures presented here should be interpreted as rough estimates of economic profit. Lastly, this section does not attempt to estimate the net economic gains to an owner from fishing their quota compared to leasing or permanently transferring their IFQ.

Profits for Active Vessels in the LAGC IFQ Fleet

Economic profits rose from approximately $1 million at the start of IFQ implementation in 2010 to about $19 million in 2015, peaking at $30 million in 2016 before declining to around $7 million by 2023 (Table 21). Overall, economic profit during 2016–23 was about 25% higher than the 2010–15 base period. Profit increased by roughly 34% during the pre-COVID years (2016–2019) but declined by about 15% during 2020–2023 compared to the base period. These gains in profit were likely driven by a reduction in fixed costs, resulting from a smaller LAGC IFQ fleet and consolidation of quotas. This consolidation reduced excess capital and lowered the opportunity cost of capital, as fewer vessels remained active in the fishery.

Table 21 - Economic Performance (Economic Profit) and Indices (Base=2010-15) for the LAGC IFQ only Fleet during IFQ Implementation (2010-2023).

FY	Producer Surplus mil 2023$	Fixed Cost mil 2023$	Profit mil 2023$	Index of Producer Surplus	Index of Fixed Cost	Index of Profit
2010	11.538	10.693	0.845	**1.00**	**1.00**	**1.00**
2011	24.447	10.021	14.426			
2012	26.238	8.368	17.871			
2013	24.300	8.419	15.881			
2014	24.426	9.074	15.351			
2015	27.774	8.641	19.133			
2016	39.295	9.516	29.779	1.70	1.03	2.14
2017	24.774	9.032	15.741	1.07	0.98	1.13
2018	22.088	8.465	13.623	0.96	0.92	0.98
2019	22.265	6.894	15.371	0.96	0.75	1.10
2020	26.657	7.102	19.556	1.15	0.77	1.41
2021	28.722	6.660	22.061	1.24	0.72	1.59
2022	21.464	5.617	15.847	0.93	0.61	1.14

2023	11.528	4.940	6.588	0.50	0.54	0.47
Avg 2010-2015	**23.120**	**9.203**	**13.918**	**1.00**	**1.00**	**1.00**
Avg 2016-2023	**24.599**	**7.278**	**17.321**	**1.06**	**0.79**	**1.25**
Avg 2016-2019	**27.106**	**8.477**	**18.629**	**1.17**	**0.92**	**1.34**
Avg 2020-2023	**22.093**	**6.080**	**16.013**	**0.96**	**0.66**	**1.15**
% Change Relative to Base (Avg 2010-2015):						
Avg 2016-2023	**6.4%**	**-20.9%**	**24.5%**			
Avg 2016-2019	**17.2%**	**-7.9%**	**33.8%**			
Avg 2020-2023	**-4.4%**	**-33.9%**	**15.1%**			

5.3.4 Leasing and transfers

This section provides empirical analyses to address the transferability aspects of the LAGC IFQ program. As indicated in Catch Share Review Guidance, Section 303A(c)(7) of the MSA requires a Council to establish a policy and criteria for the transferability of limited access privileges and that the "The review should determine whether existing transferability provisions are conducive to achieving the specified objectives, keeping in mind that trade-offs often exist between objectives." [CSRG, p.13, D. Transferability].

The following subsections examine the impacts of the transferability measures included in Amendment 11 and subsequent modifications to the program in Amendment 15 on permanent transfer and leasing activity from the 2010 to 2023 fishing years. Note that the number of IFQ transfers is not equivalent, however, to the number of exits from the LAGC IFQ fishery since some sellers transferred part of their allocations and landed scallops with the rest. The term "transfers" will be used interchangeably to refer to "permanent transfers" in the rest of this document while, for "temporary transfers" the term "leasing" will be employed.

5.3.4.1 Trends in leasing (temporary transfers) and lease prices

One of the most significant changes in the general category scallop fishery since the full implementation of Amendment 11 in the 2010 fishing year has been the extensive use of IFQ leasing.[16] With the implementation of the LAGC IFQ program, individual IFQ quota allocations have been traded through lease transactions. Table 23 summarizes leasing activity, including lease volume, number of transactions, counts of MRIs on lease in and lease out transactions, and lease price per pound (in both nominal and real 2024 dollars) along with the prices of IFQ caught scallop prices.

Since the start of the program, a substantial number of IFQ quota owners have participated in leasing, both leasing in and leasing out quota. The annual volume of lease depends on the annual LAGC IFQ allocation (base + adjustment). The average annual volume of lease transactions has increased from 1.335 million lb during 2010-2015 to 1.677 million lb during 2016-2023. The average annual number of lease transactions also increased from 309 during 2010-2015 to 362 during 2016-2023.

[16] This document uses the term 'leasing' interchangeably with the term 'temporary IFQ transfers'. The term 'leasing' was used more often than the later term, however, because of its brevity.

Throughout the LAGC IFQ program, many quota owners have regularly leased out their allocations. Due to consolidation, the annual average number of 'Moratorium Right Identifiers' (MRIs, a unique permit identifier that includes permits in CPH) leasing out quota declined from 177 in 2010–2015 to 156 in 2016–2023. Conversely, the average number of MRIs leasing in quota rose from 82 to 190 over the same periods (Table 23).

Lease prices generally tracked changes in scallop ex-vessel prices. From 2010–2015, the real lease price per pound (in 2024 dollars) averaged $3.68, ranging from $1.94 in 2010 to $5.02 in 2015. During 2016–2023, the real average lease price was slightly lower at $3.58, with a range from $2.56 in 2016 to $4.78 in 2022. While nominal lease prices were higher in the latter period, the real lease price remained slightly lower, consistent with the relatively stable scallop prices between the two periods (Table 23).

The number of lease transactions increased slightly from 309 from 2010-2015 to 369 from 2016-2023, likely as a result of several factors including the increase in scallop ex-vessel prices, the decrease in overall IFQ quota (by 72% in 2023 from 2016 levels), increase in the possession limit from 600 lb. to 800 lb per trip on access area trips with the implementation of Amendment 21 in January 2021.

Table 22 presents LAGC IFQ allocations (base plus adjustments), lease-out pounds, and landed scallop pounds, along with their percentages relative to the base total allocation. Lease-out activity represented about 49% of total quota in 2010 and steadily increased, reaching 62.5% in 2015. Although it declined slightly to 61% in 2016, it rose again to about 70% in 2020 and remained high from 2021 to 2023, averaging approximately 79%. This upward trend suggests that more efficient vessels, or quota pools, increasingly leased in quota, while some existing holders acquired additional quota to achieve economies of scale or enhance trip-level economic efficiency.

Ratio analysis of lease prices indicates that lease prices are about 23% of the scallop prices. The lease price index shows that lease prices have risen significantly relative to increases in scallop prices. While scallop prices rose by about 22% in both 2010–2015 and 2016–2023 (relative to 2010), lease prices increased by approximately 90% and 85%, respectively (Table 24).

Additional ratio analysis shows that approximately 52% of quota was leased-out during 2010–2015, increasing to 72% in 2016–2023. Similarly, about 55% and 52% of MRIs leased-out quota in the respective period. However, only about 26% and 30% of MRIs leased-in quota during those same periods (Table 24). The rising lease price index suggests that quota may be increasingly controlled by a smaller subset of the LAGC IFQ fleet, reflecting consolidation and limited availability. This likely contributed to higher lease prices, driven by increased demand from both vessels without quota and those with small allocations seeking to operate at more efficient scales. For those who lease-in quotas, lease cost could be a significant trip cost since about 22% of scallop revenue goes for lease costs alone.

Table 22 - LAGC IFQ Allocations (TAC=5%), Landed Scallops, and Temporary Transfer of Quotas (Leased out pounds).

FY	Count of Root MRI	IFQ Allocation Base Total (lb, Base +Adj)	Sum of Leased out (lb)	Leased out as % of Base Total	Scallop landings (lb)	Scallop landings as % of Base Total
2010	332	2,334,720	(1,153,140)	-49.4%	2,145,686	91.9%
2011	332	2,918,800	(1,353,196)	-46.4%	2,753,974	94.4%
2012	319	3,103,900	(1,384,649)	-44.6%	2,839,193	91.5%
2013	317	2,233,630	(1,179,065)	-52.8%	2,269,159	101.6%
2014	317	2,209,080	(1,305,963)	-59.1%	2,096,962	94.9%
2015	309	2,708,050	(1,691,270)	-62.5%	2,386,824	88.1%
2016	308	4,077,850	(2,478,407)	-60.8%	3,496,599	85.7%
2017	308	2,268,150	(1,619,475)	-71.4%	2,580,512	113.8%
2018	306	2,813,790	(1,907,937)	-67.8%	2,803,845	99.6%
2019	303	3,006,090	(1,973,027)	-65.6%	2,571,269	85.5%
2020	303	2,473,470	(1,738,694)	-70.3%	2,464,945	99.7%
2021	296	1,908,820	(1,509,089)	-79.1%	2,026,435	106.2%
2022	289	1,575,390	(1,229,775)	-78.1%	1,544,146	98.0%
2023	281	1,146,220	(909,661)	-79.4%	1,164,730	101.6%

Table 23 - Temporary Transfer (Leasing) and Lease Prices. Prices in nominal dollars (N$) and 2023 dollars (2023$). *Excludes records with 0 leased value or lease price >10.

Fishing Year	Leased Quota (mil. Lb)	Estimated Value of Leased Quotas (mil. 2023$)	No. of Lease Transactions	Unique MRI leasing out	Unique MRI leasing in	*Avg. Lease Price/LB (N$)	Avg. Lease Price/ LB (2023$)	LAGC IFQ caught scallop price/ LB (2023$)
2010	1.098	$2.124	195	157	72	$1.34	$1.94	$12.58
2011	1.353	$3.477	333	167	74	$1.84	$2.57	$14.60
2012	1.385	$4.936	300	174	77	$2.60	$3.56	$14.07
2013	1.179	$4.919	316	192	81	$3.07	$4.17	$16.24
2014	1.306	$6.268	359	201	95	$3.53	$4.80	$17.72
2015	1.691	$8.495	350	171	93	$3.73	$5.02	$17.11
2016	2.478	$6.341	348	149	107	$1.95	$2.56	$15.96
2017	1.619	$6.963	358	173	96	$3.36	$4.30	$14.61
2018	1.908	$6.945	403	170	93	$2.90	$3.64	$12.19
2019	1.973	$6.137	333	140	84	$2.51	$3.11	$12.72
2020	1.739	$3.817	344	143	89	$1.82	$2.20	$15.17
2021	1.509	$7.091	406	169	93	$4.23	$4.70	$19.96
2022	1.263	$6.040	393	163	86	$4.51	$4.78	$17.71
2023	0.928	$3.102	314	144	73	$3.26	$3.34	$15.32
Sum 2010-23	**21.429**	**$76.65**	**4,752**	**2,313**	**1,213**	-	-	-
Avg. 2010-15	**1.335**	**$5.037**	**309**	**177**	**82**	**$2.69**	**$3.68**	**$15.39**
Avg. 2016-23	**1.677**	**$5.804**	**362**	**156**	**90**	**$3.07**	**$3.58**	**$15.45**

Table 24 - Indices and Ratios for Temporary Transfer Prices (Lease Price).

Fishing Year	Lease Price to Scallop Price Ratio	Index of Lease Price/lb. in 2023$ (Base=2010)	Index of IFQ Scallop Price in 2023$ (Base=2010)	Ratio of Leased Volume to Base Total (Base + Adj)	Ratio of FROM_MRI to Root MRI	Ratio of TO_MRI to Root MRI
2010	0.15	1.00	1.00	0.47	0.47	0.22
2011	0.18	1.33	1.16	0.46	0.50	0.22
2012	0.25	1.84	1.12	0.45	0.55	0.24
2013	0.26	2.16	1.29	0.53	0.61	0.26
2014	0.27	2.48	1.41	0.59	0.63	0.30
2015	0.29	2.60	1.36	0.62	0.55	0.30
2016	0.16	1.32	1.27	0.61	0.48	0.35
2017	0.29	2.22	1.16	0.71	0.56	0.31
2018	0.30	1.88	0.97	0.68	0.56	0.30
2019	0.24	1.61	1.01	0.66	0.46	0.28
2020	0.14	1.13	1.21	0.70	0.47	0.29
2021	0.24	2.43	1.59	0.79	0.57	0.31
2022	0.27	2.47	1.41	0.80	0.56	0.30
2023	0.22	1.73	1.22	0.81	0.51	0.26
Avg. 2010-15	**0.23**	**1.90**	**1.22**	**0.52**	**0.55**	**0.26**
Avg. 2015-23	**0.23**	**1.85**	**1.23**	**0.72**	**0.52**	**0.30**

5.3.4.2 Permanent transfers

Since the implementation of LAGC IFQ program in 2010, about 1.9 million pounds of base quotas have been permanently transferred. There has been a total of 378 transfer transactions with an estimated total cumulative transfer value of $61.98 million (in 2023$). The annual average quantity of permanent transfer has increased from 128,316 pounds during 2010-2015 to 147,772 pounds during 2016-2023. Annually there are about 28 to 29 permanent transfers with an annual average value of transfer of $6.57 million during 2010-2015 and $7.3 million during 2016-2023. Permanent transfer of quota had a value of $49.53 per pound during 2010-2015, and it slightly increased to $52.92 during 2016-2023. Relative to base year 2013, the average index of transfer price was 0.98 during 2010-2015. The permanent transfer price index increased slightly higher to 1.04 during 2016-2023 (Table 25).

The number of vessels that made permanent transfers of quotas was estimated by examining the counts of MRIs without quotas (Table 26). While vessels without quota can still participate in the fishery, they must lease quota from other holders to do so. At the start of the LAGC IFQ program in 2010, there were 332 root MRIs, and six of these had likely already transferred their quotas permanently. The number of MRIs without quota increased steadily through 2019, with the pace of growth slowing after 2020. Permanent transfers rose from 6 in 2010 and 32 in 2013 to 49 in 2015. This number continued to grow, reaching 65 in 2016, 89 in 2017, and 94 in 2019. It peaked at 107 in both 2020 and 2021, before slightly decreasing to 102 in 2022 and 105 in 2023. Over the course of the LAGC IFQ program, roughly one-third of MRIs appear to have permanently transferred their quotas.

Modifications to the LAGC IFQ program regarding quota transferability were key factors contributing to an increase in permanent transfers beginning in 2012. Prior to that year, vessels were restricted to owning a maximum of 2% of the total general category allocation and were required to transfer their entire LAGC IFQ allocation when making a permanent transfer. Amendment 15, implemented in 2012, raised the ownership cap to 2.5% and allowed LAGC IFQ permit holders to permanently transfer either a portion or the entirety of their quota to another LAGC IFQ permit holder. These changes facilitated quota consolidation by enabling active vessels to accumulate a larger share of the overall allocation on a single permit. Table 26 presents LAGC IFQ quota allocations from 2010 to 2023.

Table 25 - Permanent Transfer of Scallop IFQ.

Fishing Year	Quantity of Quota Transfer (lb)	Counts of Transfer Transactions	Counts of Root MRI	Avg. Transfer Price/lb N$	Estimated Transfer Value mil N$	Avg. Transfer Price/LB in 2023$	Estimated Transfer Value in mil 2023$	Index of Transfer Price Base=2013	Avg. Index of Transfer Price
2010	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-
2011	1,850	1	1	n/a	n/a	n/a	n/a	n/a	-
2012	265,915	50	39	n/a	n/a	n/a	n/a	n/a	-
2013	77,248	21	19	$38.29	$2.957	$50.75	$3.920	1.00	0.98
2014	76,445	25	20	$35.56	$2.718	$47.17	$3.606	0.93	
2015	231,255	42	34	$38.51	$8.907	$50.67	$11.717	1.00	
2016	371,509	53	44	$37.15	$13.800	$47.53	$17.659	0.94	1.04
2017	130,869	23	13	$53.40	$6.988	$66.80	$8.742	1.32	
2018	131,462	27	18	$37.41	$4.918	$45.94	$6.039	0.91	
2019	231,562	27	23	$31.05	$7.190	$37.56	$8.697	0.74	
2020	168,990	31	16	$34.64	$5.854	$40.83	$6.900	0.80	
2021	43,702	20	11	$67.76	$2.961	$73.58	$3.215	1.45	
2022	53,290	31	16	$54.00	$2.877	$55.87	$2.977	1.10	
2023	50,790	14	12	$55.28	$2.808	$55.28	$2.808	1.09	
Sum 2011-23	**1,834,887**	**365**	**266**		**$61.980**		**$76.281**		
Avg 2013-15	**128,316**	**29**	**24**	**$37.45**	**$4.861**	**$49.53**	**$6.414**	**0.98**	
Avg 2016-23	**147,772**	**28**	**19**	**$46.34**	**$5.925**	**$52.92**	**$7.129**	**1.04**	

Table 26 - MRI Counts with and without IFQ, and leased-in and leased-out percentages in the LAGC IFQ Only Allocation.

FY	Total MRI Counts	Scallop Landed	MRI With Zero IFQ					MRI With >0 IFQ				
			MRI Counts (w/o IFQ)	Leased in (lb)	Leased out (lb)	Leased out % (out of Lease in)	Leased in % out of base total	MRI Counts (w/ IFQ)	Base total (lb)	Leased out (lb)	Leased out % (out of base total)	Leased out % (In Group or to IFQ Quota Holders)
2010	332	2,145,686	6	-	-		0%	326	2,334,720	(1,153,140)	-49.4%	49.4%
2011	332	2,753,974	14	-	-		0%	318	2,918,800	(1,353,196)	-46.4%	46.4%
2012	319	2,839,193	6	50,730	(3,000)	-6%	2%	313	3,103,900	(1,381,649)	-44.5%	42.9%
2013	317	2,269,159	32	160,768	(22,730)	-14%	7%	285	2,243,530	(1,156,335)	-51.5%	44.4%
2014	317	2,096,962	47	184,357	(29,371)	-16%	8%	270	2,212,740	(1,276,592)	-57.7%	49.4%
2015	309	2,386,824	49	355,464	(29,600)	-8%	13%	260	2,708,050	(1,661,670)	-61.4%	48.2%
2016	308	3,496,599	65	669,184	(63,088)	-9%	16%	243	4,077,850	(2,415,319)	-59.2%	42.8%
2017	308	2,580,512	89	598,458	(110,007)	-18%	26%	219	2,268,150	(1,509,468)	-66.6%	40.2%
2018	306	2,803,845	87	728,799	(45,980)	-6%	26%	219	2,813,790	(1,861,957)	-66.2%	40.3%
2019	303	2,571,269	94	883,919	(66,070)	-7%	29%	209	3,006,090	(1,906,957)	-63.4%	34.0%
2020	303	2,464,945	107	726,979	(86,224)	-12%	29%	196	2,473,470	(1,652,470)	-66.8%	37.4%
2021	296	2,026,435	107	707,743	(128,205)	-18%	37%	189	1,908,820	(1,380,884)	-72.3%	35.3%
2022	289	1,544,146	102	618,988	(94,214)	-15%	39%	187	1,575,390	(1,135,561)	-72.1%	32.8%
2023	281	1,164,730	105	567,028	(47,147)	-8%	49%	176	1,146,220	(862,514)	-75.2%	25.8%

5.3.5 Trends in employment and crew shares

Changes in the number of active vessels, total landings, possession limits, and LPUE have influenced DAS and employment levels in the LAGC IFQ fishery. As discussed earlier, the decline in fleet capacity has contributed to a reduction in the total number of crew positions. This is measured by summing the average crew size across all active vessels. Total crew positions fell from 342 in 2010 to 325 in 2015. Crew numbers rose to 402 in 2016 in response to improved stock recruitment and landings but have steadily declined since, reaching 223 in 2023.
Crew incomes are estimated using a 50/50 lay system, deducting trip costs and either all or half of the lease costs from gross scallop revenue. Without accounting for lease cost sharing, total crew income (in 2023 dollars) increased from $6.66 million in 2010 to $12.92 million in 2015, peaking at $17.42 million in 2016 before falling to $4.74 million in 2023. However, average income per crew member increased from $19,472 in 2010 to $39,765 in 2015, reaching a high of $43,370 in 2016 before declining to $21,296 in 2023 (Table 27).

Table 27 also shows income per DAS. Total crew income per DAS rose from $1,625 in 2010 to $2,774 in 2015, then decreased to $2,513 in 2016 and fell further to $1,604 in 2023. Similarly, per crew income per DAS increased from $665 in 2010 to $1,033 in 2015, dropped slightly to $857 in 2016, and declined to a low of $656 in 2023.

Table 27 - Crews's Income in the LAGC IFQ only Fleet (2010-2023).

Fishing Year	Fleet		Income per Crew in 2023$	Total Crews' Income per DAS in 2023$	Income per Crew per DAS in 2023$
	Employment or Total Crew Positions (Avg_VTR_Crews * No. of Active Boats)	Total Crews' Income in mil 2023$			
2010	342	$6.66	$19,472	$1,625	$665
2011	344	$11.57	$33,600	$2,716	$1,065
2012	305	$11.87	$38,928	$3,063	$1,155
2013	319	$11.23	$35,188	$2,928	$1,073
2014	311	$11.24	$36,126	$2,797	$1,132
2015	325	$12.92	$39,765	$2,774	$1,033
2016	402	$17.42	$43,370	$2,513	$857
2017	355	$11.49	$32,395	$2,556	$958
2018	319	$10.01	$31,439	$2,288	$912
2019	274	$9.59	$34,952	$2,361	$904
2020	300	$11.64	$38,836	$2,598	$962
2021	308	$12.71	$41,276	$3,080	$1,131
2022	252	$9.13	$36,293	$2,694	$1,071
2023	223	$4.74	$21,296	$1,604	$656

5.3.6 Permits and affiliations

5.3.6.1 Permits, landings, and quota by vessels

Changes in effort and participation since the previous review can be evaluated through trends in active permits and permits in Confirmation of Permit History (CPH). However, not every vessel with an active LAGC IFQ permit participated in the scallop fishery. For the purposes of this analysis, an active vessel is defined as one that landed any quantity of scallops under an LAGC IFQ permit, excluding LA vessels that also hold an LAGC IFQ permit.

The total number of permits, tracked by Moratorium ID (MRI), declined from 332 in 2010 to 309 in 2015, and 308 in 2016 to 281 in 2023 (Table 28). An MRI is a unique identifier assigned to a vessel, permit, or individual who qualified to participate in the fishery during a designated control date or moratorium period. It helps track permit history even when vessel permits change ownership or vessels are replaced. In this context, the total number of permits are reported by unique MRI to reflect vessel-level participation and exclude replacements. These counts include both active permits and those in CPH.

Since implementation of the LAGC IFQ program, some permits have permanently transferred their quota in full or in part. Permits without quota can still remain in the fishery by leasing in quota from other permit holders. As a result, the number of MRIs without IFQ increased from 6 in 2010 to 49 in 2015, and 65 in 2016 to 105 in 2023.

The number of active permits, defined as permits with scallop landings under an LAGC IFQ permit, declined from 140 in 2010 to 121 in 2015, and 137 in 2016 to 91 in 2023. The number of active vessels also fluctuates with the availability of scallop resources or annual quota allocation based on overall scallop resource conditions or fleet consolidation due to permanent quota transfer.

Table 28 - No. of MRIs (with and without IFQ) and the No. of Active Permits for Scallop Fleets.

Fishing Year	MRI Count	MRI Counts (w/ IFQ)	MRI Counts (w/o IFQ)	No. of Active IFQ Permits (w/ >0 landings)	No. of Combo Permits	No. of Active LA Permits or vessels
2010	332	326	6	140	41	350
2011	332	318	14	135	40	348
2012	319	313	6	115	40	348
2013	317	285	32	117	40	346
2014	317	270	47	126	40	347
2015	309	260	49	121	40	346
2016	308	243	65	137	40	345
2017	308	219	89	133	40	346
2018	306	219	87	127	40	344
2019	303	209	94	105	40	346
2020	303	196	107	111	40	346
2021	296	189	107	113	40	347
2022	289	187	102	100	39	341
2023	281	176	105	91	39	344

5.3.6.2 Affiliations and distribution of quota by activity

This report uses the term 'owner' interchangeably with the term 'affiliations' except as specified otherwise. According to the ownership data, almost every vessel and permit holder in the scallop fishery has multiple owners, and some owners of a particular vessel have ownership interest in other vessels with different individuals. In order to identify affiliations of individual owners, this report employed a very broad definition of ownership using a "Group ID." For example, if individual A and B own permit 1, individuals B and C own permit 2, and individuals C and D own permit 3, all three permits were assigned to the same Group ID. Therefore, this approach takes into account that the interests of these 4 owners could be, at the least, indirectly related through those interactions arising from joint ownership combinations of those 3 vessels. Active affiliations are those who own at least one active vessel that participates in the scallop fishery as well as CPH permits and vessels that operate in other fisheries while leasing out to or using their quota on active vessels in the LAGC IFQ fishery.

Affiliations include permit banks and cooperatives such as the Maine Permit Bank Program (MPBP), and Lower Cape Cod Community Development Corporation (LCCDC), with each permit bank or co-op considered as one 'affiliation'. The number of active LAGC IFQ affiliations declined from 99 in 2016 to 76 in 2023 (Table 30). The shrinkage in the number of active permits or vessels and their affiliates is due to continued consolidation (i.e., permanent transfer) or lease-out (i.e., temporary transfer) of IFQ. There has been a decline in the number of both inactive and active affiliations. Due to the lack of reliable ownership data prior to 2010, these analyses could not be extended to the period before the implementation of Amendment 11. No data on the number of permits held by inactive affiliations was included. However, trends for inactive permits (CPH, Table 29), suggest relative stability from 2021-2023. Data constraints limited the ability to assess the full review period. The opportunity to lease out and transfer quota to other affiliations likely an important factor that made consolidation possible among fewer affiliations. Leasing activity, gross and net revenues, profits, and distribution of income by affiliations are analyzed in Section 5.3.4.

Table 29 – LAGC IFQ permit counts and base allocations by activity status, FY2021-FY2023.

FY	Permit	Status	IFQ allocation %	Permit Counts	Base allocation (lb)
2023	LAGC IFQ Only	Active	0%	59	-
			>0%	103	585,690
		CPH	0%	45	-
			>0%	70	557,650
	LAGC IFQ + LA	Active	>0%	39	111,770
2022	LAGC IFQ Only	Active	0%	59	-
			>0%	152	998,840
		CPH	0%	43	-
			>0%	73	730,320
	LAGC IFQ + LA	Active	>0%	39	111,770
2021	LAGC IFQ Only	Active	0%	59	-
			>0%	118	988,736
		CPH	0%	41	-
			>0%	71	860,694
	LAGC IFQ + LA	Active	>0%	40	184,943

5.3.7 Summary and Conclusions

Section 5.3 evaluated the LAGC IFQ program in terms of net revenues, profits, and producer surplus, consistent with the NMFS' Economic Guidelines for conducting cost-benefit analyses[17]. The analysis used estimates of net revenue per trip, annual vessel-level profits, and producer surplus to assess the distribution of economic benefits in the fishery during the 2016–2023 review period relative to a baseline period of 5 years (2010-2015).

Scallop landings of the LAGC IFQ fishery declined slightly by 1.3% during 2016-2023 compared to the reference period. As a result, average annual LAGC IFQ fleet revenue in 2016-2023 declined marginally by 1.9% compared to the base period. However, at a per vessel level, landings and revenue increased by more than 5% during the review period.

In Section 5.3.2.2 the impacts of the main components of the LAGC IFQ program on producer surplus and profits are examined separately from the changes in landings and prices using a scenario analysis. This scenario amounts to holding scallop landings, prices of inputs, and the productivity of the scallop resource constant during the 2010-2015 and 2016-2023 LAGC IFQ program periods. When holding these assumptions constant, analyses can identify the impacts of the program on producer surplus and profits due to the changes in the number of active vessels (i.e., to pre-IFQ implementation period fleet size), as well as fixed inputs with the implementation of the catch share program. Note that the average number of active vessels in the LAGC IFQ fishery declined from 137 in 2016 to 91 in 2023, averaging about 114 active vessels during the review period 2016-2023.

The results show that the estimated producer surplus under the LAGC IFQ program would be 15% to 80% higher during 2016-2023 compared to a scenario if the 5% TAC were shared among a larger number of participants with no flexibility for leasing or transferring quota. Under the same scenario, fleet profits would probably be negative for most years in the absence of an IFQ program that allowed leasing and transferability of the quota (Table 14).

Section 5.3.2.5 presented a different approach to measure the changes in productivity of the LAGC IFQ fishery in 2016-2023 relative to a baseline period of 2010-2015. Total factor productivity was calculated using the Lowe index, which is the ratio of the value of all landings on all trips in a fishery during a year using a fixed base price to the value of all inputs from all trips in a fishery during a year, using fixed prices on the same trips. While the scenario analyses in Section 5.3.3.1 included revenues and costs from scallop fishing only, the output quantities contained in the output index. Section 5.3.2.5 included both scallops and other species that were landed during a general category trip. Another difference was that while the scenario analysis was conducted in terms of fishing year, the productivity analysis was based on calendar year. Inputs included vessel capital, labor used (crew times days spent at sea), energy (fuel used on each trip), and materials (ice). In contrast to the scenario analyses in Section 5.3.3.1 this analysis included the impacts of the changes in allocations due to 5% TAC and changes in scallop stock productivity in 2016-2023.

[17] http://www.nmfs.noaa.gov/op/pds/documents/01/111/01-111-05.pdf

Both of these approaches have some limitations. The scenario analysis does not take into account the potential change in the efficiency of active vessels, and multi-factor productivity analysis does not separate the impacts of changes in scallop resource abundance on productivity. Because species other than scallops are included in the analysis, aggregate productivity index also includes changes in the stock biomass of those other species. For example, results of the latter analysis show that Lowe's index declined in 2022 compared to 2023. In the same year, there was a decline in the LPUE of the LAGC IFQ fishery probably due to lower stock abundance in the areas where vessels were fishing, affecting the aggregate productivity of the LAGC IFQ fleet (5.3.2.5).

Despite the differences in approach, the results of these analyses are consistent with each other. During 2016-2023, both the aggregate productivity and the producer surplus for the LAGC IFQ fishery was greater than the baseline time period of 2010-2015 as well as the pre-IFQ period. (5.3.2.5). As indicated in Section 5.3.3, productivity is one component of profitability. The scenario analysis also showed that both producer surplus and profits would be higher with the LAGC IFQ program (5.3.3.3). These results are not surprising given that the LAGC IFQ program helped optimize profits in the LAGC fishery by allowing LAGC IFQ permit holders to transfer their allocations through leasing or selling quota. This system enabled quota to move to owners with a higher dependence on the scallop fishery, more efficient operations, or greater financial resources. As a result, these operators could acquire additional quota and lower their fishing costs per unit of production by targeting scallops. Transferability provisions established under Amendment 11 prompted a surge in quota transfers and leasing, particularly from LAGC IFQ holders with smaller allocations to more active affiliations with larger holdings. This trend continued through 2016–2023. Analyses of the quota and lease markets further indicate that lease prices responded to changes in supply and demand, with prices increasing due to higher scallop ex-vessel prices, lower fuel costs, more participating vessels, and a growing concentration of quota among leasing affiliations, consistent with the results of the annual lease price model.

The result of Section 5.3.5 indicates that the total crew positions fell from 402 in 2016 to 223 by 2023. Income per crew also declined during that period from $2,513 per DAS in 2016 to $1,604 per DAS in 2023 (Table 27). This 36.17% decrease in crew income during the review period is more than the decrease in total scallop revenue by 1.9%. The decline in the total number of available LAGC IFQ permits and the increase in the number of LAGC IFQ permits that have permanently transferred off their quota is consistent with a growing concentration of quota among fewer operations. Section 5.3.4.2 outlines how, over the course of the LAGC IFQ program, roughly one third of MRIs have permanently transferred their quotas.

The distributional impacts of the LAGC IFQ program were not uniform. While only qualifying vessels received IFQ under Amendment 11, the overall share of scallop landings allocated to the general category fishery was reduced from approximately 10-11% prior to 2010 to 5.5% under the LAGC IFQ program. As a result, comparisons of per-vessel landings or revenues before and after implementation are complex, as reductions in fleet size were offset by a smaller share of the total allocation. Among qualifying vessels, profits per owner are estimated to be higher for those who primarily target scallops and lease in additional quota from others. The distributional impacts of the LAGC IFQ program are analyzed in Section 5.3.2.40.

In short, the economic analyses provided in Section 5.3, both relative to a baseline period of 2010-2015, show that the impacts on net national benefits as measured by producer surplus were positive. Increased productivity and concentration of effort in fewer vessels and affiliations results in higher profits from the reference period as well as the period prior to the implementation of the LAGC IFQ fishery.

5.4 Distributional analyses: Diversity and concentration

5.4.1 Introduction

Although the primary intent of Amendment 11 was to stabilize capacity and prevent overfishing in the general category fishery, the Council also aimed to preserve opportunities for vessels to participate at various levels. The vision for the fleet included relatively small vessels operating under possession limits to maintain the historical character of the fishery and support participation by vessels from smaller coastal communities. In addition, the goals of Limited Access Privilege Programs (LAPPs), as defined in MSA §303A(c)(1)(A)–(F), include reducing overcapacity, promoting safety, supporting fishery conservation and management, and generating social and economic benefits. Section 301(a)(4) further requires that the allocation of fishing privileges be conducted in a manner that prevents any individual, corporation, or entity from acquiring an excessive share of those privileges. This section includes distributional analyses to evaluate whether the specific objectives of the LAGC IFQ program outlined in Amendment 11, as well as the broader goals of LAPPs under Section 301(a)(4), have been met. Distributional analysis of IFQ allocations across root MRIs is conducted using Gini coefficients and Lorenz curves.

This section also provides an analysis of the distribution of allocations, landings, and revenues for active and inactive affiliations to examine the changes in the diversity of the fishery and evaluate if these trends were consistent with the Council's vision of maintaining the diverse nature and flexibility within the general category component of the scallop fleet. Also included in this section are a comparative analysis of the NEFSC Crew Survey data, and a summary of the survey responses conducted by Northern Economics and the Gulf of Maine Research Institute as part of an ongoing research project exploring social and economic outcomes of the LAGC IFQ component. Section 5.4.2 examines the diversity of catch portfolios for active vessels with an LAGC IFQ permit using the Herfindahl-Hirschman index (HHI). Section 5.4.3 describes the scallop revenues by active affiliations and the number of LAGC IFQ permits by their reliance on scallop revenues. Section 5.4.4 examines the data from Sections 5.4.2 and 5.4.3 in the context of LAGC IFQ vessel activity in other fisheries. distribution of revenues per affiliation and dependency on the scallop fishery as a source of revenue. Section 5.4.5 evaluates the cumulative distribution of quota allocations using Lorenz curves and Gini coefficients. Section 5.4.6 presents data on the geographic distribution of landings and revenues by port of landings. Section 5.4.7 compares data across previous iterations of the NEFSC crew survey to provide context on scallop crew members perspectives on the fishery and management. It is important to note that the NEFSC crew survey conducted in 2018/2019 and 2023/2024 removed a question regarding their participation in the LAGC IFQ component, and therefore the analysis should be viewed as relevant only to the broader scallop fishery. Section 5.4.8 includes a summary of the survey responses conducted by Northern Economics and Gulf of Maine Research Institute as part

of a broader project exploring the social and economic outcomes of the LAGC IFQ component. A summary and conclusion of the distributional analyses are provided in Section 5.1.

5.4.2 Species diversity of catch

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 LAGC IFQ vessels among various fisheries.

A plot of the Herfindahl indices for the LAGC IFQ-only vessel/FY combinations is shown in

Figure 12. 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 30. The inverse of the Herfindahl indices are presented in
Figure 13. 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 most data points lie below 2.0 indicates there is a relatively small number of fisheries that comprise most of the revenue generated by LAGC 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 Appendix II. Compared to LAGC 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. 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 LAGC IFQ-only vessels, the distribution is even closer to 1.0, in which all vessel-level revenue is generated from a single fishery.

Figure 12 - Herfindahl indices by vessels holding an LAGC IFQ permit in at least one fishing year from 2010-2023, includes all active vessel/fishing year combinations; no LA permits.

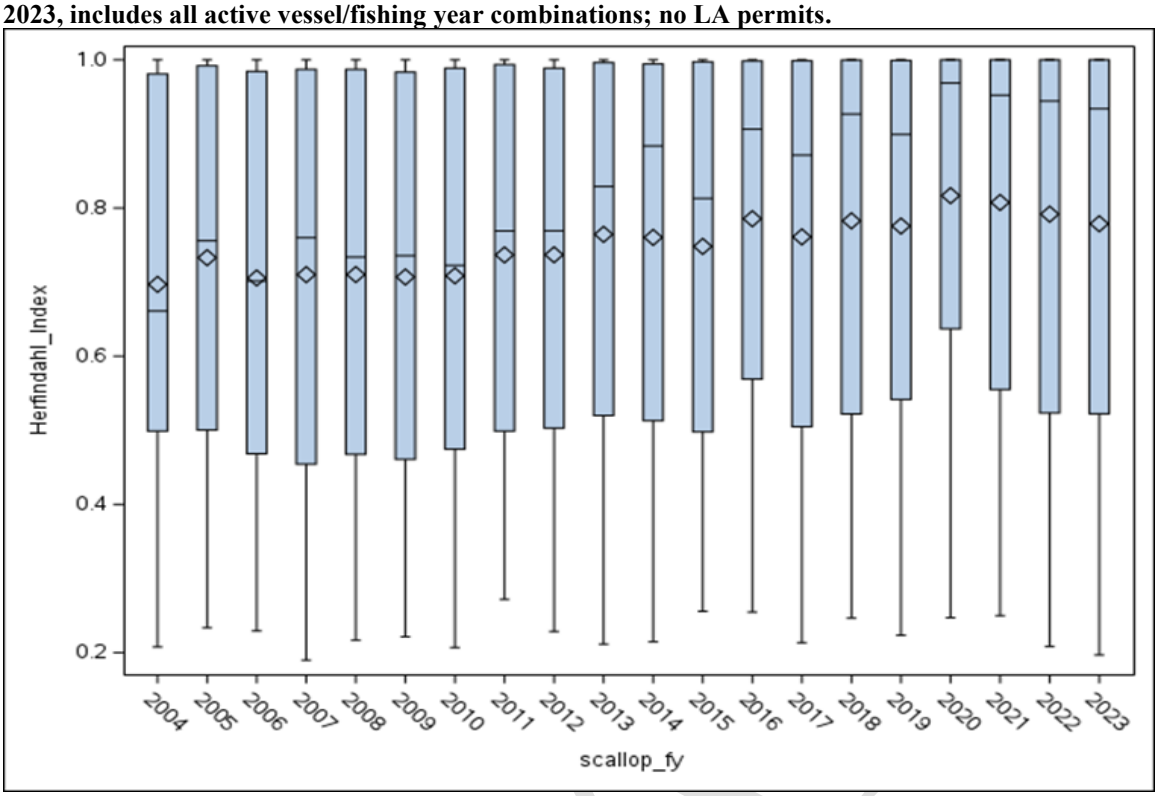
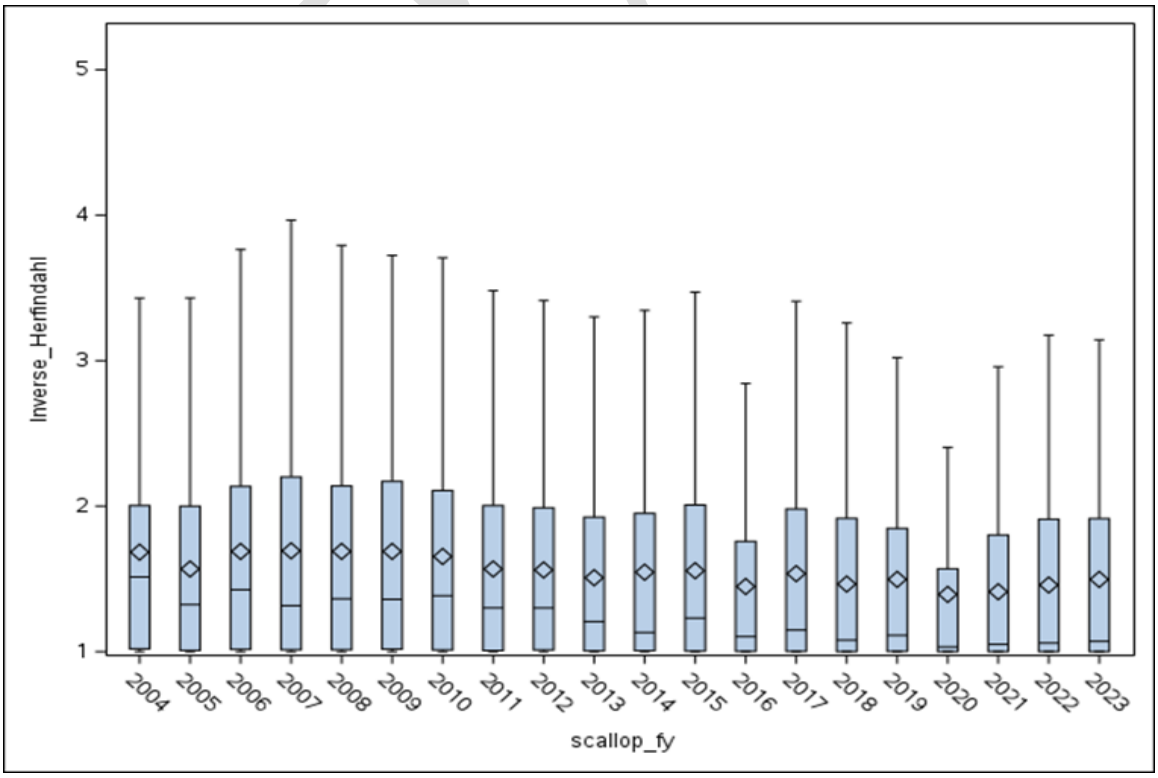


Figure 13 – Inverse of the Herfindahl indices among vessels holding an LAGC IFQ permit in at least one fishing year from 2010-2023, includes all active vessel/fishing year combinations; no LA permits.



5.4.3 Revenue and revenue reliance by active affiliation

Scallop revenue per active affiliation declined from $318,055 in 2016 to $202,100 in 2023, both as a result of a decline in total fleet revenue and a decrease in the number of active affiliations in this period (Table 30). The number of active affiliations declined from 99 in 2016 to 76 in 2023, the number of active vessels owned by these affiliations declined from 108 in 2016 to 85 in 2023. Active affiliations also owned 53 permits that did not participate in the fishery from 2016-2023 (Table 31).

Table 31 gives the breakdown of scallop landings revenue relative to overall landings revenue for LAGC IFQ-only permitted vessels. A higher percentage of vessels in the most recent 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 period. This may indicate a concentration of revenue among fewer LAGC 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, indicating a slight decline in the number of inactive vessels and vessels participating in the LAGC IFQ fishery at low levels. 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.

Table 30 – Scallop Revenue per active affiliation.

Year	No. of Affiliations	No. of Scallop Permits	*Avg. Scallop Revenue per Affiliation (N$)
2016	99	108	$318,055
2017	89	95	$229,708
2018	88	99	$270,929
2019	78	86	$235,922
2020	78	86	$238,817
2021	80	90	$342,951
2022	76	86	$296,480
2023	76	85	$202,100

Table 31 - Reliance on revenue from scallops among vessels holding an LAGC IFQ permit in at least one fishing year from 2010-2023; no LA permits. *Note: if an LAGC IFQ-permitted scallop vessel had no revenue from any fishery during an entire time period, it is not included.

% 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%)

5.4.4 Activity in other fisheries

Although this report does not evaluate comprehensively the impacts of the LAGC IFQ scallop fishery on other fisheries, Sections 5.4.2 and 5.4.3 provide information on the species diversity of LAGC IFQ vessel landings and their reliance on revenue from scallop landings. These data do not describe catches of inactive vessels and affiliations that leased out their quota to others but are active in other fisheries.

These data show that while there is a decline in the number of total affiliations and active permits across the review period, there is also a slight increase in both the percentage of permits that are highly or fully reliant on scallop revenues and a trend of decreasing diversity of catches. This may suggest that there is less activity in other fisheries for vessels that are actively participating in the scallop fishery.

There could be several factors affecting these trends including the changes in the stock conditions, prices, spatial distribution of stocks, changes in ownership patterns as well as changes in management measures for each species and a potential increase in effort by those LAGC IFQ vessels that no longer participate in the scallop fishery but redirect their effort to fishing for other species. However, in this regard, it is also important to take into account the potential reduction in effort in those other fisheries by active vessels that primarily targeted scallops to see to what extent this counteracted the increase in landings by inactive vessels.

The issue of effort displacement and its impacts are further complicated by lack of information regarding the activity of those owners who placed their LAGC IFQ permits in CPH and lease their quota to other owners. For example, there is no information available regarding if the proceeds from leasing are employed in buying quota or invested in another vessel that is active in other fisheries. Identifying the relative impacts of the LAGC IFQ program on other fisheries separately from the other potential factors that affect landings of each species including changes in the biological environment, relative prices, consumer preferences and management measures is beyond the scope of this review.

5.4.5 Distribution of quota allocations

Lorenz Curve is a graphical representation of concentration of wealth that plots the proportion of the total wealth of the population (y axis), that is cumulatively earned by the bottom X% of the population. On the graph, a straight diagonal line represents perfect equality of wealth; the Lorenz curve lies beneath it, showing the actual wealth distribution (Figure 14). The difference between the straight line and the curved line is the amount of inequality of income distribution and is described by the Gini coefficient. A low Gini coefficient indicates a more equal distribution, with “0” corresponding to complete equality, while higher Gini coefficients indicate more unequal distribution, with “1” corresponding to complete inequality.

As noted by Agnarsson, Matthiasson and Giry [2016], “this approach is appropriate if the owners of the selling firm leave the fisheries business altogether, it may be more questionable if those selling quotas have merged or have been taken over by other firms but still remain in partial ownership of a harvesting company. However, the bias from including only firms with positive quota holdings is probably greater than the bias from including all firms that have sold their quotas, as mergers or takeovers have probably been less common than sellouts and exits from the

industry." It is evident from the Lorenz curves depicted in Figure 14 and from the value of Gini coefficients provided in

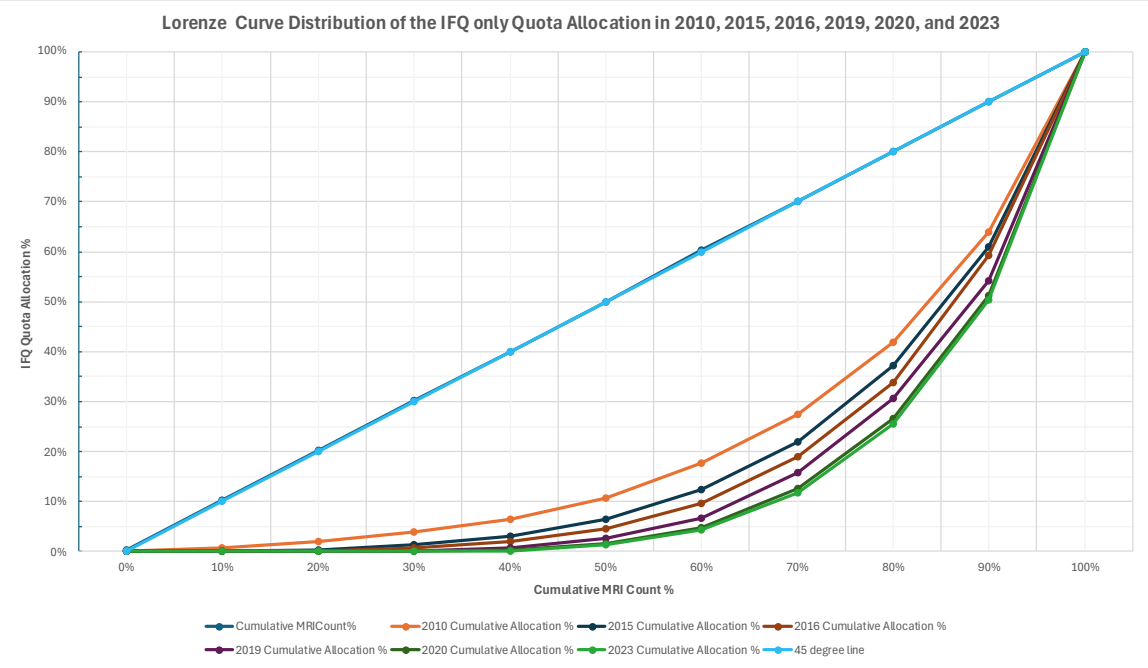
Figure 15 that quota allocations among LAGC IFQ affiliations were unequally distributed both in 2010 and 2015, although in 2015, it seems that concentration became less unequal. In 2010, 90% of the affiliations owned 57% of the quota, with remaining 10% owned 43%. In 2015, 90% owned 64% while the rest of the 10% owned 36% of the IFQ allocations (

Figure 15)[18].

The Gini coefficients indicate that concentration of quota became more unequal in 2015 (Gini=0.67) compared to 2010 (Gini=0.62) if all the affiliations were included, but slightly less unequal (Gini=0.62 in 2010 and 0.60 in 2015) if those that sold out their shares are excluded. [19]

Inequities in quota allocations among LAGC IFQ permit holders further widened during 2016-2023. Both Lorenze curve and Gini coefficients during the current LAGC IFQ review period suggest further quota consolidation to fewer MRIs. In 2016, 90% of the MRIs owned 60% of the quota, with remaining 10% owned 40%. In 2023, 90% of the MRIs owned 50% of the quota while the rest of the 10% owned 50% of the quota (Figure 14). Likewise, the Gini coefficients indicate that concentration of quota became more unequal during 2016-2023 i.e., Gini=0.65 in 2016 vs Gini=0.71 in 2023 (Figure 14).

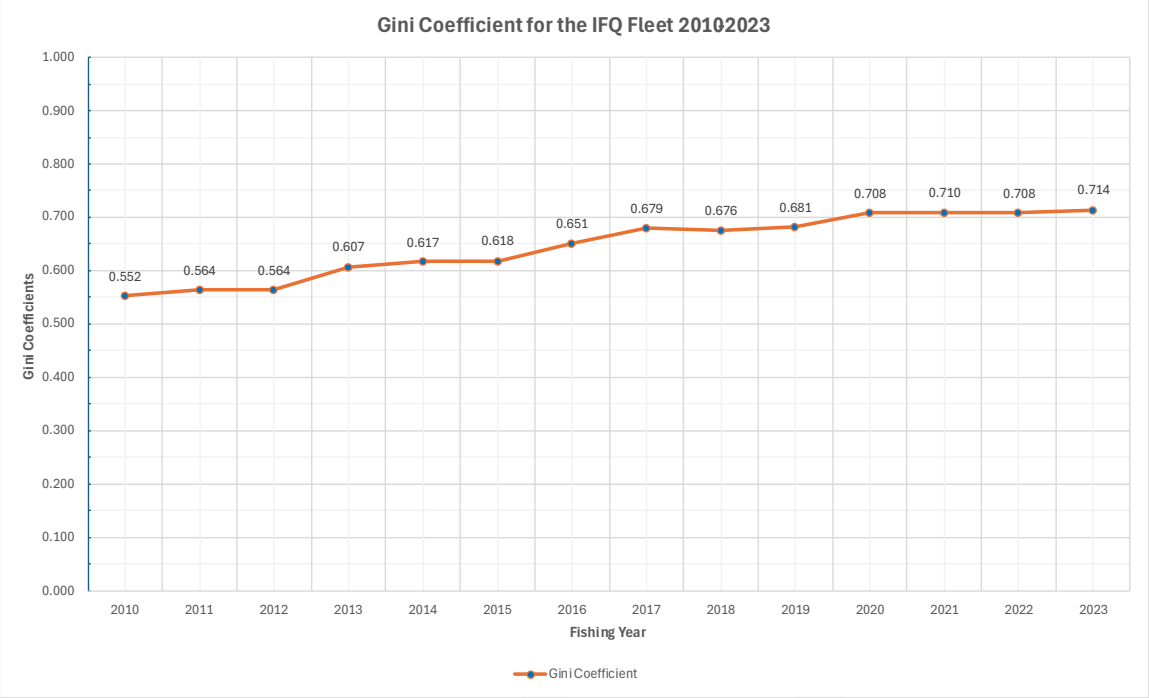
Figure 14 - Lorenze Curve Distribution of the LAGC IFQ only Quota Allocation (for 2010, 2015, 2016, 2020 and 2023).



[18] The figures based on IFQ Review Report (2010-2015)

[19] The figures based on IFQ Review Report (2010-2015)

Figure 15 - Gini Coefficients for the LAGC IFQ Quota Allocations (2010-2023)



5.4.6 Trends in the geographic distribution of landings

Table 33 and Table 34 show the number of LAGC IFQ permits and active LAGC IFQ permits (>1 lb of scallop landings annually) by state of principal port in 2016 and 2023. New England ports saw a decline in total LAGC IFQ permits by 24.5% and of active LAGC IFQ permits by 3.8%, while Mid-Atlantic ports saw a decline in total LAGC IFQ permits by 36.7% and of active LAGC IFQ permits by 56.7% over the same period. Most of the reduction took place in New Jersey as the number of active vessels declined from 40 in 2016 to 19 in 2023 (Table 33). The number of active vessels from New Jersey and Massachusetts exceeded the number of active vessels from other states. The decline in total permits in both regions may reflect permit-holders either permanently converting their LAGC A (IFQ) permit to a LAGC B (NGOM) permit or exiting the fishery. In the Mid-Atlantic the large decline in active permits could suggest a greater proportion of permit-holders leasing out quota due to the decline in the inshore and southern extend of the scallop resource and shift in the geographic center of scallop biomass to the Great South Channel and Georges Bank, leading to an increase in trip costs.

The fishing activity of the LAGC IFQ component generally overlaps spatially with the LA fishing activity, but is impacted by changes in resource condition in inshore areas. The distribution of LAGC IFQ landings shifted northward from FY 2016 to FY 2023 (Table 32). While in previous years, LAGC IFQ vessels landed scallops in ports as far north as Massachusetts and as far south as North Carolina. During the current review period, smaller ports in North Carolina and Virginia saw very few landings, while larger ports in New Jersey and New York saw steep declines in landings. The port with the greatest percentage share of LAGC IFQ scallop landings during this time was Point Pleasant, NJ (20%), followed by New Bedford, MA (11%) and Barnegat Light/Long Beach, NJ (11%). Several New Jersey ports saw large declines in LAGC IFQ scallop landings during this period, such as Atlantic City, NJ had 20-21%

of annual LAGC IFQ scallop landings in 2016/2017 but no scallops were landed in the port for the remainder of the period, and Cape May, NJ declined from 8-12% of annual LAGC IFQ landings from 2016-2020 to 2-4% from 2021-2023. Ports in Massachusetts saw the opposite trend, with an increasing proportion of LAGC IFQ scallop landings across the period, such as New Bedford, MA, which increased its share from 8% in 2016 to 22% in 2023; Chatham, MA, which increased its share from 3% in 2016 to 14% in 2022; and Provincetown, MA, which increased its share from 3% in 2016 to 17% in 2022.

Consistent with these trends, 2016 marked the peak in LAGC IFQ scallop landings, coinciding with the peak in biomass in both the Mid-Atlantic Access Area and Nantucket Lightship region, both nearshore scallop access areas. As described in Table 41 and Table 42, LAGC IFQ vessels harvested a larger proportion of their quota in these access areas when LPUE was very high, but as catch rates declined in those areas, fishing effort shifted to Georges Bank. Access area trips to Closed Area I and Closed Area II, which are much further from Mid-Atlantic ports, likely increased trip costs and contributed to decreased fishery participation.

Table 32 – LAGC IFQ Permits by listed state of home port, excluding LA (Source: GARFO Permit Database)

Home Port State	LAGC A (IFQ) Permits		% Change
	2016	2023	
ME	6	4	-33.3%
NH	2	1	-50%
MA	90	65	-27.8%
RI	7	7	0%
CT	5	6	20%
NY	17	11	-35.3%
NJ	57	43	-24.6%
DE	1	1	0%
MD	8	2	-75%
VA	6	3	-50%
NC	20	9	-55%
Total	**219**	**152**	**-30.5%**

Table 33 – Active LAGC IFQ Permits (>1 lb of scallop landings annually) by listed state of home port, excluding LA (Source: GARFO Permit Database)

Home Port State	LAGC A (IFQ) Permits		% Change
	2016	2023	
ME	3	2	-33.3%
NH	0	1	100%
MA	43	41	-4.7%
RI	4	3	-25%
CT	3	4	25%
NY	10	6	-40%
NJ	40	19	-52.5%
DE	1	0	-100%
MD	1	1	0%
VA	3	0	-100%
NC	12	1	-91.7%
Total	**120**	**78**	**-35%**

Table 34 – Scallop landings by LAGC IFQ vessels by port of landing. Values are in pounds. Data excludes landings in ports with fewer than three associated LAGC IFQ permits or dealers in a given year.

Port of Landing	2016	2017	2018	2019	2020	2021	2022	2023	Port Total
POINT PLEASANT, NJ	949,186	497,391	539,494	538,112	628,551	474,777	293,566	188,260	**4,109,337**
NEW BEDFORD, MA	366,037	348,877	276,133	175,896	256,201	281,044	204,811	286,280	**2,195,279**
BARNEGAT LIGHT, NJ		501,535	488,068	419,420	333,056	305,316		146,769	**2,194,164**
CAPE MAY, NJ	549,736	247,650	242,844	329,583	237,200	93,900	32,148	37,716	**1,770,777**
CHATHAM, MA	150,421	156,643	411,801	188,797	216,604	256,940	220,326	120,073	**1,721,605**
PROVINCETOWN, MA	144,355	147,263	254,610	208,176	182,178	274,315	251,392	170,211	**1,632,500**
ATLANTIC CITY, NJ	876,800	632,053			42,352				**1,551,205**
HARWICHPORT, MA	72,232	151,680	126,488	157,600	132,321	89,814	138,085	85,219	**953,439**
OCEAN CITY, MD	126,497		109,323	222,892	142,576	61,877			**663,165**
POINT JUDITH, RI	74,857	79,690	94,556	135,656	99,633	68,429	54,031	42,353	**649,205**
LONG BEACH, NJ	548,360								**548,360**
WILDWOOD, NJ	161,291	57,936	92,964	103,303	111,103				**526,597**
NEW LONDON, CT	54,520	50,308	46,436	39,206	49,719	54,005	45,027	8,084	**347,305**
GLOUCESTER, MA	45,141	20,409	59,120	15,032	16,923	37,945	54,448	75,906	**324,924**
MONTAUK, NY	71,975	86,254	49,603	51,729	30,820	21,661			**312,042**
HAMPTON BAYS, NY	193,557			51,503	6,379	14,057	10,487	18,317	**294,300**
HYANNIS, MA	2,460	31,236	22,250	11,203		17,371	73,705	75,407	**233,632**
HYANNISPORT, MA					108,612		61,006	33,934	**203,552**
WELLFLEET, MA						24,355	61,203		**85,558**
CUTLER, ME	15,338	6,416		9,532	8,716		22,938	11,144	**74,084**
PORTLAND, ME	15,800	15,108	6,945	2,878	6,193				**46,924**
BARNSTABLE, MA						41,597			**41,597**
WANCHESE, NC	26,184								**26,184**
SHINNECOCK, NY	14,266					3,585			**17,851**
NEWPORT NEWS, VA	11,854	4,734							**16,588**
STONINGTON, ME				12,658					**12,658**
SCITUATE, MA								10,428	**10,428**
HAMPTON, VA			2,365			3,556			**5,921**
SOUTHWEST HARBOR, ME					3,158			1,798	**4,956**
ROCKPORT, MA			3,268						**3,268**
STONINGTON, CT					1,601				**1,601**
JONESPORT, ME	575								**575**
Annual Total	**4,471,442**	**3,035,183**	**2,826,268**	**2,673,176**	**2,613,896**	**2,124,544**	**1,523,173**	**1,311,899**	

Table 35 – Total value of scallop landings by LAGC IFQ vessels by port of landing. Values are in 2023 dollars. Data excludes landings in ports with fewer than three associated LAGC IFQ permits or dealers in a given year.

Port of Landing	2016	2017	2018	2019	2020	2021	2022	2023	Port Total
POINT PLEASANT, NJ	$11,060,955	$5,639,339	$5,765,906	$5,577,355	$11,238,811	$8,835,274	$4,826,972	$2,582,636	**$55,527,248**
NEW BEDFORD, MA	$6,014,613	$5,077,329	$3,085,204	$2,016,528	$3,586,235	$5,620,839	$3,076,963	$3,537,218	**$32,014,929**
BARNEGAT LIGHT, NJ		$5,883,053	$5,683,465	$4,876,536	$4,386,028	$6,522,069		$2,105,626	**$29,456,777**
PROVINCETOWN, MA	$2,557,822	$2,424,243	$3,377,056	$3,039,249	$2,443,955	$5,176,585	$4,665,290	$2,805,745	**$26,489,945**
CHATHAM, MA	$2,635,459	$2,595,158	$4,871,206	$2,369,145	$2,656,334	$4,840,514	$3,488,461	$1,762,500	**$25,218,777**
CAPE MAY, NJ	$7,725,732	$2,819,669	$2,680,940	$3,396,065	$2,595,019	$1,559,744	$500,516	$483,684	**$21,761,369**
HARWICHPORT, MA	$1,356,766	$2,520,162	$1,542,510	$2,089,362	$1,589,201	$1,544,081	$2,347,430	$1,261,616	**$14,251,128**
LONG BEACH, NJ	$8,004,917								**$8,004,917**
OCEAN CITY, MD	$1,893,095		$1,130,132	$2,543,988	$1,331,044	$1,047,202			**$7,945,461**
POINT JUDITH, RI	$1,034,921	$916,221	$881,336	$1,391,615	$1,039,148	$944,284	$761,422	$545,627	**$7,514,574**
WILDWOOD, NJ	$2,391,527	$723,416	$942,891	$1,097,581	$1,276,512				**$6,431,927**
GLOUCESTER, MA	$749,491	$314,966	$755,704	$213,991	$255,419	$813,892	$1,218,635	$1,580,855	**$5,902,953**
ATLANTIC CITY, NJ	$3,195,801	$1,473,711			$120,643				**$4,790,155**
NEW LONDON, CT	$763,382	$627,458	$493,062	$447,183	$587,850	$885,894	$647,258	$107,521	**$4,559,608**
MONTAUK, NY	$1,024,096	$1,006,100	$521,359	$570,757	$341,204	$232,869			**$3,696,385**
HYANNIS, MA	$39,615	$509,025	$288,870	$174,963		$400,882	$1,177,327	$1,066,842	**$3,657,524**
HYANNISPORT, MA					$1,503,194		$1,136,444	$554,879	**$3,194,517**
HAMPTON BAYS, NY	$1,726,250			$328,414	$55,214	$107,469	$62,321	$181,055	**$2,460,723**
WELLFLEET, MA						$583,215	$1,052,243		**$1,635,458**
CUTLER, ME	$216,588	$73,349		$97,289	$118,117		$243,909	$129,207	**$878,459**
BARNSTABLE, MA						$697,560			**$697,560**
PORTLAND, ME	$200,142	$197,669	$80,706	$31,511	$82,817				**$592,845**
SHINNECOCK, NY	$156,576					$17,499			**$174,075**
SCITUATE, MA								$157,213	**$157,213**
WANCHESE, NC	$140,981								**$140,981**
STONINGTON, ME				$137,421					**$137,421**
NEWPORT NEWS, VA	$86,854	$33,330							**$120,184**
HAMPTON, VA			$22,382			$56,117			**$78,499**
ROCKPORT, MA			$41,604						**$41,604**
SOUTHWEST HARBOR, ME					$29,125			$5,598	**$34,723**
STONINGTON, CT					$22,478				**$22,478**
JONESPORT, ME	$6,710								**$6,710**
Grand Total	**$52,982,293**	**$32,834,198**	**$32,164,333**	**$30,398,953**	**$35,258,348**	**$39,885,989**	**$25,205,191**	**$18,867,822**	

5.4.7 Comparative analysis of crew surveys in the scallop fishery

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 LAGC 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). 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. Note that not all survey questions were reported for this analysis, but instead we focused on results relevant to the LAGC IFQ review.

While we are unable to compare LAGC 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. 2025), such that an understanding of fishing crew vulnerabilities in general will better equip managers to predict the possible outcomes of future system states.

The first survey wave enabled analysis of LAGC 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 LAGC 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 (i.e., respondents who selected scallops as their primary fishery.) and other fishery crews (i.e., respondents who selected a non-scallop fishery as their primary fishery) and 2) within sea scallop crew over time. From here on, these respondent groups will respectively be called sea scallop crew and non- sea scallop crew, although their opinions may not be exclusive to their primary fishery as crew could participate in multiple fisheries. 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 LAGC 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 general 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 LAGC 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 LAGC IFQ vessels versus non-IFQ vessels. A bulleted list of those initial findings for the period 2012/2013 are repeated here:

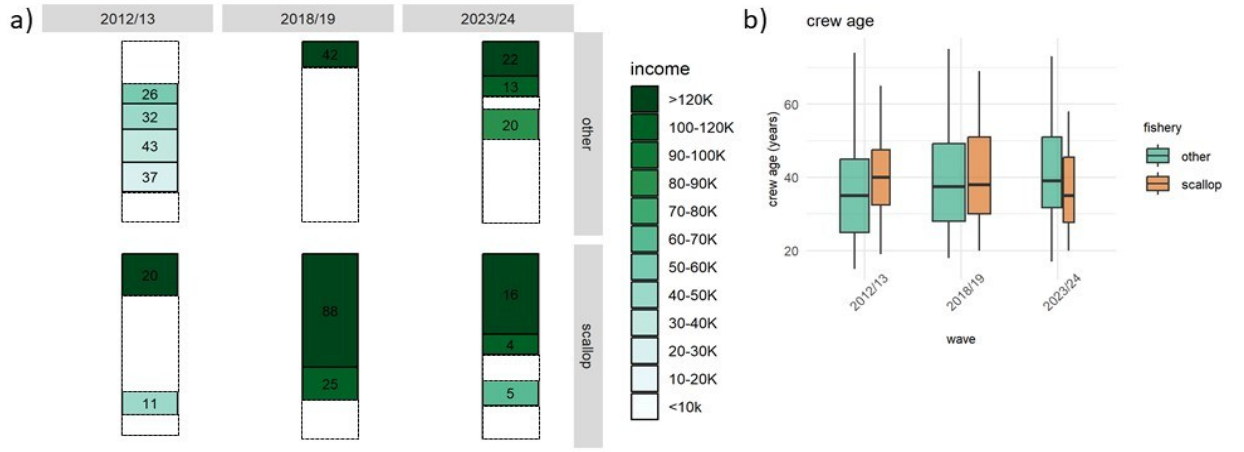
- Crew members of LAGC IFQ vessels were more likely than those on non-IFQ vessels to report that they did not trust managing authorities to make the right decisions when it came to regulating fisheries.
- Crew members of LAGC IFQ vessels were more likely than those on non-IFQ vessels to report that their captains were able to fish where he wanted to.
- Crew members of LAGC 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. LAGC 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 LAGC 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.

For the full report, please refer to Appendix II.

Results and Discussion

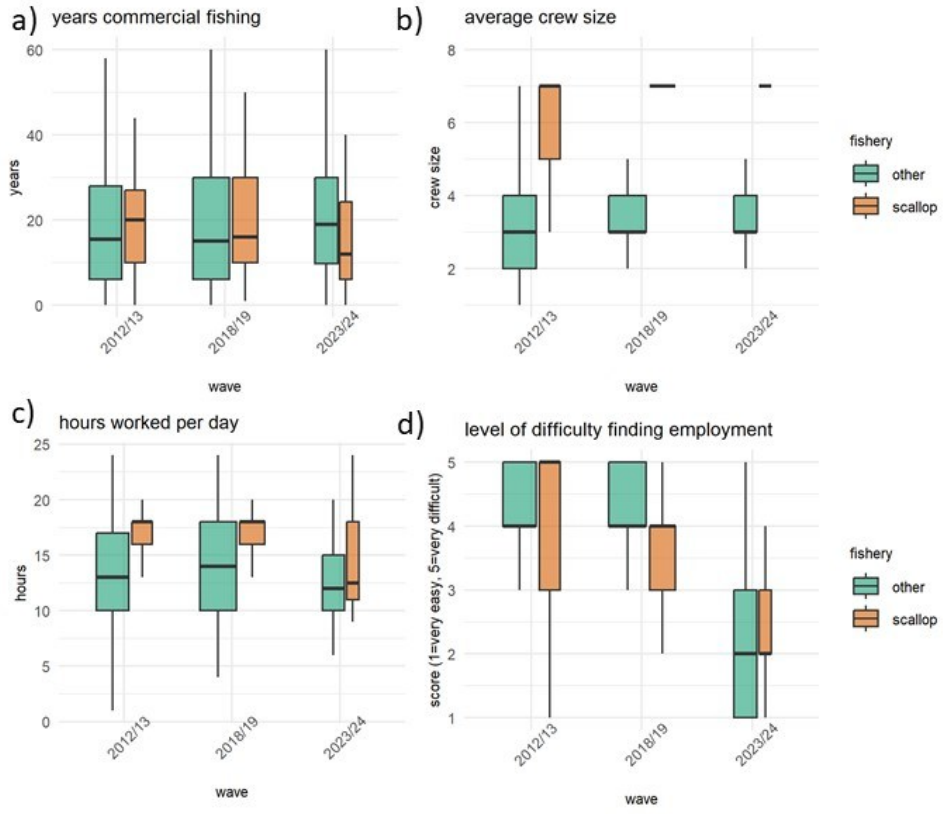
Results from the Crew Survey suggest that important socio-demographics characteristics of the sea scallop fishery may have changed over time. sea scallop crew have also been able to achieve higher salaries than respondents that participated in other primary fisheries, although there is a clear decline 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 16a). 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 16b). 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 16 - 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).



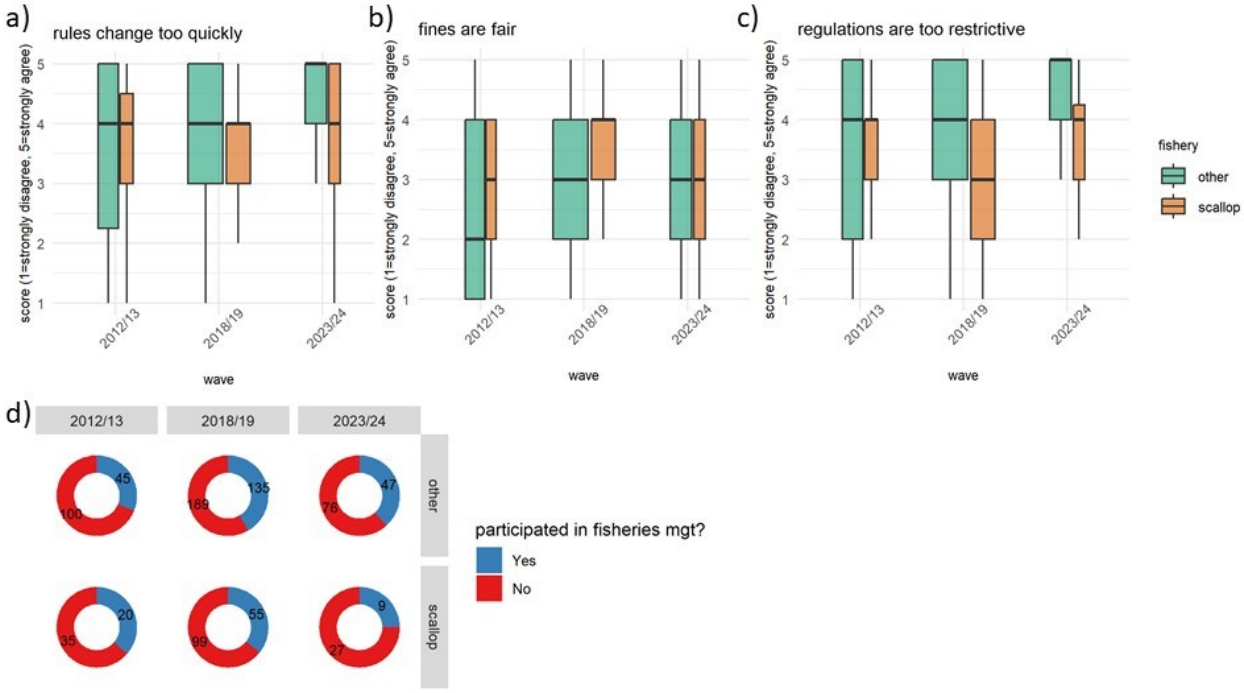
In line with the declines in crew age, the average experience of sea scallop crew has declined over time, with a notable drop from 2018/19 to 2023/24; the median number of years experience in commercial fishing for sea scallop decreased from 16 to 12 years (Figure 17a). The on-the-water experiences of 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 17c). There is also a clear trend in which crew members across fisheries believe that it is much easier to find employment most recently (Figure 17d). Younger, less experienced crew coupled with shorter workdays highlight that the fishery has changed over time. The impact of these changes is uncertain however.

Figure 17 - 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). Note one outlier was removed in the calculations of average crew size.



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 18a). 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 18b). 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 18c). 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.

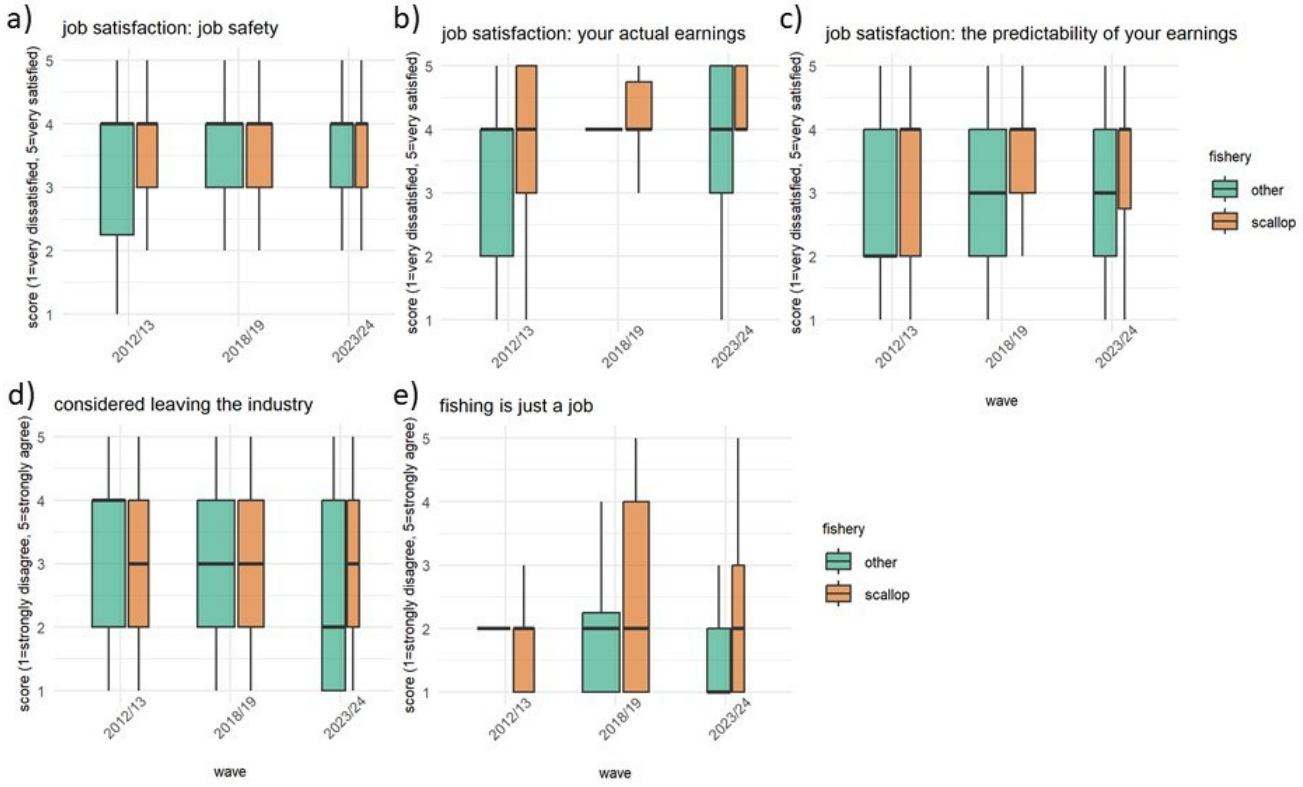
Figure 18 - A summary of questions related to fisheries management over the three Crew Survey waves demonstrating important differences between scallop crew and non-scallop crew and/or within scallop crew over time. For the first three plots, summarized data is shown via box plots (center black line = 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 19a; *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 19b, Figure 19c). 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 19d). 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 19e).

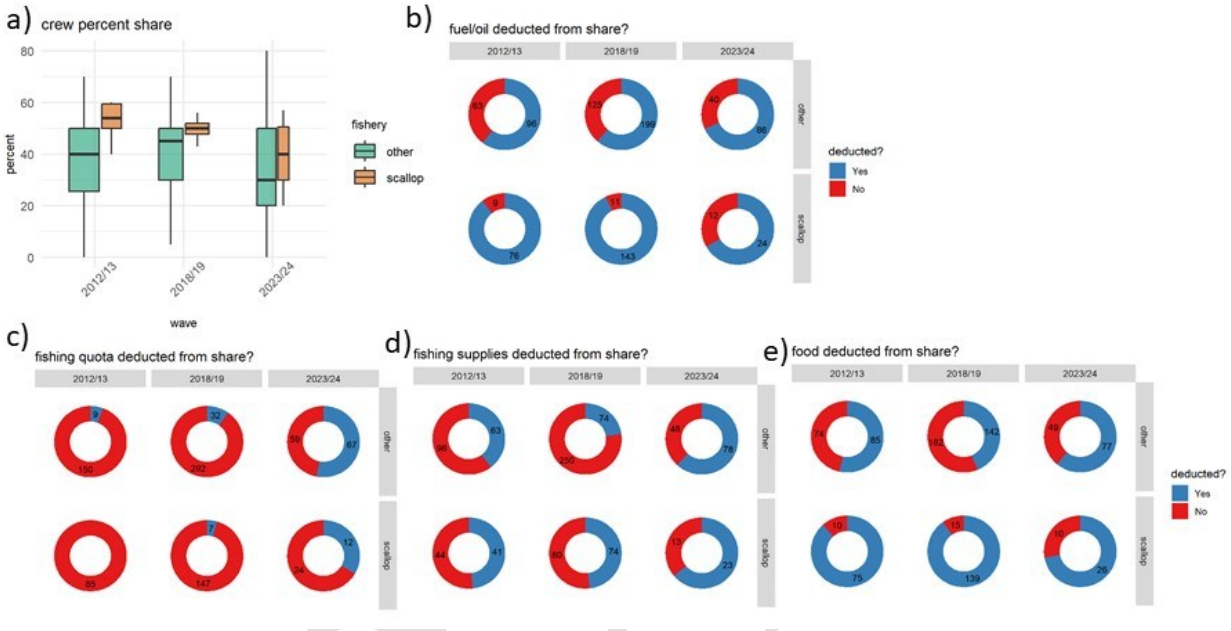
While we cannot deduce differences between LAGC IFQ and non-IFQ sea scallop crew, we do not find evidence of large declines in crew perceptions (i.e., more negative viewpoints) of careers in fishing over the time since the LAGC IFQ program has been implemented. However, we do not have data pre-LAGC IFQ program, precluding a Before-vs-After analysis.

Figure 19 – 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 20a). Amongst sea scallop crew, the median proportion of shares distributed to crew was 54%, 50%, and 40%, across the three survey waves, respectively (Figure 20a). Furthermore, the types of expenses that are deducted from crew shares have also changed. While fuel/oil and food is deducted less frequently for sea scallop crew in 2023/24, both fishing supplies and fishing quota are more frequently deducted most recently (Figure 20b-e). Coupled with declines in salary over time (Figure 20b), these results suggest that sea scallop crew are more vulnerable to changes that would reduce vessel revenue.

Figure 20 – 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.



5.4.8 LAGC IFQ industry survey conducted by Northern Economics, Inc. and the Gulf of Maine Research Institute

Introduction

Under a grant from the Walton Family Foundation, Northern Economics, Inc. and the Gulf of Maine Research Institute (GMRI), as part of a larger project, conducted a survey to assess the social and wellbeing outcomes of the LAGC IFQ scallop program. The survey was designed to inform a broader research effort examining how structural changes to catch share programs may affect equity, economic opportunity, and community wellbeing. It is important to note that although the survey falls outside the formal review period (Conducted in 2025), it provides important context on survey participants' experiences under the LAGC IFQ program.

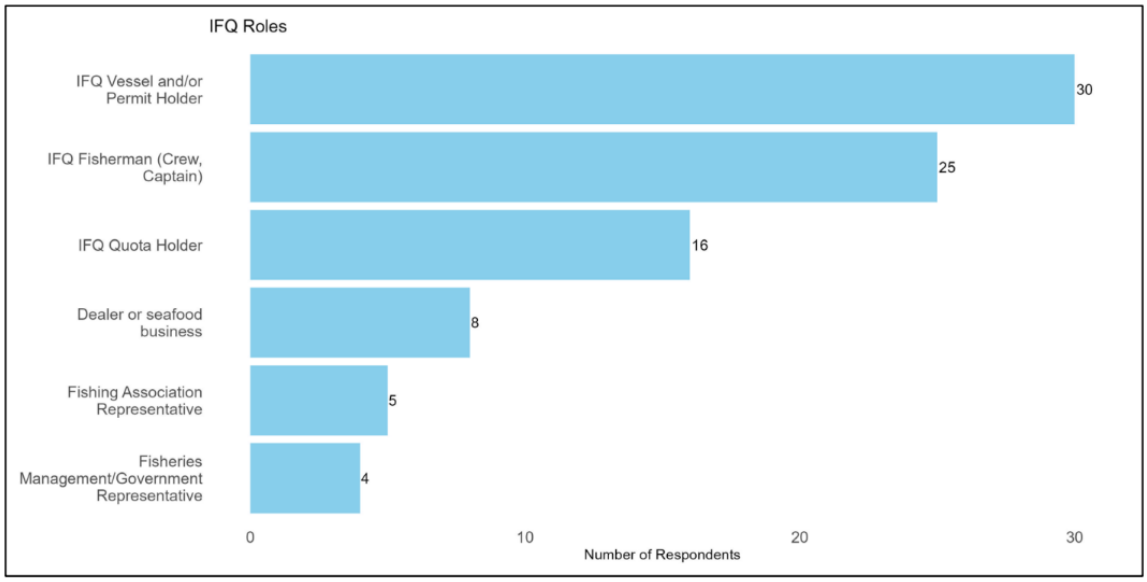
The goal of the survey was to gather information at the community level rather than at the individual level. The broadness of the survey also gave opportunity for a wider range of industry members to participate instead of limiting it to active crew and vessel owners. Participants were recruited using a multi-pronged approach to reach a wide range of industry members connected to the LAGC IFQ fishery. Individuals could complete the survey online or over the phone. The survey was open for one month between March and April 2025 and received 32 responses. Questions focused on participant roles, quota ownership and leasing, and perceptions of

economic, mental, and community wellbeing within the LAGC IFQ program. The full draft survey report is available in Appendix III.

Demographic and Representation

The survey received 32 responses, primarily from individuals in Massachusetts and New Jersey (Table 36), most of which are actively involved with the LAGC IFQ scallop fishery. Most respondents identified as active fishermen, with 94% owning vessels or permits and 50% holding quota (Figure 21). Over 60% participated in the program every year since its start in 2010, although only 31% were initial recipients of quota. Most trips taken were under 24 hours in duration (Figure 22), and a significant portion of participants also used multiple ports throughout the region (Table 36).

Figure 21 - Roles of survey participants within the LAGC IFQ scallop fishery (n=32).



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

Figure 22 - Trip length by region (n=28).

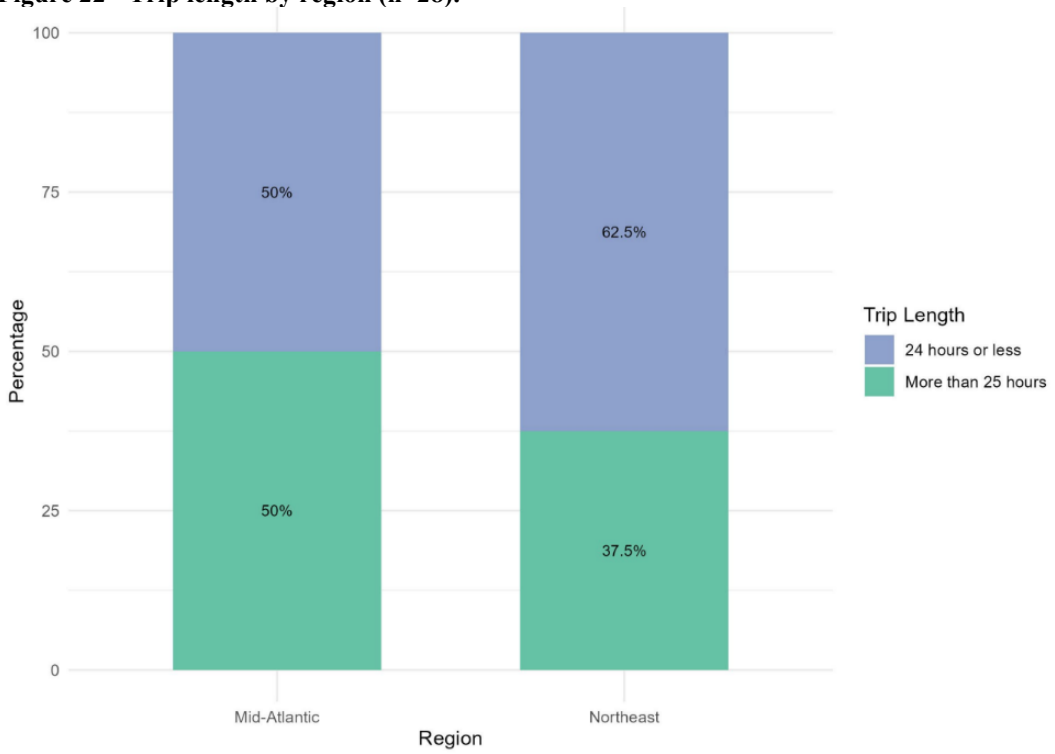


Table 36- Principal Port State and State of Other Ports Utilized (n=26).

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%

Quota Ownership and Leasing

More than half of respondents reported leasing in most or all of the quota used on their vessels, while about 30% relied entirely on their own quota (Figure 23). Very few participants reported leasing out large portions of their allocation, and none leased out all of it. Quota banks were used by over 60% of respondents (

Figure **24**), mainly to access lower prices or secure reliable fishing opportunities. Some respondents shared that they use quota banks in part to ensure that they have a voice in their policy process and can advocate for small operators in the fishery.

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

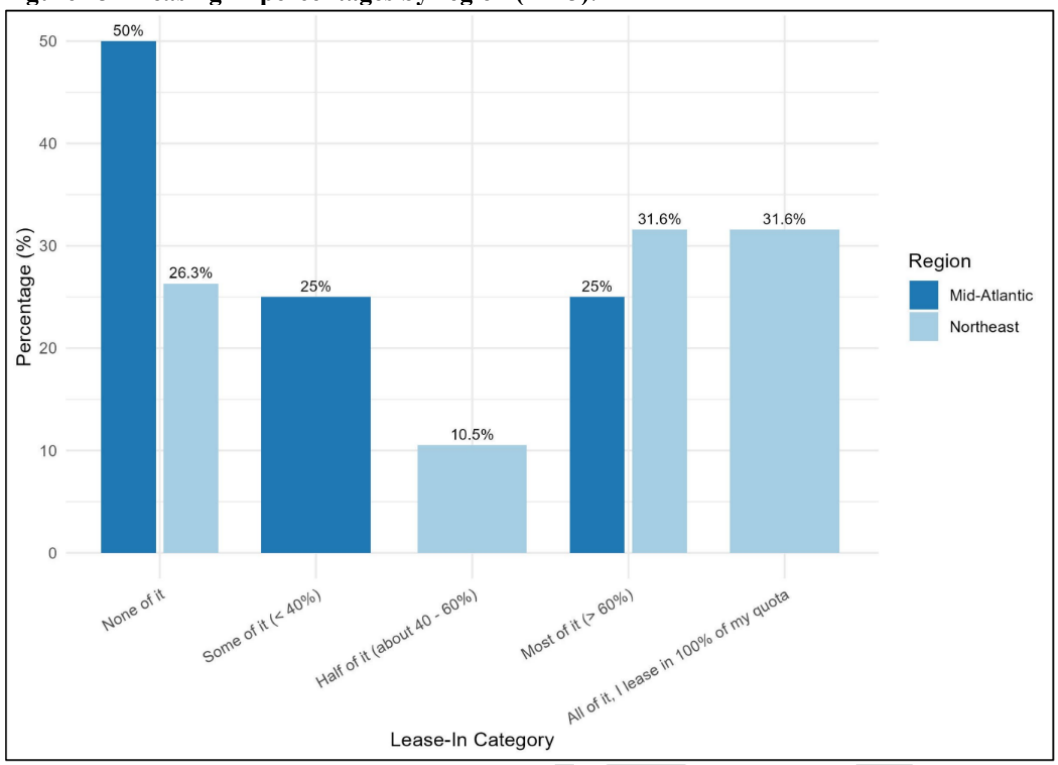
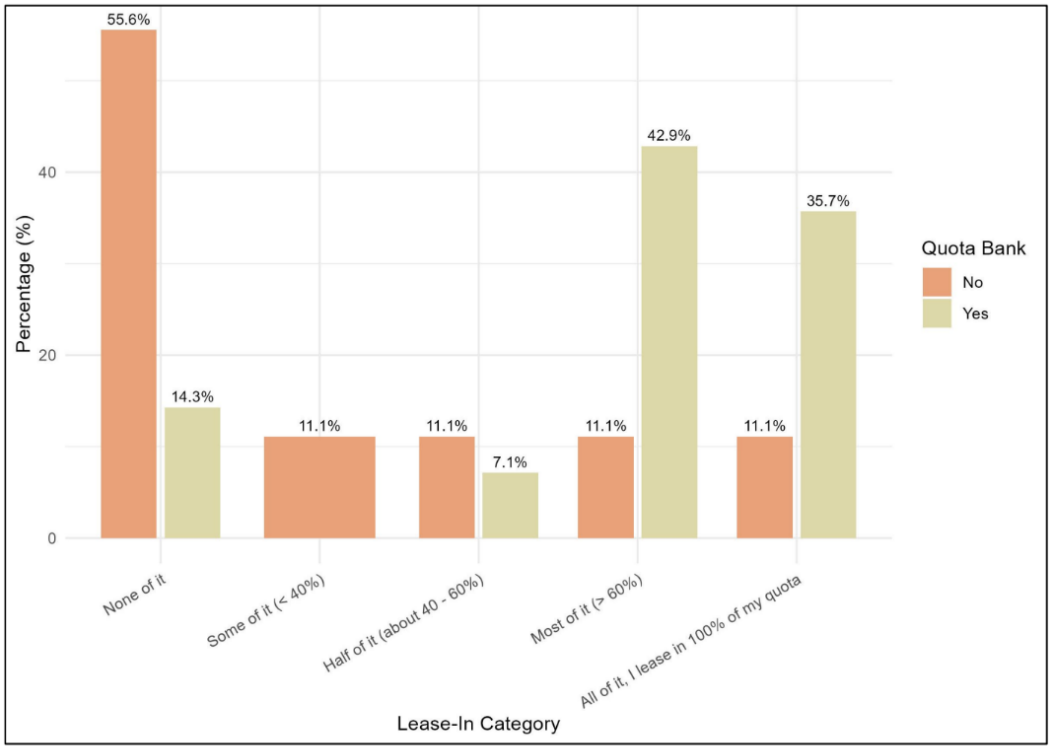


Figure 24 - Quota bank membership and leasing-in arrangements across respondents (n=23).



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

Quota Affordability And Availability

Affordability of quota emerged as a widespread concern (
Figure 25). High lease prices were described as a major challenge to profitability, particularly for fishermen who depend entirely on leased quota or are trying to enter the fishery. Several participants emphasized that leasing decisions require careful planning, often a year in advance, in order to manage both availability and cost. Some expressed concern that quota held by non-fishing entities can distort pricing, making it harder for working fishermen to compete. Additional expenses, such as permit bank fees or agent fees, were also seen as cutting into already tight margins.

While many respondents felt that quota is generally available, others noted that access can vary depending on the time of year (
Figure 26). "Unofficial seasonality" was a term used to describe how quota prices tend to be highest early in the year, when catch rates and market conditions are most favorable. This dynamic can force fishermen to choose between fishing during peak conditions with tight margins or waiting until later in the year, when quota may be cheaper but fishing is more difficult and less productive.

Figure 25 - Responses to quota affordability statements (n=29).

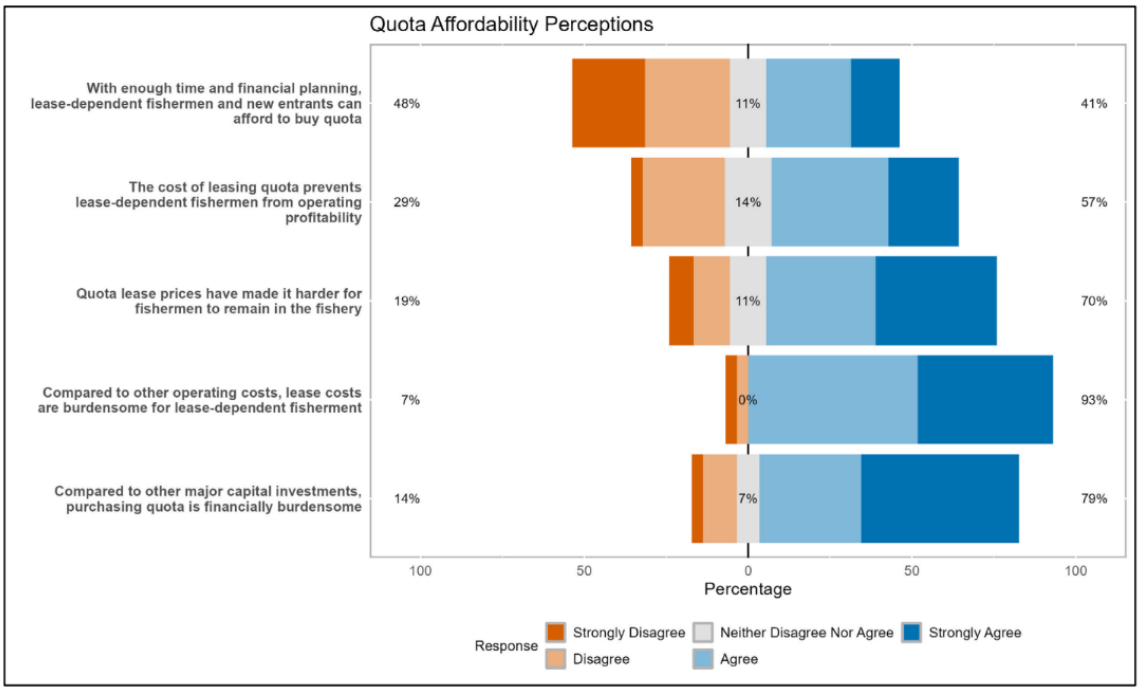
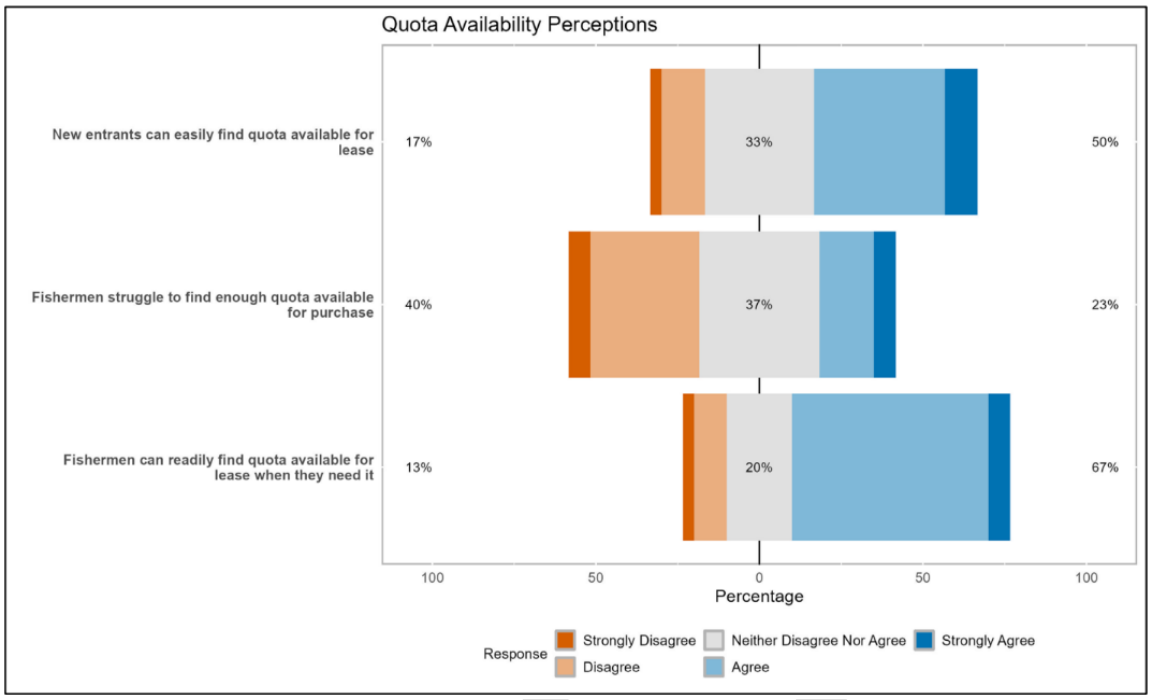


Figure 26 - Responses to quota availability statements (n=30)



Fishing Reliance And Diversification

Participants reported varied levels of reliance on the LAGC IFQ scallop fishery, reflecting the individual nature of income dependence within the fishery (Figure 27). About 77% received at least 40% of their fishing income from the program (Figure 28), but nearly 80% also had income from other fisheries, such as lobster, groundfish, and other scallop sectors (

Figure 29). A majority of respondents reported that they rely entirely on fisheries for their income, although a few listed other work like farming, boat building, and research trips (

Figure 30). Overall, most participants disagreed with the statement that participating in the scallop LAGC IFQ program meant stable and predictable wages.

Figure 27 - Responses to individual fishing reliance statements (n=26).

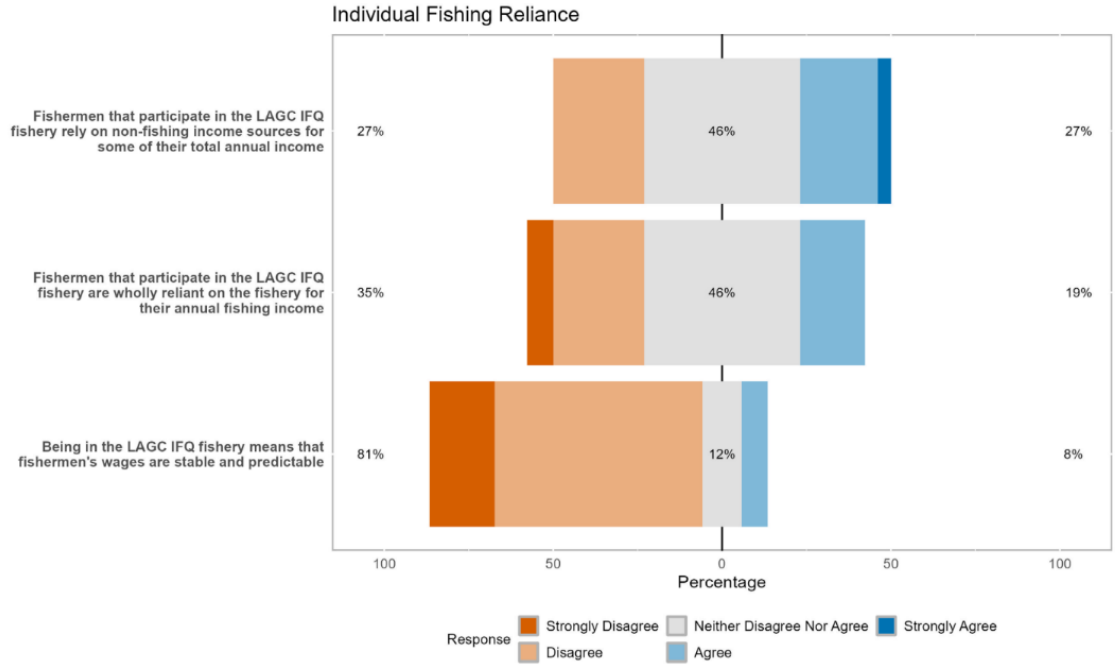


Figure 28 - Fishing Income Dependency on the LAGC IFQ Fishery (n=28).

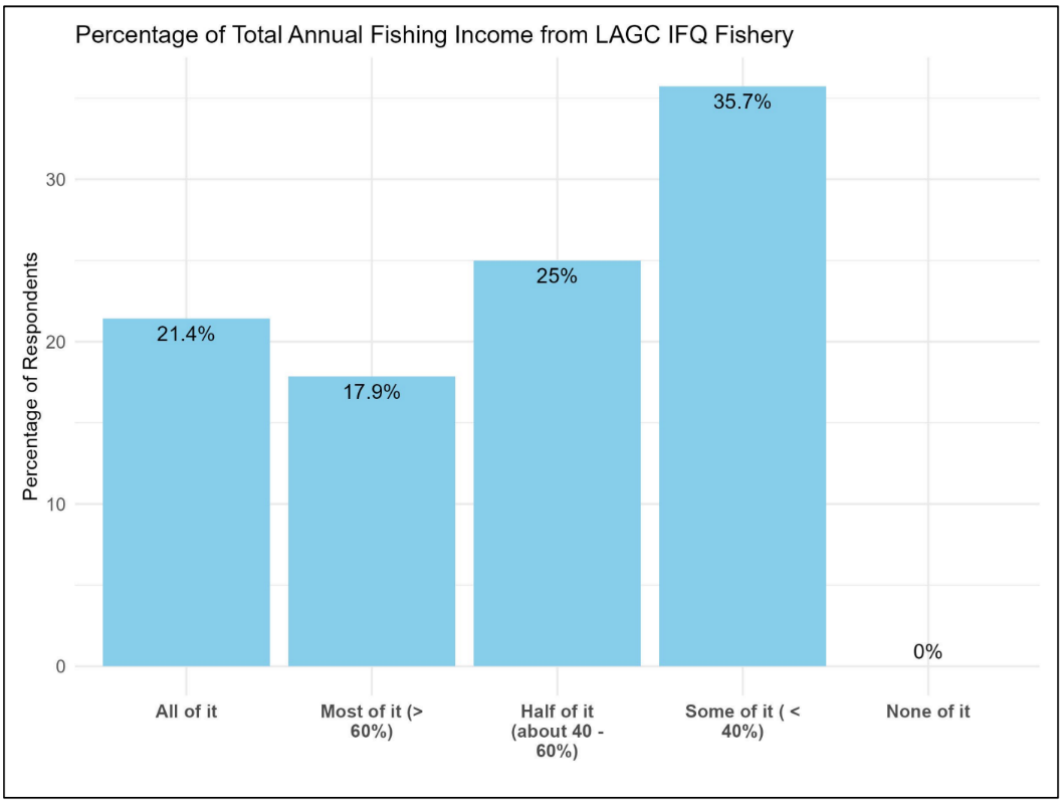


Figure 29 - Other Sources of Fishery Income (n=26).

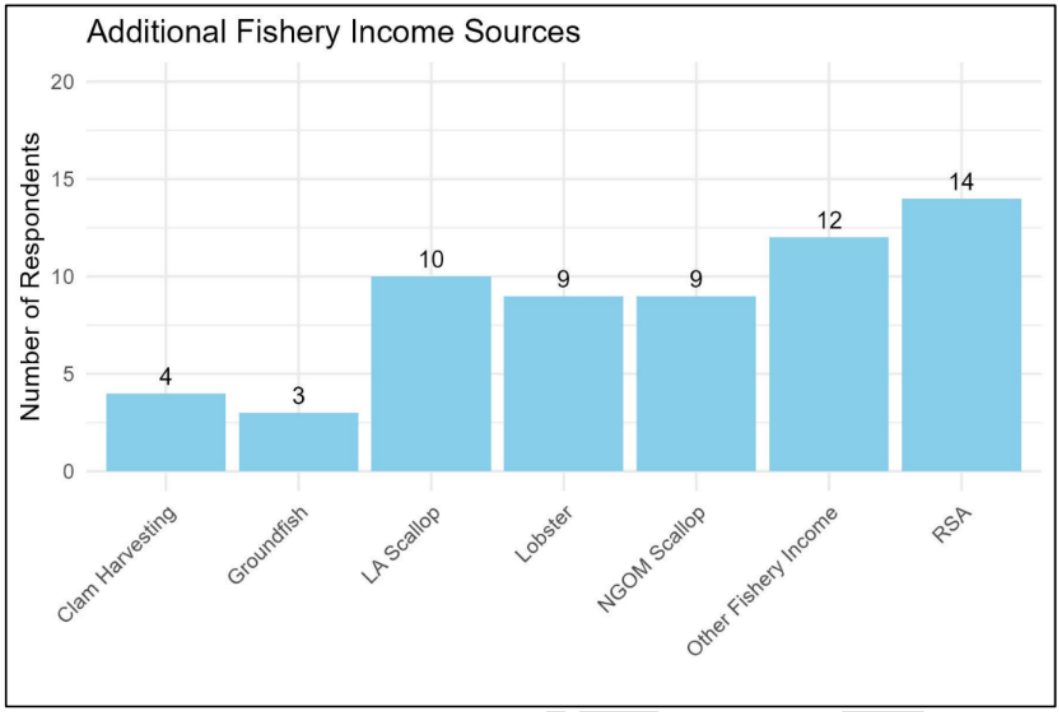
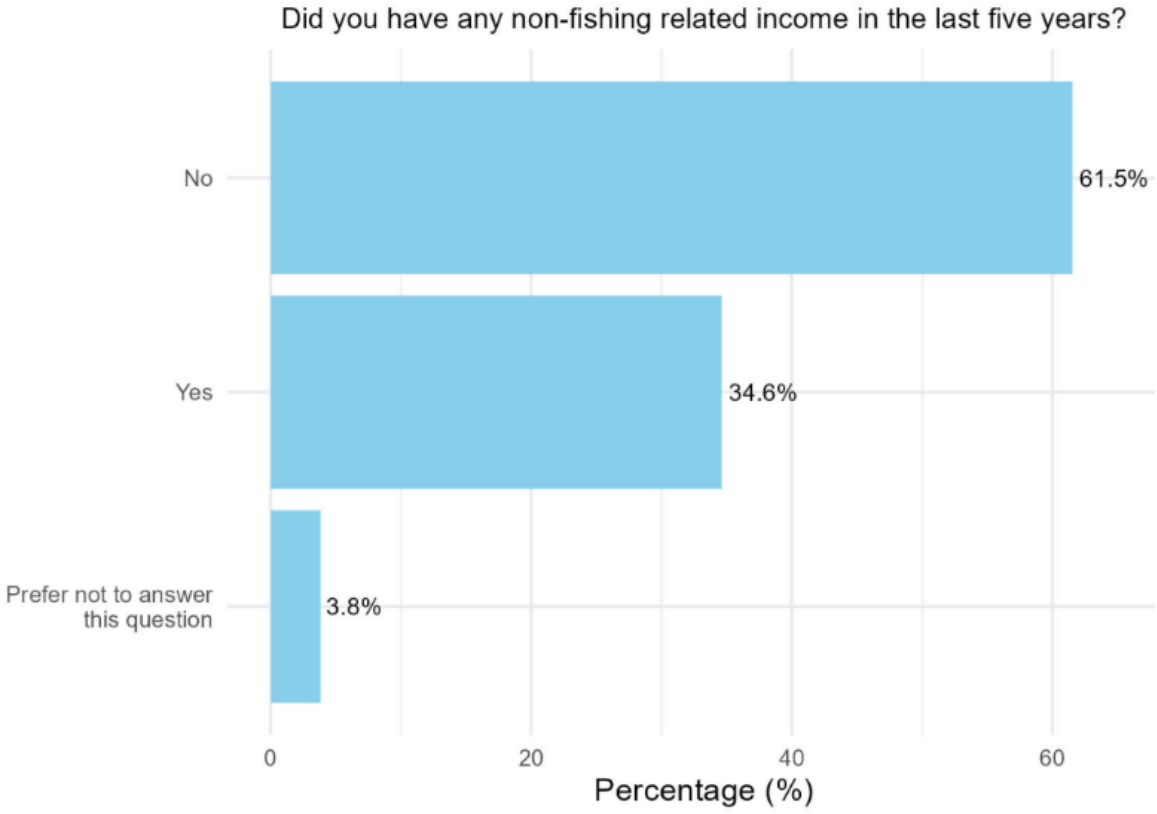


Figure 30 - Proportion of Respondents with Non-Fishery Income (n=26).



Job Satisfaction

Overall, job satisfaction was moderate to high, especially regarding general enjoyment, safety, and earnings (Figure 31). However, there was more dissatisfaction around time spent away from home, and several respondents expressed concerns about the difficulty of recruiting and retaining crew members. Respondents also voiced discontent toward management of the fishery, noting that the increasingly competitive nature of scalloping makes it more difficult to find enjoyment in the work.

Mental wellbeing responses were mixed. While many believed fishermen in the LAGC IFQ fishery experience good mental health, others described widespread challenges with stress, anxiety, and sleep deprivation (

Figure 32). It was noted that issues with mental health and addiction were generally in line with fluctuations in the productivity of the fishery. Some respondents, however, believed that the LAGC IFQ component experiences better mental health than the Limited Access component.

Figure 31 - Responses to job satisfaction statements (n=30).

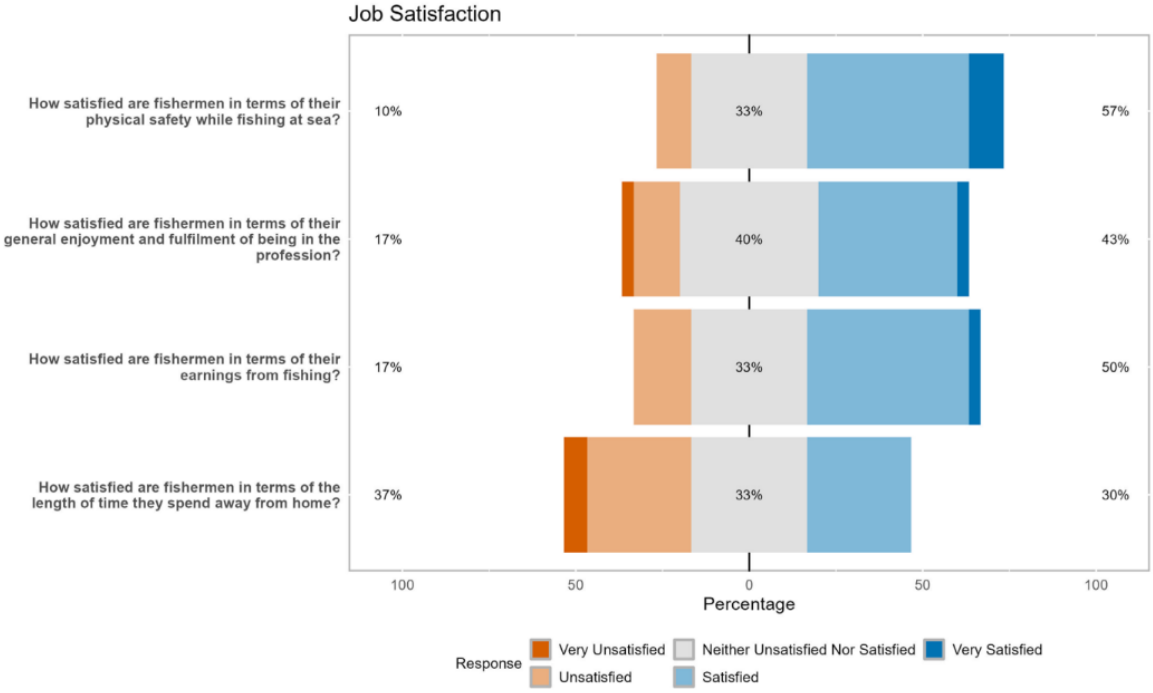
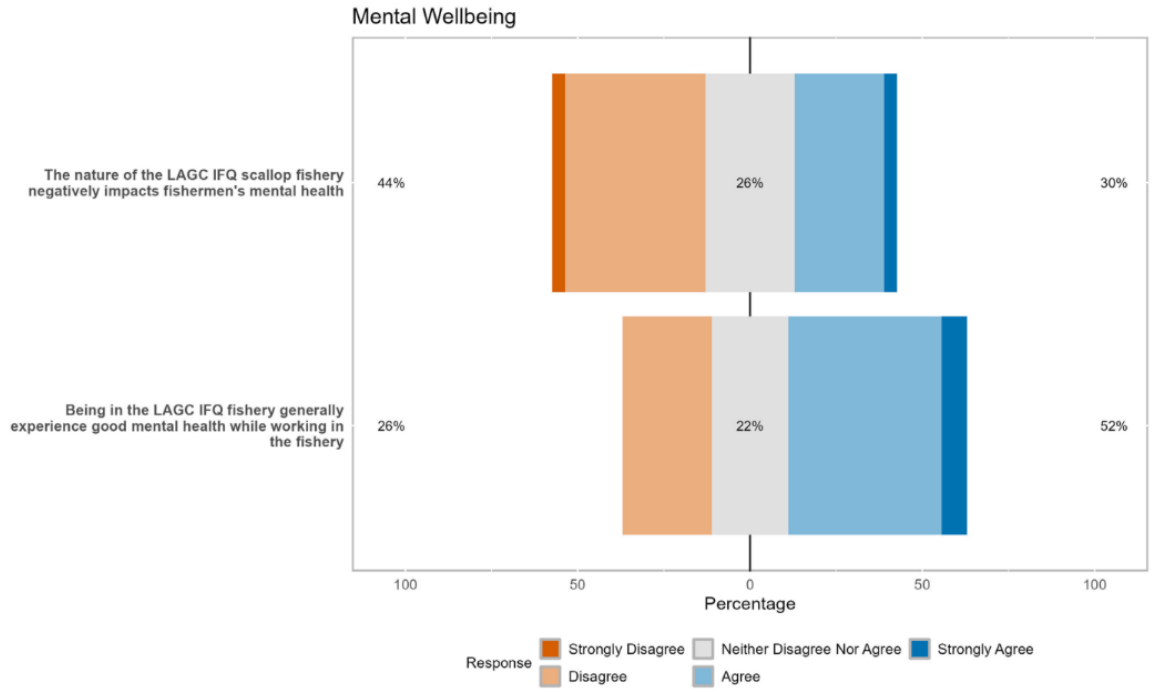


Figure 32 - Perceptions of mental wellbeing in the fishery (n=27).



Upward Mobility and Crew Shares

Most respondents used a share-based payment system for crew, with an average crew share of around 46% (Table 37). 80% of vessel owners deducted lease costs before calculating crew shares, which can affect crew income in lower-revenue years.

Table 37 - Average Reported Crew Pay Share and Variance (n=23).

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

Responses about upward mobility were divided. Some participants viewed the fishery as offering opportunities for advancement (Figure 33). However, others emphasized high barriers to entry, including the cost of vessels, gear, and quota. A majority of respondents agreed that fishermen are looking to leave the fishery, even if just temporarily. 41% stated that the fishery was not something they could count on as a career in the future. However, respondents are less concerned about communities as a whole, with 63% agreeing that the LAGC IFQ fishery would be part of their community's future (Figure 37). Overall, respondents pointed to the wider issue of workforce availability, reliability, and their relationship to the state of the resource.

Figure 33 - Responses to Upward Mobility Statements (n=29).

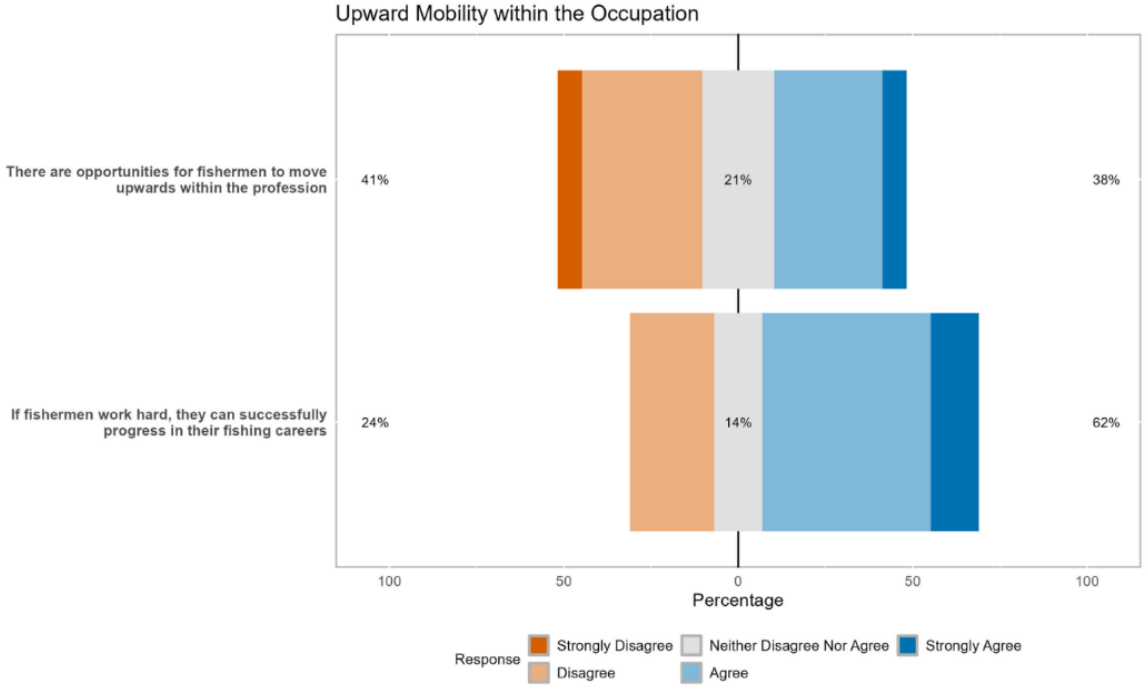
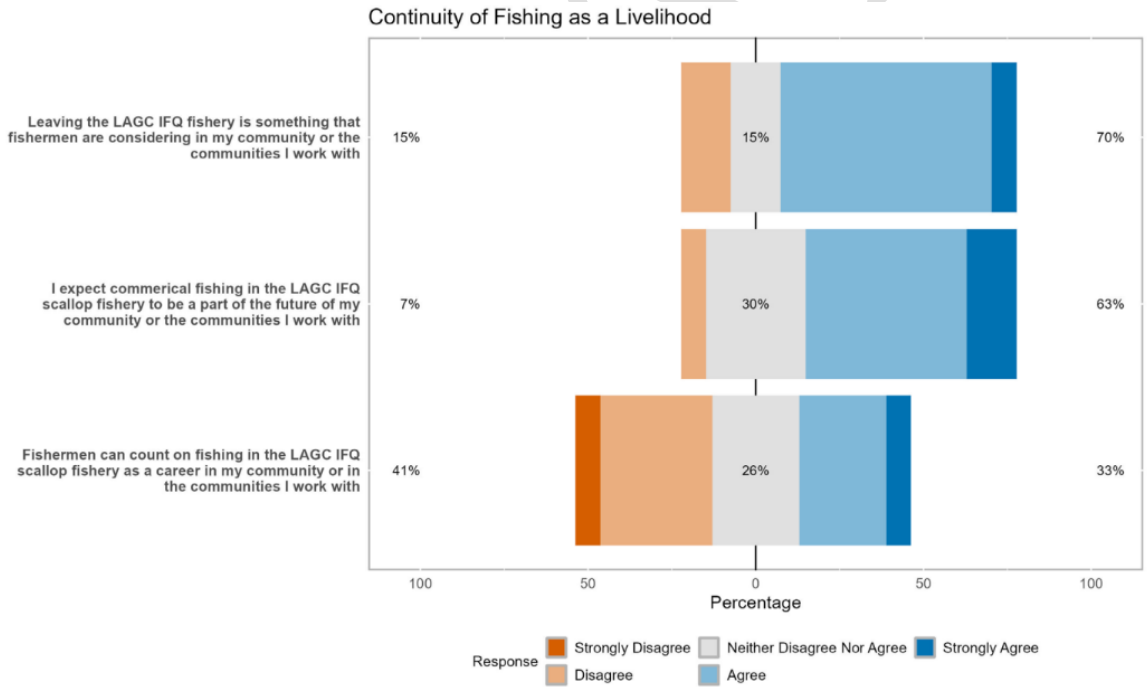


Figure 34 - Perceptions of continuity of the scallop LAGC IFQ fishery as a livelihood into the future (n=27).

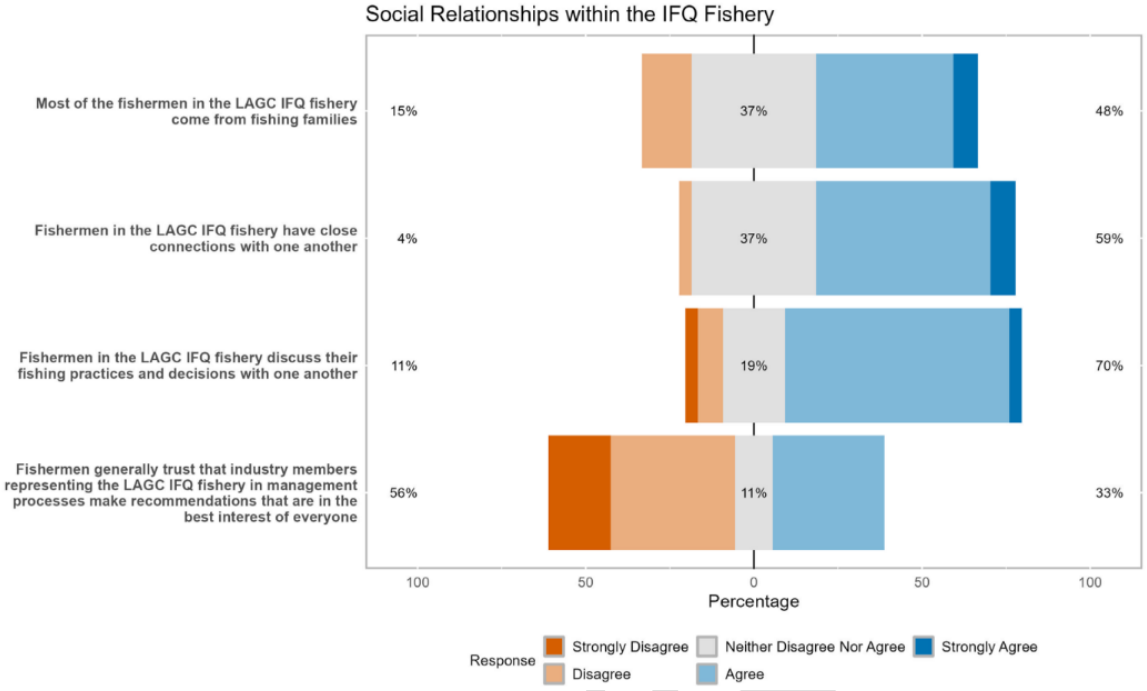


Social Relationships

Respondents generally described strong social ties within the fishery. Most respondents agreed that fishermen often came from fishing families and maintained close relationships with one another (

Figure 35). However, trust in industry representatives involved in management was low. Many respondents questioned whether industry representatives truly reflected the interests of all industry participants.

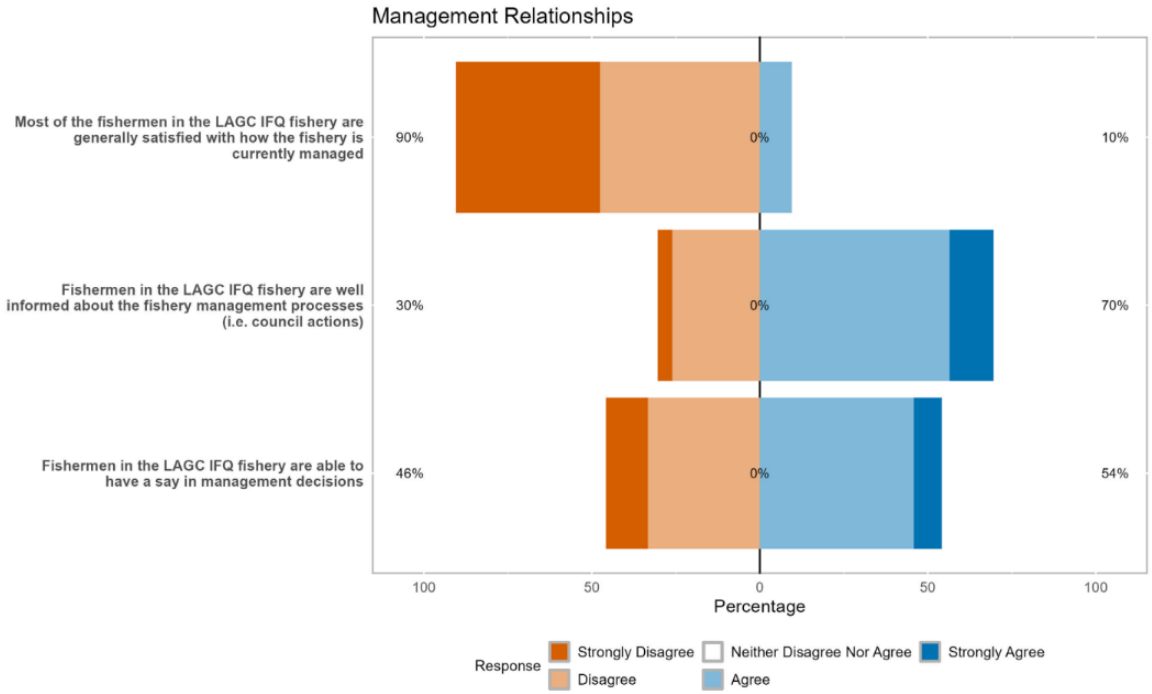
Figure 35 - Perceptions of social relationships within the fishery (n=27).



Management Perspectives

While 70% of respondents felt that fishermen were well informed about management processes, only 54% believed they had meaningful input in decisions. A large majority, 90%, said they were dissatisfied with how the fishery is currently managed (Figure 36). Participants expressed frustration with inconsistent regulations, lack of responsiveness, and the perception that management favors larger operators or outside interests. Some felt engaged in the process but still doubted that their concerns were being addressed.

Figure 36 - Management Relationships within the Fishery (n=28)



5.4.1 Summary and Conclusions

The analysis of catch diversity based on the Herfindahl-Hirschman index (HHI, Section 5.4.2) indicated that the majority of LAGC IFQ vessels derive revenue from a single species group, and a relatively small proportion of vessels derive revenue from more than two species groups (

Figure 12). This suggests that LAGC IFQ vessels are highly specialized in the scallop fishery, and that the LAGC IFQ fishery appears to be deriving revenue from fewer fisheries from 2016-2023 relative to earlier years. In Section 5.4.3, analysis of scallop revenue and revenue reliance suggested a large decline in scallop revenue per active affiliation. This downward trend has likely been driven by an overall decline in total fleet revenue, which has also led to a decline in active affiliations over the review period. Over this period, a higher percentage of vessels became increasingly reliant on scallop revenue, which could support a concentration of revenues among fewer affiliations.

Analysis of the distribution of quota allocations provides compelling support that the LAGC IFQ fishery is growing more specialized and consolidated. As evidenced in Figure 14 and Figure 15, the distribution of quota ownership among LAGC IFQ affiliations has been growing more unequal overtime, with 10% of LAGC IFQ affiliations owning 50% of the quota in 2023 (Gini=0.71), up from 36% in 2015 (Gini=0.60). The degree to which this consolidation has occurred more among inactive or active affiliations is worth additional investigation.

While the number of active and inactive LAGC IFQ permits declined in most states between 2016 and 2023, declines appeared to be much greater for LAGC IFQ permits with a principal port in the Mid-Atlantic, particularly among active LAGC IFQ permits. Between 2016 and 2023, active LAGC IFQ permits with a principal port in Massachusetts declined by 4.7%, while those active in New Jersey ports declined by 52.5%, and by 91.7% for those active in North Carolina ports. By vessel landings and total value by port of landing (Table 34 and Table 35) this decline can be seen in the decline in scallop landings across New Jersey ports. Point Pleasant, NJ saw an 80% decline in landings from 2016 to 2023, Cape May, NJ saw a decline of 93%, and the ports of Atlantic City, NJ and Long Beach, NJ, the 2nd and 4th largest ports for LAGC IFQ landings in 2016, did not see any LAGC IFQ scallop landings by the end of the review period. Meanwhile, ports in Massachusetts saw minor declines to minor gains from 2016 to 2023, including New Bedford (22% decline), Chatham, (20% decline), and Provincetown (18% increase). This is likely attributable to declines in scallop productivity in the Mid-Atlantic, particularly in the inshore and southern extent of the resource, and a shift towards the majority of scallop fishing effort occurring on Georges Bank, which is much shorter trip from major ports in Massachusetts.

Section 5.4.7 and Section 5.4.8 provide important context as well as the industry's demographics and perspectives on the scallop fishery and the LAGC IFQ program. As noted in these sections, the NEFSC crew survey data is not necessarily representative of the LAGC IFQ fishery, and instead may better represent the scallop fishery as a whole, while the Northern Economics/GMRI LAGC IFQ survey is IFQ-specific, but may represent only a small, non-random sample of all LAGC IFQ fishery participants.

5.5 Conservation And Management

5.5.1 Stock Status and recent assessments

The sea scallop resource had a benchmark assessment in 2018 (SARC65, 2018) as well as a Level 3 management track assessment in 2020. Therefore, all of the data and models used to assess the stock were reviewed. The final results from that assessment were incorporated into subsequent actions, including updated reference points for status determination. Overall, a

handful of issues were updated as a result of the assessment and are summarized below. The full assessment and summary report can be found at:
http://www.nefsc.noaa.gov/publications/crd/crd1409/ .

The major highlights from the benchmark assessment include:

1. Use of gonad weight as a proxy for reproductive potential, rather than Spawning Stock Biomass (SSB) estimated from meat weight.
2. Direct estimation of natural mortality by year
3. Several model parameter adjustments, including natural mortality and growth.
4. Updated biological reference points

In the 2020 management track assessment, several changes were made in growth for the most recent years, adjusting to the observed slower growth, which was at least in part due to the large year classes. Fishery selectivity periods for 2018 and 2019 for Georges Bank Closed were added to account for the large landings of intermediate-sized scallops in the Nantucket Lightship West area. The assumed standard deviation of natural mortality in the SYM reference point model was reduced, which had very little effect on the reference points but helped stabilize the model. Based on all these changes the assessment approved new reference points for status determination.

5.5.1.1 Stock status

The scallop stock is considered overfished if F is above F_{MSY}, and overfishing is occurring if biomass is less than ½ B_{MSY}. The previous estimate of F_{MSY} was 0.38 and B_{MSY} was 96,480 mt (1/2 B_{MSY} = 48,240 mt). SARC65 revised these reference points and increased F_{MSY} to 0.51 and increased B_{MSY} to 116,766 mt (½ B_{MSY} = 58,383 mt), and the 2020 Management Track assessment slightly reduced F_{MSY} to 0.45 and reduced B_{MSY} to 102,657 mt (1/2 B_{MSY} = 51,329). A comparison of the reference points are described in Table 38.

Table 38 – Atlantic sea scallop reference points and status determination from previous stock assessments.

	Definition in Scallop FMP	SARC 50 (2010)	SARC 59 (2014)	SARC 65 (2018)	2020 Management Track
OFL	F_{MSY}	F=0.38	F=0.48	F=0.64	F=0.61
ABC=ACL	25% probability of exceeding the OFL	F=0.32	F=0.38	F=0.51	F=0.45
B_{MSY}	B_{TARGET}	125,358 mt	96,480 mt	116,766 mt	102,657 mt
½ B_{MSY}	$B_{THRESHOLD}$	62,679 mt	48,240 mt	58,383 mt	51,329 mt
MSY		24,975 mt	23,798 mt	46,531 mt	32,079 mt
Overfished?	$B < B_{THRESHOLD}$	No	No	No	No
Overfishing?	$F < F_{THRESHOLD}=F_{MSY}$	No	No	No	No

Four types of mortality are accounted for in the assessment of the sea scallop resource: natural, discard, incidental, and fishing mortality. In SARC 65, adult natural mortality was revised upward from 0.16 to 0.2 on Georges Bank, and from 0.2 to 0.25 in the Mid-Atlantic. Natural mortality was directly estimated by year for Georges Bank closed areas and juveniles in the Mid-Atlantic, and fixed at the aforementioned values for Georges Bank open areas and adults in the Mid-Atlantic.

Discard mortality occurs when scallops are discarded on directed scallop trips because they are too small to be economically profitable to shuck or due to high-grading during access area trips. Total discard mortality (including mortality on deck) is uncertain, but was estimated at 20% in this assessment, as well as the previous four assessments. Incidental mortality is non-landed mortality associated with scallop dredges that likely kill and injure some scallops that are contacted but not caught by crushing their shells, and this source of mortality is highly uncertain. The last benchmark assessment in 2010 used 0.20 on Georges Bank and 0.10 in the Mid-Atlantic (NEFSC, 2010), compared to earlier values of 0.15 on Georges Bank and 0.04 for Mid-Atlantic. Recent studies evaluated during SARC65 suggested that the incidental mortality is likely lower than previously estimated, and 0.11 and 0.06 were used for Georges Bank and the Mid-Atlantic respectively. There was no new information to modify these values for the 2020 Management Track Assessment. In general, incidental mortality does not have a very large impact on the overall assessment of the stock.

Finally, fishing mortality, the mortality associated with scallop landings on directed scallop trips, is calculated separately for Georges Bank and the Mid-Atlantic because of differences in growth rates. Fishing mortality peaked for both stocks in the early 1990s, but has decreased substantially since then as tighter regulations were put into place, such as area closures, and biomass levels recovered. Table 39 shows F and biomass estimates for the combined stock overall through 2019.

The 2020 Management Track Assessment included a formal stock status update through FY 2019, and the reference points were updated. The updated estimates for 2019 are: F=0.34 and SSB = 147,073 mt, so the stock is not overfished and overfishing is not occurring, under both the old and new reference points (Table 38 and Table 39). Important drivers of the increase in F_{MSY} is due to increases in natural mortality and a weakening of the Mid-Atlantic stock recruit relationships. In general F_{MSY} is uncertain because the F_{MSY} curve for the Mid-Atlantic is very flat, and it is uncertain where F_{MAX} is for that region.

Figure 37 - Indices of sea scallop biomass for the lined dredge, drop camera, and HabCam surveys on Georges Bank (top row), the Mid-Atlantic (middle row), and combined (bottom row).

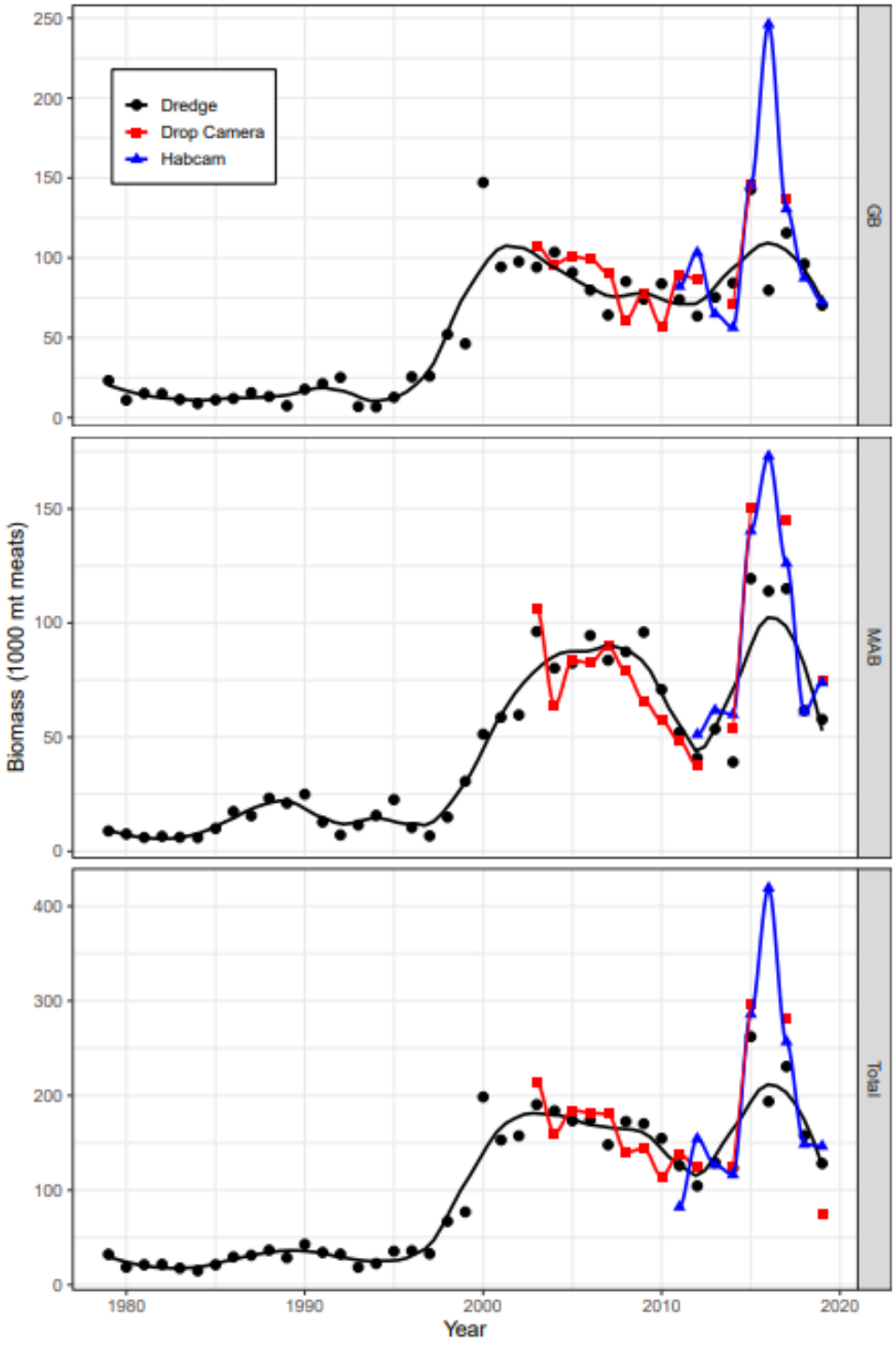


Figure 38 – Fully recruited annual fishing mortality rate for scallops from 1975-2019. Note that trends are different for partially recruited scallops because of changes in commercial size selectivity. 2020 Management Track Assessment F_{MSY} is shown with red dotted line for the most recent period.

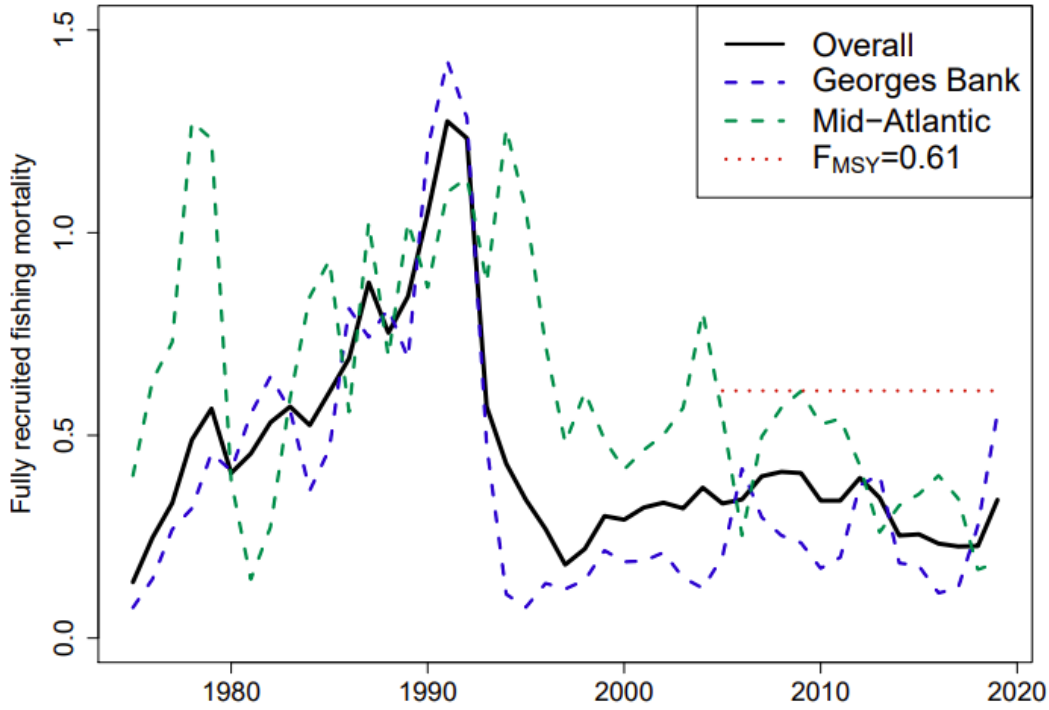


Table 39 – 2020 sea scallop stock status – overfishing is not occurring and the resource is not overfished.

	2020 Estimate	Reference Points
SSB	147,073 mt	½ Bmsy = 51,329 mt
F	0.34	OFL = 0.61

5.5.2 Allocation and Landings

The LAGC IFQ component is allocated 5% of the ACL, which corresponds to an F=0.45 based on the 2020 management track assessment. The fishing mortality from the LAGC IFQ fishery, measured in terms of total catch, is estimated to be about 5% of the total projected fishing mortality. The LAGC component is allocated a total allowable quota of 5% of the projected catch after other sources of mortality are removed such as incidental catch and set-asides for observer coverage and research. Estimating how much of the total LAGC IFQ sub-ACL is harvested can be viewed as an indirect measure of fishing mortality and biological performance.

In some cases, LAGC IFQ vessels may have a lower fishing mortality than larger limited access vessels due to smaller gear and lower area swept. However, in other cases the mortality and impacts on the environment could be similar or even higher if general category vessels are fishing in areas with lower scallop densities, potentially having higher impacts on scallop mortality and bycatch per unit of effort. If it is assumed that fishing mortality from all scallop fishing is similar, then assessing the amount of catch harvested from the total available catch allocated is one way to measure the biological performance of this fishery in terms of associated fishing mortality.

Based on the previous review and the latest eight years of information, the sub-ACLs and IFQs in place are effectively controlling mortality from this component of the fishery. The proportion of the sub-ACL for the LAGC IFQ fishery that was harvested annually during the program review period varied from 42.1% in FY 2019 to over 80% in FY 2016 and FY 2022. It should be noted that the LAGC IFQ component has fished within its sub-ACL after the implementation of up to 15% carryover pounds. In summary, from a biological perspective this IFQ and sub-ACL management program has been effective at controlling mortality and preventing overfishing.

Figure 39 - Comparison of LAGC IFQ actual landings with LAGC IFQ sub-ACL for FY2016 - FY2023.

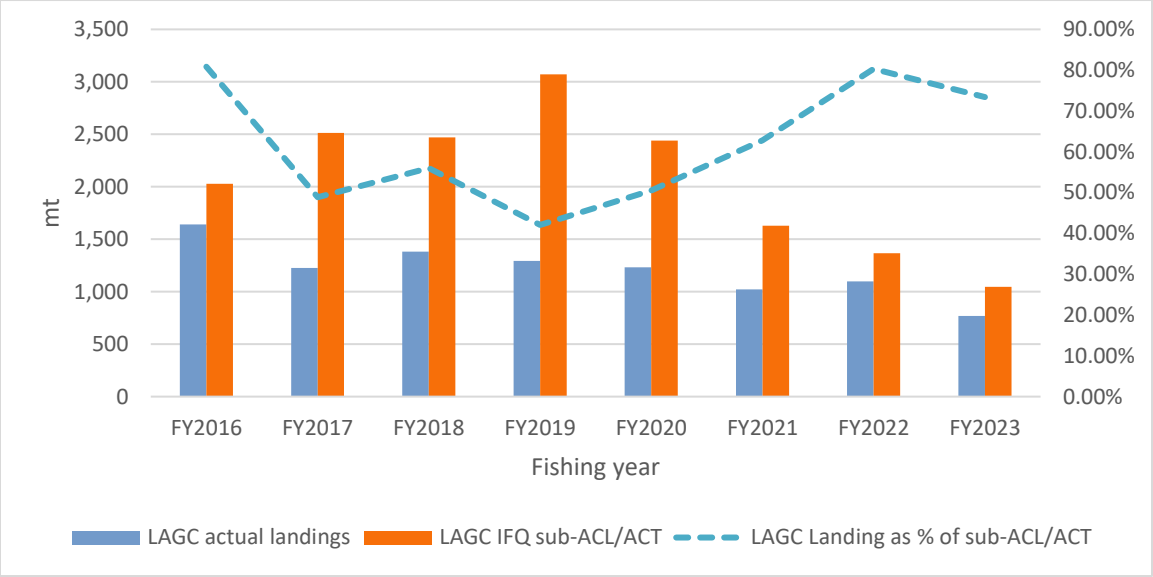
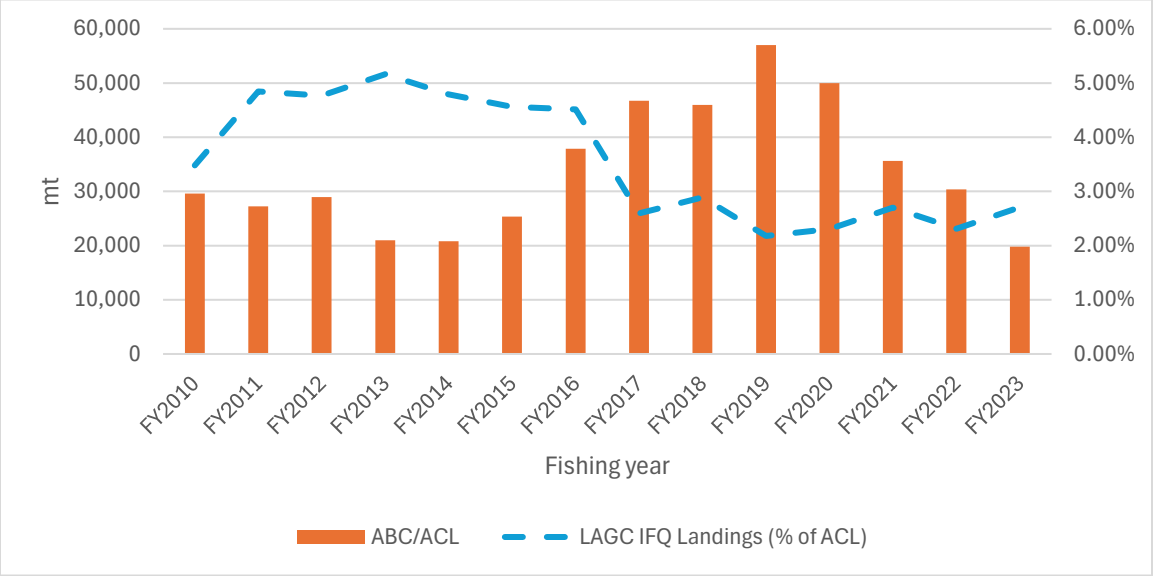


Figure 40 – LAGC IFQ actual landings as a proportion of the ABC/ACL for FY2016 – FY2023.



5.5.3 LPUE

The average LPUE (scallop lb. of kept catch per unit effort) of LA and LAGC IFQ vessels is shown in Figure 41 (per Day at Sea) and Figure 42 (per Day Fished). Overall, average LA LPUE was higher than the LAGC IFQ LPUE, corresponding to LA vessels having more fishing power (i.e. larger vessels, more horsepower, more and larger dredges than LAGC IFQ vessels). LPUE based on DAS includes transit time outside of the VMS demarcation line. Between FY 2016 and FY 2018, LAGC IFQ LPUE increased 23% while LA LPUE increased approximately 34%. From FY2018 to FY2021, LPUE decreased in both LAGC IFQ and LA components of the fishery by approximately 30% and 32%, respectively. From FY 2021 to FY 2023, LAGC IFQ LPUE decreased by 12% while LA LPUE increased by 15%

LPUE based on Days Fished excludes transit time outside of the VMS demarcation line. From FY 2016 to FY 2018, LAGC IFQ LPUE increased by 50% and the LA LPUE increased by 91%. From FY 2018 to FY 2021, LAGC IFQ LPUE decreased by 43% and the LA LPUE decreased by 40% after peaking in FY 2019 at 6,313 lb/DF. From FY2021 to FY 2023, LAGC IFQ LPUE declined by 12%, while LA LPUE declined by 7%.

Figure 41 - The average annual scallop landings per DAS for LA and LAGC IFQ vessels.

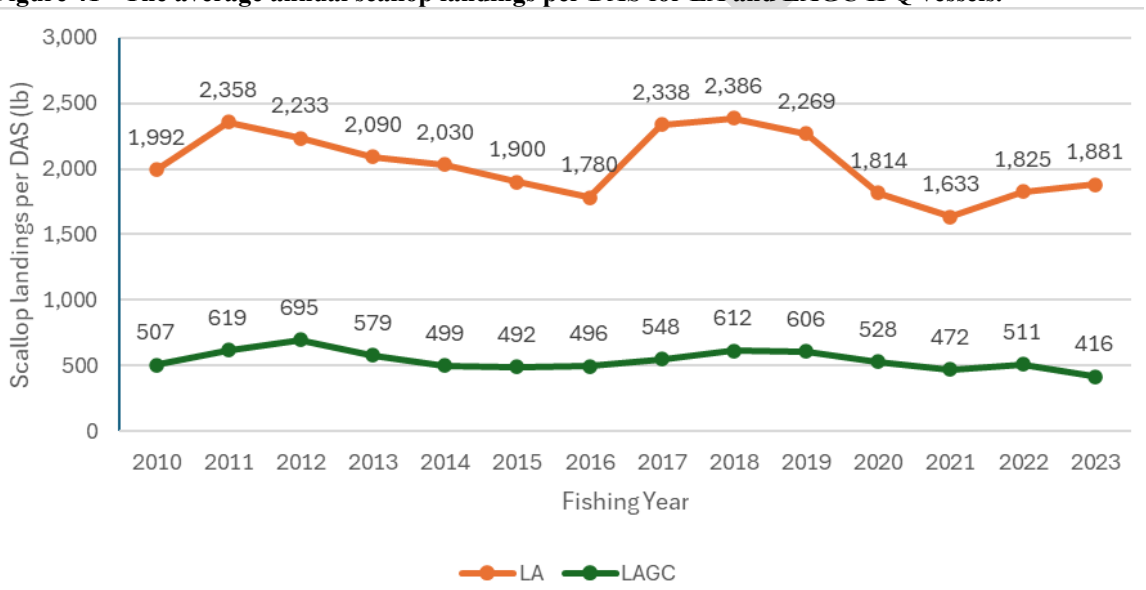


Figure 42 - The average observed open-area LPUE (scallop lb./day fished) for LA (red line) and LAGC (green line) vessels.

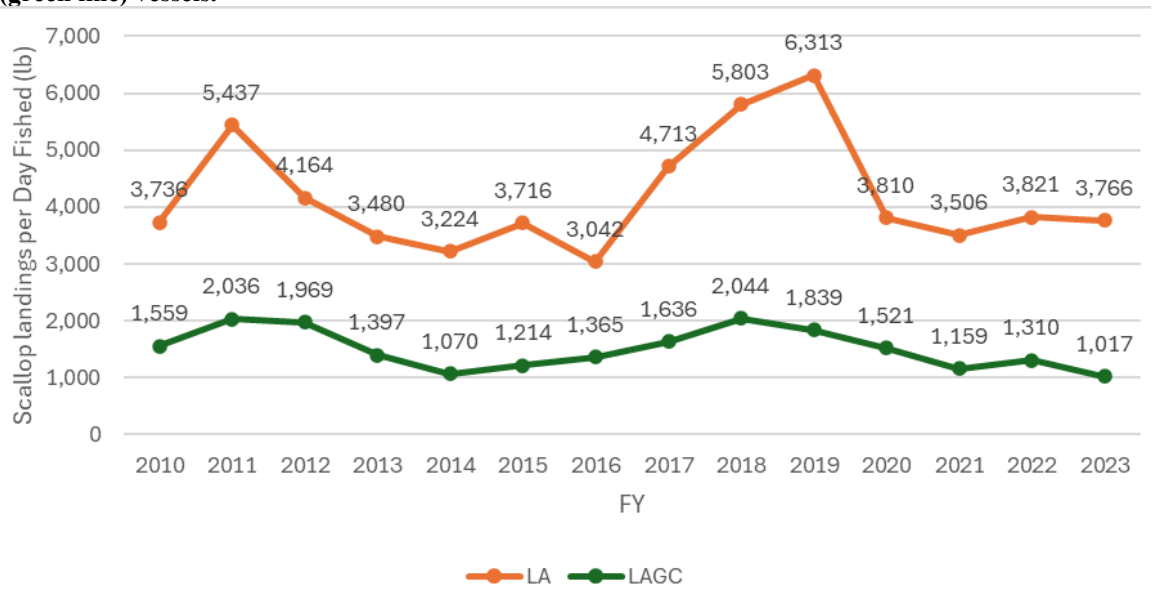


Table 40 displays the percent of allocated trips taken by LAGC IFQ vessels, and Table 41 and Table 42 show the total and proportion of all trips taken by LAGC IFQ vessels. Figure 47 and Figure 48 describe the average trip length (in days) of access area trips and open trips. Average trip length seemed to be an indicator of the quality of fishing for LAGC IFQ vessels. For example, very few trips (< 1%) were taken in the Nantucket Lightship - West access area in FY2019 while average trip length was much longer than other nearshore access areas, such as Closed Area I (Figure 47) In instances where fishing was better, a greater proportion of allocated trips were taken to a specific area while average trip length would be decreased compared to other areas. For example, all allocated Mid-Atlantic access area trips were taken in FY2019, and the average trip length was approximately 18% less than the average for that year and approximately 22% less than for open trips. Other reasons that trip length increased in some years was the distance of an allocated access area from shore, for example, trips to Closed Area II in FY2023 were 77% longer on average than the overall age trip length that year.

LAGC IFQ vessels have fished predominantly open trips from FY2016 to FY2023. From FY2016 to FY2023, between 44.9% (FY2018) and 78.7% (FY2023) of trips taken were open trips. A notable decrease in the proportion of open trips taken occurred in FY2015 (from 91.5% in FY2014 to 61.7% in FY2015), as an increased proportion of trips were taken in the Mid-Atlantic access area (38.3% in FY2015). Effort was also redirected to other nearshore access areas, such as the NLS-W in FY2018 (18.5%) and Area I.

In several years, the LAGC IFQ vessels used only a small percentage of their allocated trips to a given area (Table 40). This could be attributed to access areas with low LPUE, such as in the NLS-S (FY2018 – FY2022) where an extremely high-density year class exhibited below average growth rates, or productive areas of open bottom that were preferred by LAGC IFQ vessels.

Table 40 - Proportion of allocated access area trips taken by LAGC IFQ vessels from FY2016 to FY2023. Data used in the table also includes RSA compensation trips.

FY	CAI	NLS-N + CAII	NLS	NLS-S	NLS-W	NLS-N	MA AA
2016			100.00%				100.19%
2017			104.54%				27.12%
2018	98.25%			8.76%	80.47%		97.55%
2019	94.57%				2.45%		100.99%
2020	96.15%					91.94%	100.61%
2021	98.13%						99.12%
2022	103.78%			0.28%			
2023		63.05%					

Table 41 - Number of trips taken to each access area and open bottom by LAGC IFQ vessels from FY2016 to FY2023.

FY	CAI	CAII	NLS	NLS-S	NLS-W	NLS-N	MA AA	NGOM	Open Bottom
2016			485				2072	157	4045
2017			189				875	66	3571
2018	561			50	919		1114	84	2221
2019	540				42		1730	48	2321
2020	549					525	1149	41	2876
2021	840						566	42	2350
2022	741			1				364	2176
2023		285				75		176	1980

Table 42 – Proportion of trips taken to each access area and open bottom by LAGC IFQ vessels from FY2016 to FY2023.

FY	CAI	CAII	NLS	NLS-S	NLS-W	NLS-N	MA AA	NGOM	Open Bottom
2016			7.18%				30.66%	2.32%	59.85%
2017			4.02%				18.61%	1.40%	75.96%
2018	11.34%			1.01%	18.57%		22.51%	1.70%	44.88%
2019	11.54%				0.90%		36.96%	1.03%	49.58%
2020	10.68%					10.21%	22.35%	0.80%	55.95%
2021	22.12%						14.90%	1.11%	61.87%
2022	22.58%			0.03%				11.09%	66.30%
2023		11.33%				2.98%		7.00%	78.70%

5.5.4 Bycatch

The biological performance of the LAGC IFQ program can also be measured in terms of impacts on non-target species or bycatch. Again, the LAGC IFQ fishery is a relatively small component of the scallop fishery and LAGC IFQ bycatch estimates represent a small proportion of total fishery estimates. As previously stated, the transition to limited access and IFQ through Amendment 11 dramatically reduced fishing capacity for this part of the fishery. Because the fishery was open access prior to the implementation of the LAGC IFQ program, changes in bycatch from the period before Amendment 11 cannot be directly attributed to the implementation of an IFQ in and of itself. Also, the implementation of hard TACs and ultimately ACLs with accountability measures for the targeted catch of scallops are likely to influence bycatch estimates, which are a function of fishing effort and total landings.

There are several considerations when interpreting bycatch and fishery behavior with respect to non-target species. These include changes to the status of each stock, the triggering and timing of reactive accountability measures, the implementation on proactive accountability measures, changes in possession requirements, spatial constraints of the LAGC IFQ fishery, changes in fleet capacity and activity, the availability of the scallop resource in near-shore areas where the LAGC IFQ component prosecutes the fishery, and the type of gear used in fishing operations (i.e. dredge vs. trawl). This section will focus on bycatch of four key stocks for which the entire scallop fishery has sub-ACLs and accountability measures.

The 2023 management track assessments found that northern windowpane is overfished but overfishing is not occurring, while southern windowpane flounder is not overfished and overfishing is not occurring. For Georges Bank yellowtail, stock status remains unknown, while Southern New England-Mid Atlantic yellowtail are overfished and overfishing is not occurring as of the 2022 management track assessment.

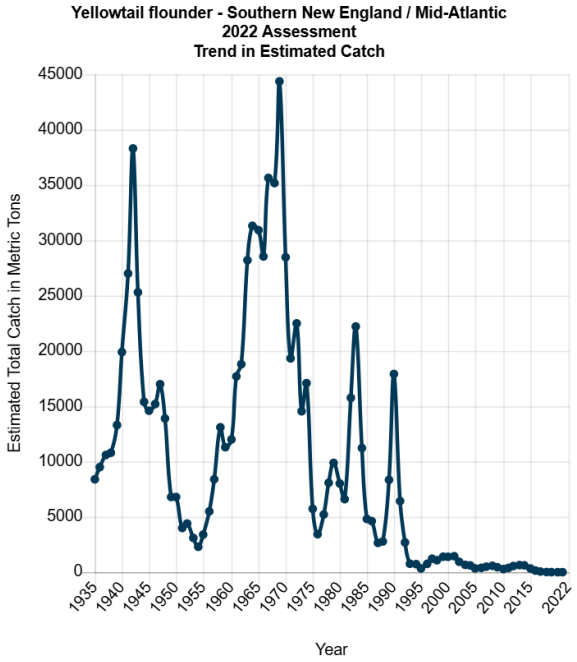
The Southern New England-Mid Atlantic yellowtail stock is also in poor condition and is under a rebuilding plan until 2029. The estimate of spawning stock biomass (SSB) in 2021 was 241 mt, relative to an SSB_{MSY} of 1,715 mt. Georges Bank yellowtail remain in poor condition, and trends in survey biomass are declining despite reductions in catch to historically low levels. The average survey biomass for 2023 was estimated to be 917 mt. Northern windowpane was declared overfished in 2008 and was supposed to be rebuilt by 2017. However, a 2017 Operational Update indicated that the stock was still overfished, and a new rebuilding plan was implemented with a target of 2029. Estimated swept area biomass was 2,367 mt in 2022. Southern windowpane have experienced a declining trend in the biomass index for the stock since 2013 to a 10-year low in 2022 of 0.213, relative to B_{MSY} proxy = 0.250.

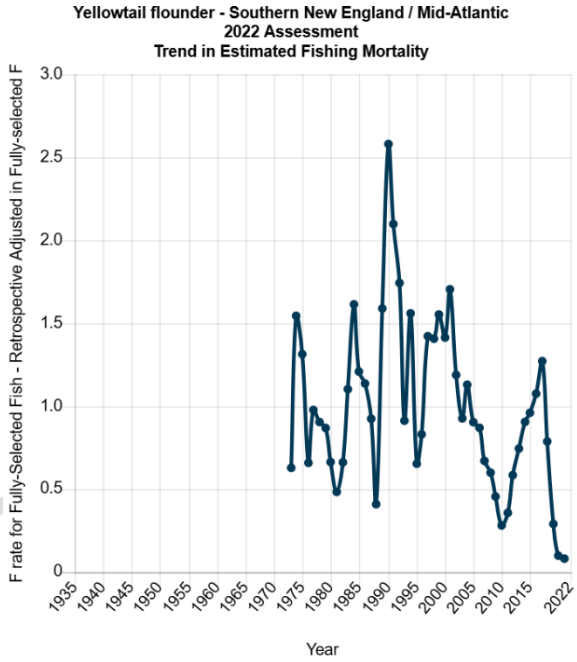
As described in Table 43, both estimates of stock biomass and exploitation rate remained at very low levels during this review period (2016 – 2023) for all flatfish stocks allocated to the scallop fishery. Fishing mortality is not considered to be a major driver of stock status for any of the four stocks.

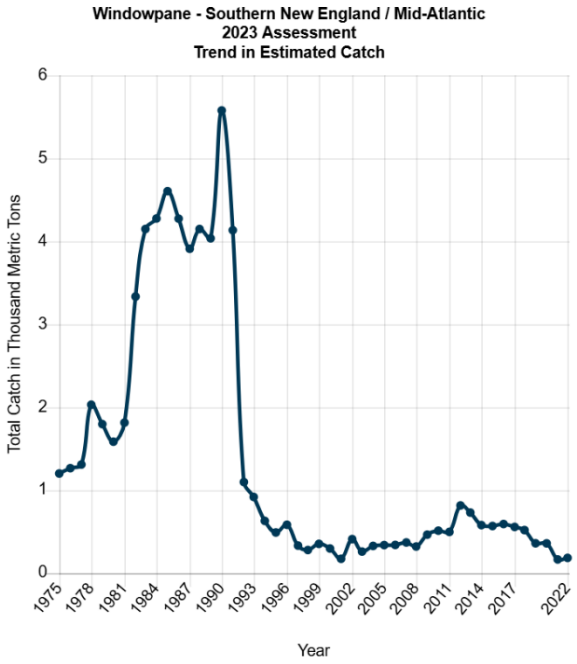
Table 43 - Comparison of recent flatfish sub-ACLs and realized catch, FY 2010-FY 2023. Values are shown in mt.

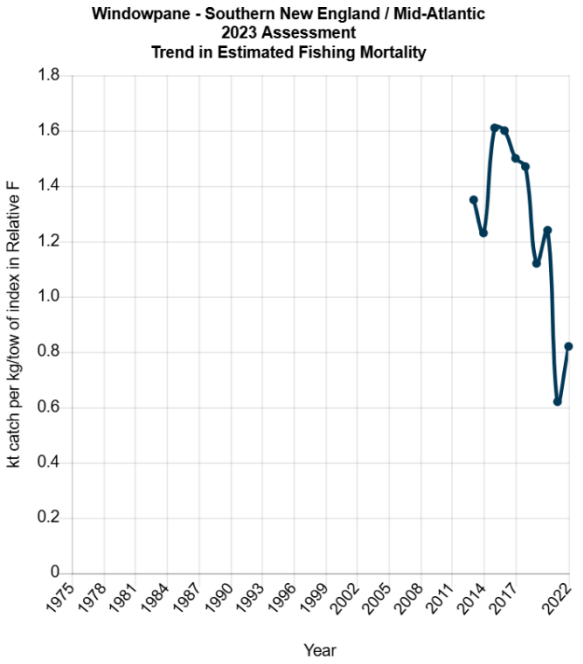
FY		GB YT	SNE/MA YT	S WP	N WP
2010	sub-ACL	146	135	No sub-ACL	No sub-ACL or accounting in place
	LAGC IFQ Catch	N/A	N/A	N/A	
	Total Catch	17.6	113	178.3	
2011	sub-ACL	200.8	82	No sub-ACL	
	LAGC IFQ Catch	0.0	19.8	N/A	
	Total Catch	83.9	110.9	N/A	
2012	sub-ACL	156.9	127	No sub-ACL	
	LAGC IFQ Catch	0.0	3.0	N/A	
	Total Catch	164	54	N/A	
2013	sub-ACL	41.5	43.6	186	
	LAGC IFQ Catch	0.0	7.9	28.8	
	Total Catch	37.5	48.6	129.1	
2014	sub-ACL	50.9	66	186	
	LAGC IFQ Catch	0.0	6.8	23.1	
	Total Catch	59	63	136	
2015	sub-ACL	38	66	183	
	LAGC IFQ Catch	0.0	3.2	14.2	
	Total Catch	29.8	34.6	210.6	
2016	sub-ACL	42	32	209	
	LAGC IFQ Catch	0.0	6.7	23.8	
	Total Catch	2	10.8	84.4	
2017	sub-ACL	32	34	209	36
	LAGC IFQ Catch	0.0	0.9	10.3	0.7
	Total Catch	52.6	4.3	143.9	44.1
2018	sub-ACL	33	5	158	18
	LAGC IFQ Catch	0.0	0.3	7.0	14.9
	Total Catch	12.7	2.6	157.1	22.3
2019	sub-ACL	17	15	158	18
	LAGC IFQ Catch	0.0	0.6	8.2	2.8
	Total Catch	1.7	2.1	57.7	25.4
2020	sub-ACL	19	2	143	12
	LAGC IFQ Catch	0.0	0.0	8.0	2.5
	Total Catch	1.5	1	86	35
2021	sub-ACL	12	2	129	31
	LAGC IFQ Catch	0.1	0.3	7.6	0.0
	Total Catch	29	1	26	123
2022	sub-ACL	19	2	129	33
	LAGC IFQ Catch	1.3	0.0	1.1	4.7
	Total Catch	7.8	0.2	10.5	101.1
2023	sub-ACL	16.5	2	129	31
	LAGC IFQ Catch	0.0	0.5	3.4	4.8
	Total Catch	19.5	2.1	5.6	81.7
*332,016 lb of GB yellowtail flounder were transferred from the scallop fishery sub-ACL to the groundfish fishery sub-ACL					

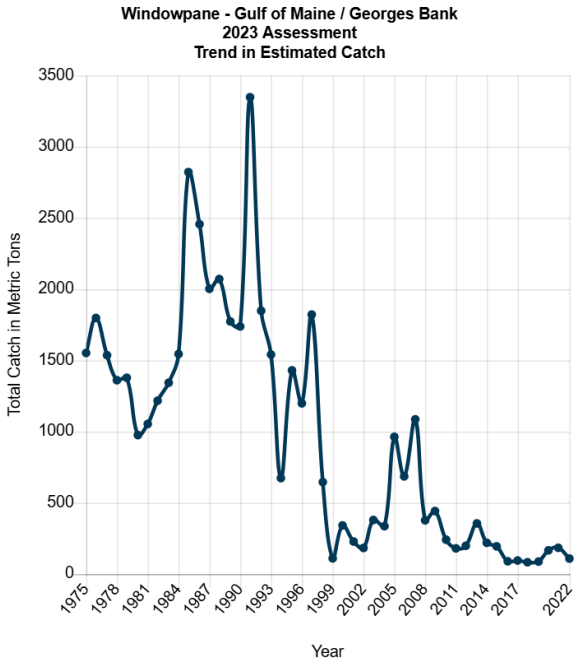
Table 44 – Estimated catch and fishing mortality for SNE/MA yellowtail flounder, southern windowpane flounder, and northern windowpane flounder from the beginning of the respective time series through the terminal assessment year. Due to the Limiter approach to the Georges Bank yellowtail flounder assessment, time series are not available for this stock.

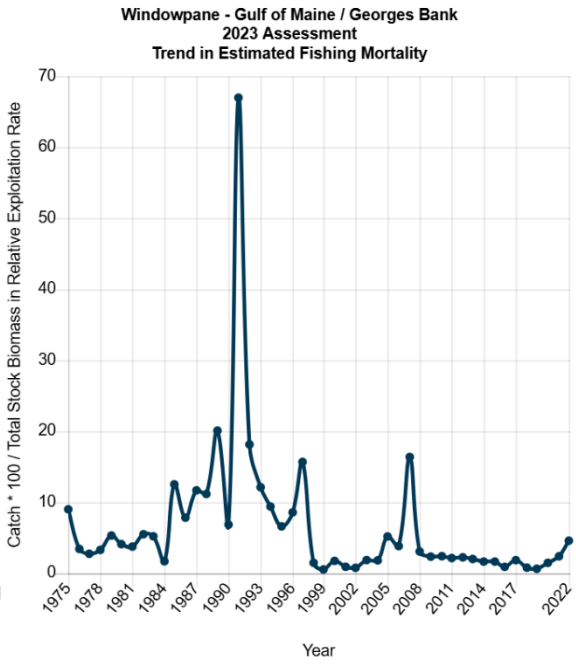












The LAGC IFQ component is held jointly accountable with the LA component for sub-ACL overages. In 2018, reactive accountability measures (AMs) were established for northern windowpane flounder, as well as modifications of the Georges Bank and Southern New England/Mid-Atlantic yellowtail flounder. The AMs for northern windowpane and Georges Bank yellowtail flounder require vessels to fish in Closed Area II with a maximum 5-row apron and 1.5 to 1 maximum average hanging ratio. The reactive AMs are implemented two fishing years after the year in which either the sub-ACL for a given stock was exceeded by more than 50%, or if both the sub-ACL for a given stock was exceeded and the overall ACL was exceeded. These gear modifications are expected to result in a minor to moderate reduction in bycatch of both stocks. During the time period in question (2016 – 2023), the scallop fishery was subject to accountability measures from 2021 through 2023 due to overages of more than 50% in 2020, 2021, and 2022 for northern windowpane, and in 2021 for Georges Bank yellowtail.

The LAGC IFQ's percent share of bycatch for SNE/MA yellowtail and southern windowpane is proportionally larger than its overall scallop allocation (>5%) when compared to the LA component. This result is not altogether unexpected when considering the regulatory constraints of the dredged exemption areas, and the Amendment 11 vision of a fleet made up of relatively smaller vessels. Said another way, LAGC IFQ vessels cannot fish in all of the places that the LA component can (by regulation, and as practical matter of range/vessel size) but are allocated 5.5% of the annual projected landings from all areas. In practice, this means that the LAGC IFQ component interacts much less with the Georges Bank stocks, and fishing in concentrated in more near-shore areas which coincide with SNE/MA yellowtail and southern windowpane stock boundaries, as well as the GB/GOM windowpane stock area.

One way to assess bycatch in fisheries is to evaluate the ratio of discarded species to kept catch. In the scallop fishery, the convention is to use scallop meat weight (shucked product) when

calculating the ratio of discards to kept catch. Flatfish discard to kept (d/K) ratios were calculated for SNE/MA yellowtail flounder, SNE/MA windowpane flounder, GB yellowtail flounder and GB/GOM windowpane flounder for observed hauls on LAGC IFQ trips between FY 2007 – FY 2023 on an annual basis using data from the Catch Accounting and Monitoring System (CAMS). Figure 43 depicts the d/K ratios of SNE/MA and GB yellowtail, both of which have remained relatively low throughout the review period (2016-2023). Figure 44 depicts d/K ratios for northern and southern windowpane flounder from FY 2007 – FY 2023. While southern windowpane d/K ratios have declined from a peak in 2013 to a time series low in 2022, northern windowpane d/K ratios have fluctuated annually.

Scallop fishery catches of GB yellowtail have declined since the implementation of the LAGC IFQ program and have been consistently low during the review period from 2016 – 2023. While SNE/MA yellowtail increased from FY 2011 – FY 2014, LAGC IFQ fishery bycatch of this stock has also been consistently low during the review period. SNE/MA windowpane increased sharply after the implementation of the LAGC IFQ program but has largely declined since FY 2013 have varied over the course of the program period. The increase in windowpane bycatch from FY2013 – FY 2015 may be a driven by several factors, including the timing for the fishery, and the improved status of the windowpane resource.

Figure 43 - Annual d/K ratios of yellowtail flounder catch by LAGC IFQ vessels (excludes CC/GOM yellowtail stock).

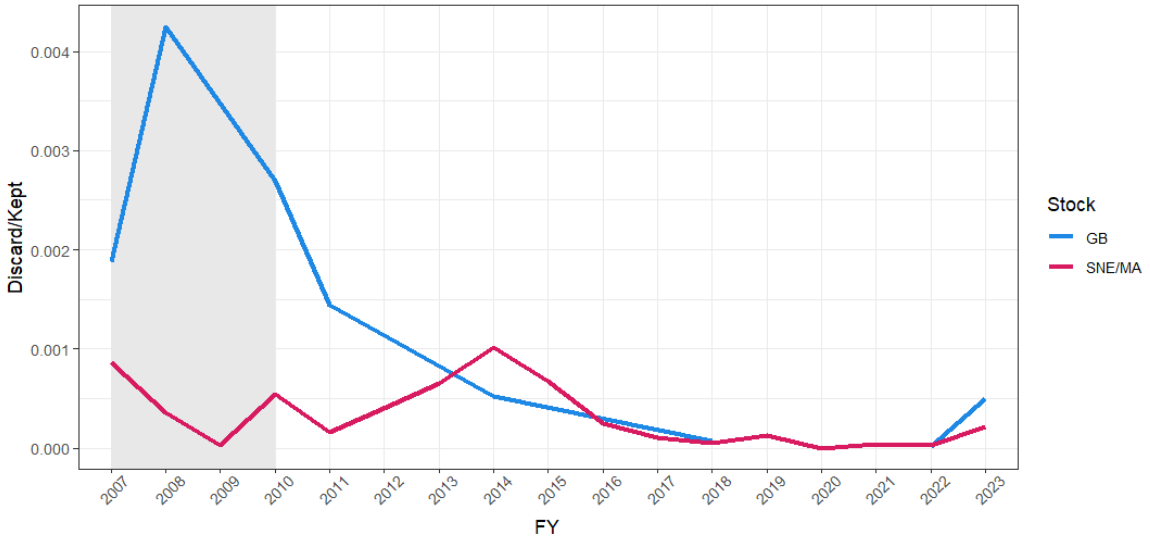
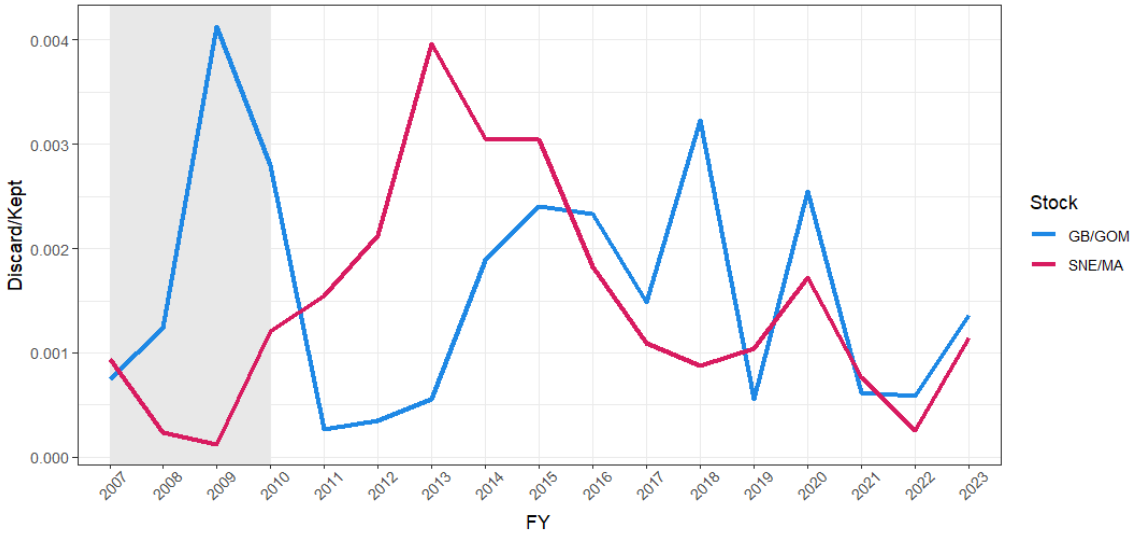


Figure 44 - Annual d/K ratios of windowpane flounder catch by LAGC IFQ vessels.



5.6 Safety, Compliance, and Enforcement

5.6.1 Compliance with individual quota allocations

NMFS monitors the LAGC IFQ catches per vessel and usually several months into the fishing year reports any overages from the previous fishing year directly to vessels. Table 45 summarizes the number of MRIs with IFQ overage for 2016 to 2023. Overall, a relatively small number of MRIS had overages during the time series, and there were no overall quota overages in any year from 2016 to 2023.

Table 45 - Number of scallop LAGC IFQ MRI's with quota overages by fishing year (2016 - 2023).

Fishing Year	Total MRIs
2016	15
2017	15
2018	5
2019	3
2020	6
2021	14
2022	14
2023	3

5.6.2 Compliance based on VMS reports

LAGC IFQ vessels are required to submit a pre-landing notification to NMFS through VMS six hours prior to landing. These reports include information on the estimated catch, time and location of landing. Data was analyzed separately for LAGC IFQ-declared and non-IFQ declared trips in terms of the level of compliance with this regulation. Vessels on LAGC IFQ declared trips are principally targeting scallops, while vessels on non-IFQ declared trips may be active in other fisheries, such as groundfish or surf clam/ocean quahog trips.

Since 2016, the total number of LAGC IFQ trips taken has declined from 7,239 in FY 2016 to 2,349 in FY 2023, with a time series average of 4,609 (
Table 46). The total number of trips varies based on the total quota available for the year, and the possession limit increased from 600 pounds to 800 pounds in 2022, which led to fewer trips being taken.

Table 47 summarizes the number of LAGC IFQ declared trips that were in compliance with this requirement, and the overall compliance rate for the fleet. From FY 2016-FY 2022, the overall compliance rate for LAGC IFQ declared trips was 87%, which represents a large increase in compliance from the 47% VMS pre-land reporting compliance rate from FY 2010-FY 2015.

Table 46 - Number of non-NGOM LAGC IFQ trips and active vessels in fishing years 2016-2023.

Fishing Year	Number of Trips	Active Permits
2016	7,239	161
2017	5,026	146
2018	5,343	134
2019	5,095	120
2020	4,878	122
2021	4,092	126
2022	2,854	110
2023	2,349	102

Table 47 - VMS pre-land reporting compliance for LAGC IFQ declared trips by LAGC IFQ vessels, including NGOM trips, for fishing years 2016 – 2022.

Fishing Year	Trips	Pre-landings	Percent Compliance
2016	7601	6843	89.9%
2017*	5296	4433	83.7%
2018	5604	4650	83.0%
2019	5432	4563	84.0%
2020	5159	4765	92.4%
2021	4408	3962	89.9%
2022	3885	3461	89.1%
*13-month fishing year			

5.6.3 Safety – Average vessel age and length of fishing trips

Table 48 shows the average year built of LAGC IFQ permitted vessels, and Figure 45 shows the frequency of permitted vessels in 2023 (in 5 year bins). The average year built for LAGC IFQ permitted vessel built in 1985, for example, was 31 years old in 2016 but 38 years old in 2023, indicating that the fleet has become older on average. This suggests that few new vessels have entered the fishery since 2016 and that most existing vessels have remained in service. ed vessels increased slightly between 2016 and 2023, indicating that the fleet is aging overall. It is important to note that these data represent all permitted vessels, not just active participants, so difference between quota-leasing and actively fishing vessels cannot be distinguished. The trend toward an older fleet may indicate reduced new investment or barriers to entry in the LAGC IFQ fishery, potentially reflecting consolidation, economic uncertainty, or limited incentive to replace aging vessels.

Figure 45 - Age of permitted vessels (year built) in 2023.

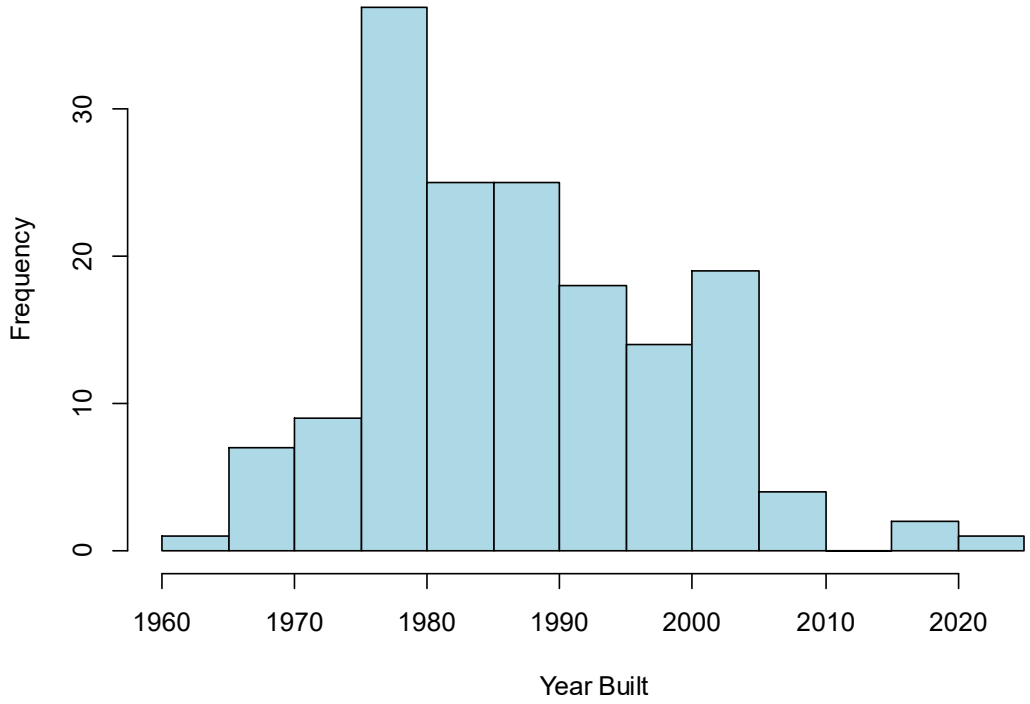


Figure 46 - Vessel age of LAGC IFQ permitted vessels from FY2016 to FY2023.

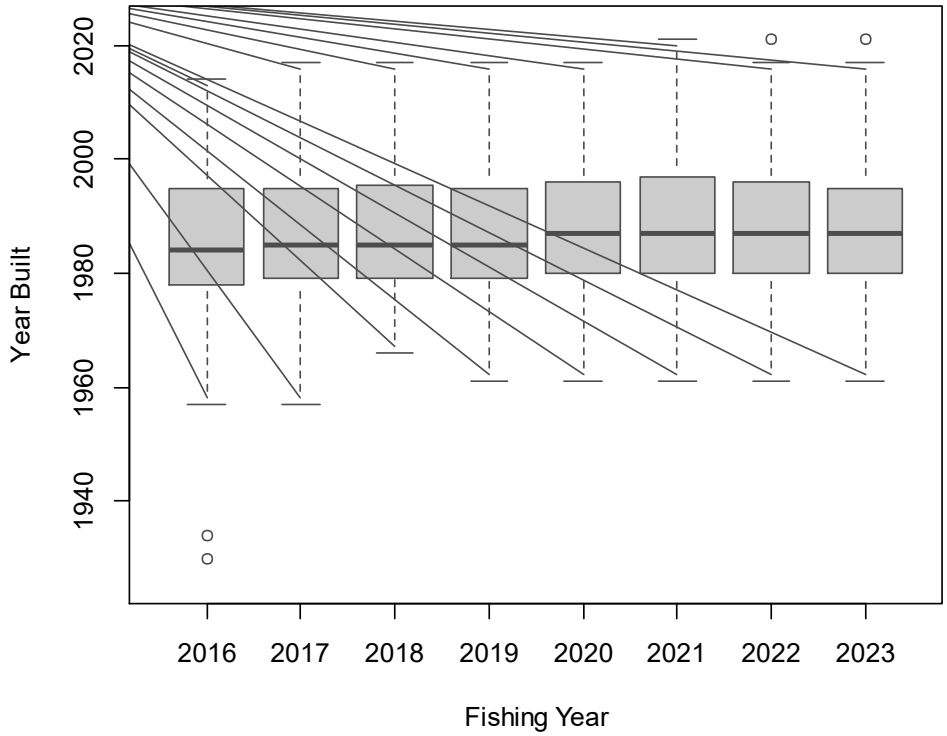


Table 48 – The average year LAGC IFQ permitted vessels were built and the number of LAGC IFQ permitted vessels from FY2016 to FY2023.

FY	Average Year Built	Permitted Vessels
2016	1985	162
2017	1986	153
2018	1986	152
2019	1986	147
2020	1987	134
2021	1988	168
2022	1987	126
2023	1986	123

Figure 47 - The average trip length (days) of LAGC IFQ vessels by area fished from FY2016 to FY2023. The dashed red line shows the annual combined average trip length.

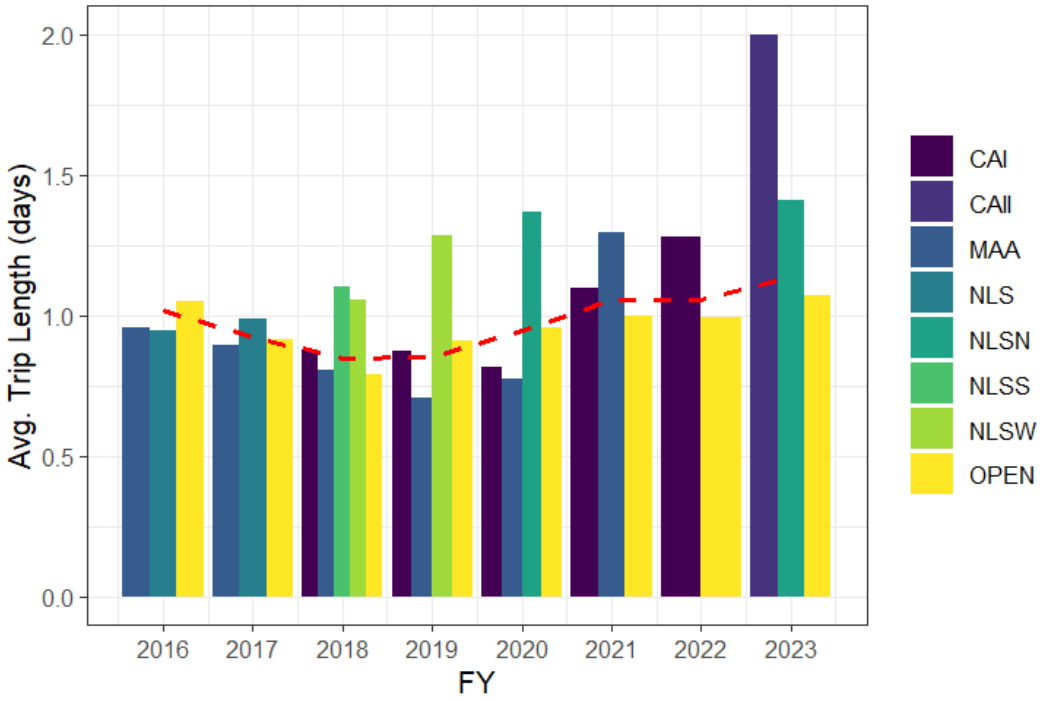
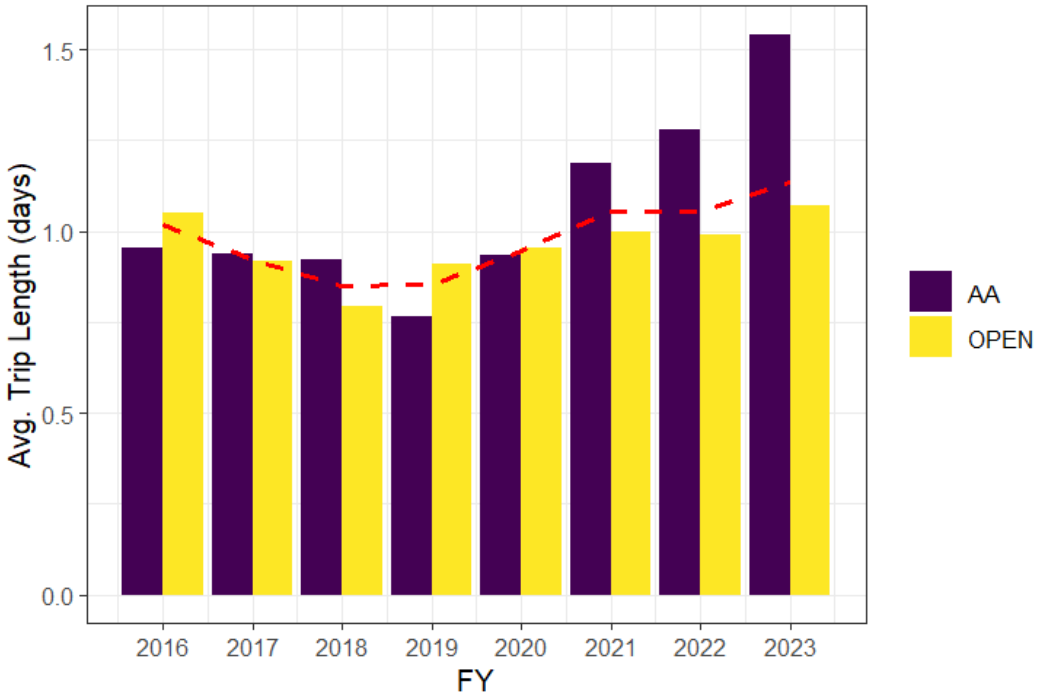


Figure 48 - The average trip length (days) of LAGC IFQ vessels fishing open and access area trips from FY2016 to FY2023. The dashed red line shows the annual combined average trip length.



6 SUMMARY OF FINDINGS

The following section focuses on summarizing the results of this review with respect to the four key questions outlined in the scope of this report (Sections 6.1 - 6.4).

6.1 Net Benefit to the Nation

1. Has the IFQ program resulted in the greatest overall benefit to the Nation, including the evaluation of biological, economic and social criteria in such decision making?

Net Economic Benefits

NOAA Fisheries' Guidelines for Conducting Review of Catch Share Programs requires an assessment of the program's effects keeping in mind that the net benefits are not exclusively economic in nature[20]. Furthermore, the guidance indicates that "A baseline period of at least 3 years is preferable, but this may be modified depending on circumstances surrounding the creation and implementation of each program."

Section 4.3.3 evaluated the LAGC IFQ program in terms of its impact on net revenues, profits, and producer surplus consistent with NMFS' Economic Guidelines for conducting cost-benefit analyses[21]. The results show that the LAGC IFQ Program's effects on the net benefits to the nation as measured by the producer surplus relative to the levels in the baseline period of 2010-2015 were slightly positive. The results show that the estimated producer surplus under the LAGC IFQ program would be 15% to 80% higher during 2016-2023 compared to a scenario if the 5% TAC were shared among a larger number of participants with no flexibility for leasing or transferring quota. Under the same scenario, fleet profits would probably be negative for most years in the absence of an IFQ program that allowed leasing and transferability of the quota (Table 14, Section 5.3.2.5). The impact of the program on the total factor productivity was 19% higher than the 2010-2015 period and 33% higher than the 2007-2009 period. As indicated in Section 5.3.2.5, productivity is a component of profitability. The scenario analysis also showed that profits would be higher with the LAGC IFQ program compared to the pre-implementation levels.

The analyses of the trends in net scallop revenue and profits support the conclusion that both revenues and profits have not meaningfully increased overall during the review period from 2016 - 2023 (Section 5.3.3) relative to 2010-2015. Accounting for inflation, net revenue per active vessel increased by 88% relative to 2007-2009, but only by 5% relative to 2010-2015. While analysis of net profit is uncertain due to limited available data on fixed costs, average net profit was estimated to be 24.5% higher from 2016-2023 relative to 2010-2015, although the terminal year 2023 saw the lowest net profit since 2010.

The percentage increase in net fleet revenue and producer surplus since the 2016 fishing year exceeded the increase in gross revenue due to the decline in fuel prices by 10%, increase in the

[20] http://www.nmfs.noaa.gov/op/pds/documents/01/121/01-121-01.pdf
[21] http://www.nmfs.noaa.gov/op/pds/documents/01/111/01-111-05.pdf, p.7

possession limit to 800 lb. per trip in 2022, as well as due to the concentration of effort in a smaller number of, theoretically, more efficient vessels (Table 21, Section 5.3.2.2). These results are not surprising given that the LAGC IFQ program helped to optimize profits in the LAGC fishery by providing opportunity for LAGC IFQ permits holders to transfer their allocations through leasing or sale of quota to those owners with a higher dependence on the scallop fishery as well as more efficient operations and/or financial resources to buy/lease quota from others to lower their fishing costs per unit of production by targeting scallops.

The functioning of the lease and quota markets provide insights about the impacts of the LAGC IFQ program on economic benefits: "Transferability is generally thought to improve technical efficiency and thus aid in achieving economic efficiency in a fishery, which, for example, is a goal under National Standard 5"[22]. The analyses of the quota and lease markets show that lease prices varied with the changes in demand and supply for quota as expected by the economic theory. During 2016-2023, lease prices slightly decreased, while quota prices (transfer prices) increased, due to a decrease in the number of vessels participating in the fishery and concentration of a higher proportion of overall IFQ allocations in the affiliations that lease in quota. According to economic theory, the price for IFQ transfer (QS) is equal to capitalized profits in the fishery over time, whereas the IFQ lease price reflects the marginal net return in the fishery. These two should be positively correlated and the ratio of lease prices to transfer prices reflects the discount rate perceived by Scallop IFQ traders. The ratio of lease price to quota price was approximately 0.234 from 2010-2015 and 0.233 from 2016-2023, reflecting a slight increase in the ex-vessel price per pound and a slight decrease in the lease price per pound. Decline in the lease price to quota price ratio could be a sign of a decline in the perceived uncertainties about future returns.

Distributional Impacts of the LAGC IFQ program

The distributional impacts of the LAGC IFQ program since 2016 appear to be uneven. As noted in Section 5.3.3, leasing activity and the number of MRIs leasing in quota increased during the review period, while the number of MRIs leasing out quota declined. This pattern, along with a concurrent rise in the lease price index, may suggest that a smaller subset of IFQ quota-holders is exerting greater influence over the quota market. Such concentration could be contributing to reduced access for other participants. Lease costs accounted for approximately 23% of LAGC IFQ scallop revenues for vessels that leased in quota, which may be affecting profitability and limiting access for those dependent on leasing. The proportion of quota leased relative to the base allocation has increased from 49.4% in 2010, to 60.8% in 2016, to 79.4% in 2023 (Table 22). While high rates of leasing indicate that quota mobility is supporting operational efficiency for many vessels, this may also be occurring at the expense of broader access to quota. The continued decline in MRIs leasing out quota, combined with an increasing proportion of quota being leased, raises questions about the long-term equity of quota distribution.

The reduction in fleet capacity from 2016-2023, relative to the 2010-2015 baseline, also points to a potential decline in total crew employment opportunities. Average crew income varied considerably depending on annual IFQ allocations, peaking at $43,370 in 2016 before falling to

[22] http://www.nmfs.noaa.gov/op/pds/documents/01/121/01-121-01.pdf, p.13

$21,296 in 2023, without accounting for lease cost sharing. Total number of crew positions likewise peaked at 402 in 2016 before declining to below 2010 levels (Table 27). Crew income per DAS followed a similar downward trend, reaching its lowest levels since the LAGC IFQ program's inception. These fluctuations in total crew income appear to reflect changes in scallop biomass as determined by annual specifications, with 2023 representing the lowest survey estimate in over 25 years. Despite this downturn, average crew income in 2023 was comparable to 2010 levels when the program began, though total crew income was substantially lower, likely due to reduced landings and employment. The estimated impacts on crew were not necessarily positive. If lease cost sharing were included in this analysis, the decline in total crew income would likely be greater.

The decline in both MRIs and active permits between 2016 and 2023 may further illustrate the scale of consolidation within the LAGC IFQ program. While the number of MRIs fell by 9%, the number of active permits declined by 25%. Notably, the number of MRIs without quota in 2023 was 114% higher than in 2015, suggesting a growing reliance on leasing rather than ownership. Although leasing allows continued participation in the fishery, it may also be reinforcing structural barriers for smaller or new entrants. As the economic benefits of quota ownership appear to be concentrating among fewer individuals or entities, a growing share of permit holders are left dependent on leasing. This dynamic could be putting increasing financial pressure on lease-dependent participants. Lease prices fluctuate with market demand and quota availability, introducing uncertainty into trip-level costs. For new entrants, this volatility may complicate operational planning or access to financing, particularly in the absence of a more stable cost structure.

The geographic distribution of the economic benefits of the LAGC IFQ program have not been equal over this review period. In 2016, 79% of LAGC IFQ landings were landed in Mid-Atlantic ports, such as Point Pleasant, NJ; Barnegat Light, NJ, and Atlantic City, NJ, but this proportion declined over the review period to only 30% by 2023. Recent below average scallop recruitment in the Mid-Atlantic and an increasing proportion of scallop fishing effort taking place in the Great South Channel, the Northern Gulf of Maine, and Georges Bank, likely contributed to this shift along with the ease of transferring quota. However, this decline in Mid-Atlantic ports with high engagement and reliance on the scallop fishery suggests that these fishing communities would likely see an increased negative economic impact of declining profitability in the more recent years of the review period (i.e. 2022 and 2023).

The impacts of the LAGC IFQ program on net economic benefits (as measured by producer surplus) were positive relative to a baseline period of three years (2007-2009) before implementation of Amendment 11, and relative to the previous review period (2010-2015). Increased productivity and concentration of effort in fewer vessels and affiliations resulted in higher profits from the baseline period as well as compared to the previous review period, however the terminal year of this review suggests that the economic benefits have declined to approximately 2010 levels.

Fishery perceptions were captured via the NEFSC Crew Survey (2018/2019 and 2023/2024), as well as a survey of LAGC IFQ industry participants conducted by GMRI and Northern Economics in 2025. While survey respondents were limited, outside of this review period, and in

the case of the NEFSC Crew Survey, not specific to the LAGC IFQ program, the survey results are informative context to the analyses presented in this report. Specifically, the NEFSC Crew Survey reported a decrease in satisfaction with scallop fishery regulations and participation in scallop management during this review period, but overall satisfaction with job safety and earnings. The survey results also point to a decline in the proportion of revenue distributed to crew members over time. In the LAGC IFQ industry survey, access to quota was a clear concern for most respondents, with high usage of quota banks and the perception that lease prices were significantly limiting their profitability, particularly for fishermen who depend entirely on leased quota or are trying to enter the fishery. While quota was viewed as generally available, respondents noted that access can vary depending on the time of year, with quota prices tending to be highest early in the year, when catch rates and market conditions are most favorable. These responses indicate that there may be substantial obstacles to profitability for lease-dependent LAGC IFQ fishermen due to lease market dynamics that are not captured elsewhere in these analyses, which should be investigated further in future analyses. Lastly, the respondents reported an average crew share of 46%, with 80% of vessel owners deducting lease costs before calculating crew shares, which can affect crew income in lower-revenue years.

6.2 Participation at Varying Levels and Excessive Shares

2. Has the IFQ program preserved the ability for vessels to participate in the general category fishery at different levels? Has the program prevented excessive shares?

Participation at varying levels of the LAGC IFQ fishery

This program review considers participation in the fishery by vessels and affiliations. In this report, an affiliation represents LAGC IFQ permit holders that are affiliates of each other based on the definition of Small Business Administration (SBA). Active affiliations include both active LAGC IFQ vessels as well as permits in CPH and those permit holders that participate in fisheries other than scallops. Inactive affiliations do not own any active LAGC IFQ vessel that participated in the scallop fishery.[23] The program maintained the ability for vessels and affiliations to participate at different levels in the LAGC IFQ fishery, although the distribution of landings, revenue and profits were not uniform across vessels and affiliations (Section 5.3). The average number of LAGC IFQ permit holders who derived more than 25% of their revenue from scallops increased from 165 during FY 2010 – FY 2015 to 172 during FY 2016 – FY 2023 (Table 31). This increase was primarily driven by growth in the number of permit holders who were fully (100%) reliant on scallop revenue. At the same time, the average number of permit holders with 25% or less dependence on scallop revenue declined from 69 to 54 across the same periods. This shift suggests that some affiliations may have leased out or sold their quota to others who more actively target scallops or have a higher economic reliance on the scallop fishery.

[23] An affiliation "Concerns and entities are affiliates of each other when one controls or has the power to control the other, or a third party or parties controls or has the power to control both. It does not matter whether control is exercised, so long as the power to control exists." https://www.law.cornell.edu/cfr/text/13/121.103

From FY 2016 - FY 2023, landings, revenue, and quota did fluctuate from year to year; this was reflective of the strength of the resource and the quality of fishing as opposed to trends that were dictated by the LAGC IFQ program in and of itself. The number of permits in the program declined by 9% from FY 2016 - FY 2023, while the number of active permits decreased by 34% over the same period.

While the number of active vessels has declined, the average LAGC IFQ vessel length declined by 2% between 2016 – 2023 and 2010 – 2015, while GRT declined by 6%. During this decline, the average VHP did not significantly change. This may indicate that some larger vessels with less quota may have transferred their quota permanently and suggests that smaller vessels may not be disproportionately affected by declines in overall LAGC IFQ allocations in recent years. However, the distribution of quota allocation has shifted notably. In 2016, 90% of MRIs owned 60% of the quota, while the remaining 10% of MRIs owned 40% of the quota. In 2023, 90% of MRIs owned 50% of the quota while the remaining 10% of MRIs owned 50% of the quota (Figure 14). Likewise, the Gini coefficients indicated that concentration of quota became more unequal during 2016-2023 i.e., Gini=0.65 in 2016 vs Gini=0.71 in 2023. These values indicate that quota ownership became more unequal than during the 2010–2015 period and reflect continued concentration of economic benefits among larger quota-holding entities. Although affiliation-level landings and profit Gini coefficients were not recalculated for this review period, the 2016–2023 quota allocation data strongly suggest that the unequal distribution of economic outcomes observed in earlier years has persisted and, in some areas, increased.

Vessels that participate in other fisheries in addition to the LAGC IFQ scallop fishery appear to be less common over this review period as well (

Figure 12), which may indicate that fewer LAGC IFQ vessels are able to participate in the fishery at low-levels and are deriving a great proportion of their fishing revenue from scallops. This supports the finding that the capacity of the LAGC IFQ fleet has been reduced without reducing the overall performance of the fleet (in terms of landings and revenue). However, a declining diversity of quota ownership and catch portfolios may indicate a declining ability to participate in the fishery at varying levels.

There have been large fluctuations in the geographical distribution of landings and leasing in the LAGC IFQ fishery since 2010. However, many of these changes could probably be attributed to the changes in the scallop productivity by area, with most fishing effort taking place on Georges Bank in the most recent years of this review period (Section 3.2.1).

The LAGC IFQ industry survey respondents reported mixed perceptions regarding upward mobility and new entrants. Some participants viewed the fishery as offering opportunities for advancement, while others emphasized high barriers to entry, including the cost of vessels, gear, and quota. Most respondents agreed that LAGC IFQ fishermen are looking to leave the fishery, even if just temporarily.

Excessive Shares

As noted above, quota allocations among LAGC IFQ affiliations were unequally distributed both in 2016 and 2023, with the allocations becoming more concentrated over this review period. In terms of distribution of quota by activity status, in 2023, 70 inactive LAGC IFQ affiliations held 49% of the quota. These include about 5 permit banks operating in the LAGC IFQ fishery, which typically hold approximately 10% of the overall quota. The rest of the quota was held by 103 active LAGC IFQ permits. Inactive affiliations included those with CPH permits with no revenue from other species, as well as those affiliations that are active in other species but do not participate in the scallop fishery.

Although distribution of quota remains to be unequal, the concentration of quota in the LAGC IFQ fishery is far below the potential limits set by the caps on ownership and vessel quotas. At a 5% share cap, the smallest possible number of affiliates would be 20, but in 2023 there were 176 affiliates, which is 8.8 times that of the level the share cap would allow. Those caps probably contributed to preventing further consolidation of ownership in the LAGC IFQ fishery.

These results suggest that the concentration of quota allocations noted above is largely driven by an increasing concentration among inactive affiliations, rather than by active participants in the LAGC IFQ fishery. For example, the previous LAGC IFQ Program Review reported that inactive affiliations held 34% of the quota in 2015 (relative to 49% in 2023), as well as a slight decrease in the concentration of quota among active affiliations between 2010 and 2015 while concentration among inactive affiliation increased over the same period. Although the current analysis for this review period (2016-2023) is not conclusive, prior findings suggest that this trend may be continuing and perhaps exacerbated by overall declines and fishery allocations.

6.3 Fishery Capacity and Conservations and Management

3. Has the IFQ program controlled capacity, controlled mortality, and promoted fishery conservation and management?

A primary goal of Amendment 11 was to control capacity and mortality in the general category scallop fishery. The LAGC IFQ program instituted catch limits with accountability measures and reduced the number of permits in the general category fishery. In transitioning from an open access fishery to a limited access IFQ program, the number of active vessels in the fishery declined from a high of 592 vessels in 2006 to 152 active vessels in 2010 at the end of the phase in period. There were 128 active vessels in FY 2015. Over this review period, the number of active vessels in the LAGC IFQ fishery declined from 137 in FY 2016 to 91 in FY 2023. There was also a decline in active affiliations from 99 in FY 2016 to 76 in FY 2023. This decline occurred in conjunction with a decline in the LAGC IFQ fishery allocation and resulting landings over this period (Table 6). This continues a trend of declining total and active permits and affiliations found in the previous reporting period (2010 – 2015).

The LAGC IFQ component has not exceeded its sub-ACL allocation since the program was fully instituted in FY 2010. Through Amendment 11, the LAGC IFQ component was allocated 5% of the fishery-wide ACL was to LAGC IFQ permit holders, and 0.5% to Limited Access vessels that also qualified for the LAGC IFQ program. The LAGC IFQ program allows participants to permanently transfer and/or annually lease individual quota among other qualifiers. Limited Access vessels with LAGC IFQ may lease quota only to an LAGC IFQ-only permit holder.

The analyses provided in Section 5 of this report conclude that these measures were effective in continuing to reduce capacity of the LAGC IFQ fleet from FY 2016 – FY 2023 when compared to the baseline and previous reporting period. Based on the change in Composite Fleet Capacity Index (number of vessels, vessel gross tonnage, length, and horsepower), the LAGC IFQ component experienced a 15.54% decline in fleet capacity relative to the previous review period (2010-2015) (Table 10). The opportunity to lease out and transfer quota to other participants resulted in the consolidation of quota across fewer vessels and affiliations, and ultimately consolidated effort to fewer active vessels from FY 2016 to FY 2023. The total number of affiliations went from 264 in 2016 to 224 in 2023, and the total number of LAGC IFQ permits (MRIs) declined from 308 in 2016 to 281 in 2023. These changes led to an increase in the total factor productivity of the LAGC IFQ fishery over this period relative to both FY 2010 – FY 2015, and the pre-implementation period (FY 2007-FY 2009) (Table 18).

Landings by the LAGC IFQ component since the inception of the program have not exceeded catch limits. The LAGC IFQ component is allocated 5.5% of the APL and accounted for 4% - 8% of total scallop landings between FY 2016 and FY 2023. Overall, this component of the fishery accounts for a small percentage of the overall fishing mortality. LPUE increased for the LAGC IFQ component between FY 2016 and FY 2018 and declined from FY 2018 to FY 2023. The pattern of open area and access area harvest suggests that the fleet is mobile, and that fishing activity tracks the availability of the resource. In years when few access area trips were used, open bottom fishing was very productive (Section 5.2). As open area LPUE declines, and overall landings remain steady or increase, the overall amount of area swept is also expected to increase.

The biological performance of the LAGC IFQ program can also be measured in terms of impacts on non-target species or bycatch. Again, the LAGC IFQ fishery is a relatively small component

of the scallop fishery and LAGC IFQ bycatch estimates represent a small proportion of total fishery estimates. As previously stated, the transition to limited access and an IFQ through Amendment 11 dramatically reduced fishing capacity for this part of the fishery. Because the fishery was open access prior to the implementation of the LAGC IFQ program, changes in bycatch from the period before Amendment 11 cannot be fully attributed to the implementation of an IFQ. Also, the implementation of hard TACs and ultimately ACLs with accountability measures for the targeted catch of scallops are likely to influence bycatch estimates, which are a function of fishing effort and total landings. LAGC IFQ vessel catches of SNE/MA yellowtail and Southern windowpane flounder have declined over the course of the review period, likely reflecting the low biomass of both stocks as well as the shift towards a greater proportion of fishing taking place on Georges Bank. Due to relatively little activity on eastern Georges Bank, LAGC IFQ vessel catches of GB yellowtail flounder are minimal, while catches of northern windowpane flounder have fluctuated during the review period from 0 mt – 14.9 mt.

6.4 Safety, Compliance, and Enforcement

The number of individual IFQ MRIs with quota overages fluctuated from 3 to 15 between 2016 and 2023, but there were no overall IFQ overages during this period. The total amount of annual quota overages as a proportion of the total allocation was not able to be assessed in the report. Compliance with LAGC IFQ reporting requirements has generally been high during 2016 to 2023. While VMS pre-land compliance remains high, the total number of offloads that are monitored remains very low (<1% of total trips). These data suggest that overall fishery compliance rates for the LAGC IFQ program are high.

The average vessel age among active vessels increased from 1982 to 1986 between FY 2010 and FY 2015. The oldest vessels in the fleet in FY 2010 (built before 1940) are no longer active. The increasing average age of vessels in the LAGC IFQ fleet raises safety concerns due to the potential for aging infrastructure, outdated equipment, and structural fatigue, which may elevate the risk of mechanical failure or accidents at sea.

The average trip length of LAGC IFQ vessels varied largely by the area fished and the associated LPUE. In years where LPUE was high (e.g. 2018), the average trip length was shorter as LAGC IFQ vessels could more quickly harvest their possession limit. As LPUE in the open bottom has declined in the more recent years of the review period, and fewer near-shore rotational opportunities have been allocated, the average trip length increased in the open bottom as well as in aggregate, as LAGC IFQ vessels took their trips to Area II. Overall, longer trips pose a greater safety risk for LAGC IFQ vessels, but this trend is likely more driven by overall resource conditions than by the IFQ program.

The results of NEFSC crew survey suggest that scallop crew members have generally been satisfied with vessel safety, and this remained consistent over time.

6.5 Future Data and Research Needs

This report evaluated the performance of the LAGC IFQ fishery based on the data for allocations, landings, revenues, prices, ownership, leasing, transfers and fishing costs. Several data issues identified in earlier reviews were addressed in preparation for this report, improving the ability to track vessel activity and affiliations. However, ownership information is still not

readily available, particularly for permits in CPH. While owners and affiliations could be reliably identified for active permits, CPH records continue to lack matching business and owner IDs or MRIs. As a result, staff manually linked CPH permits to owners and affiliations using allocation tables and other databases for each year from 2016 to 2023, a time-intensive process. To support more efficient analysis in future reviews, the ownership dataset should be expanded to include affiliation identifiers for CPH permits, or a dedicated dataset should be developed specifically for CPH ownership and affiliation tracking

There is a good amount of information about quota lease and transfer prices; however, data on how lease costs are allocated between vessel owners and crew remain limited. Cost information used in this report continues to rely on earlier cost surveys, which had a relatively small number of LAGC IFQ vessels, making it difficult to fully assess current lay systems and how they may have changed since the start of the LAGC IFQ program. Given that different boat owners apply different formulas in dividing revenues and costs between the crew and the owner, expanding cost survey coverage to include more LAGC IFQ vessels would help determine common practices and improve the accuracy of the estimates for crew and boat incomes. Updated cost survey data with greater representation of LAGC IFQ vessels would also help address these information gaps.

Other information that was not available at this time was the costs associated with bank loans to lease quota. Anecdotal information suggested some owners took on substantial debt to acquire or lease quota and interest payments on such debt have become an additional cost item for many LAGC IFQ fishermen. Although challenging to collect, information regarding bank loans and interest payments would be helpful in assessing how these factors affect the viability and the distribution of income in the fishery. It would be very useful if the coverage of future cost surveys could be expanded to include more LAGC IFQ boats and if the interest payments for bank loans versus vessel mortgage are identified separately. Having more information about these borrowing and transaction costs for leasing and transfers, and activity by co-ops would also improve the analyses regarding quota and lease prices.

In the most recent iteration of the NEFSC crew survey, questions regarding LAGC IFQ fishery participation were removed, limiting the utility of these data for differentiating the impact on scallop fishery crew members who participate in different components of the fishery. The changes in the employment patterns in the LAGC IFQ fishery are another area that needs further research. Because many vessels are involved in this fishery on a part-time basis, a survey to determine whether crew members are employed year-round on different vessels for different shifts would help analyze changes in employment opportunities in the LAGC IFQ fishery. Finally, further research could also include sociological surveys to evaluate the impacts of the LAGC IFQ program on communities.

7 COST RECOVERY

The MSA allows for cost recovery up to 3% of ex-vessel value of scallops harvested under the LAGC IFQ program. Fees are used to cover actual costs that are directly related to the management, data collection, and enforcement of the LAGC IFQ program. Fees are calculated

by multiplying the permit holder's landings by the average price per pound and the fee percentage. The 2023 Scallop IFQ Fee Annual Report is available as Appendix IV.

The MSA requires that the Councils and NMFS conduct a formal and detailed review five years after the implementation of an IFQ program, and every subsequent 5-7 years, to review the operations of the program. Most of the work to conduct this review and write the report took place during the 2025 fee period and resulted in additional staff time for both the Regional Office and the Northeast Fisheries Science Center, which was recoverable under this program. This additional work did not result in an increase in recoverable costs in the 2023 fee period.

Individual bills for cost recovery ranged from $10.57 to ~$5,271 in fee year 2023. As recoverable costs are based on landings, active permit holders are fully accountable for covering program costs. Because recoverable costs were less than 3% for fee year 2023, permit holders were assessed total recoverable costs of the 2023 fee period.

Table 49 – Scallop LAGC IFQ recoverable costs, fishery value, and fee percentage by year.

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%

8 ACKNOWLEDGEMENTS AND MEETINGS

This report was prepared by a technical work group of staff from the New England Fishery Management Council, the Greater Atlantic Regional Fisheries Office, and the Northeast Fisheries Science Center (Table 50). In addition to the technical work group, several individuals and groups with NMFS assisted in data gathering, input, and analysis, including Greg Ardini (NEFSC SSB), and NOAA OLE. Additionally, the survey results presented in Section 5.4.8 were provided by Melissa Errend (Northern Economics Inc.), Dr. Kanae Tokunaga (GMRI), and Katherine Maltby (GMRI). Table 51 provides a summary of official workgroup and Council related meetings where this program review was discussed.

Table 50 - LAGC IFQ Review Technical Work Group

Agency	Name	Role
NEFMC	Connor Buckley	Primary point of contact for NEFMC, present and communicate review with Advisory Panel/Committee/Council, coordinate development of program review with technical group and overall document preparation. Lead analyst on several parts of review, primary author of several sections of this report.
NEFMC	Dr. Naresh Pradhan	Lead analyst on several parts of review, primary author of several sections of this report.
NEFMC	Chandler Nelson	Lead analyst on several parts of review, author of several sections of this report.
NEFMC	Jonathon Peros	Assisted with analysis across several parts of the review and supported drafting of multiple report sections
NMFS, NEFSC	Dr. Robert Murphy	Primary point of contact for NEFSC, lead analyst on several parts of review
NMFS, GARFO	Emily Keiley	Primary point of contact for GARFO
NMFS, GARFO	Dr. Benjamin Galuardi	Develop several databases needed for this review, lead analyst on several parts of review

Table 51 - Summary of Meetings Related to the LAGC IFQ Program Review

Meeting	Date	Location
Technical Workgroup #1	May 20, 2024	Webinar
Technical Workgroup #2	June 20, 2024	Webinar
Technical Workgroup #3	August 13, 2024	Webinar
Technical Workgroup #4	October 18, 2024	Webinar
Council	January 30, 2025	Portsmouth, NH
Technical Workgroup #5	February 6, 2025	Webinar
Council	April 2025	Mystic, CT
Technical Workgroup #6	March 20, 2025	Webinar
Council	June 15, 2025	Freeport, ME
Technical Workgroup #7	July 23, 2025	Webinar
Council	January 28, 2026	Webinar

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