1.1 Average Economic performance per owner

This section evaluates the trends in income from scallops either through participating in the LAGC fishery actively or through leasing activities for IFQ. For the active owners, the net revenue for each year is estimated as the difference between the scallop revenue, leasing and trip costs. For IFQ owners who lease out their entire quota to other owners, the revenue constitute the earnings from lease.

Whenever available, the recorded lease costs was used to estimate the value or cost of lease. For those leasing transactions with no reported lease cost, they were projected to be equal to the average annual lease price for the corresponding fishing year. Similarly, for leasing our transactions without any lease price, the average price for leasing out was used to estimate total lease value for owners that lease out their IFQ. This maybe an overestimate for lease-out value if the owners pay a fee to find prospective owners that want to lease quota. Furthermore, if the leasing transaction took place between vessels that belong to the same owner, leasing cost is assumed to be zero. However, in estimating the crew income and the owner's share, the lease prices will be taken into account if crew pays the lease-in costs in total or partially from their share.

Trip expenses include food, fuel, oil, ice, water and supplies and are estimated using the trip cost equation provided in Appendix III to Framework 25 (Economic Model). The trip costs per day-at-sea is postulated to be a function of vessel crew size, vessel size in gross tons, vessel length, fuel prices, and dummy variables for limited access general category (LGC) and small dredge (SMD) vessels. This cost equation was assumed to take a double-logarithm form and estimated using the observer data from 1991 to 2012 for the limited access and limited access general category vessels.

The unique owners with ownership interest in one or more vessel is determined using a method based on 'maximum ownership' criteria. This method follows SBA's criteria for affiliation to the extent possible, which is based on the principle of control that "may arise through ownership, management, or other relationships or interactions between the parties" including foreign affiliations even when the control is not exercised (CFR 121.103 in its Small Business Size Regulations). Appendix III to Framework 25 (Economic Model) provides a detailed description of this approach.

Figure 1. Number LAGC-IFQ owners with scallop earnings from fishing and leasing out

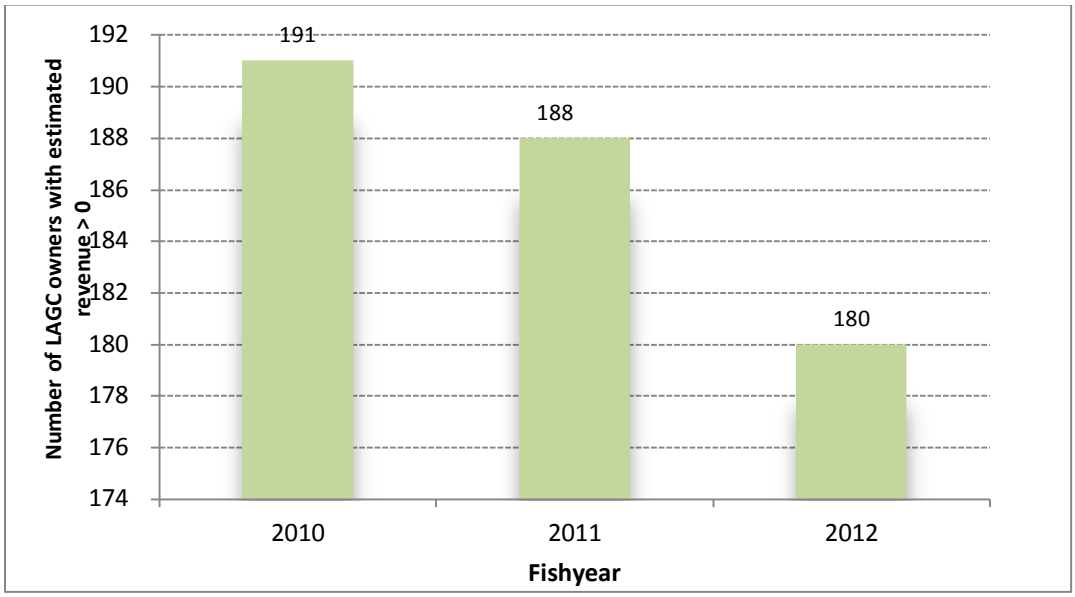
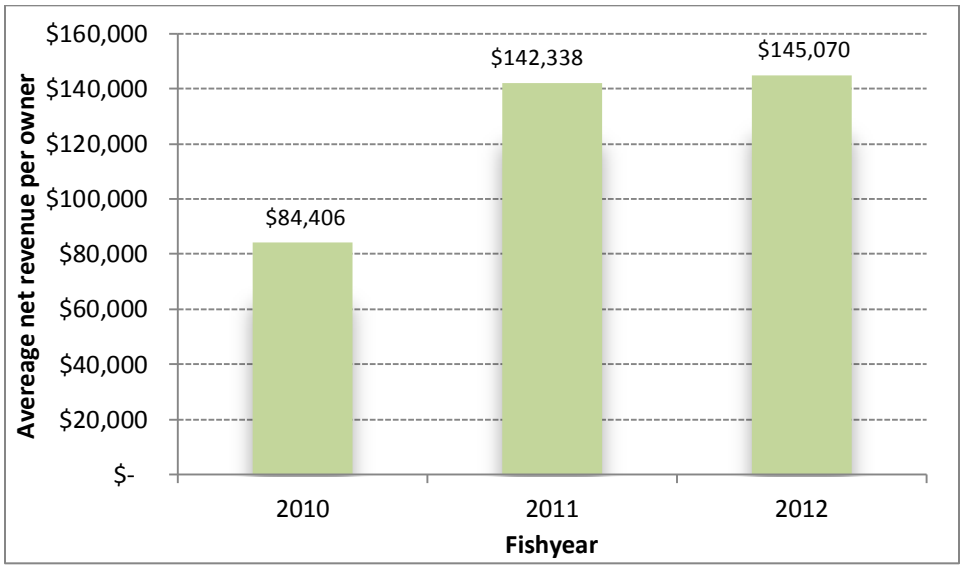


Figure 2. Net scallop revenue for LAGC-IFQ permit holders (net of leasing and trip costs)



The number of IFQ owners estimated to have a net income from either fishing for scallops or leasing out scallop IFQ declined from 191 in 2010 fishing year to 180 in 2012 fishing year as some owners permanently transferred their shares to others (Figure 1). The average net revenue per owner increased from $84,406 to $145,070 in 2012 as a result of increase in LAGC ACL and partly because of the concentration of quota in smaller number of owners (Figure 2). Figure 3 shows that number of owners that leased out their shares increased from 79 in 2010 to 86 in 2012 fishing year, while the number of owners with no leasing activity declined from 55 in 2010 to 38 owners in 2012 fishing year. The net revenue per owner was considerably higher for the group who leased pounds from other owners compared to the revenues per owner for the group who leased out their IFQ or involved with no leasing (Figure 5). For example, in 2012 fishing year, the net revenue for the active owners that also leased pounds was $287,386 per owner, more than twice of the no-lease group ($59,936) and quadruple of the leasing-out group ($59,936). This is expected given that the allocations per owner for the leasing out group were smaller than either the owner group who leased quota or fished for their own IFQ (Figure 4).

There is a variation in net revenue per owner for each group, however. Although majority of the owners who lease-out have earnings up to $50,000 per year, a small group of 3 to 5 owners earned $300,000 or more annually in each fishing year (Figure 6). The net revenue per owner for the active owners varied considerably as well (Figure 7). The following sections examines the distribution of net revenues and the diversity in the LAGC –IFQ fleet by quartiles , Lorenz curves and Gini coefficients.

Figure 3. Number LAGC-IFQ owners with scallop earnings from fishing and leasing out

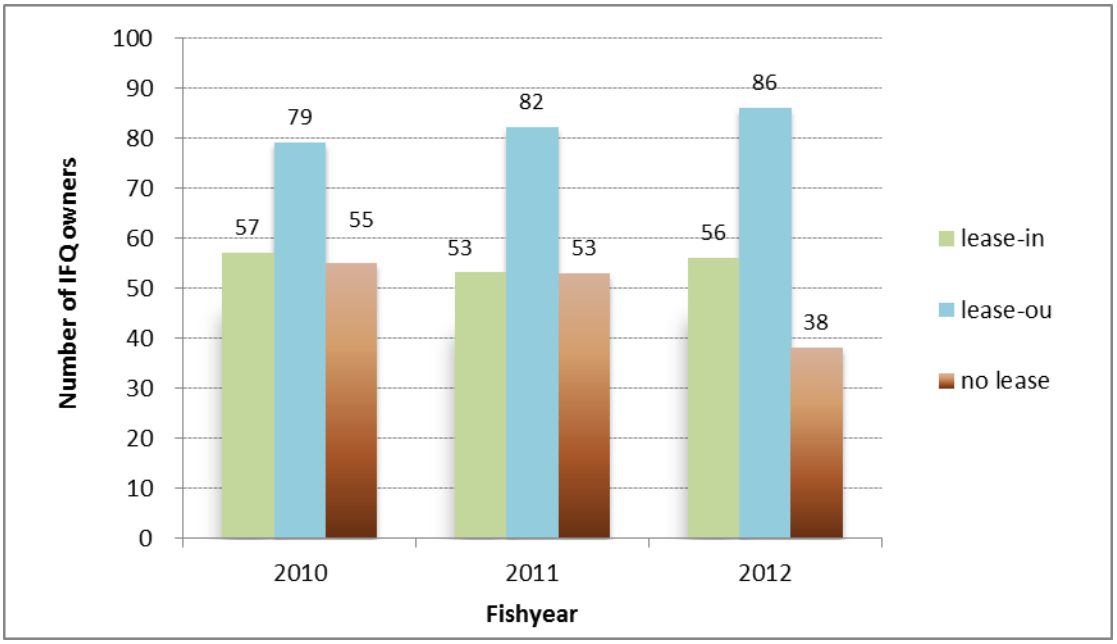


Figure 4. Allocations per owner by leasing group

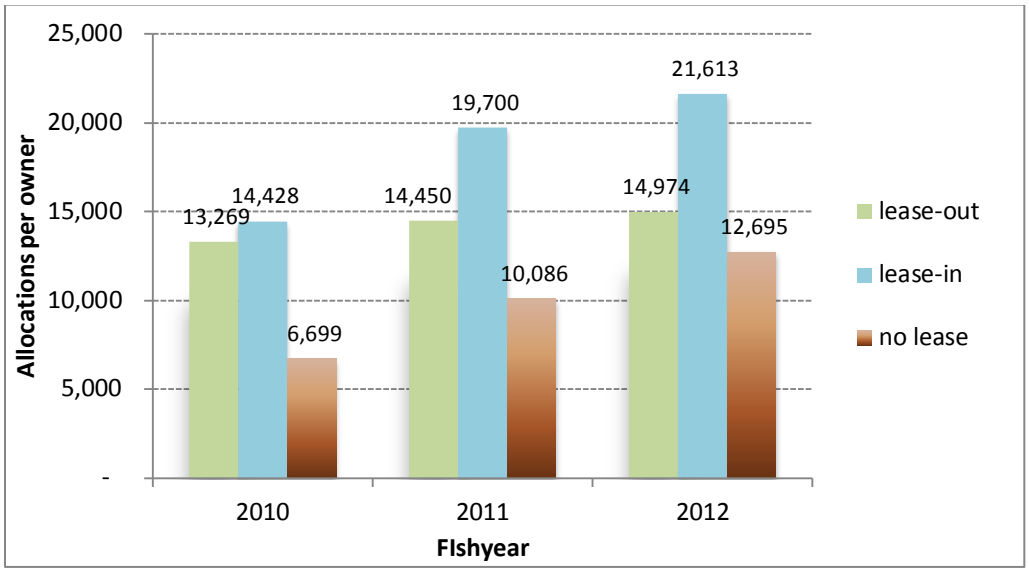


Figure 5. Net scallop revenue for LAGC-IFQ permit holders (net of leasing and trip costs)

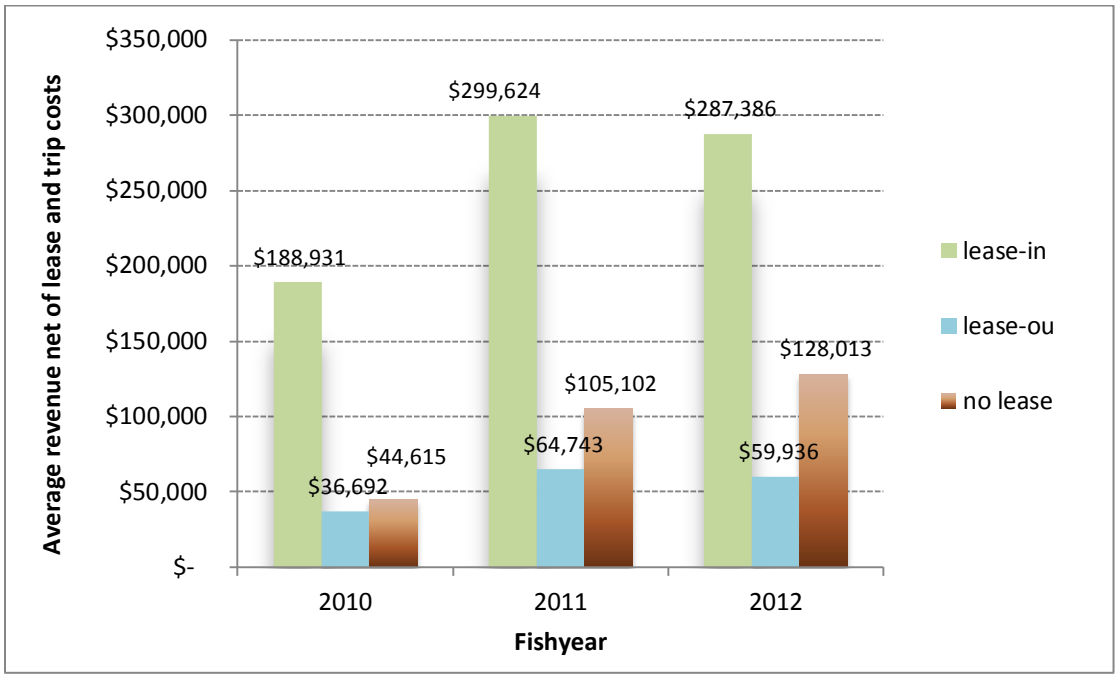


Figure 6. Net scallop revenue for LAGC-IFQ owners who leased-out quota (net of leasing and trip costs, excluding owners with no revenue)

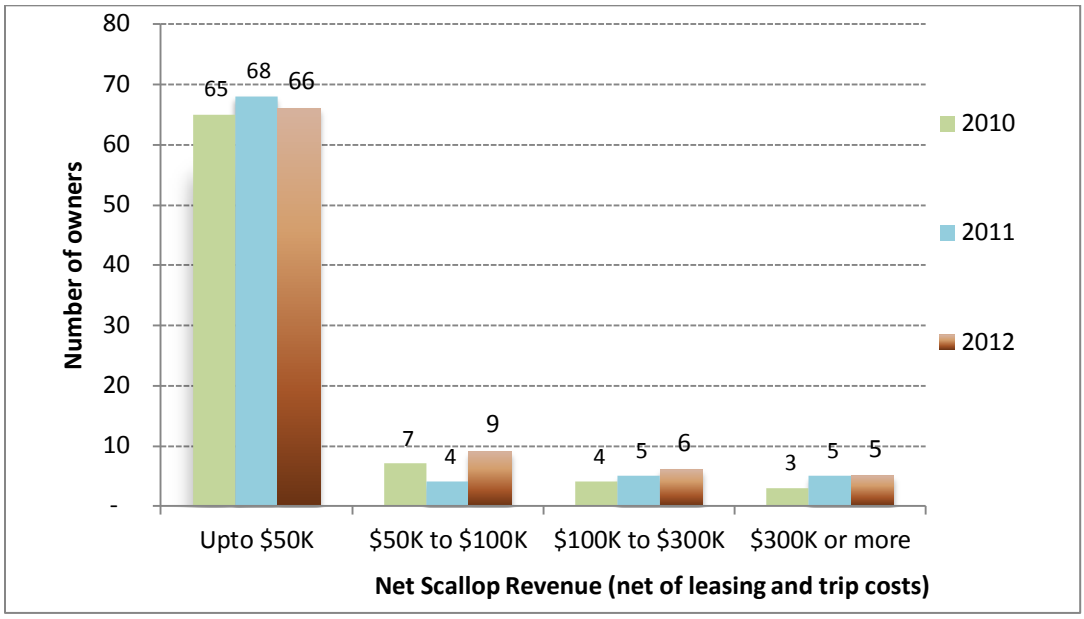
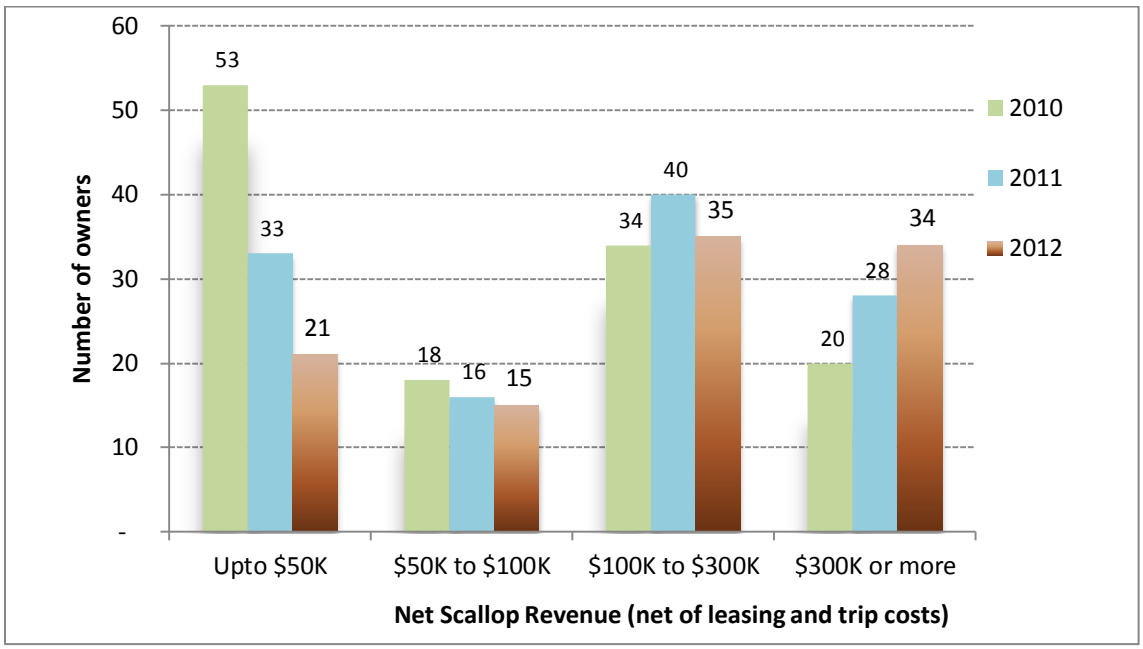


Figure 7. Net scallop revenue for active LAGC-IFQ owners (net of leasing and trip costs, excluding owners with no revenue)



1.2 Distribution of net revenue among LAGC IFQ owners

The changes in the distribution of net revenue is analyzed using cumulative distribution of revenue and the number of by ordering the revenues from smallest to largest. For the purposes of this analyses, the data is divided into four quadrants such that each quadrant is equivalent to about 25% of the total net revenue for the fleet ranked starting with the bottom 25%. The number of owners include all active owners as well as those owners that lease out their entire quota to others to fish for scallops.

The results show that the net revenues were highly concentrated among the top earning groups. About 8 to 10 top owners (Q4, Top 25%) earned about 25% of the total net revenue during 2010-2012 fishing years, while the about 146 owners (Q1: Bottom 25%) in 2010 and 132 owners in 2012 earned about 25% of the net revenue. There has been a decline in the later group as some of these owners either consolidated their shares with others or sold their IFQ to other owners. There number of owners in the 25% to 50% percentile group (Q2), 23 owners, remained stable during 2010-2012, while there was a slight increase in the number of owners in the third quadrant (Q3:50% to 75%) from 13 in 2010 and 2011 to 16 in 2012 fishing year (Figure 8).

The differences in the average net revenue per owner in each group remained high although there was an increase after 2010 for each group as the LAGC-IFQ ACL increased. The average net revenue for the top 9 owners amounted to $680,000 in 2012, for the next group of 16 owners it amounted to over $420,000 while the 23 owners in the third group average net revenue was over $280,000 and the 132 owners in the bottom 25% percentile group earned on the average close to $50,000 in 2012 fishing year (Figure 9).

Figure 8. Net scallop revenue for LAGC-IFQ permit holders (net of leasing and trip costs, excluding owners with no revenue)

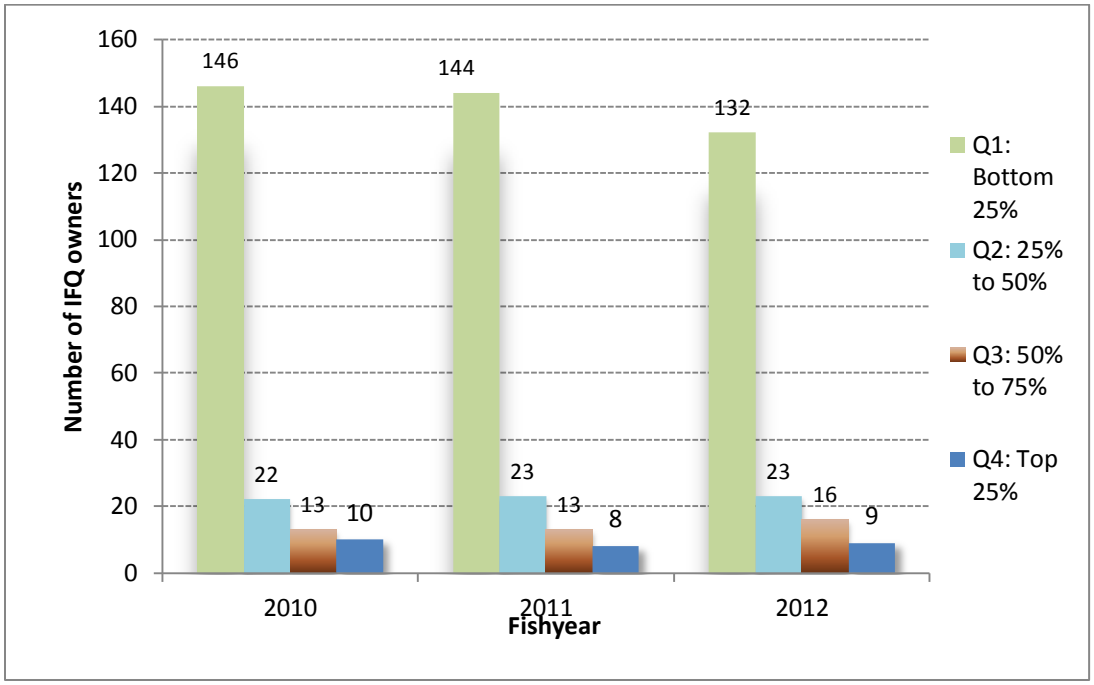
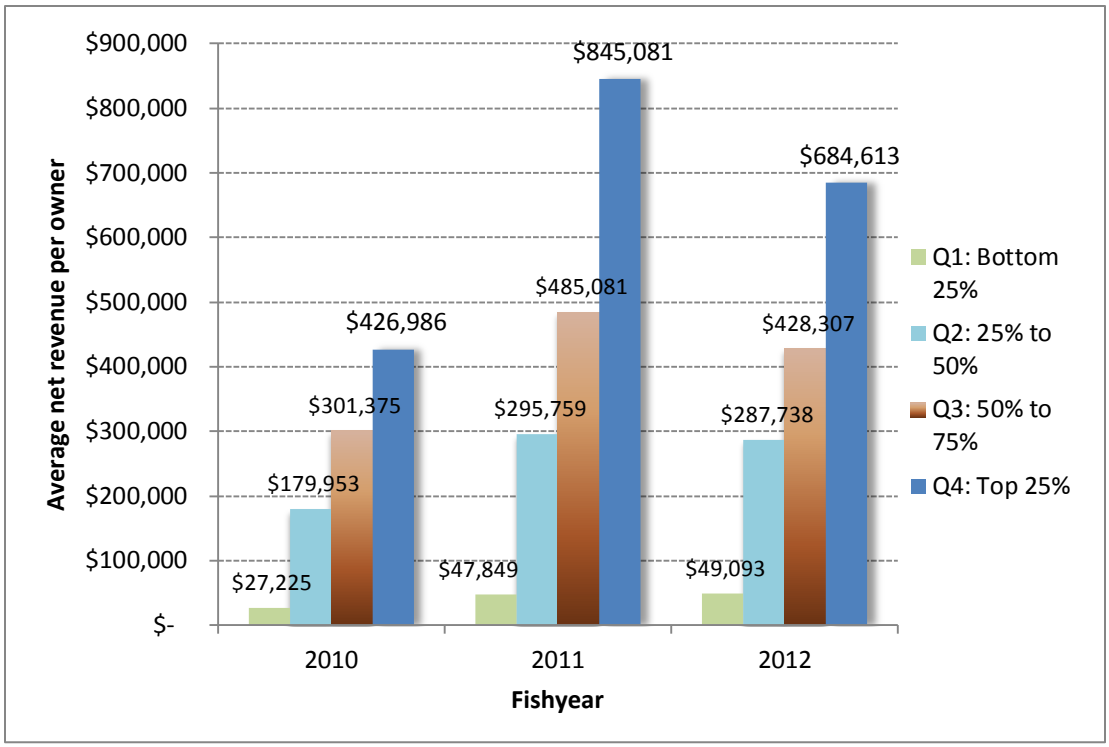


Figure 9. Net scallop revenue for LAGC-IFQ permit holders (net of leasing and trip costs, excluding owners with no revenue)



1.3 Distribution of net revenue using Lorenz curves ad Gini Confidents

Lorenz Curve is graphical representation of income distribution which plots the proportion of the total income of the population, net scallop revenue including earning from leasing out in our case (y axis), that is cumulatively earned by the bottom x% of the population (Figure 10). On the graph, a straight diagonal line represents perfect equality of incomes; the Lorenz curve lies beneath it, showing the actual income distribution. The difference between the straight line and the curved line is the amount of inequality of income distribution, a figure described by the Gini coefficient. The Gini coefficient can be thought of as the ratio of the area that lies between the line of equality and the Lorenz curve over the total area under the line of equality. 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. When used as a measure of income inequality, the most unequal society (assuming no negative incomes) will be one in which a single person receives 100% of the total income and the most equal society will be one in which every person receives the same income.

It is evident from Figure 10 and from the value of Gini coefficients provided in Table 1 that the net revenues among LAGC owners owners are unequally distributed. This is mostly arise from the unequal distribution of allocations in 2010. The reduction in the value of the Gini coefficients from 2010 to 2012

imply that the distribution of revenues became slightly more equal. However, this is due to reduction in the number of low revenue earners after 2010 as some of those earners either sold their shares to other owners or consolidated them with other small quota owners in partnership.

Figure 10. Lorenz curve for LAGC-IFQ owners for scallop revenue net of leasing and trip costs (2012 fishing year)

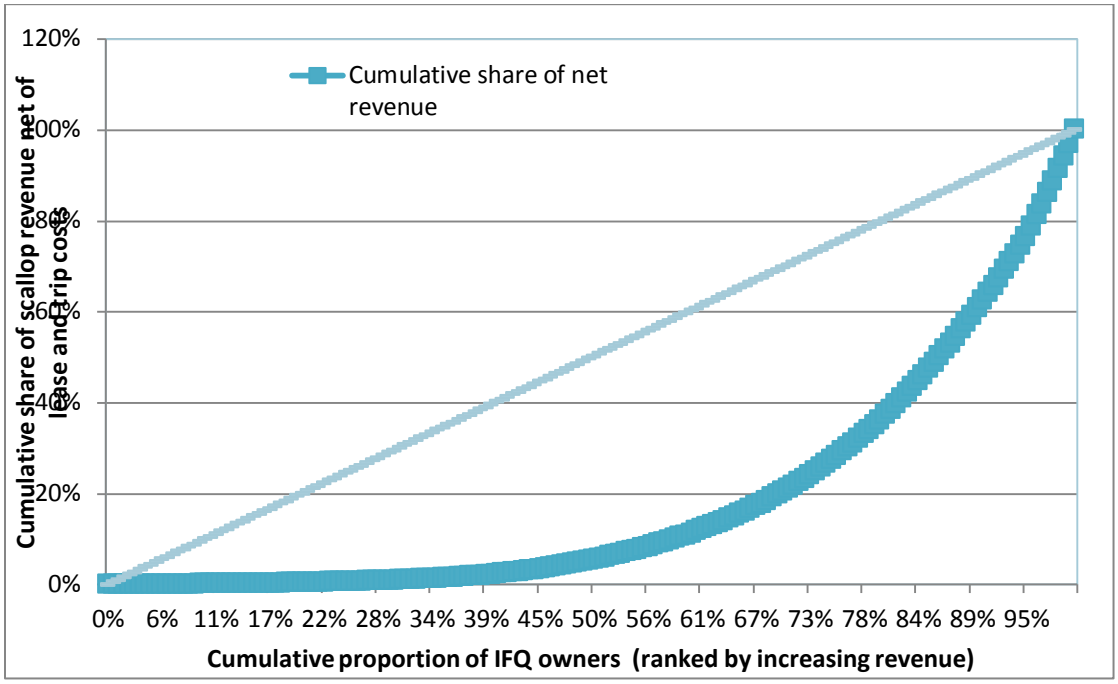


Table 1. Gini Coefficients

Fishyear/Variable	Revenue per owner (Active owners only)	Net Revenue per owner (including owners who leased out)	IFQ allocations per owner
2010	0.58302	0.68009	0.64209
2011	0.57711	0.68628	0.64508
2012	0.50545	0.65738	0.63740

It must be emphasized that the fixed costs and crew shares were part of the net revenue values depicted above. When the profits are estimated taking into account the fixed costs and payment to the crew, the Gini coefficients will probably will decline since the active owners have to pay for these expenses whereas a slot of owners in the bottom 25% lease out their IFQ shares and do not incur those costs. Therefore, the Lorenz curve is expected to be less unequal for profits compared to the Lorenz curve for net revenues.

1.4 Economic dependency on the scallop fishery

The share of scallop revenue as a % of total revenue from all species varies among the LAGC-IFQ holders with about 58 owners deriving more than 75% of their revenue from scallops fishing years while on the other end, for about 51 to 55 owners the scallop revenue constituted less than 5% of their total revenue from all species in the last two fishing years (Figure 11). While the number of the owners in the high dependency group remained relatively stable, there has been a decline in the number of owners in the low dependency group since 2011 as some owners transferred their IFQ to other owners mainly targeting scallops. The average scallop revenue per owner increased considerably in all revenue groups except for the top (>75%) group as the LAGC ACL increased and the number of active owners in each group declined since 2010 fishing years (Figure 12). The owners in the top group derived on the average 95% to 96% of their total fishing revenue from scallops (Figure 13). In general, average total revenue from all species was higher in the lower dependency groups (Figure 14).

Figure 11. Owners with LAGC-IFQ permits by the percentage of revenue from scallops

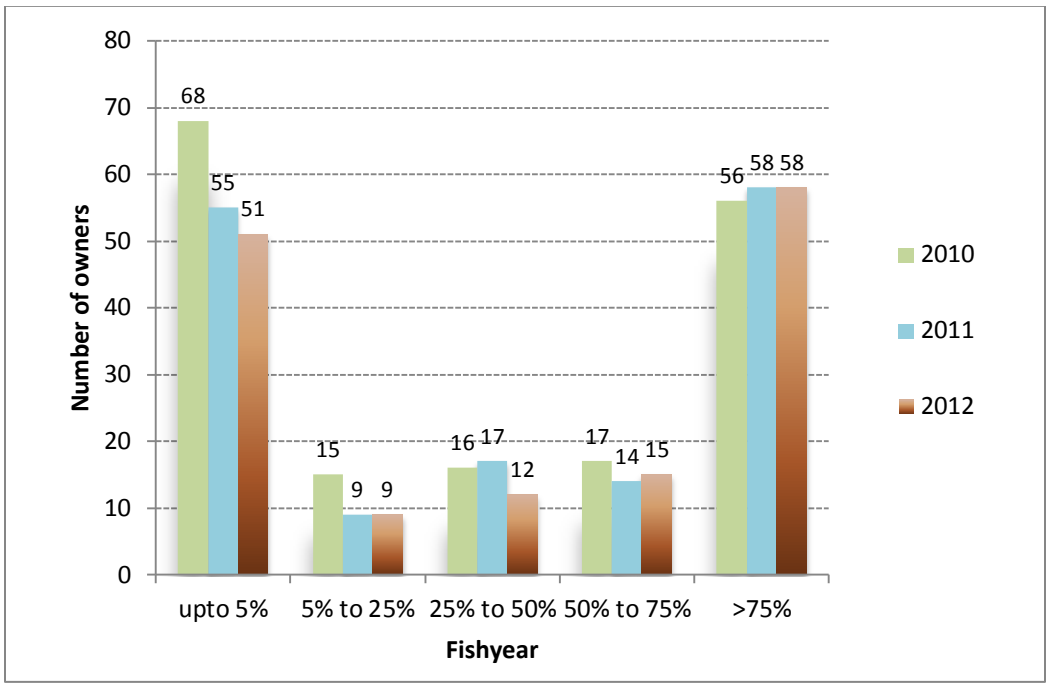


Figure 12. Average scallop revenue by dependency group

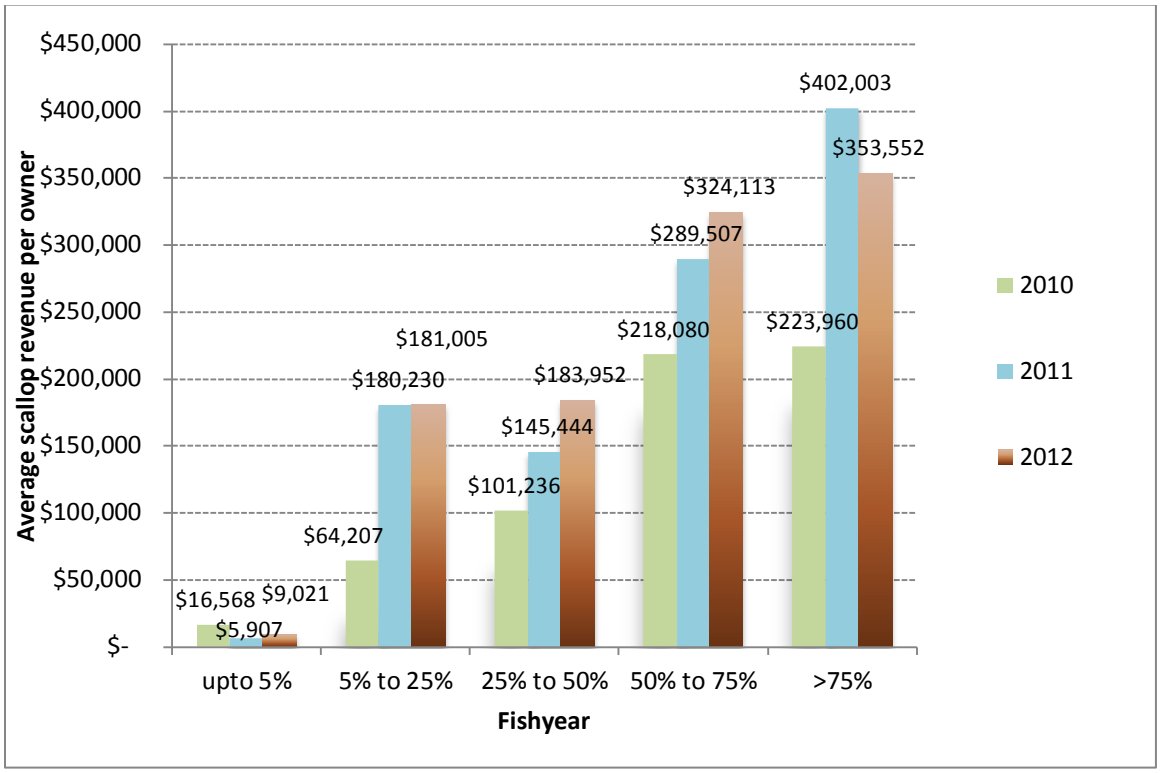


Figure 13. Scallop revenue as a % of total revenue (Owners with LAGC-IFQ permits)

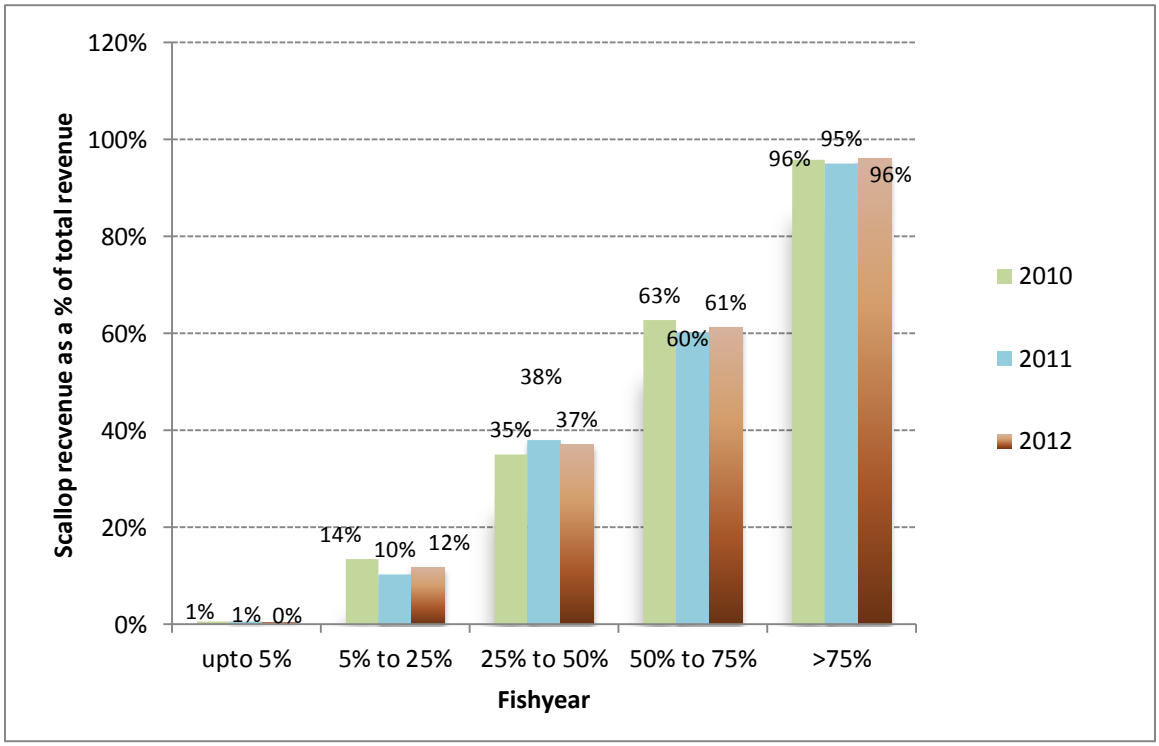
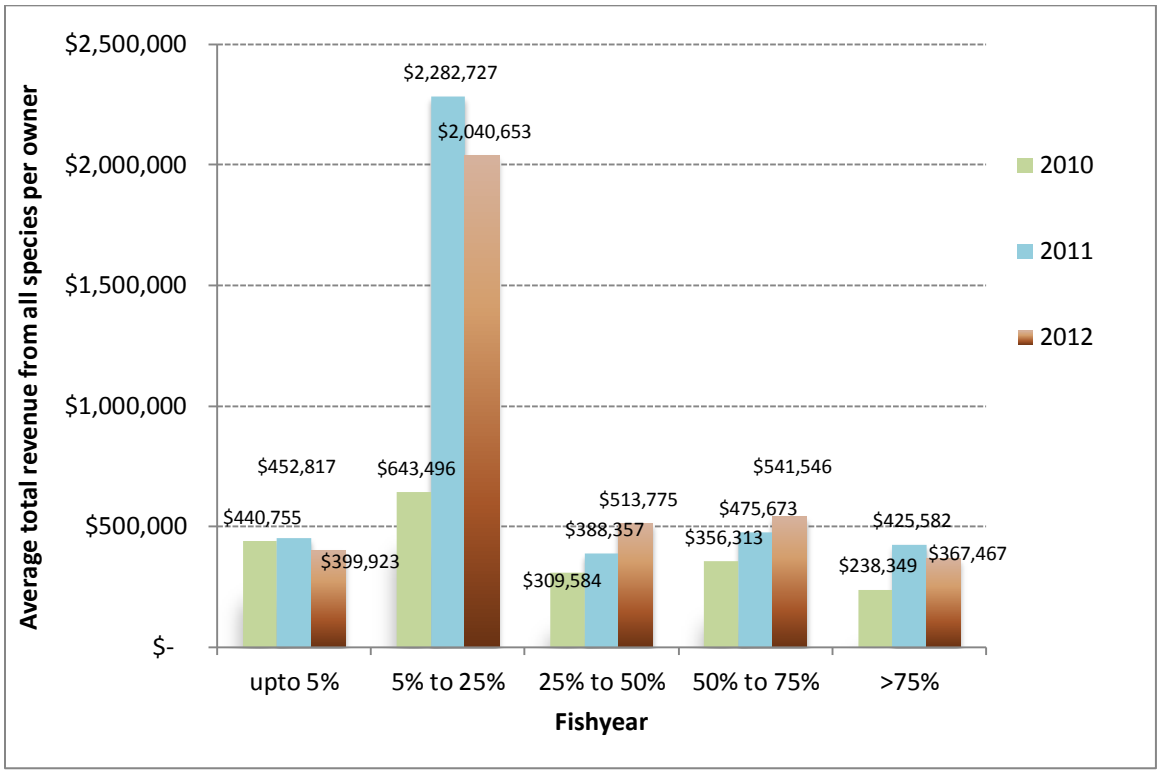


Figure 14. Average total revenue by dependency group



1.5 Geographical trends in landings, allocations, transfers and leasing activity

There has been a decline in the number of active IFQ vessels from the Mid-Atlantic states while the number of active vessels with a primary port in MA and other new England states remained relatively stable during 2010 to 2012 fishing years (Figure 15). There also hasn't been much change in the distribution of allocations by primary state for the vessels with IFQ allocations (Figure 16). However, in terms of the allocations for active vessels only, the share of MA increased from 21% in 2010 to 30% in 2012 fishing year while the share of states in Mid-Atlantic region declined during the same years (Figure 17).

Consistent with these trends, there has been a shift in the leasing activity since 2010 with MA becoming the main state with net leasing of IFQ from other states (Figure 18) . While in 2010, while MA and the other New England states like ME, NH, RI and CT leased out to the Mid-Atlantic States this situation was reversed in 2012 fishing year. MA has become the state with the largest lease-in activity (net of leased-out quota) while all the other states became net lenders of of IFQ. Figure 19 shows that MA leads both in terms of leasing in and leasing out activity with the largest amounts of pounds exchanged. As a result of this shift, the share of MA in scallop landings increased from 31% in 2010 to 40% in 2012 fishing year (Figure 20).

Figure 15. Number of active vessels with LAGC IFQ permits by primary state

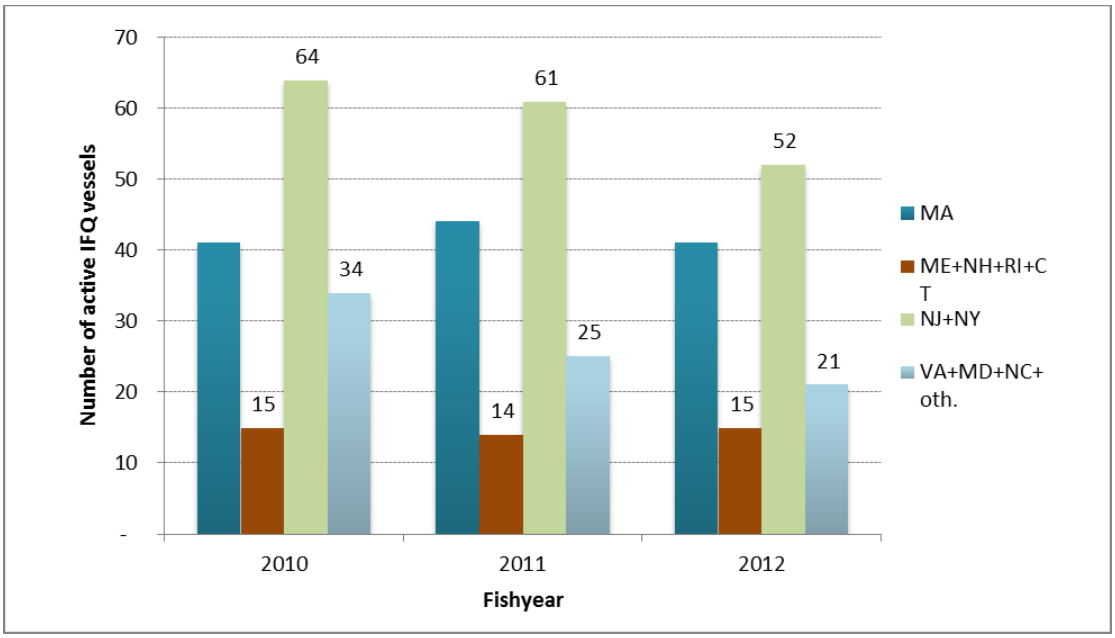


Figure 16. Allocations by primary state (all vessels, including active and non-active)

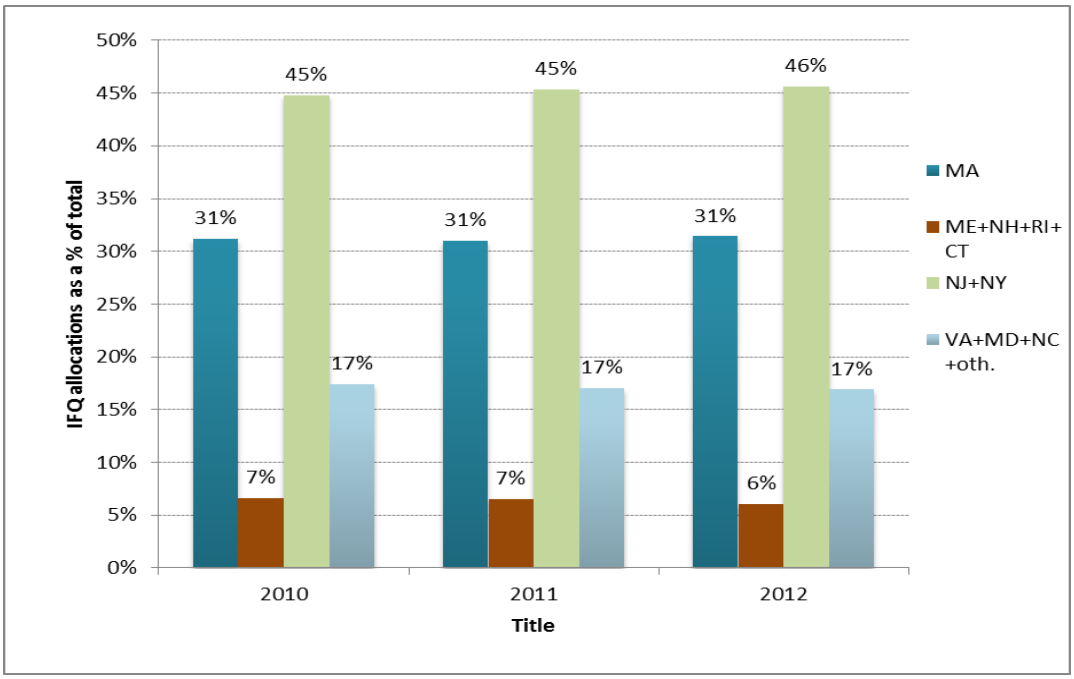


Figure 17. Allocations by primary state (active vessels only)

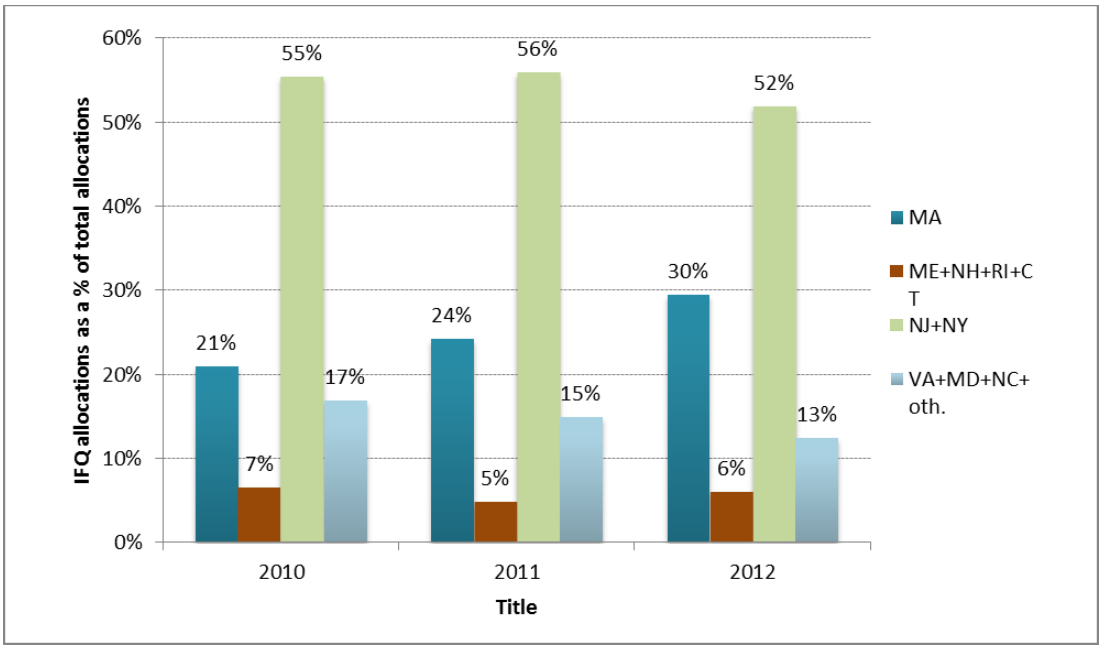


Figure 18. Net leasing activity by primary state

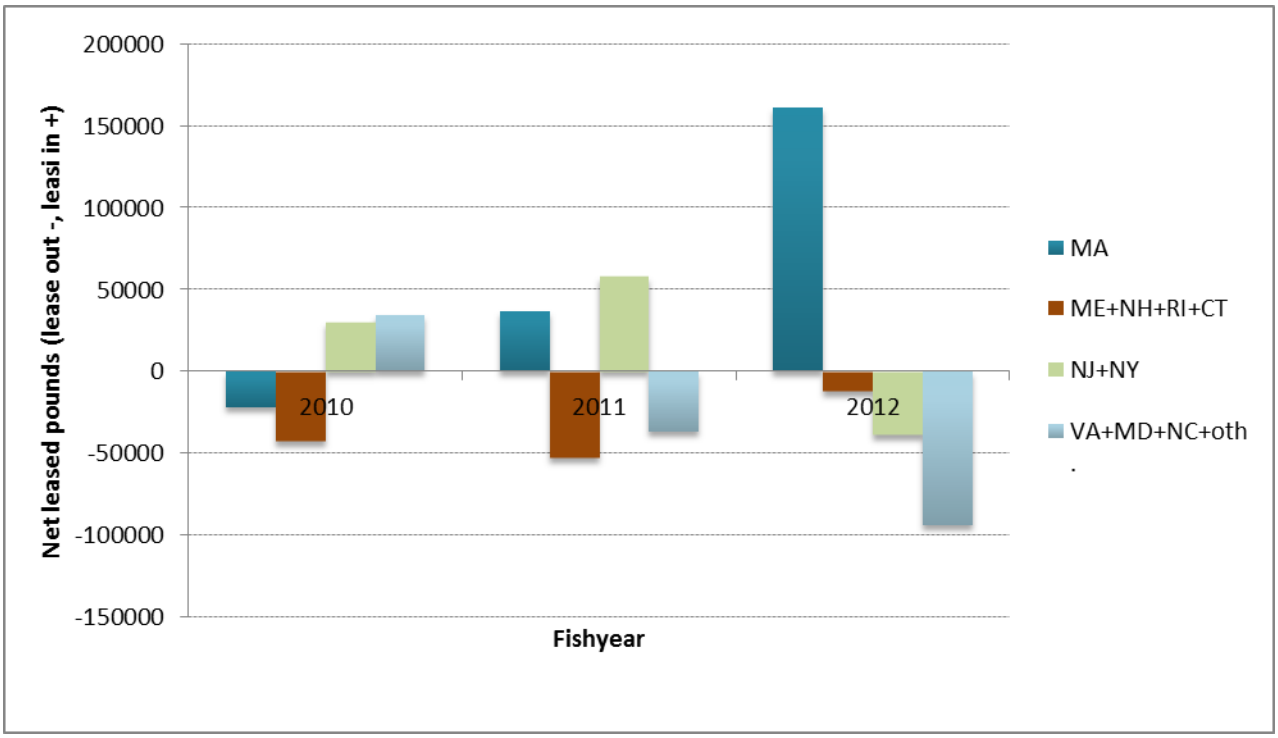


Figure 19. Leasing activity by primary state

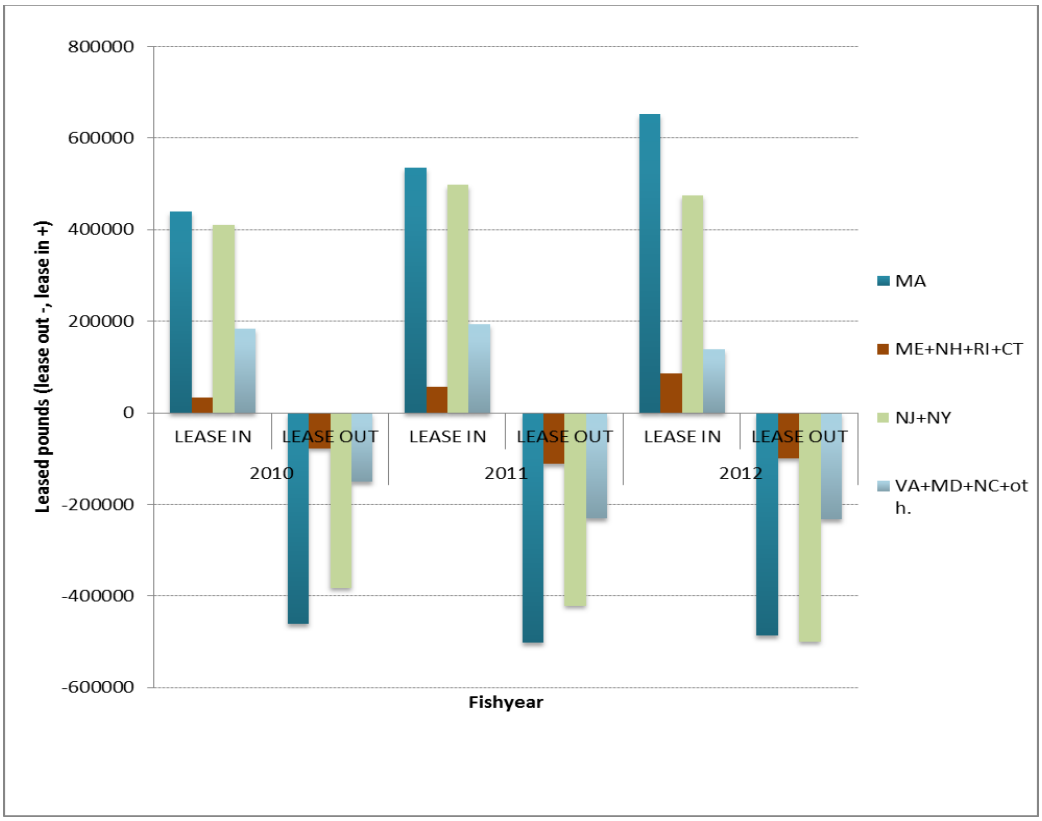
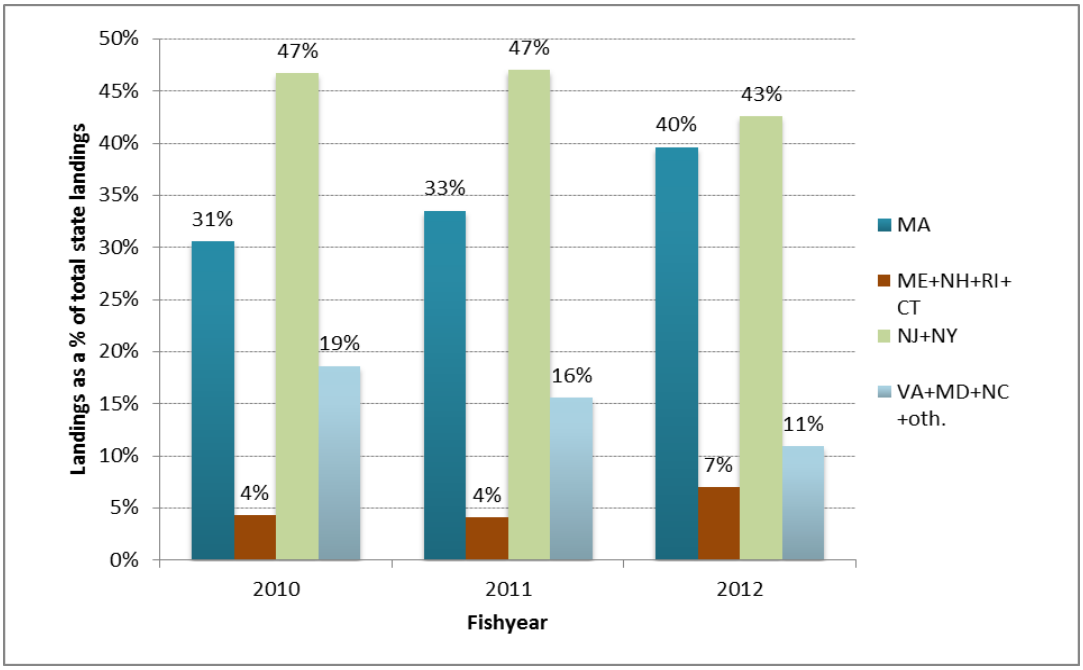


Figure 20. Scallop landings as a % of total by primary state



1.6 Vessel Characteristics

One noticeable change in the vessel characteristics since 2010 was the decline in the number of active large LAGC IFQ vessels with a length ranging from 50ft to 75ft., while the number of active vessels in other categories remained relatively stable (Figure 21). It seems that concentration of IFQ took place among vessels within this length category since the average landings per active vessel with a length from 50ft to 75ft increased relatively more compared to the landings for smaller or larger vessels (Figure 22). Still, there hasn't been any significant changes in terms of landings by length category in 2010-2012 fishing years except perhaps the share of larger vessel declined slightly (Figure 23). Figure 24 shows that while transfer of IFQ took place more from larger to smaller vessels in 2010, in 2011 and 2012, the vessels with IFQs transferred to other vessels were smaller.

Similarly, there has been a decline in the average GRT and average horsepower per active vessel in the same period (Figure 25) . Comparison of Figure 25 with Figure 26 indicates that, in general, the vessels that leased-in quota form others had a higher horse power, gross tonnage and length than the vessels that leased out their quota in 2010-2012.

In terms of year built, the average age of active vessels declined slightly from 2010 to 2012 (**Figure 27**) . In 2012, those vessels that leased IFQ from others were slightly newer than those that leased out their shares (Figure 28). However, those vessels that transferred their IFQ to other were relatively older (average year built=1984) than the ones (average year built=1990) that bought quota from others both in 2010 and 2012 (Figure 29).

Figure 21. Number of active LAGC IFQ vessels by length group.

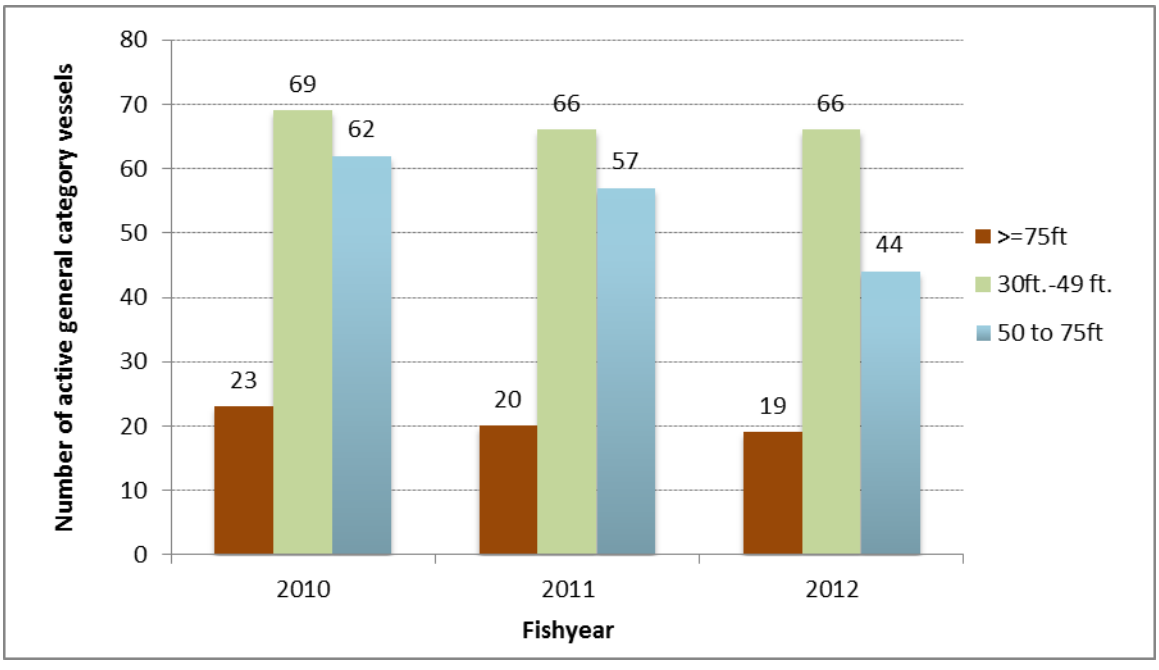


Figure 22. Average scallop landings per LAGC IFQ vessel by length group.

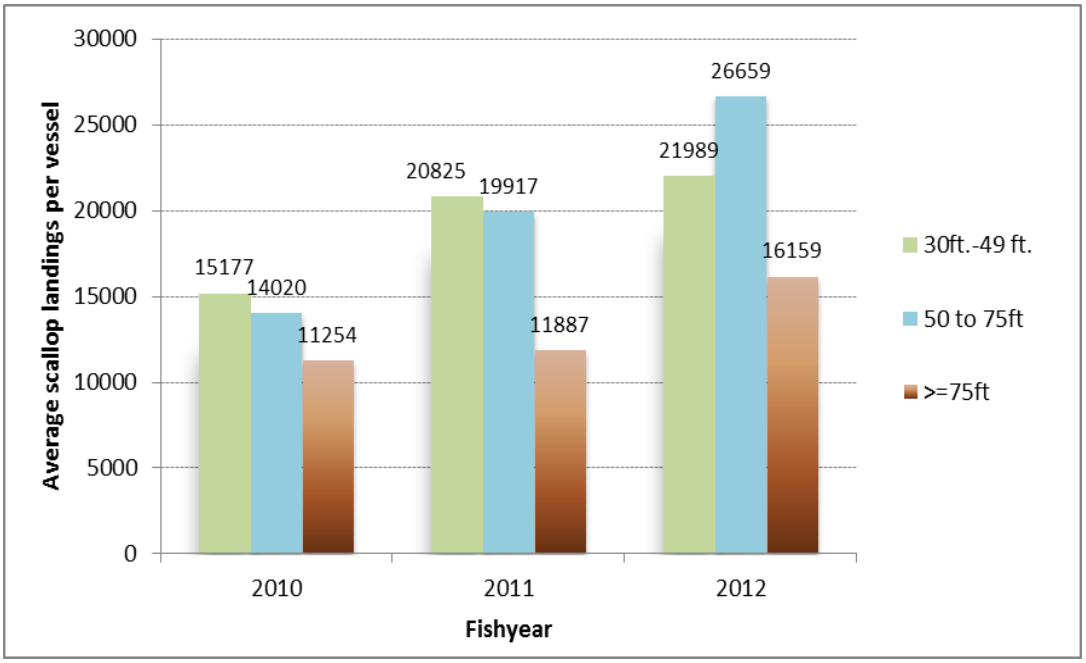


Figure 23. Composition of scallop landings by length group (% of total)

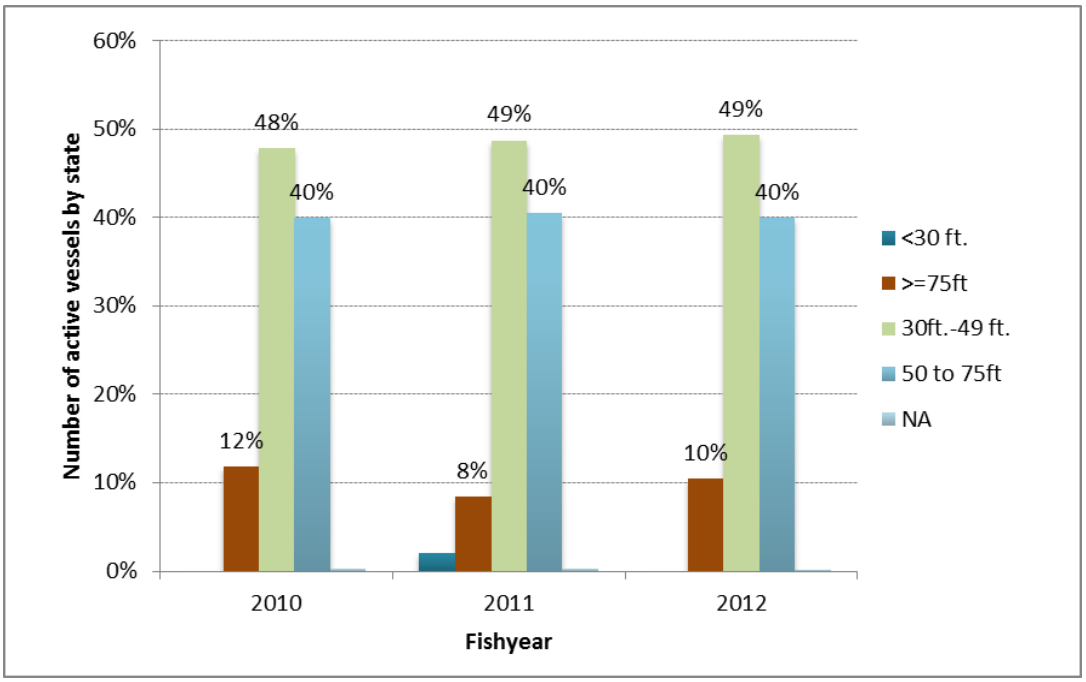


Figure 24. Average length of vessels by transfer category

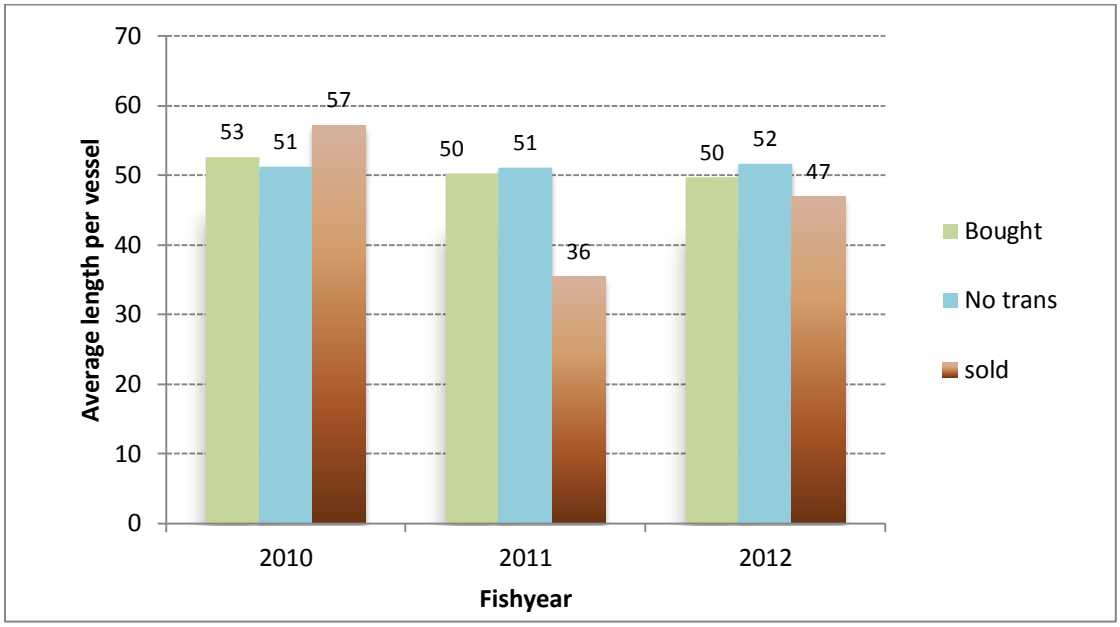


Figure 25. Average length (ft.), horsepower and gross tonnage of LAGC IFQ vessels that leased pounds from other vessels

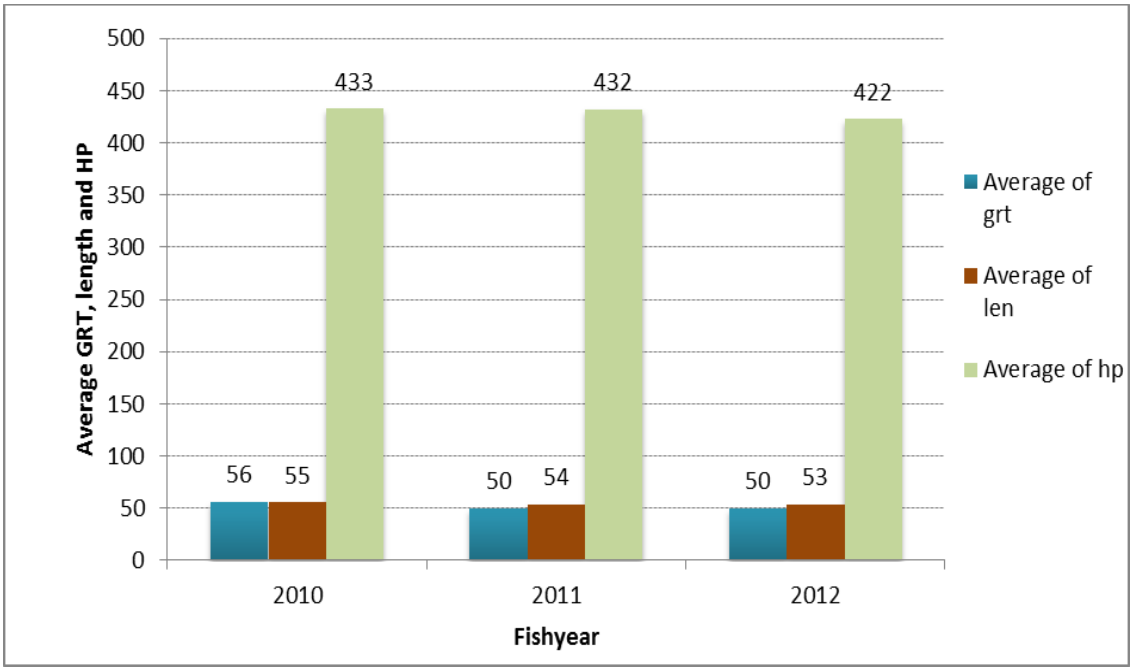


Figure 26. Average length (ft.), horsepower and gross tonnage of the active LAGC IFQ vessels that leased out their quota

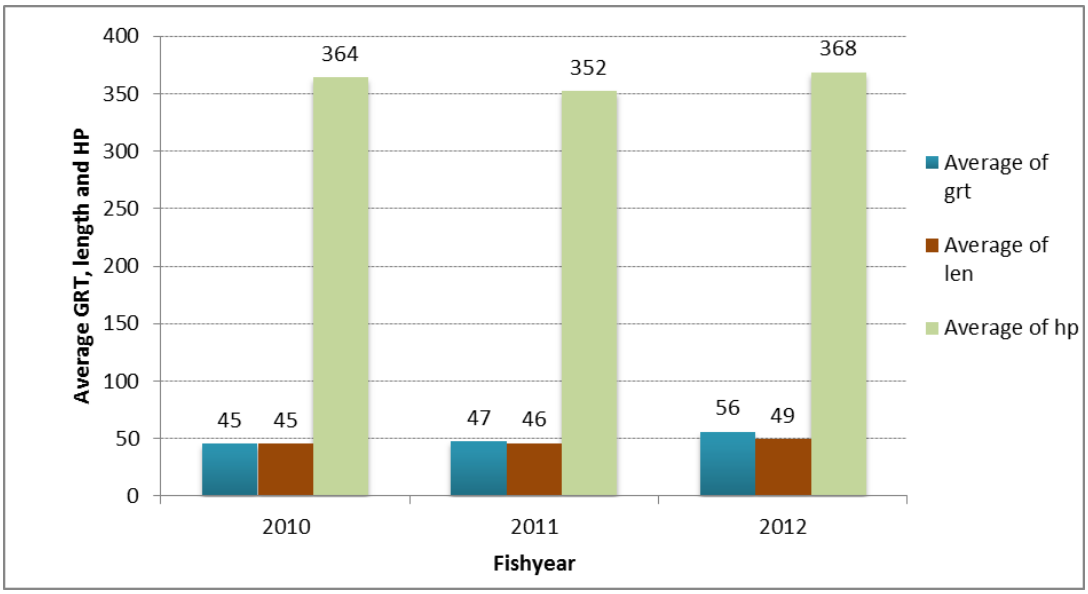


Figure 27. Average year built of the active LAGC IFQ vessels

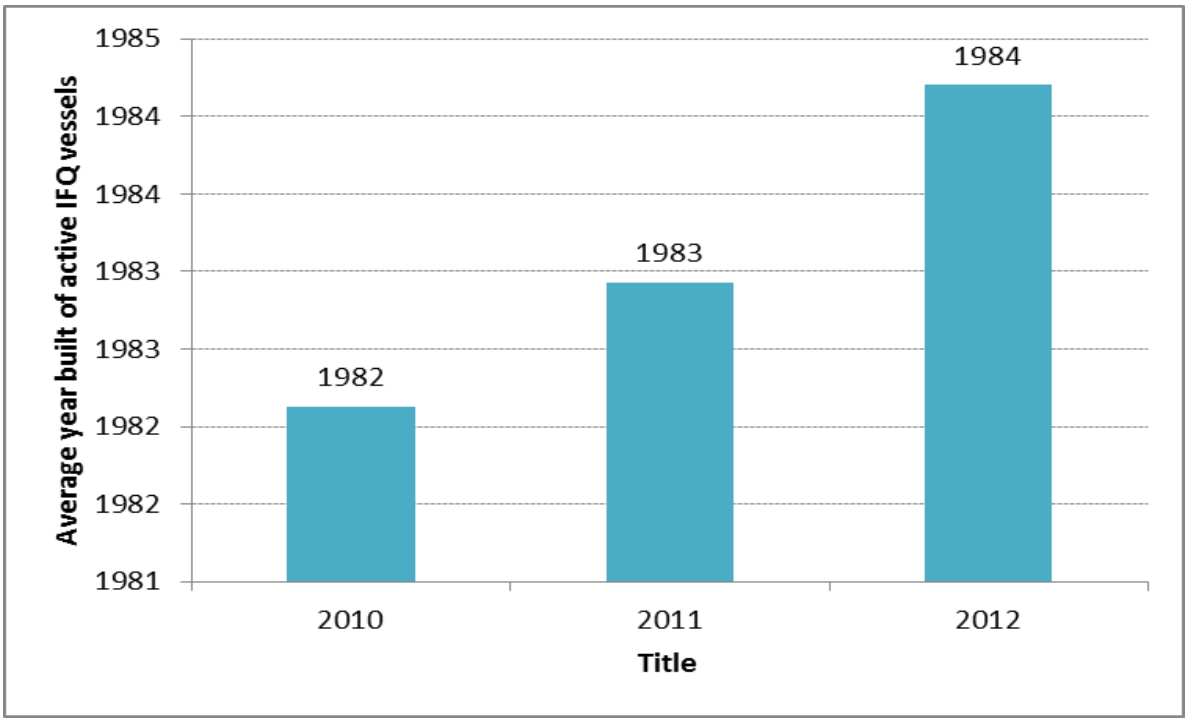


Figure 28. Average year built of the LAGC IFQ vessels by leasing group

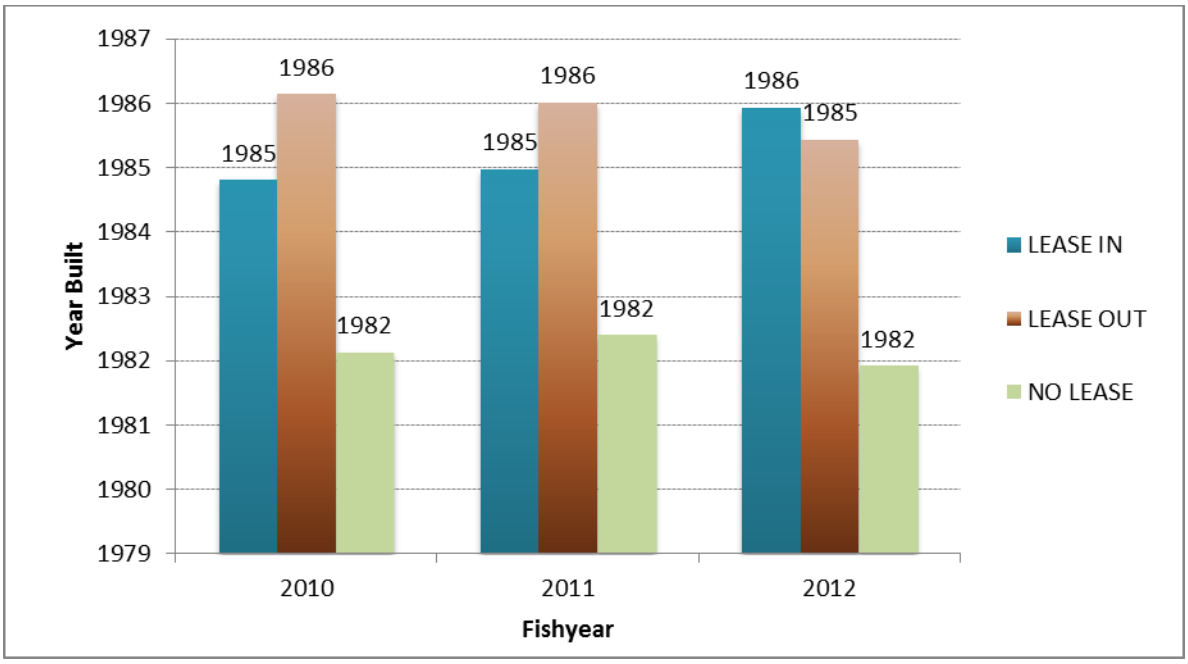


Figure 29. Average year built of the LAGC IFQ vessels by transfer group