

getting buyers (lessees) and sellers (lessors) to negotiate lease prices and quantities and the indirect costs associated with leases that would have made both buyers and sellers better off but did not happen. Together, these are considered transaction costs.

It was not possible to estimate the value of transaction costs for three reasons. The first is a structural impediment. The fact that ACE is held at the sector level but leases almost universally occur at the individual permit (MRI) and/or vessel affiliation level means that lease market data are opaque, leaving only the lessee side of the transaction obviously discernible from official NOAA records. Second, while most sectors included some perspective on some forms of transaction costs in their annual reports, no comprehensive data are available on all of the costs associated with orchestrating leases between individuals, firms, or sectors. Such costs may include fees paid to sector managers or brokers, costs associated with advertising ACE availability, or the cost of time spent searching for and completing suitable leases. The third and final reason for being unable to estimate transaction costs is that no data are available on which to base estimates for the cost of lost leasing opportunities,³² the largest form of transaction cost in this market. Primarily these lost opportunities are due to search frictions and/or structural market impediments that prevent or impair lease negotiation. That is to say, it is not possible to estimate which fishermen or vessel affiliations wanted to lease quota but could not and what the impact of any inability to match buyers and sellers may have been on the potential for increasing the catch of non-binding stocks. The fact that only 33% of total allocated ACE/PSC was caught in 2013 and that less than half of these allocations were caught for eight of the 17 stocks implies at first glance that the potential for efficiency gains from improving lease markets may be large (Table 31). In fact, the inability of sectors to catch their allocated ACE is not likely attributable to any one factor. For example, it may be due to search frictions and/or structural impediments, but it may also be due to fish availability and/or imperfect quota setting, insufficient technology to target particular stocks, expectations about future market conditions, or other factors altogether.

6. DISTRIBUTIONAL ISSUES

Considerable attention has been given to consolidation in the groundfish fishery and whether the degree of consolidation has been heightened by Amendment 16. There is concern also that consolidation may generate a loss of diversity in the fishery. The term “consolidation” can be used to refer to many possible events including the following: a reduction in the number of vessel affiliations (i.e., ownership groups), a reduction in the number of active vessels, a narrower range of vessel sizes, or fewer landed or home ports. To avoid confusion, this report uses the term “consolidation” to mean fewer active vessels or fewer active vessel affiliations earning total revenues for all species and groundfish. In discussing how revenues for all species and groundfish are distributed among existing active vessels and active vessel owners in a given fishing year, we either use the term “concentration” or refer to revenue distributions as being relatively more or less equally distributed.

It is important to note that this section addresses the consolidation and concentration of all species and groundfish revenues from landings by active vessels and vessel affiliations, which are earned through *use* of the fishery resource. It does not address concentration and

³² Leases that would have left both lessee and lessor better off had they occurred.

consolidation of quota or permits, which allows for *access* to the fishery resource. A fisherman may not be actively landing fish, which means that he would not earn a share of the landings revenues discussed in this section. However, he may still be earning revenues from leasing his quota to other fishermen, and those earnings are not reflected in the discussion in this section.

6.1. Number of Vessel Affiliations

Changes in the number of vessel affiliations, or networks of vessels connected by common owners, do not necessarily mean there are more or fewer individuals involved in the fishery. Changes in vessel ownership among existing individuals can also result in changes in the number of vessel affiliations; the results in Table 32 reflect the combination of these two possibilities. The number of vessel affiliations issued limited access groundfish permits declined 14.3% from 2010 to 2013 (910 to 780 affiliations). This is similar to the rate of decline in the number of active vessels (Table 10).

The number of vessel affiliations that had vessels with revenue from at least one groundfish trip is declining at a faster rate (28.1% between 2010 and 2013; Table 32) than the number of vessel affiliations that had revenue from any species. This, too, is similar to the rate of decline in vessels with revenue from at least one groundfish trip (Table 10).

The percentage of vessel affiliations that are inactive (i.e., have no landings) has remained relatively stable over the four-year period, ranging from a low of 22% in 2012 and 2013, to a high of 25% in 2011 (Table 32).

Consolidation of vessels and vessel affiliations is occurring among owners that actively target groundfish. Vessels and vessel affiliations that were active (i.e., have revenue from any species while holding a limited access groundfish permit) but did not earn any revenue from a groundfish trip may be viewed as vessels and affiliations that do not actively target groundfish. Over the period from 2010 to 2013, there does not appear to be ongoing consolidation in this group of vessels and owners. The number of active vessels with limited access groundfish permits that did not have revenue from a groundfish trip remained nearly constant between 2010 (408 vessels) and 2013 (409 vessels; Table 10). The number of active vessel affiliations that did not actively target groundfish increased slightly from 339 vessel affiliations to 347 affiliations during the four-year period (Table 32).

Data presented in Table 32 and Table 33 together suggest that the decline in the number of active vessels in 2010-2013 is primarily due to attrition of active vessel affiliations (fewer ownership groups) rather than consolidation of operations within a vessel affiliation (i.e., ownership groups choosing to harvest fish on fewer vessels). In general, the percentages of vessel affiliations containing a single vessel versus those containing multiple numbers of vessels have remained stable during the four-year period. The percentage of vessel affiliations with a single active vessel in 2013 was 85.0% (531 affiliations), a small decline from 85.7% (598 affiliations) in 2010. The average number of active vessels per active vessel affiliation only changed from 1.22 in 2010 to 1.21 in 2013 (Table 33).

6.2. Distribution of Revenue among Vessels

All species and groundfish revenues were not evenly distributed among groundfish vessels during 2010-2013 (or probably at any time). Between 2010 and 2013, the amounts of all species and groundfish revenues concentrated in the top earning categories remained relatively

stable. Both all species and groundfish revenues were unequally distributed in 2010, and they remained so through 2013. Groundfish revenue remained more concentrated among the top earning vessels than did all species revenue. Distributions of revenues among active vessels during 2010-2013 were examined by ranking active vessels by revenue from highest to lowest and then categorizing the vessels into seven earnings brackets from highest to lowest: top 1%, 2-20%, 21-40%, 41-60%, 61-80%, 81-99%, and bottom 1%. This was done for both all species revenues on all trips and groundfish revenues on all trips (Table 34 and Table 35).

During 2010-2013, the top 20% of vessels annually accounted for 56.7%-58.0% of the total revenue from all species. In this same time period, little change occurred in the proportional share of the bottom 20% of vessels for all species revenues (Table 34).

Groundfish revenues continue to be less equally distributed among active vessels than all species revenues in 2013. Between 2010 and 2013, groundfish revenues became more concentrated in the highest-earning 20% of vessels, increasing from 66.2% to 71.9%. On the other end of the earnings spectrum, the bottom 20% of active vessels earned 0.3% of total groundfish revenues in 2010. This increased to 0.6% in 2013 (Table 35).

6.3. Distribution of Revenue among Vessel Affiliations

The distributions of both all species and groundfish revenues are more concentrated at the vessel affiliation (ownership) level than at the vessel level. The concentration of revenues among top earning vessel affiliations was marked in 2010-2013, and this level of concentration persisted and slightly increased in the top 1% in 2013. Groundfish revenue is more concentrated than all species revenue among the top earning vessel affiliations, as was the case at the vessel level.

Distributions of revenues among vessel affiliations in 2010-2013 were examined by ranking active vessel affiliations by revenue from highest to lowest, and then categorizing the vessels into seven earnings brackets from highest to lowest: top 1%, 2-20%, 21-40%, 41-60%, 61-80%, 81-99%, and bottom 1%. This was done for both all species revenues on all trips and groundfish revenues on all trips (Table 36 and Table 37). In addition, vessel affiliations with at least one active vessel in each year were divided into eight revenue categories. The smallest revenue category included affiliations earning less than \$50,000 for all trips and species landed. The highest revenue category included affiliations earning \$1 million or more (Figure 9).

As noted in Section 6.1, the total number of vessel affiliations with active vessels declined annually between 2009 and 2012 (Table 32). From 2010 to 2013, declines in the number of vessel affiliations occurred in five of the eight revenue categories. Figure 5 also shows not only are there fewer vessel affiliations in 2013 than in 2010 but the distribution of all species revenues among active vessel affiliations changed somewhat over the four-year period (Figure 9).

During 2010-2013, the distribution of all species revenue among vessel affiliations remained unequal but relatively stable. The top 20% of vessel affiliations annually accounted for between 53.5% and 55% of the total revenue. The top 1% of vessel affiliations accounted for between 17.5% and 18.7% (Table 36).

The percentage of total groundfish revenue earned by the top 20% of vessel affiliations had a similar range of values (57.2% to 60.8%) to the top 20% of all species revenue. However, the range of values for the top 1% was increased from a four-year low of 26.6% in 2011 to a four-year high of 28% in 2013 (Table 37).

6.4. Distribution of Revenue Using Lorenz Curves and Gini Coefficients

Lorenz curves provide a graphical interpretation of how revenue is dispersed among the income levels of a population.³³ For any given point on the Lorenz curve, the vertical axis value is the share of total revenue accounted for by all vessels that earned revenue equal to or less than the proportion of the population indicated by the horizontal axis value. The Gini coefficient can be derived from the Lorenz curve and reflects the degree of deviation between the Lorenz curve and the 45 degree line that represents perfect equality.³⁴ Gini coefficient values are bounded by 0 and 1, where 0 indicates perfect equality and 1 indicates maximum inequality.

It is important to recall that revenues have not been equally distributed for some time, as seen earlier in this section. During 2010-2013, the distribution of groundfish revenues was more unequal than the distribution of all species revenues among vessel affiliations, which can be seen by comparing the Gini coefficients for the period for all species revenues (0.694 to 0.701; Figure 10) with the Gini coefficients for the same time period for groundfish revenues (0.808 to 0.842; Figure 11). There has been little change between 2010 and 2013 at the all species revenue level (Figure 10). At the groundfish revenue level, there was an increase in the Gini coefficient, as shown by a change in the shape of the Lorenz curve, in 2013 (Figure 11).

6.5. Consolidation and Concentration of Revenue among Vessel Affiliations

Another way of analyzing the distribution of revenue is to evaluate the number of vessel affiliations that earn various shares of the overall revenue. When fewer affiliations earn all species and groundfish revenues, consolidation has occurred. To assess whether changes in the concentration of revenue have occurred, annual changes in the proportion of affiliations by revenue quartile were examined adjusting for yearly changes in the total number of affiliations. The number of affiliations accounting for 25%, 50%, 75%, and 100% of the revenue from all species on all trips and groundfish species on all trips was tabulated for each year from 2010 to 2013 (Table 38 and Table 39).

Consolidation of all species revenues into fewer ownership groups has occurred, meaning some ownership groups are no longer actively fishing under their limited access groundfish permits. From 2010 to 2013, there has been decline in the number of vessel affiliations in each earnings quartile. Overall, there were 93 fewer affiliations earning total all species revenues in 2013 (605 affiliations) than in 2010 (698 affiliations). However, the percentage of each affiliations in each quartile did not change substantially over the four years indicating that, while the number of affiliations earning all species revenue has declined, the distribution of all species revenues among those vessel affiliations that remain active in the fishery has not changed significantly (Table 38).

Groundfish revenues continue to be consolidated into fewer ownership groups. Between 2012 and 2013, the degree of concentration of groundfish revenues among those vessel

³³ A Lorenz curve is constructed by ranking vessels in order of increasing revenue and then plotting the cumulative proportion of the population on the horizontal axis versus the cumulative share of revenue on the vertical axis.

³⁴ The Gini coefficient is equal to twice the area between the diagonal and the Lorenz curve.

affiliations remaining in the fishery slightly increased. Overall, there were 69 fewer vessel affiliations earning total groundfish revenues in 2013 than there were in 2010. A slight increase in the concentration of groundfish revenues among vessel affiliations occurred in the percentages of vessel affiliations earning the top 25%, 50%, and 75% of groundfish revenues. For example, in 2012, the top 5.1% of vessel affiliations earned 50% of groundfish revenues. In 2013, this percentage of top vessel affiliations earning 50% of groundfish revenues decreased to 4.2% (Table 39).

Taken together, Table 38 and Table 39 imply that there are fewer ownership groups remaining in the fishery and therefore, fewer groups to divide up all species and groundfish revenues earned from actively fishing under limited access groundfish permits. Groundfish revenues were distributed among vessel affiliations slightly less equally in 2013 than they were in 2012. The distributions of revenues among vessel affiliations indicate that groundfish revenues are more concentrated among vessel affiliations than all species revenues, as was also the case among individual vessels.

7. EMPLOYMENT

Changes in employment levels can result from changes in fishery regulations. If new management approaches, such as catch shares, foster vessel consolidation or reductions in fishing effort, working conditions (such as pay, time spent at sea, and number of jobs) may be affected. Although NMFS does not track employment in the fishing industry in the Northeast, Vessel Trip Reports contain information about crew size on fishing trips and on the duration of trips. While these reports do not identify the actual number of individuals employed (e.g., crew often work for more than one vessel owner), the VTR data can be used to determine the number of crew positions available and the length of time that crew spend at sea.

In general, trends in crew employment indicators were negative, suggesting that in 2013 there were fewer opportunities for crew work on most vessel sizes and in many of the region's home port states. For the fleet as whole, total crew positions, total crew trips, and total crew days were at four-year lows in 2013. The ratio of crew days to crew trips—which is described in more detail in Section 7.2 and can be interpreted as an indicator of time spent per earning opportunity (a crew trip)—was also at a four-year high for the fleet in 2013.

7.1. Number of Crew Positions

The total number of crew positions, measured by summing the average crew size of all active vessels on all trips, declined annually between 2010 and 2013 from 2,268 to 2,039, a 10.1% decline and a four-year low in 2013. From 2012 to 2013, the number of crew positions fell across vessel sizes, with decreases ranging from 1.3% (-1 crew position) for the smallest vessel class to 5.7% (-38 crew positions) for the 50' to <75' length class (Table 40).

Most home port states saw declines in the number of crew positions in 2013. Crew positions were at a four-year low for the home port states of Massachusetts, New Hampshire, New York, and Rhode Island, with declines from 2012 to 2013 ranging from 2.6% for Rhode Island to 9.5% for New Hampshire. In Maine, the number of crew positions (228 crew positions) declined 5.8% (-14 crew positions) from 2012 to 2013, but it was higher than it was in 2011 (222 crew positions). Connecticut saw no change in the number of crew positions from 2012 to 2013