Economic Data Collection Program

Catcher Vessel Report (2009-2014)

Erin Steiner, Lisa Pfeiffer, Marie Guldin, Amanda Warlick

NOAA Fisheries

Northwest Fisheries Science Center[1]

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[1] For questions or comments, please contact the EDC Program at nwfsc.edc@noaa.gov.

2014 Economic Data Collection (EDC)

West Coast Groundfish Trawl Catch Share Program

NOAA FISHERIES
Northwest Fisheries SCIENCE CENTER

CATCHER VESSELS

FISHERY PARTICIPATION	Vessels	Avg Days at Sea	Total Landings (1000s mt)
CATCH SHARE FISHERIES: *At-sea Pacific whiting*	19	45.2	62.3
Shoreside Pacific whiting	25	65.3	99.3
Non-whiting midwater	10	11.1	0.9
DTS trawl (with trawl endorsement)	50	37.5	10.3
Non-whiting, non-DTS trawl (with trawl endorsement)	54	23.0	5.8
Groundfish fixed gear (with trawl endorsement)	21	31.4	0.7
Groundfish fixed gear (with fixed gear endorsement)	10	57.3	0.3
Crab	62	41.7	1.9
Shrimp	40	57.4	16.6
Other fisheries	18	30.1	0.1
Alaska	28	114.0	183.6

ECONOMIC SUMMARY*

Vessel Average

$621.2K revenue
$393.3K variable costs
$228.0K variable cost net revenue
$129.6K fixed costs
$98.4K total cost net revenue

$4.7K variable cost net revenue per day

Fleet-wide Totals

105 vessels
$65.2M revenue
$23.9M variable cost net revenue
$10.3M total cost net revenue

ALASKA PARTICIPATION

Alaska: $51.6M
28 vessels, typically 24 trips to AK per year

AT-SEA PARTICIPATION

At-sea: $12.4M
19 vessels

SHORESIDE PARTICIPATION

Total value of catch share groundfish landings
Vessel ports

South & central Washington, Puget Sound: $8.1M
18 vessels

Astoria: $17.2M
31 vessels

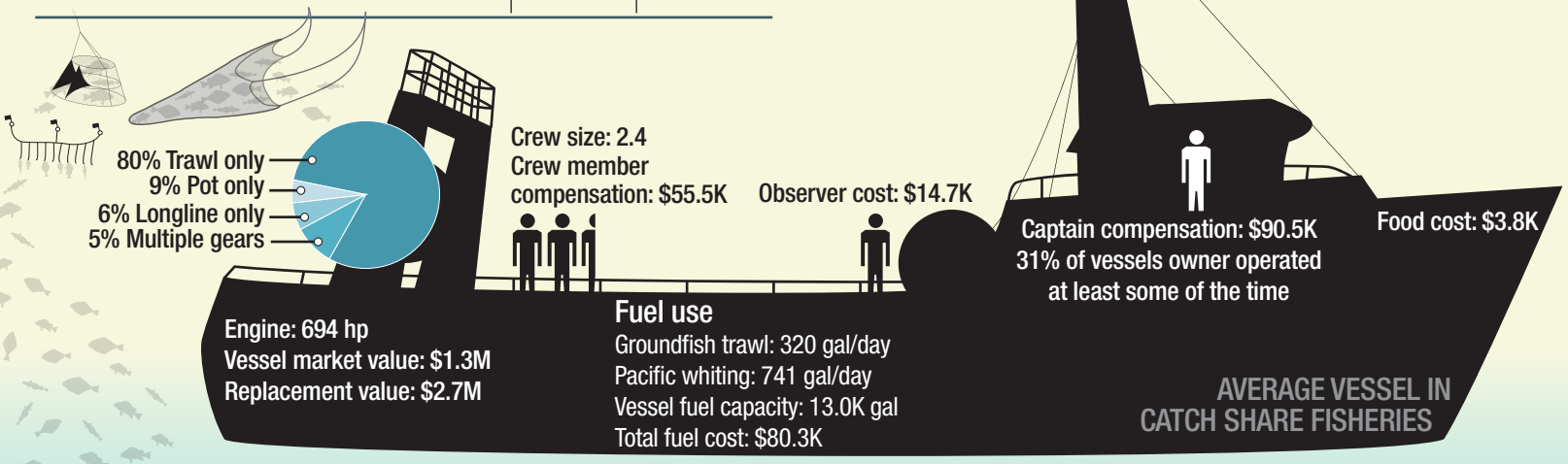
Newport: $13.0M
20 vessels

Coos Bay, Brookings: $4.7M
23 vessels

Crescent City, Eureka, Fort Bragg: $6.3M
18 vessels

San Francisco: $0.7M
7 vessels

Monterey, Morro Bay, Santa Barbara: $2.6M
11 vessels



69 ft average length

29% are < 60 ft | 42% are 60-80 ft | 29% are > 80 ft

*Note that some off-board costs are not collected. Therefore reported net revenue is an overestimate of actual net revenue.

www.nwfsc.noaa.gov/edc/reports

Catcher Vessel Sector: 2014 Highlights

In 2014, the fourth year of the catch share program, there were 102 catcher vessels that participated in the West Coast Groundfish Trawl Catch Share program.

- Catcher vessels generated $85 million in income and 954 jobs from deliveries of fish caught in the catch share program.
- Catcher vessels spent an average of 60 days fishing in the West Coast Groundfish Trawl Catch Share Program (the catch share program) and spent an average of 80 additional days fishing in non-catch share fisheries.
- West Coast catcher vessels deliver to ports in Washington, Oregon, California, and at-sea; the two ports with the highest landings in 2014 were Astoria and Newport, both in Oregon.
- An average of 2.4 crew members worked aboard each West Coast catcher vessel, each earning an average compensation of $55,500.
- In 2014, 31 percent of vessels were owner-operated at least part of the year.
- The average ex-vessel revenue per vessel from participation in the catch share program was $621,000.
- Average variable cost net revenue (ex-vessel revenue minus variable costs) per vessel was $228,000 from participation in the catch share program, and the fleet-wide variable cost net revenue was $23.9 million.
- Average total cost net revenue (ex-vessel revenue minus variable costs and fixed costs) per vessel was $98,400 and the fleet-wide total cost net revenue was $10.3 million.
- For all catch shares, the variable cost net revenue when quota costs and earnings were included ranged from 2.0% and 14.8% less than the variable cost net revenue when it was not included over the time period 2011 through 2014.

Infographic created by Su Kim, Scientific Communications Office, Northwest Fisheries Science Center.

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Acknowledgments

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We thank the Pacific Fishery Management Council and advisory bodies for their valuable comments on the EDC reports and data.

Finally, we thank the members of the West Coast fishing industry who met with us to discuss the development and implementation of data collection processes. We appreciate the time and effort of each participant that will continue to help improve the program in the coming years.

Report Introduction

About the Report

The US West Coast groundfish fishery takes place off the coasts of Washington, Oregon and California, and is comprised of over 90 different species of fish. The fish are harvested both commercially and recreationally. The commercial fishery has four components: limited entry with a trawl endorsement, limited entry with a fixed gear endorsement, open access, and tribal. In January 2011, the West Coast Limited Entry Groundfish Trawl fishery transitioned to the West Coast Groundfish Trawl Catch Share Program. The catch share program consists of cooperatives for the at-sea mothership (including catcher vessels and motherships) and catcher-processor fleets, and an individual fishing quota (IFQ) program for the shorebased trawl fleet.[1] The Economic Data Collection (EDC) Program is a mandatory component of the West Coast Groundfish Trawl Catch Share Program, collecting information annually from all catch share participants: catcher-processors, catcher vessels, motherships, first receivers, and shorebased processors. The EDC information is used to monitor the economic effects of the catch share program, and consists of data on operating costs, revenues, and vessel and processing facility characteristics.

This report summarizes information collected from the West Coast catcher vessel fleet. The EDC reports are also produced for the other sectors, and currently cover the years 2009 to 2014. The 2009 and 2010 data were collected in 2011 to provide a baseline of pre-catch share information. There is a one-year lag in collecting the EDC data to allow companies to close their accounting books. Thus, 2014 data were collected from May to September 2015. The EDC reports are updated annually to disseminate the data collected and provide background, analysis, and context to support the interpretation of the data. The reports are also expected to serve as a catalyst for feedback on the data collected and its analysis. It is envisioned that the scope of these reports will expand, and the methods used will be refined with each publication.

The report is composed of three major sections. The first section, Catcher Vessel Overview (beginning on page 8), is an in-depth summary that contains descriptive analyses of the at-sea and shorebased catcher vessel fleet focusing on activities during 2014. The second section, Catcher Vessel Data Summaries (beginning on page 55), provides tables of all of the data collected from 2009 to 2014, with a detailed discussion of the methods used to collect and analyze the data. The third section, Catcher Vessel Data Analysis (beginning on page 121), contains information about cost disaggregation and calculations of net revenue and economic performance. The data that form the basis for this report are confidential and must be aggregated so that individual responses are protected. In cases where there are not enough observations to protect confidentiality, the data are either not shown, or are combined with broader groups of data. More information about EDC Program administration and fielding of the surveys, the EDC forms, data quality controls and quality checks, data processing, and safeguarding confidential information can be found in the EDC Administration and Operations Report.[2]

[1] Information about the West Coast Groundfish Trawl Catch Share Program is available online at http://www.westcoast.fisheries.noaa.gov/fisheries/groundfish_catch_shares/.

[2] For more information about the EDC Program and the West Coast Groundfish Trawl Catch Share Program, please see the Economic Data Collection Program, Administration and Operations Report available at the EDC website: http://www.nwfsc.noaa.gov/edc.

Background - Economic Data Collection and West Coast Groundfish Trawl Catch Share Program

The economic benefits of the West Coast groundfish trawl fishery and the distribution of these benefits are expected to change under the West Coast groundfish trawl catch share program. To monitor these changes, the Pacific Fishery Management Council (PFMC) proposed the implementation of the mandatory collection of economic data. Using data collected from industry participants, the EDC Program monitors whether the goals of the catch share program have been met.

Many of the PFMC's goals for the catch share program are economic in nature. These goals include: provide for a viable, profitable, and efficient groundfish fishery; increase operational flexibility; minimize adverse effects from an IFQ program on fishing communities and other fisheries to the extent practical; promote measurable economic and employment benefits through the seafood catching, processing, distribution elements, and support sectors of the industry; provide quality product for the consumer; and, increase safety in the fishery.

The EDC program is also intended to help meet the Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 2007 requirement to determine whether a catch share program is meeting its goals, and whether there are any necessary modifications of the program to meet those goals. The MSA requires a formal review 5 years after the implementation of a catch share program to which the EDC Program will make a valuable contribution.

Monitoring the economic effects of a catch share program requires a variety of economic data and analyses. The primary effects of a catch share program can be captured in two broad types of economic analysis: 1) economic performance measures, and 2) regional economic impact analysis. Both of these require information on the costs and earnings of harvesters and processors.

Economic performance measures include: costs, earnings, and profitability (net revenue); economic efficiency; capacity measures; economic stability; net benefits to society; distribution of economic net benefits; product quality; functioning of the quota market; incentives to reduce bycatch; market power; and, spillover effects in other fisheries. Some of these measures are presented in this report, while others will require more specific and involved analysis using EDC data.

Regional economic impact analysis measures the effects of the program on regional economies. The catch share program will likely affect different regional economies in different ways. Regional economic modeling involves tracking the expenditures of all businesses, households, and institutions within a given geographic region to arrive at the effects on income and employment. On the Pacific coast, the Northwest Fishery Science Center's IO-PAC model[3] is used to estimate regional economic impacts using data from both the EDC survey forms and the voluntary cost earnings survey as model inputs.[4]

[3] Leonard, J., and P. Watson. 2011. Description of the input-output model for Pacific Coast fisheries. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-111, 64 p.

[4] For more information on cost earnings survey data collection process, see the Administration and Operations Report Draft Report for PFMC Review (May 2016).

OVERVIEW

Management context

In January 2011, the West Coast limited entry groundfish trawl fishery transitioned to the West Coast Groundfish Trawl Catch Share Program. The catch share program consists of cooperatives for the at-sea mothership (including catcher vessels and motherships) and catcher-processor fleets, and an individual fishing quota (IFQ) program for the shorebased trawl fleet. The vessels participating in the IFQ program deliver shoreside to buyers and processors with first receiver site licenses and at-sea vessels deliver to mothership vessels.

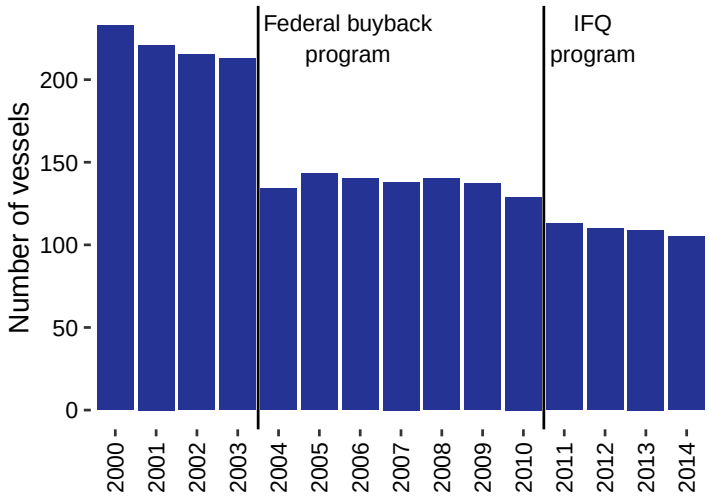

Figure 1: Number of catcher vessels participating in the At-sea and Shoreside limited entry trawl groundfish fisheries (2000-2010) and the number of vessels participating in the West Coast Groundfish Trawl Catch Share Program (2011-2014).

The Pacific Fishery Management Council and the National Marine Fisheries Service are responsible for managing the West Coast Groundfish Trawl fishery. The Pacific Coast Groundfish Fishery Management Plan contains the current rules for managing the fishery, and its amendments give a history of the changes that have occurred. One major milestone was the limited entry (license limitation) program, which was established in 1993 and intended to address over-capitalization and restrict further entry into the groundfish fishery. In 2003, there was an industry funded buyback program, designed to further decrease overcapacity in the fishery.[1] The result of the buyback program was a decrease in the number of active vessels from 213 in 2003 to 134 in 2004 (Figure 1). The number of vessels participating in the limited entry trawl fishery ranged from 129 to 143 between 2004 (post-buyback program) and 2010 (pre-catch share program). In 2011, the first year of the catch share program, the number decreased to 113, with the lowest number of vessels to date in 2014 (105 vessels).

NOAA Fisheries has mandatory rebuilding plans that limit bycatch for species that are designated "overfished". There are two rockfish species that remain designated as overfished as of 2014: Pacific ocean perch and dark-blotched rockfish. In 2011, widow rockfish was taken off the overfished list.[2] As a result, the annual catch limit for widow rockfish was raised starting in 2013. Similarly, canary rockfish was taken off the overfished list in 2015,[3]

[1] 68 FR 42613, available at www.federalregister.gov/articles/2003/07/18/03-18344/magnuson-stevens-act-provisions-fishing-capacity-reduction-program-pacific-coast-groundfish-fishery.

[2] http://www.pcouncil.org/wp-content/uploads/Widow_2011_Assessment.pdf.

[3] NMFS 2015. Status of canary rockfish in the CA current in 2015: http://www.pcouncil.org/wp-content/uploads/2015/05/D8_Att1_Canary_2015_FULL-E-Only_JUN2015BB.pdf.

and the coast-wide annual catch limit will likely be increased for canary rockfish and again for widow rockfish starting in 2017.

Prior to 2011, the fishery was managed with a system that included harvest guidelines, trip and landings limits, area restrictions, seasonal closures, and gear restrictions. Many of these measures were developed to assist in the rebuilding of seven species that are caught as targets or bycatch in the groundfish fishery and were declared overfished in 2003. The catch share program was designed to alleviate the restrictive, inflexible nature of trip and landings limits, which limited the landings of groundfish species by two-month period. Landings limits tend to encourage discarding, which can be detrimental to the rebuilding of overfished species. Under the catch share program, vessels holding a limited entry trawl permit were allocated individual quota shares.

Quota shares were allocated for 30 different groundfish species and rockfish complexes to permit owners based on their historical participation.[4] Annually, the quota shares are converted into quota pounds, which are then used by vessels to harvest fish within the catch share program. The quota shares and quota pounds are transferable, both through lease arrangements and sale, and are infinitely divisible.[5] The catch share program allows vessels to catch their quota at any time during the season. One hundred percent at-sea observer coverage – another feature of the program – ensures that all catch, including discards, is counted against a vessel's quota pounds.

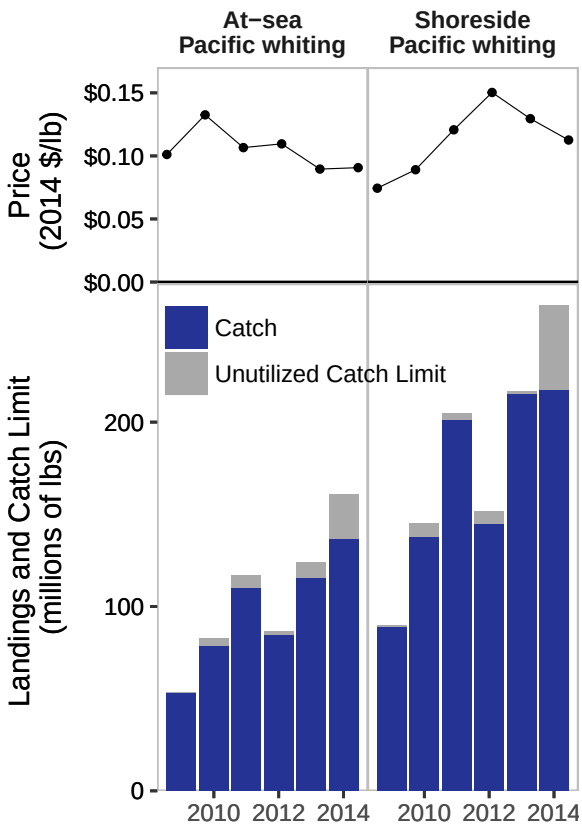

Figure 2: Landings and unutilized catch limit and average ex-vessel prices (2014 $) in the At-sea and Shoreside Pacific whiting sectors. Pacific whiting includes any reapportionment among sectors that may have occurred during the season.

Just as all quota for target species are allocated to individuals, so are quota for the overfished species. If an individual is unable to cover catch of overfished species with their existing quota, they are prohibited from fishing. In response to the high consequences related to catching a species without available quota, some vessels have formed risk pools. The risk pools minimize the risk of needing to prematurely end the fishing season by pooling quota of overfished species with other quota owners. The participants in some risk pools are contractually obligated to follow a set of fishing guidelines, and if the guidelines are followed, any catch of overfished species is covered by the pooled quota and the individual can continue fishing.

Within the catch share program, there are various ways that quota can be traded. The types of trades most frequently recorded are self-trades, other, cash sales, and barter. The "other" category includes cases such as

[4] Additional information on the regulations, including the Federal Register notice, can be found at the West Coast Region website: www.westcoast.fisheries.noaa.gov/fisheries/groundfish_catch_shares/.

[5] There was a moratorium on transfers of quota share percentages (permanently transferring a percent of allocation) until January 1, 2014.

transfers involving risk pools and arrangements where there is no predetermined price, but instead the payment is a percentage of the ex-vessel value of the landed fish. Barter transactions generally refer to a "quota for quota" trade, where individuals trade quota they do not plan to fish themselves. In 2014, Northern sablefish quota (North of 36°N) was traded the most frequently ($1.00 per pound), followed by petrale sole ($0.96), widow rockfish ($0.23), and Pacific whiting ($0.03). The price paid for Southern sablefish quota (South of 36°N) was only 16% of the price for the Northern quota and there were only 22 single species trades in comparison to the 62 single species trades for the Northern quota.[6]

Landings and unutilized quota for each of the catch share species groups are shown in Figures 2 and 3, as well as average prices for landings in that group. Trawl sector-specific allocations of the Annual Catch Limit (ACL) were implemented for all species as part of the catch share program. Prior to the program, only Pacific whiting and sablefish had a sector-specific allocation. Percent utilization of the ACL was low for many species, with the exception of Pacific whiting (Figure 2), sablefish, and petrale sole (Figure 3).

Catcher Vessel Sector Description

In 2014, the fourth year of the catch share program, there were 105 catcher vessels that participated in the program. These include both catcher vessels that deliver shoreside and those that deliver to at-sea motherships.[7] Catcher vessels generated $85 million in income and 954 jobs from deliveries of fish caught in the catch share program.[8] These vessels caught about 63% of all catch share fish (the catcher-processor sector caught the remainder) and 33% of all fish caught commercially on the West Coast.

The catcher vessels that fished in 2014 ranged from 34 feet to 140 feet in length and employed between one and four crew members. The total fleet-wide number of days spent fishing in the limited entry groundfish trawl fishery has decreased from 8,930 during the pre-catch share period (2009-2010) to 6,380 in 2014. There were 53 vessels that fished in 2009 and/or 2010 that did not fish in 2014. Of those vessels, 18 stopped fishing on the West Coast completely, and 35 continued fishing in other fisheries (e.g., shrimp, crab, tuna, and California halibut). Despite the exit of some vessels from the catch share program, there were 18 vessels that fished in 2014 but did not fish in the trawl fishery in 2009 or 2010. Of those "new" vessels, 14 now fish in the Groundfish fixed gear with trawl endorsement fishery.

[6] Note that the prices are based on a relatively small number of single species trades, which are less common than multispecies trades. See Holland, D. S., and K. Norman. 2015. The Anatomy of a Multispecies Individual Fishing Quota (IFQ) "Market" in Development. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-F/SPO-158, 30 p. http://spo.nmfs.noaa.gov/tm/TM158.pdf

[7] Vessels can participate in both the shoreside and at-sea fisheries.

[8] Note that these impacts do not include the complementary impacts associated with the shorebased buyers and processors, nor the mothership vessels. Leonard, J., and P. Watson. 2011. Description of the input-output model for Pacific Coast fisheries. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-111, 64 p.

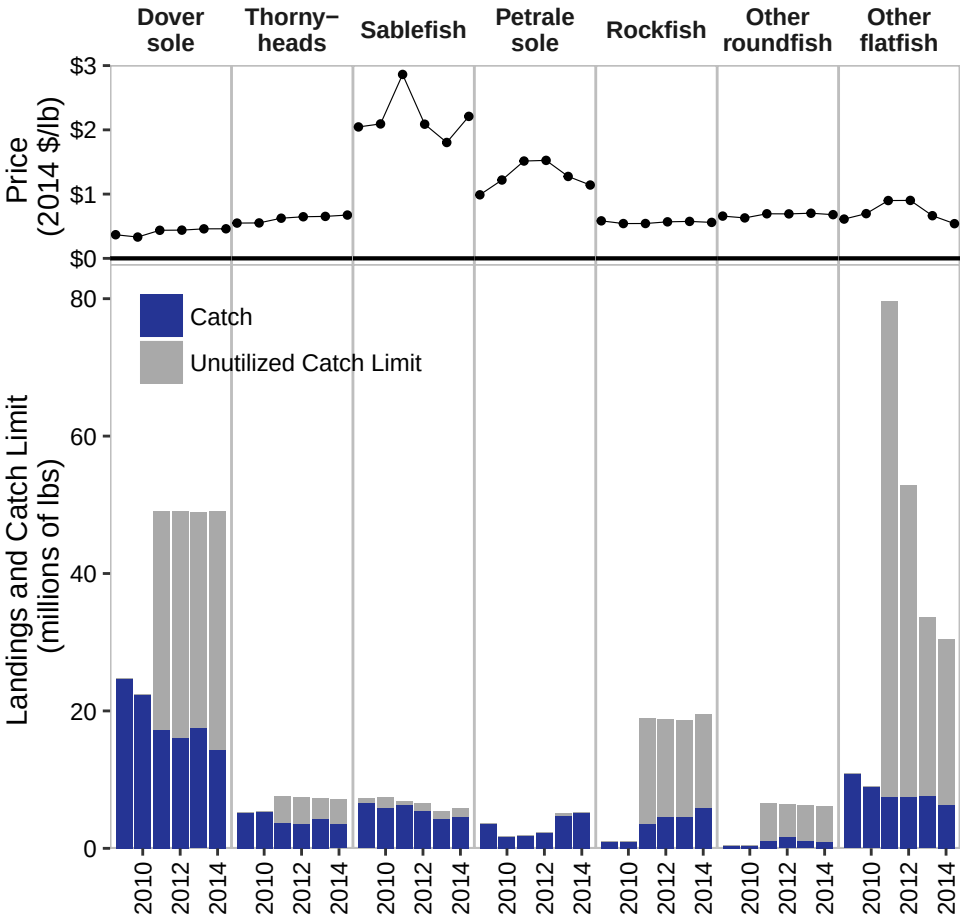

Figure 3: Landings and unutilized trawl sector catch limits and average ex-vessel prices (2014 $) of non-whiting groundfish species. *Unutilized catch limit is not shown for 2009 or 2010 for most groundfish species and species groups because prior to 2011, there was not a trawl-specific allocation of the ACL (Annual Catch Limit).

Table 1: Total ex-vessel revenue, landings weight, and number of vessels delivering to each port for all catch share fisheries in 2014. Some vessels make deliveries in multiple ports, and each vessel is counted in every port where catch is delivered. Delivery ports by fishery are not shown to protect confidential information.

	Revenue (millions of $)	Landings (millions of lbs)	Number of vessels
At-sea	12.4	136.5	19
Washington state	8.1	51.0	18
Astoria, Oregon	17.2	90.1	31
Newport, Oregon	13.0	97.8	20
Southern Oregon	4.7	6.1	23
Northern California	6.3	8.3	18
San Francisco, CA	0.7	0.8	7
Santa Barbara, Morro Bay, Monterey, CA	2.6	2.0	11

The two ports with the highest catch share landings in 2014 were Newport and Astoria, Oregon. Newport received 97.8 million pounds of catch share fish, worth $13 million and Astoria received 90.1 million pounds, worth $17.2 million. Washington received 51 million pounds, worth $8.1 million. All of the California ports combined received 11.1 million pounds, worth $9.6 million. Nineteen vessels delivered 136 million pounds of fish to at-sea motherships, worth $12.4 million (Table 1).

Fishery Participation

For the purposes of this report, the catch share program is divided into the following six fisheries:

- At-sea Pacific whiting fishery
- Shoreside Pacific whiting fishery
- Non-whiting midwater trawl fishery[9]
- Dover sole, thornyheads, and sablefish (DTS) trawl with trawl endorsement fishery
- Non-whiting, non-DTS trawl with trawl endorsement fishery
- Groundfish fixed gear with trawl endorsement fishery

Most vessels participate in more than one of these fisheries. In addition to the catch share fisheries, most vessels also fish in Alaska or participate in state-managed fisheries (primarily shrimp and crab). A few vessels participate in other federally managed fisheries including the Groundfish fixed gear with fixed gear endorsement, salmon, and tuna fisheries. Participation in these other fisheries is more common for the shoreside non-whiting vessels, while fishing in Alaska is more common for the At-sea and Shoreside Pacific whiting vessels. The Groundfish fixed gear with trawl endorsement fishery is the result of a "gear switching" provision that allows either for vessels with trawl quota to fish with fixed gear (pots or longlines) or for vessels that traditionally fished with fixed gear to lease or purchase trawl quota and fish with fixed gear. Fixed gear is primarily used to target sablefish. The At-sea and Shoreside Pacific whiting fisheries are the highest volume fisheries.

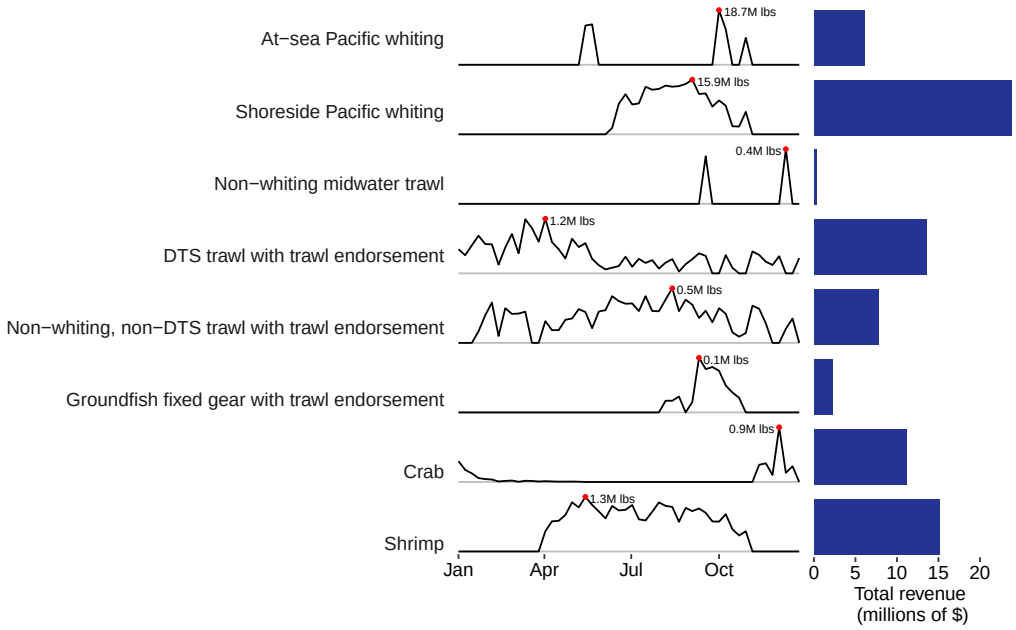

Figure 4: Landings by fishery and week (y-axis varies across fisheries) (left) and total ex-vessel revenue (millions of $) (right) in each fishery (2014). Red point represents highest landing (millions of pounds) by fishery and year.

[9] In 2011, widow rockfish, one of the three main targets (the others are Pacific whiting and yellowtail rockfish) with midwater trawl gear, was taken off the overfished list. As a result, the annual catch limit for widow rockfish was increased in the 2013/2014 Biennial Harvest Specification. Vessels only began targeting widow in 2012.

Regulations prohibit fishing with midwater trawl gear prior to May 1. The At-sea and Shoreside Pacific whiting fisheries occur between late May and October (Figure 4). The DTS and Non-DTS trawl fisheries occur year-round. Vessels that fish with both trawl permits and fixed gear permits tend to use the fixed gear permits during the Primary sablefish fishery (April 1 - October 31) and then transfer the trawl permit onto their boat once they have finished fishing in that fishery (September and October). The opening of the crab season varies by state based on pre-season crab condition testing, but generally begins in December or January and lasts until March. Shrimp is caught between April and October. Salmon, halibut, and tuna are caught in much lower volumes throughout the year, but are not included in the figure.

Economic Indicators

The EDC Program tracks economic indicators by compiling information submitted by participants about expenses and revenue and how those figures change over time. Pre-catch share data for the 2009 and 2010 operating years were submitted in 2011 and have been averaged to calculate "baseline" conditions within the fishery to which subsequent years of data can be compared. Values reported in the Overview are inflation adjusted 2014 dollars.

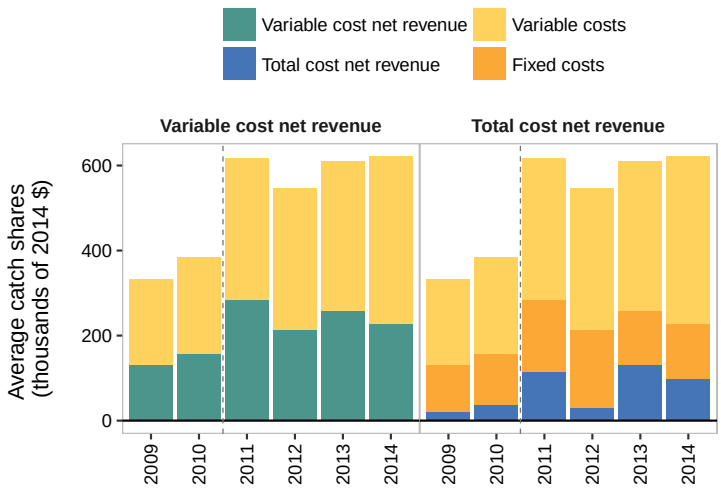

Figure 5: Average variable cost net revenue (ex-vessel revenue minus variable costs), and average total cost net revenue (ex-vessel revenue minus variable costs and fixed costs) per vessel from participation in all of the catch share fisheries combined (thousands of 2014 $). Dashed line represents the beginning of the catch share program.

The EDC Program measures the net economic benefits of the catch share program by reporting two types of net revenue. The first is variable cost net revenue, which is revenue minus variable costs. The second is total cost net revenue, which is revenue minus both variable and fixed costs.[10] To provide a complete picture of the changes that have occurred, both net revenue figures are presented at two scales. Figure 5 shows the average total cost net revenue per vessel while Figure 6 shows the fleet-wide net revenue. Average net revenue is the value generated by a typical vessel, while fleet-wide net revenue represents the total value generated by the fishery. Both figures only include revenues and costs associated with the catch share program. It is important to note that the EDC forms only capture costs that are directly related to vessel fishing operations, and do not include other expenses such as vehicles or office costs that may be related to the fishing business. Therefore, the net revenue reported here is an overestimate of the true net revenue.[11]

[10] See Figure 7 for a description of which costs are considered variable costs and which costs are considered fixed costs.
[11] See Section 12 of the Data Summaries for more information.

Net Revenue

Both average and fleet-wide variable cost net revenue are higher for all years after the implementation of the catch share program than the baseline period. Average variable cost net revenue was $133,000 during the pre-catch share period, and fleet-wide variable cost net revenue was $17.2 million. In 2014, the average variable cost net revenue was $228,000 and the fleet-wide was $23.9 million. Total cost net revenue was higher in all years since the catch share program was implemented, except for 2012. The trends are slightly different for average and fleet-wide total cost net revenue. Average total cost net revenue was highest in 2013 ($131,000), and lowest in 2012 ($29,100) for both. But, the second highest fleet-wide total cost net revenue occurred in 2014 ($10.3 million), while the second highest average total cost net revenue occurred in 2011 ($12.9 million).

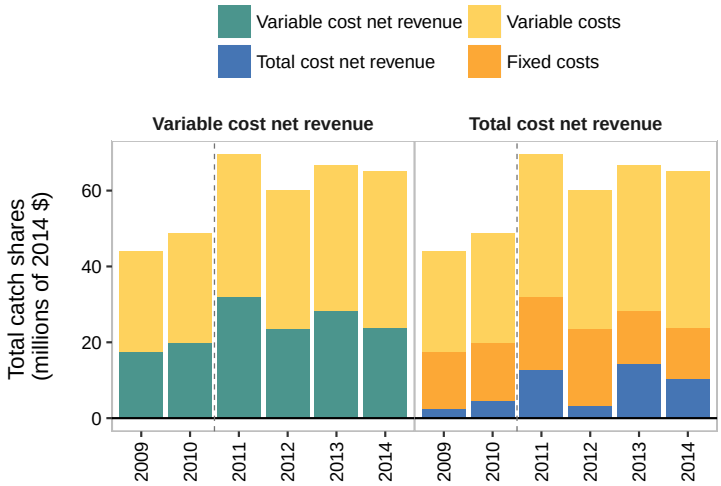

Figure 6: Fleet-wide variable cost net revenue (ex-vessel revenue minus variable costs), and fleet-wide total cost net revenue (ex-vessel revenue minus variable costs and fixed costs) from participation in all of the catch share fisheries combined (millions of 2014 $).

Increases in revenue are a result of a combination of considerable increases in TAC for Pacific whiting as well as increases in ex-vessel prices for many target species. Compared to the pre-catch share period, the ex-vessel price for whiting in the shoreside fishery was 38% higher in 2014 ($0.11 per pound), the ex-vessel price for dover sole was 32% higher ($0.46), and the ex-vessel price for thornyheads was 22% higher ($0.67). Sablefish prices increased substantially in 2011 to $2.86, but then decreased in 2012 to previous years' levels ($2.09) (Figure 3).

Quota earnings and costs are excluded from calculations of net revenue above and throughout this report for reasons related to both economic theory and data limitations. Leasing costs should not be included in calculations of net benefits because leasing constitutes a rent transfer of which there is no opportunity cost outside of the fishery. The data available do not allow for the allocation of costs to a specific fishery or calendar year (from the fiscal year reported on the EDC form); and quota lease revenue is not collected from non-active participants. Additionally, many quota trades are non-cash transactions and therefore cannot be included in the calculations. Despite these limitations, net revenue with quota was calculated to examine how including these additional earnings and costs affect average operational performance measures currently reported. The average revenue (for all catch share participation by survey year) per vessel ranged from 2.3% and 6.4% higher (from 2011-2014) than the ex-vessel revenue alone.[12] For all catch shares, the variable cost net revenue when quota was included was between 2% and 14.8% less than the variable cost net revenue when it was not included. For whiting vessels, the difference in variable cost net revenue when including quota versus not including quota was largest in 2013 (9.3% less), and for groundfish vessels, the difference was highest in 2014 (25% less).

The quota data collected on the EDC forms can provide some information about quota costs that are not paid to a vessel owner that is currently participating in the catch share fisheries. The percent of quota costs going to non-active participants has increased over time, in 2011, 74% of all quota costs reported on the EDC forms

[12] Transactions from purchase or sale of quota shares are not included because there are too few observations.

were also reported as earnings for vessels currently participating in the catch share fisheries. In contrast, in 2013 and 2014, only 48% and 45%, respectively, of all quota costs were reported as earnings for current catch share participants.

Costs

In all four years since the implementation of the catch share program, the highest variable cost categories were crew and captain compensation and fuel (Figure 7). The highest fixed costs were vessel and on-board equipment. Fixed costs do not vary as directly with the level of fish harvest as much as variable costs. Costs per vessel have increased for nearly all cost categories, with the largest increases coming from equipment, captain and crew compensation, and fuel. Fleet-wide fixed costs were highest in 2011 and 2012, at $19.1 million and $20.4 million, but have since decreased to pre-catch share levels of $13.6 million in 2014. In addition to fixed and variable costs, 51 vessels spent an average of $64,200 on the purchase or lease of quota in 2014.

One other change resulting from the implementation of the catch share program was a shift to 100% observer coverage with partial industry funding. Prior to catch shares, there was approximately 20% observer coverage, paid for by the National Marine Fisheries Service (NMFS). In order to lessen the cost of transitioning to the required 100% observer coverage, catcher vessels received a maximum subsidy of $328.50 per day in 2011 and 2012. This subsidy decreased in 2013 to $256 per day and in 2014 to $216 per day. Catcher vessels spent on average $14,700 on observer coverage (excluding the NMFS subsidy payments) while operating in the catch share program in 2014 (Figure 7). In 2011, observer costs represented 0.6% of total costs, and increased to 2.8% in 2014. Note that as observer subsidies have decreased over time, the average expenses per vessel have increased. For this reason, the average 2014 costs reported will not reflect the costs currently incurred by the fleet.

As noted above, most vessels participate in more than one fishery within the catch share program, as well as state and federally-managed fisheries that are not part of the catch share program. More details about each fishery and the economics of vessels participating in each fishery are included in the fishery-specific summaries in the following section.

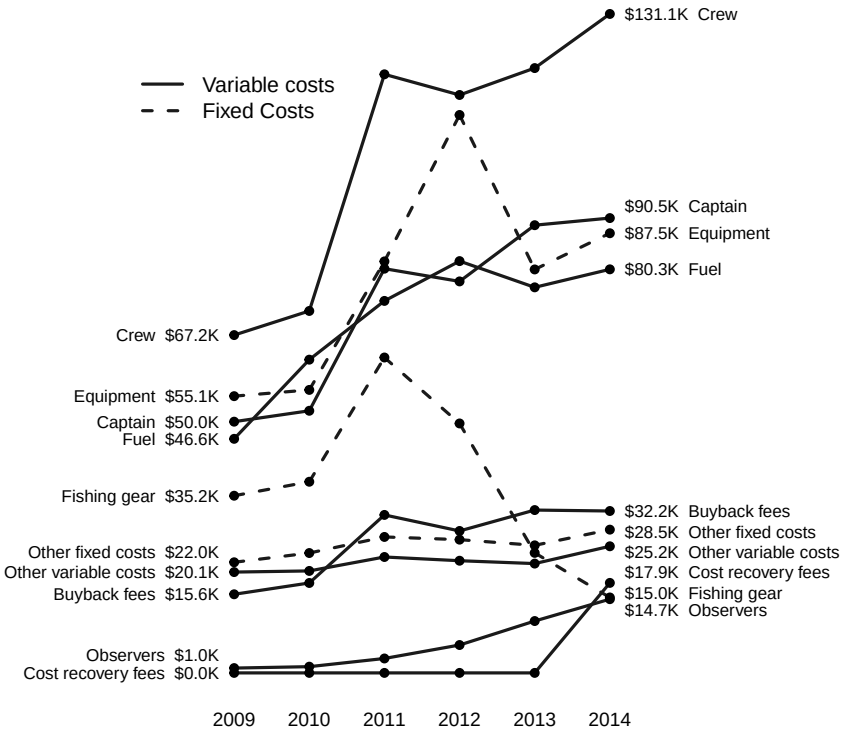

Figure 7: Average fixed (dashed line) and variable costs (solid line) (thousands of 2014 $) per vessel in the West Coast Trawl Groundfish Catch Share Program. Note that vessels participating in Exempted Fishing Permit (EFP) programs during the pre-catch share period (2009-2010) paid for their own observer coverage.

Fishery Summaries

At-sea Pacific whiting

Nineteen vessels participated in the At-sea Pacific whiting fishery in 2014. These vessels delivered to five motherships as part of a single fishing cooperative. This fishery targets Pacific whiting (99.8% of total landings by weight) and has very low bycatch (Figure 8). Although the bycatch rate is extremely low, the total weight of bycatch was still 519,000 pounds in 2014. The majority of this catch consisted of rockfish, sharks, skates and rays, and squid. Not all species caught in this fishery must be "covered" with quota, but of the quota species, the most common were yellowtail rockfish (98,100 pounds), widow rockfish (87,500 pounds), darkblotched rockfish (15,920 pounds), and splitnose rockfish (13,680 pounds).

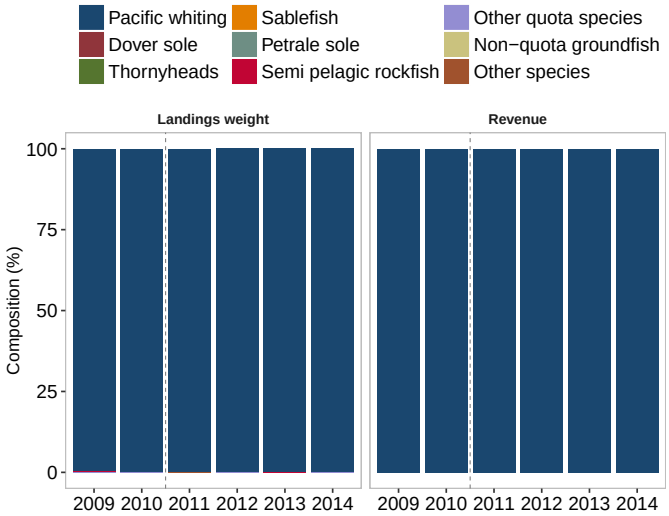

Figure 8: The species composition of catch (left) and revenue (right) in the At-sea Pacific whiting fishery (%). Dashed line represents the beginning of the catch share program.

Revenue

Participation in the At-sea Pacific whiting fishery resulted in $12.4 million in ex-vessel revenue in 2014 (Figure 9 (top)). Vessels that participated in the At-sea Pacific whiting fishery also earned revenue fishing in Alaska (54.5% of total revenue) and fishing in the Shoreside Pacific whiting fishery (23.6% of total revenue). In 2014, all of the participants in the At-sea Pacific whiting fishery also fished in Alaska and most also fished in the Shoreside Pacific whiting fishery (Figure 9 (bottom)). In 2009 through 2011, there were some vessels that also fished in the bottom trawl fisheries (DTS trawl with trawl endorsement and Non-whiting, non-DTS trawl with trawl endorsement fisheries), but there has been nearly no participation by At-sea Pacific whiting vessels since 2012. Total revenue has been higher since the implementation of the catch share program, mainly due to an increase in the catch limit for Pacific whiting and Alaska pollock (for those vessels that fish in Alaska).

Net Revenue

Average revenue for participants in the At-sea Pacific whiting fishery was $651,000, average variable cost net revenue was $237,000, and average total cost net revenue was $84,000 in 2014 (Figure 10). The revenue and net revenue figures correlate closely to the volume of Pacific whiting allocated to the mothership sector. Average variable cost net revenue for 2011 was 41% higher than the two years prior to the catch share program. Although variable cost net revenue was lower in 2014 than previous years, it was still 9% higher than the pre-catch share period. The average total cost net revenue was highest in 2011 ($128,000), followed by 2014 ($84,000).

Costs

The single largest cost in 2014 was crew compensation ($136,000 per vessel), followed by equipment ($105,000), and fuel ($111,000) (Figure 11). The total amount spent on fuel, crew compensation, and captain compensation

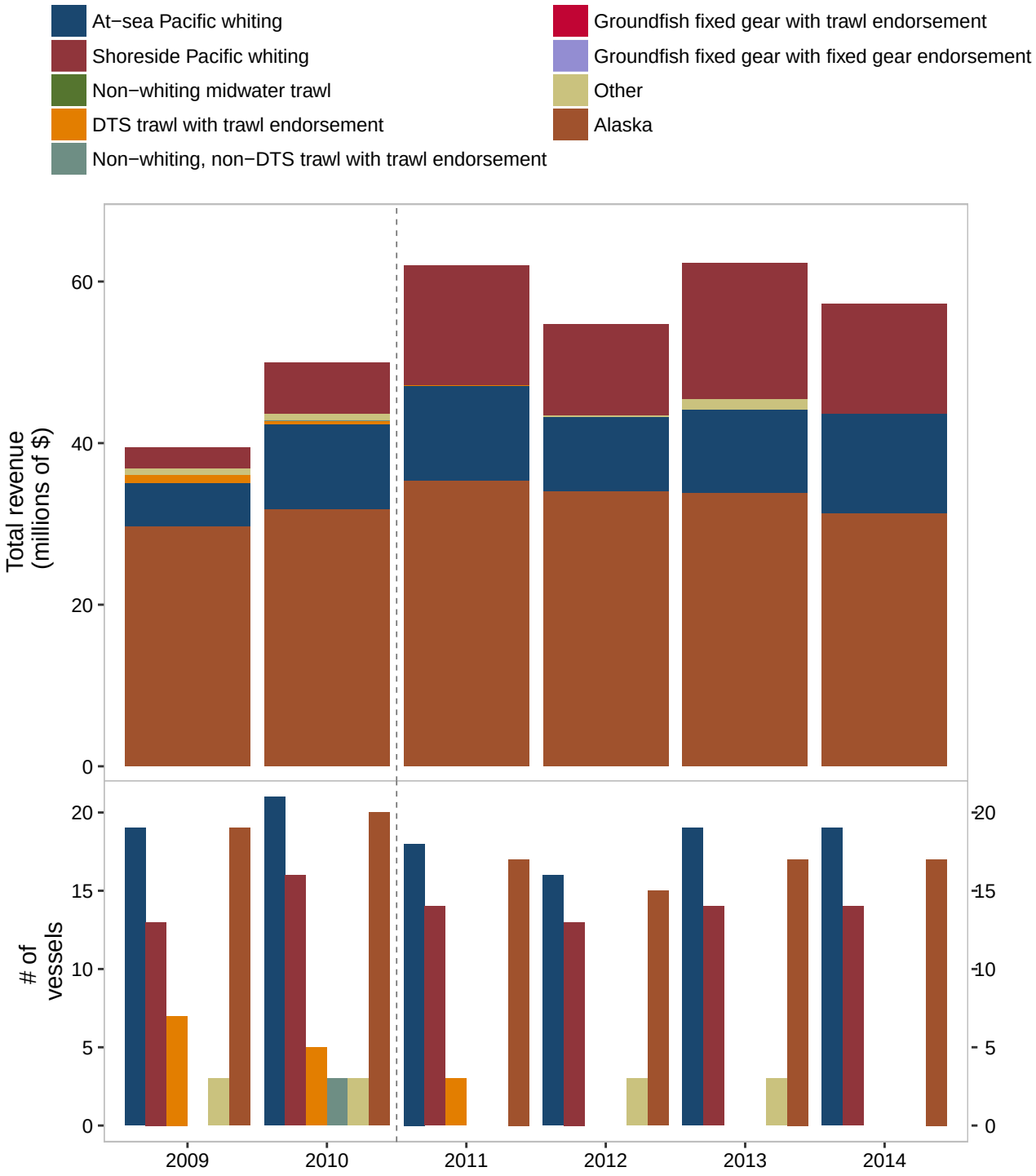

Figure 9: Total ex-vessel revenue earned by vessels that participated in the At-sea Pacific whiting fishery by fishery (millions of 2014 $) (top) and number of vessels that participated in each fishery (bottom). Dashed line represents the beginning of the catch share program. *Some values are suppressed to protect confidential data.

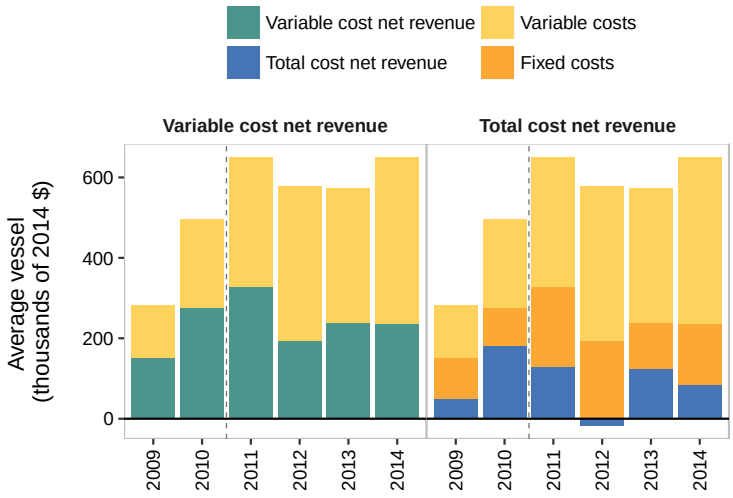

Figure 10: Average variable cost net revenue (ex-vessel revenue minus variable costs) (left), and average total cost net revenue (ex-vessel revenue minus variable costs and fixed costs) (right) from participation in the At-sea Pacific whiting fishery (thousands of 2014 $). Dashed line represents the beginning of the catch share program.

nearly doubled between 2009 and 2014. On a per unit basis (not shown in the figure), crew compensation decreased from $1.97 per hundred pounds delivered to mothership vessels during the pre-catch share period to $1.87 per hundred pounds in 2014, while captain compensation increased from $1.07 per hundred pounds delivered to $1.15 per hundred pounds in 2014. Fuel expenses were the same during the pre-catch share period and in 2014 ($1.70 per hundred pounds). Expenses per hundred pounds were highest in 2012 for fuel ($2.46), captain wages ($2.46), and crew wages ($2.46). The increase in fuel costs can at least be partly attributed to increases in fuel prices (see Mothership report for a full discussion).

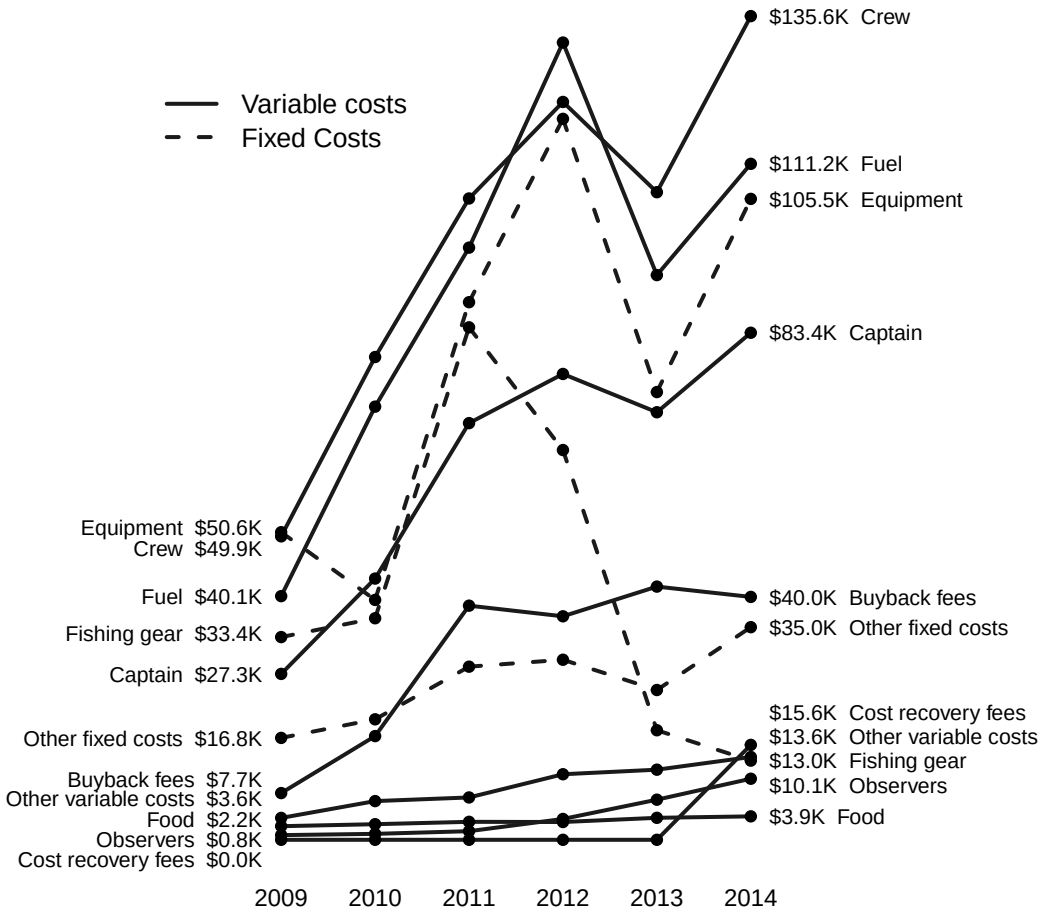

Figure 11: Average fixed (dashed line) and variable costs (solid line) per vessel in the At-sea Pacific whiting fishery (thousands of 2014 $).

Shoreside Pacific whiting

Twenty five vessels participated in the Shoreside Pacific whiting fishery in 2014. This fishery targets mainly Pacific whiting (98.8% of total landings by weight, Figure 12). In 2014 the bycatch rate in the Shoreside Pacific whiting fishery (1.2%) was higher than the At-sea fishery, amounting to 2.55 million pounds. The majority of the bycatch consisted of rockfish, sardines, sharks, skates and rays, and shad. Not all species caught in this fishery must be "covered" with quota, but of the quota species, the most common were yellowtail rockfish (681,000 pounds), and widow rockfish (605,000 pounds).

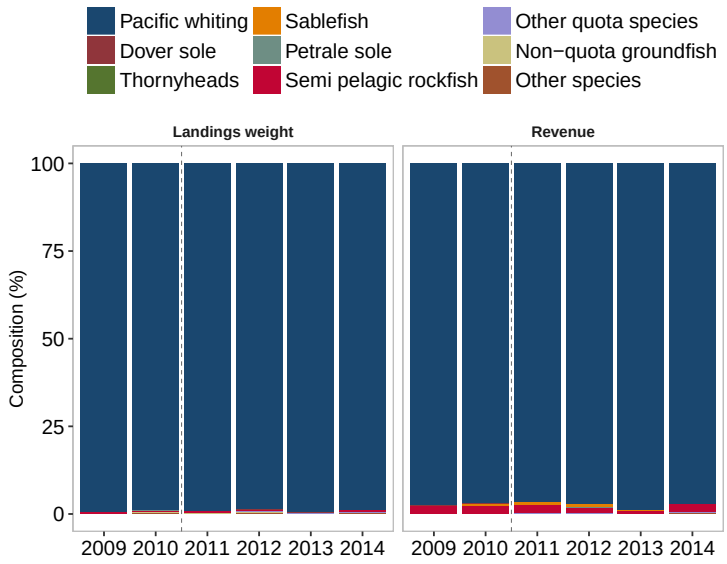

Figure 12: The species composition of catch (left) and revenue (right) in the Shoreside Pacific whiting fishery (%). Dashed line represents the beginning of the catch share program.

Revenue

Participation in the Shoreside Pacific whiting fishery resulted in $24.3 million in total ex-vessel revenue in 2014 (Figure 13 (top)). Vessels that participated in the Shoreside Pacific whiting fishery also earned revenue from fishing in Alaska (34.4% of total revenue) and fishing in the At-sea Pacific whiting fishery (14.6% of total revenue). Most Shoreside Pacific whiting vessels either fished in Alaska or in the At-sea Pacific whiting fishery (Figure 13 (bottom)). The total revenue earned by Shoreside Pacific whiting vessels was lower in 2014 than 2013. This was a result of decreases in total ex-vessel revenue on the West Coast as well as Alaska. Compared to the first year of the catch share program, 2011, the total fishery-wide ex-vessel revenue from fishing in Alaska in 2014 was $2.9 million less and the ex-vessel revenue from At-sea Pacific whiting was $2.4 million less. The number of vessels participating in the Shoreside Pacific whiting fishery decreased from the pre-catch share period (37 vessels) to 27 vessels in 2014.

Net Revenue

Average revenue for vessels participating in the Shoreside Pacific whiting fishery was $973,000, average variable cost net revenue was $373,000, and average total cost net revenue was $134,000 in 2014 (Figure 14). All three measures increased substantially from pre-catch share levels. Total cost net revenue was negative in both of the years leading up to the implementation of the catch share program. The increase in ex-vessel revenue was a result of an increase in the catch limit for Pacific whiting, especially in 2011, and steadily increasing ex-vessel prices paid by first receivers to the shoreside fleet. Ex-vessel revenue, variable cost net revenue, and total cost net revenue were all highest in 2013.

Costs

The single largest cost in 2014 was for crew compensation ($203,000 per vessel), followed by vessel and on-board equipment ($180,000), and captain compensation ($143,000) (Figure 15). The average amount spent on vessel and on-board equipment was nearly triple compared to the pre-catch share period; and crew compensation and

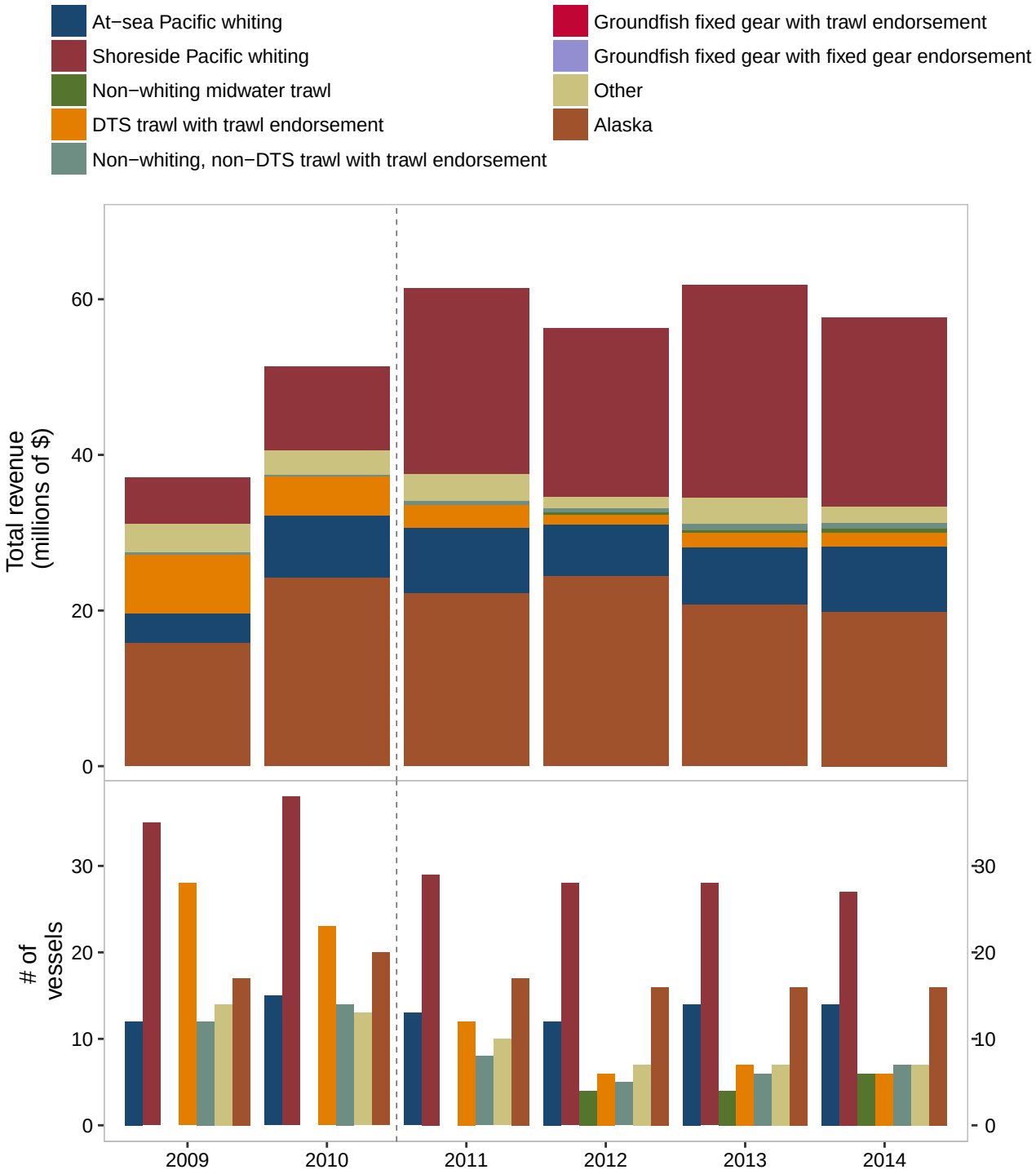

Figure 13: Total ex-vessel revenue earned by vessels that participated in the Shoreside Pacific whiting fishery by fishery (millions of 2014 $) (top) and number of vessels that participated in each fishery (bottom). Dashed line represents the beginning of the catch share program. *Some values are suppressed to protect confidential data.

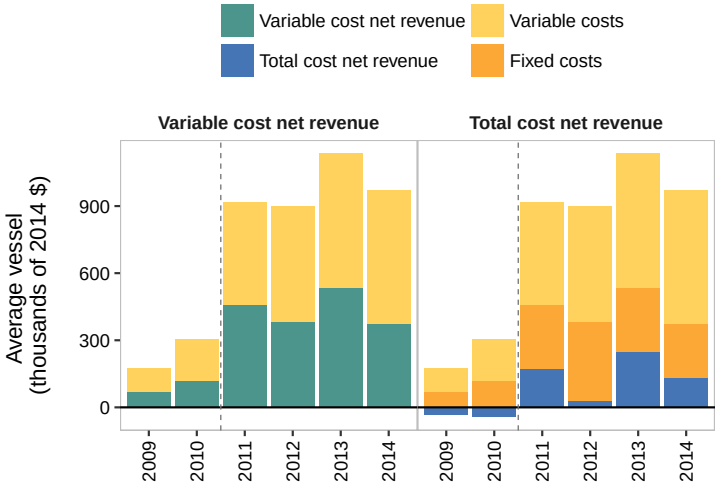

Figure 14: Average variable cost net revenue (ex-vessel revenue minus variable costs) (left), and average total cost net revenue (ex-vessel revenue minus variable costs and fixed costs) (right) from participation in the Shoreside Pacific whiting fishery (thousands of 2014 $). Dashed line represents the beginning of the catch share program.

captain compensation in 2014 were five times the amount spent in 2009 and 2010. On a per unit basis (not shown in the figure), crew compensation increased from $1.33 per hundred pounds delivered during the pre-catch share period to $2.32 per hundred pounds in 2014, and captain compensation increased from $0.88 per hundred pounds delivered in 2009 to $1.64 per hundred pounds in 2014. In contrast, fuel cost per hundred pounds was slightly lower than the fuel cost during the pre-catch share period, $1.46 compared to $1.47. The highest fuel cost per unit occurred in 2012 ($2.15 per hundred pounds).

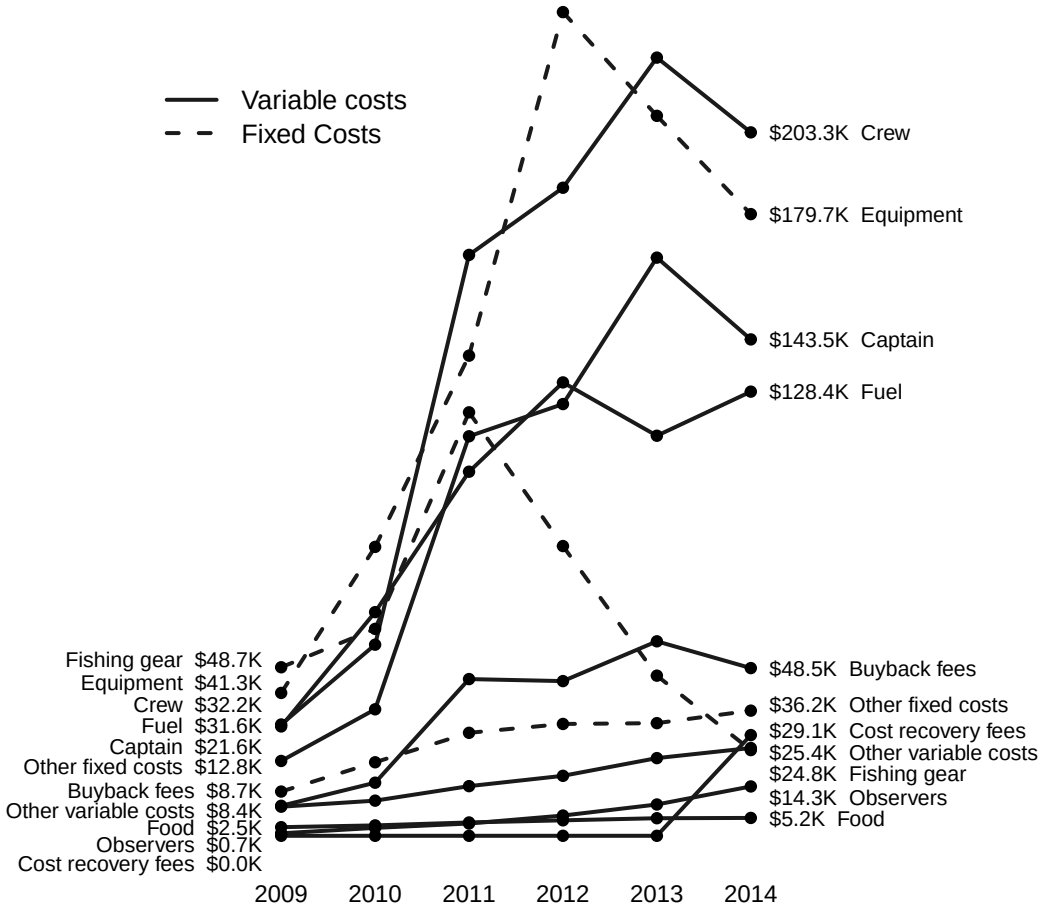

Figure 15: Average fixed (dashed line) and variable costs (solid line) per vessel in the Shoreside Pacific whiting fishery (thousands of 2014 $).

Non-whiting midwater trawl

Vessels only began participating in the Non-whiting midwater trawl fishery in 2012, as a result of increased quota for widow rockfish. In 2014, ten vessels participated. This fishery targets mainly widow rockfish (33% of catch in 2014) and yellowtail rockfish (58% of catch) using midwater trawl gear. This is the same gear used to target Pacific whiting. Yellowtail rockfish constituted the largest revenue source (63% of revenue in 2014), followed by widow rockfish (34%) (Figure 16).

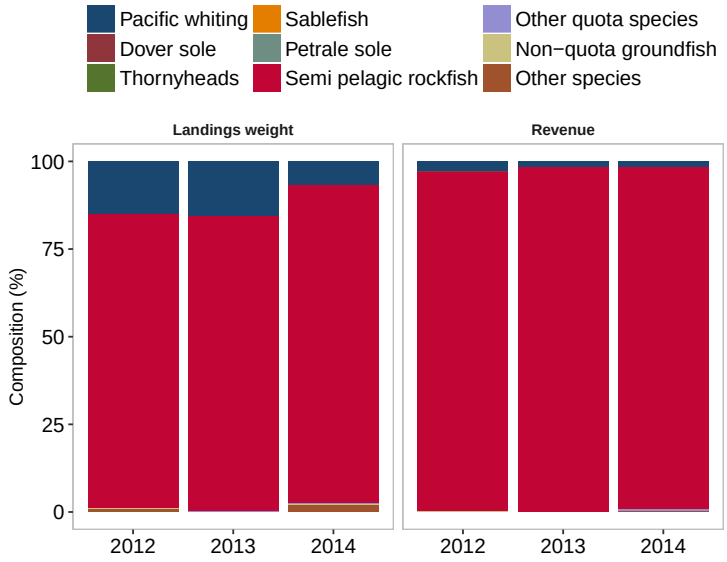

Figure 16: The species composition of catch (left) and revenue (right) in the Non-whiting midwater trawl (%). Vessels did not begin participating in this fishery until 2012.

Revenue

The ex-vessel revenue from participating in the Non-whiting midwater trawl fishery makes up a small share (7.4%) of total revenue. Vessels that participated in the Non-whiting midwater trawl fishery also earned revenue from the Shoreside Pacific whiting fishery (31.5% of revenue) as well as both bottom trawl fisheries (33.7%) (Figure 17). In 2014, there were two vessels that only fished in the Non-whiting midwater trawl fishery.

Net Revenue

Average revenue for vessels participating in the Non-whiting midwater trawl fishery was $92,400, average variable cost net revenue was $33,500, and average total cost net revenue was -$6,990 in 2014 (Figure 18). The highest average revenue since this fishery resumed, occurred in 2013.

Costs

The single largest cost in 2014 was for vessel and on-board equipment ($32,400 per vessel), followed by captain compensation ($16,700), and crew compensation ($15,200) (Figure 19).

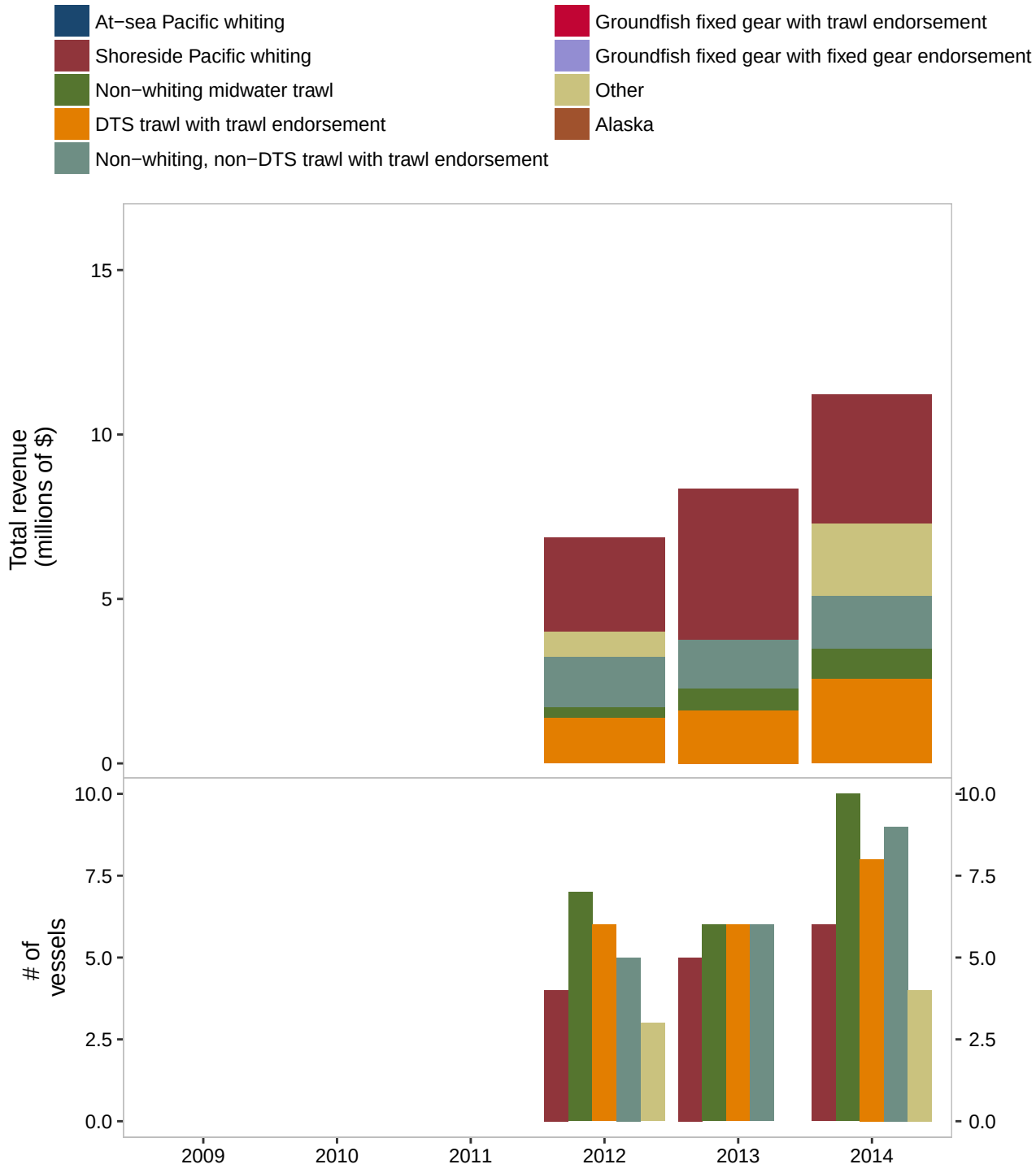

Figure 17: Total ex-vessel revenue earned by vessels that participated in the non-whiting midwater fishery by fishery (millions of 2014 $) (top) and number of vessels that participated in each fishery (bottom). Vessels did not begin participating in this fishery until 2012. *Some values are suppressed to protect confidential data.

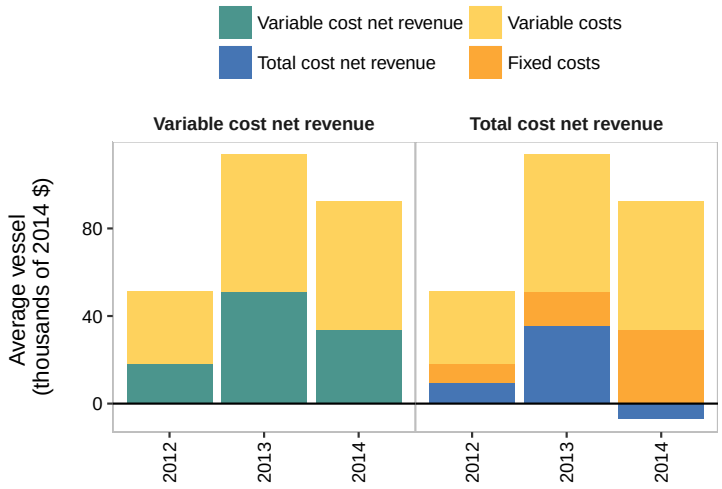

Figure 18: Average variable cost net revenue (ex-vessel revenue minus variable costs) (left), and average total cost net revenue (ex-vessel revenue minus variable costs and fixed costs) (right) from participation in the Non-whiting midwater trawl (thousands of 2014 $). Vessels did not begin participating in this fishery until 2012.

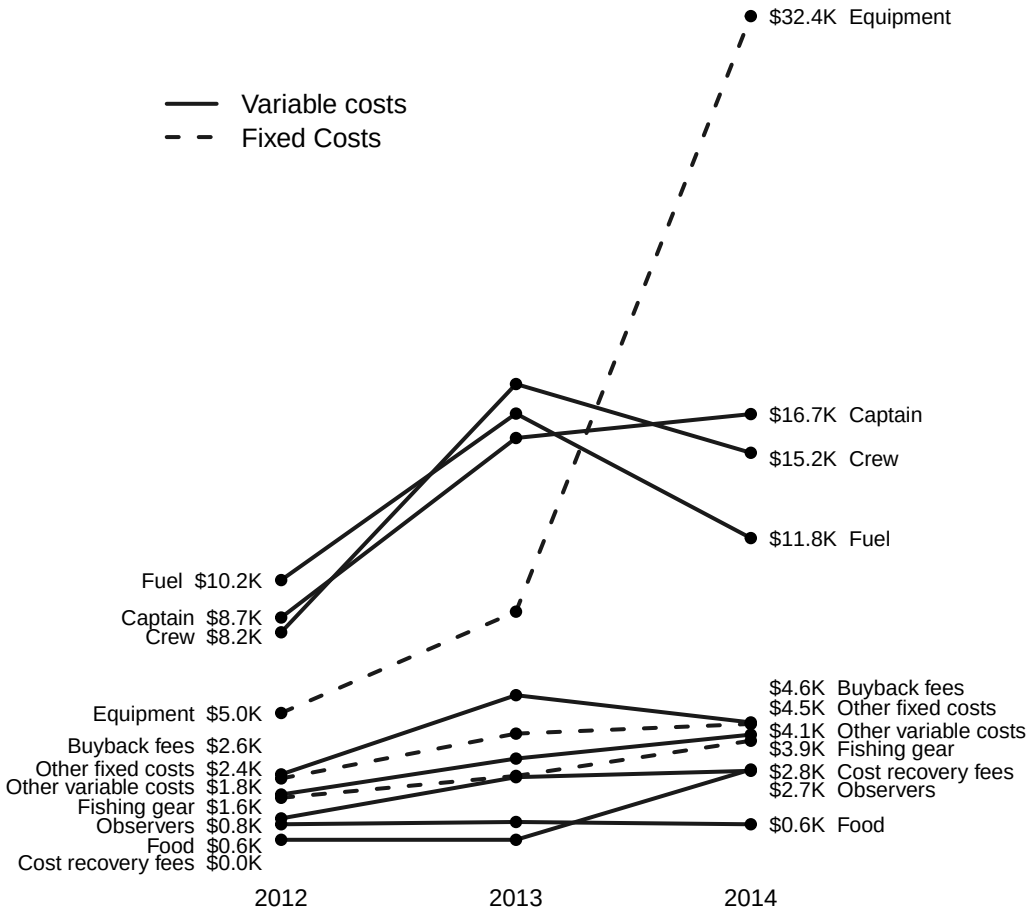

Figure 19: Average fixed (dashed line) and variable costs (solid line) per vessel in the Non-whiting midwater trawl fishery (thousands of 2014 $).

DTS trawl with trawl endorsement

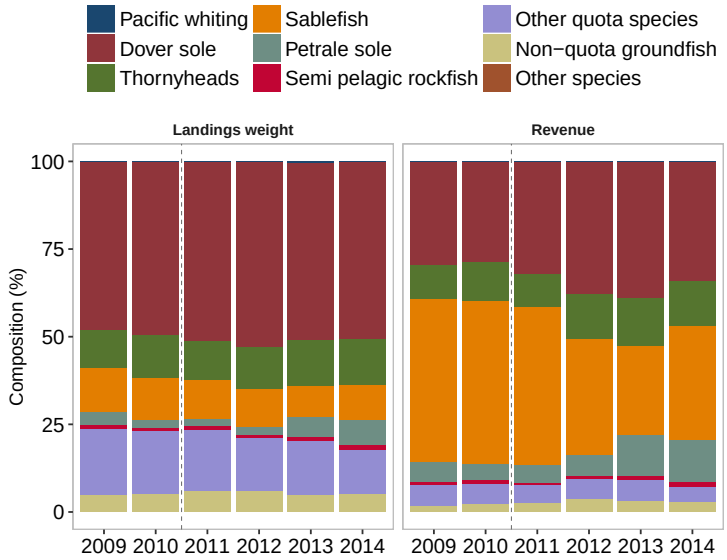

Figure 20: The species composition of catch (left) and revenue (right) in the DTS trawl with trawl endorsement fishery (%). Dashed line represents the beginning of the catch share program.

Fifty vessels participated in the DTS trawl with trawl endorsement fishery in 2014. This fishery has experienced the largest drop in number of participating vessels since the first year of the catch share program (25% decrease). The largest number of vessels exited the fishery between 2013 and 2014 (14 vessels). In 2014, there were fewer than half the number of vessels that fished in the fishery during the pre-catch share period. This fishery targets mainly dover sole (50.2% of catch in 2014), thornyheads (13%), and sablefish (10%) using trawl gear. Sablefish constituted the largest revenue source (32% of revenue in 2014) (Figure 20). The fishery catches smaller amounts of other quota species (including rockfish, 12.7% of catch), and marginal amounts of other non-quota groundfish and other species. The relative share of dover sole has stayed consistent through time, ranging from 48% to 53% of catch by weight. The relative share by ex-vessel revenue has varied more, ranging from 29% to 39%. The relative share of revenue of sablefish decreased from 2011 to 2014, mainly due to a decrease in price from 2011 to 2014 (Figure 3).

Revenue

Vessels that participated in the DTS trawl with trawl endorsement fishery also earned revenue from Other fisheries (primarily crab and shrimp), and to a much smaller extent, the Non-whiting, non-DTS trawl and Shoreside Pacific whiting fisheries (Figure 21). In 2014, participation in crab and shrimp fisheries made up 40.4% of total revenue. Of the vessels that participated in the DTS trawl with trawl endorsement fishery, 34 vessels also participated in the Other fisheries category. Although some of these vessels fished in Alaska in 2009-2011, there were no vessels in this fishery that went to Alaska in 2014. The total revenue for all activities for DTS trawl with trawl endorsement vessels was highest in 2011 ($59.2 million). The total revenue for DTS trawl with trawl endorsement vessels was lower in 2014 ($44.7 million) than in 2013, though average revenue from participation in the DTS trawl with trawl endorsement has been increasing since 2012.

Net Revenue

Average revenue for vessels participating in the DTS trawl with trawl endorsement fishery was $299,000, average variable cost net revenue was $107,000, and average total cost net revenue was $60,000 in 2014 (Figure 22). Average variable cost net revenue has been higher than the pre-catch share period ($96,500) in every year since the catch share program was implemented.

Costs

The single largest cost in 2014 was for crew compensation ($64,300 per vessel), followed by captain compensation

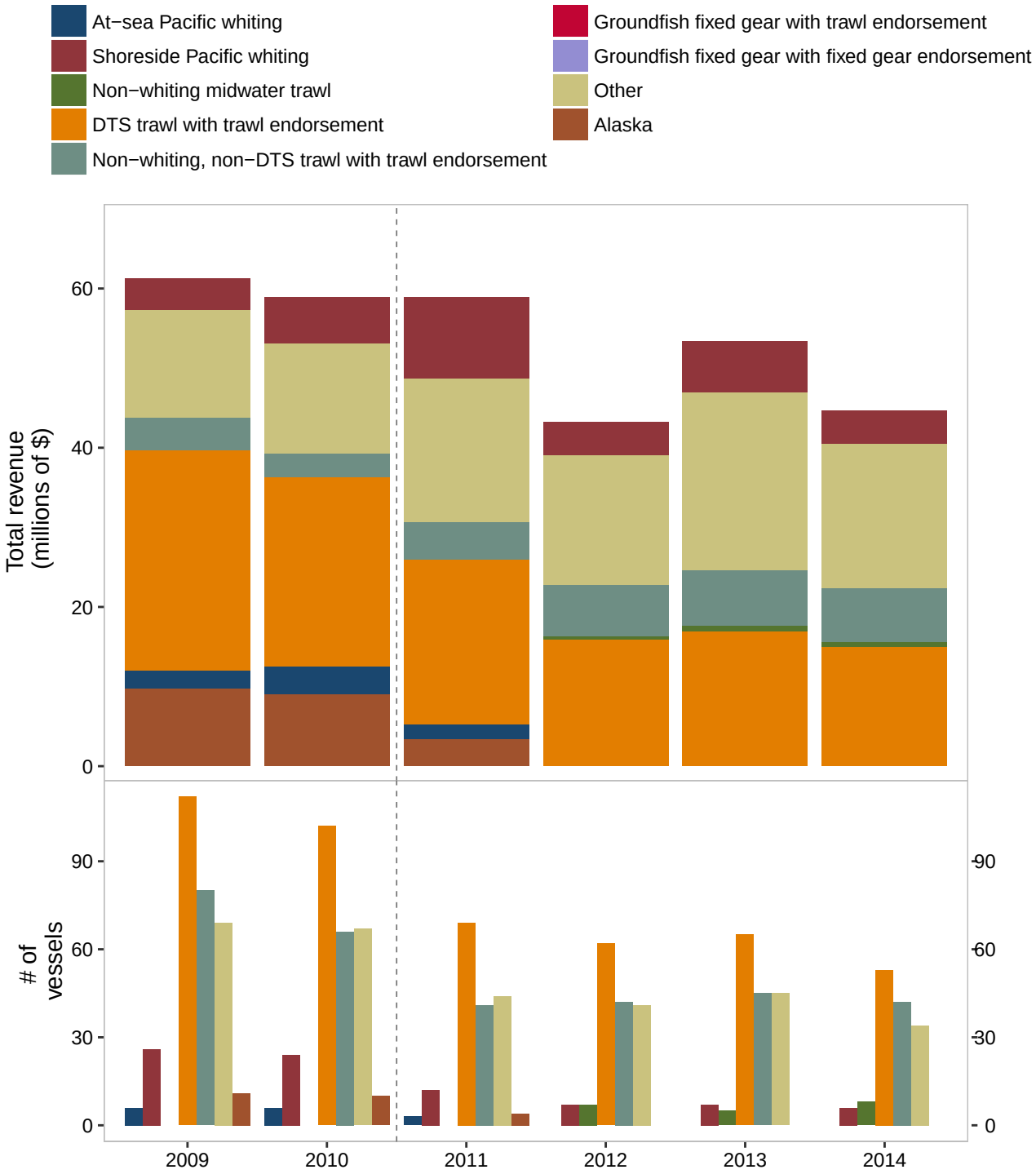

Figure 21: Total ex-vessel revenue earned by vessels that participated in the DTS trawl with trawl endorsement fishery by fishery (millions of 2014 $) (top) and number of vessels that participated in each fishery (bottom). Dashed line represents the beginning of the catch share program. *Some values are suppressed to protect confidential data.

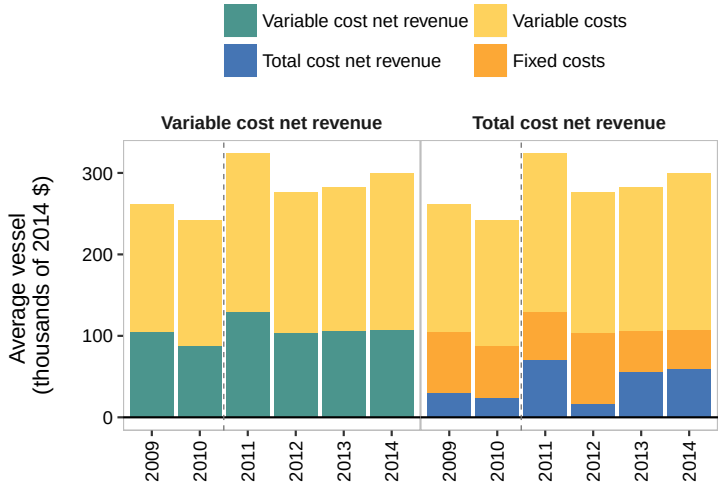

Figure 22: Average variable cost net revenue (ex-vessel revenue minus variable costs) (left), and average total cost net revenue (ex-vessel revenue minus variable costs and fixed costs) (right) from participation in the DTS trawl with trawl endorsement fishery (thousands of 2014 $). Dashed line represents the beginning of the catch share program.

($47,000), and fuel ($33,800) (Figure 23). The cost per pound in the DTS trawl with trawl endorsement fishery has experienced very few increases since the implementation of the catch share program. In 2014, the average annual cost and cost per pound for crew was 21% higher than during the pre-catch share period and costs on captain wages were 11% higher. The largest decrease was average cost per pound on fishing gear (65% decrease) from $0.04 during the pre-catch share period to $0.01 in 2014.

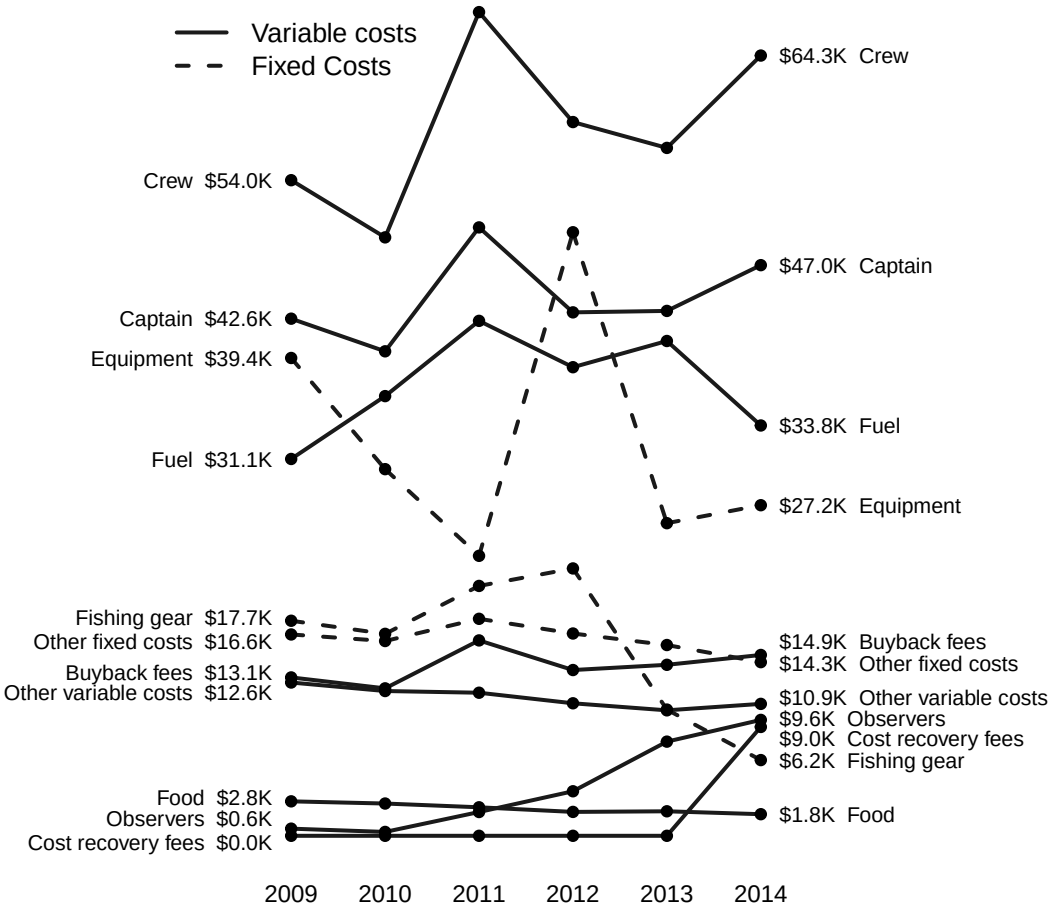

Figure 23: Average fixed (dashed line) and variable costs (solid line) per vessel in the DTS trawl with trawl endorsement fishery (thousands of 2014 $).

Non-whiting, non-DTS trawl with trawl endorsement

Fifty four vessels participated in the Non-whiting, non-DTS trawl with trawl endorsement fishery in 2014, the highest number of vessels since the implementation of the catch share program. In 2014, this fishery surpassed the DTS trawl with trawl endorsement fishery for the largest number of vessels. The Non-whiting, non-DTS trawl with trawl endorsement fishery is a significantly lower value groundfish fishery (Figure 4) than the other catch share fisheries. Vessels in this fishery target mostly petrale sole (26%), other quota species (25.2%), and dover sole (19.6%). Non-quota groundfish are also caught in relatively large volumes (Figure 24). The most common "other quota species" are arrowtooth flounder, rockfish, and other flatfish.

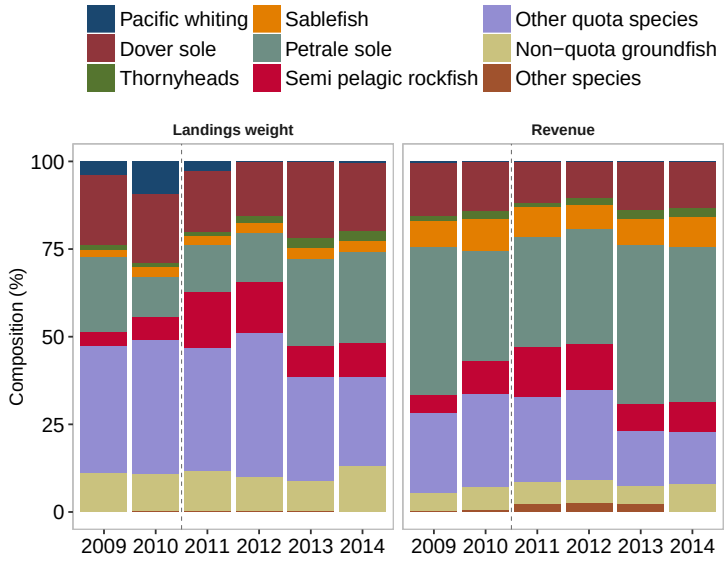

Figure 24: The species composition of catch (left) and revenue (right) in the Non-whiting, non-DTS trawl with trawl endorsement fishery (%). Dashed line represents the beginning of the catch share program.

Revenue

Participation in the Non-whiting, non-DTS trawl with trawl endorsement fishery makes up a minor portion of total revenue for participants in that fishery (Figure 25). They also participate in the Shoreside Pacific whiting, DTS trawl with trawl endorsement, and Other fisheries. A few vessels fished in Alaska in the early years of the program, but since 2013, none of the Non-whiting, non-DTS trawl vessels have fished in Alaska (Figure 25). In 2014, 67% of total revenue came from participation in the shrimp, crab, and DTS trawl with trawl endorsement fisheries.

Net Revenue

Average revenue for vessels participating in the Non-whiting, non-DTS trawl with trawl endorsement fishery was $159,000, average variable cost net revenue was $55,500, and average total cost net revenue was $37,200 in 2014 (Figure 26). Both net revenue measures were greater in the post-catch shares years, variable cost net revenue increased by 5 fold between the pre-catch share period and 2014, and total cost net revenue was less than zero during the pre-catch share period.

Costs

The largest expense in 2014 was for crew compensation ($34,000 per vessel), followed by captain compensation ($25,600), and fuel ($17,300). Costs on crew compensation and captain compensation per pound increased by 36% and 29%, respectively, in 2014 compared to the pre-catch share period. In contrast, the cost per pound for fuel decreased 28% between the pre-catch share period and 2014.

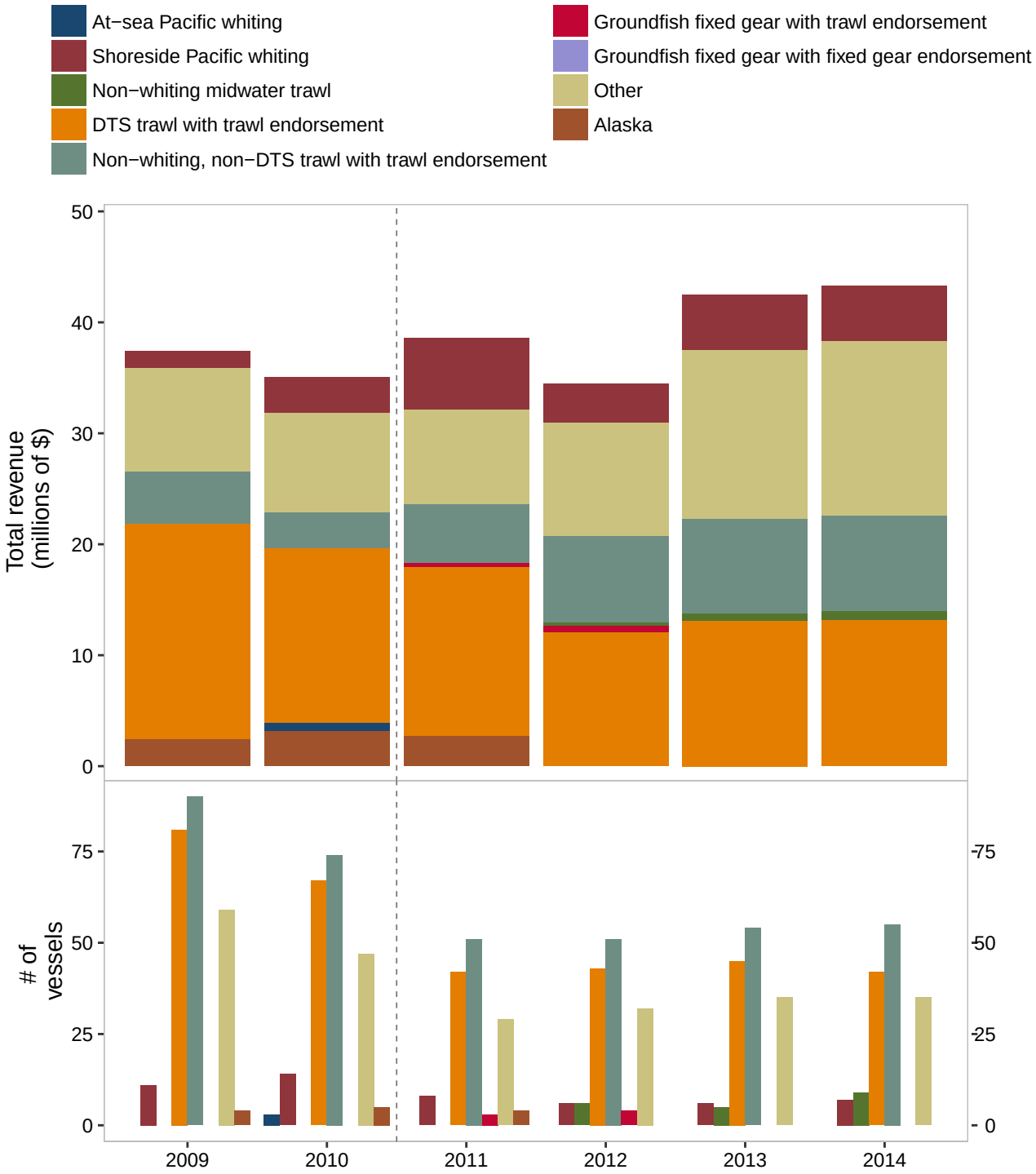

Figure 25: Total ex-vessel revenue earned by vessels that participated in the Non-whiting, non-DTS trawl with trawl endorsement fishery by fishery (top) and number of vessels that participated in each fishery (bottom). Dashed line represents the beginning of the catch share program. *Some values are suppressed to protect confidential data.

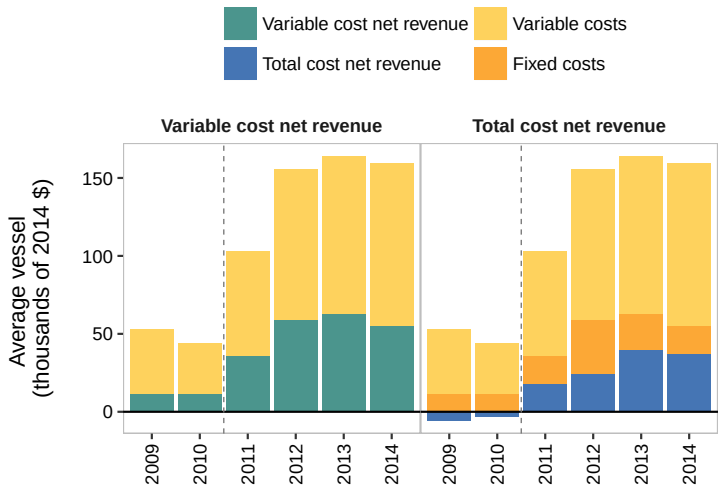

Figure 26: Average variable cost net revenue (ex-vessel revenue minus variable costs) (left), and average total cost net revenue (ex-vessel revenue minus variable costs and fixed costs) (right) from participation in the Non-whiting, non-DTS trawl with trawl endorsement fishery (thousands of 2014 $). Dashed line represents the beginning of the catch share program.

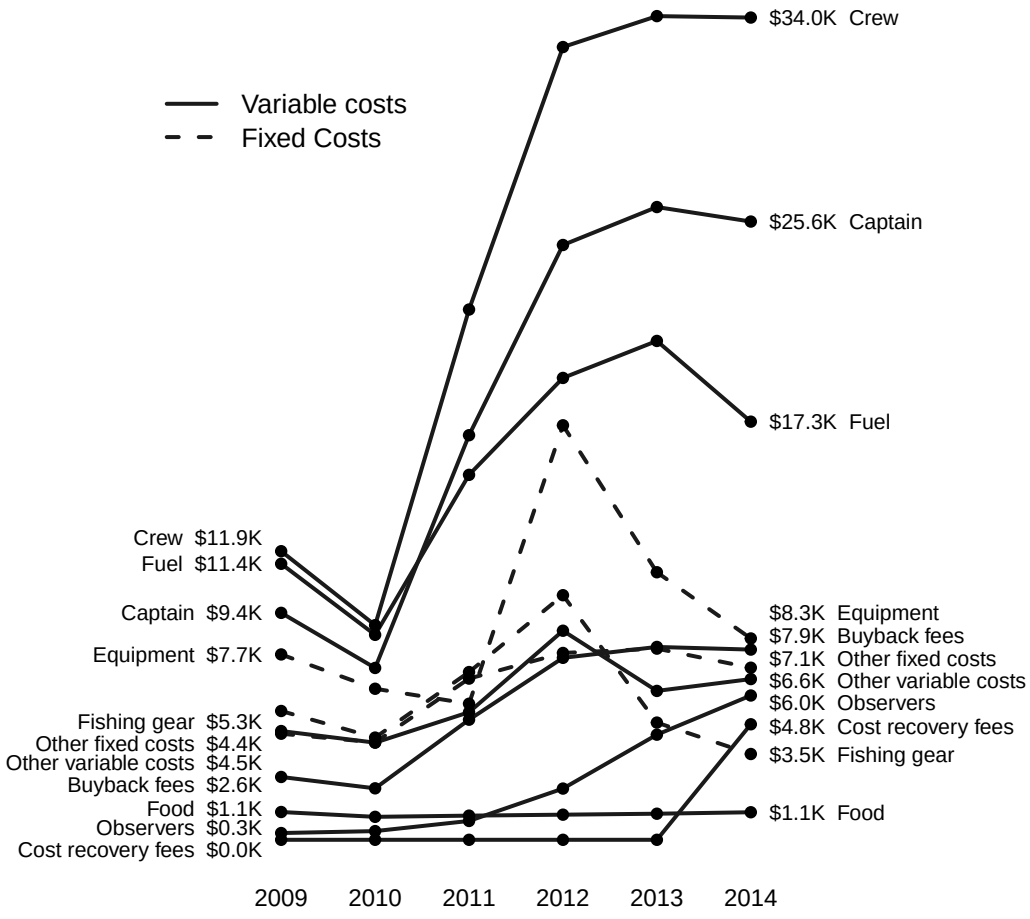

Figure 27: Average fixed (dashed line) and variable costs (solid line) per vessel in the Non-whiting, non-DTS trawl with trawl endorsement fishery (thousands of 2014 $).

Groundfish fixed gear with trawl endorsement

In the first two years of the catch share program, 26 vessels caught sablefish allocated to the trawl fishery using fixed gear. In 2014, there were twenty one vessels, an increase of two vessels compared to 2013. This fishery targets almost exclusively sablefish (94% of catch in 2014) (Figure 28). In 2009 and 2010, there was a small number of vessels that fished in an Exempted Fishing permit fishery, fishing with fixed gear with limited entry trawl permits. This program was sponsored by the Nature Conservancy.[13]

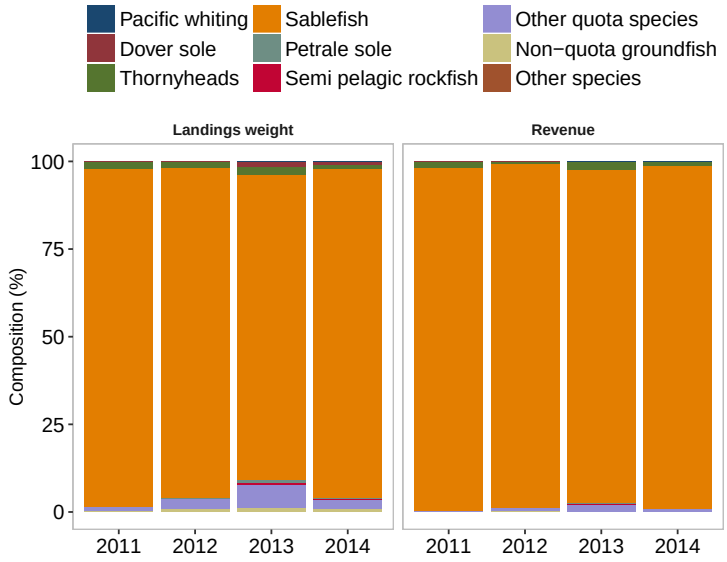

Figure 28: The species composition of catch (left) and revenue (right) in the Groundfish fixed gear with trawl endorsement fishery (%). The data for 2009 and 2010 are not shown because they represent a small group of vessels participating in an exempted fishery permit program.

As described in the Fishery Participation section (page 13), unlike the other fisheries, this fishery uses fixed gear (either fish pots or longlines). Generally, the vessels fishing with fish pots are vessels that have historically fished with trawl gear and have switched to using fish pots to harvest groundfish, almost entirely sablefish. The vessels fishing with longline gear participate primarily in the limited entry fixed gear sablefish fishery and have acquired a limited entry trawl permit and quota in order to target sablefish allocated to the trawl fishery. Since the first year of the catch share program, the number of vessels fishing with fish pots decreased 28% to 13 vessels in 2014, and the number of vessels fishing with longlines has decreased 21% to 11 vessels (3 vessels used both fixed gears).

Revenue

Vessels that participated in the Groundfish fixed gear with trawl endorsement fishery also earned revenue from fishing in Alaska, the limited entry fixed gear sablefish fishery, and fishing in Other fisheries (Figure 29 (top)). In 2011 and 2012, a large proportion of total revenue for the Groundfish fixed gear with trawl endorsement vessels came from Alaska. The vessels that also participated in Alaska left the fishery, and now no revenue for Groundfish fixed gear with trawl endorsement vessels comes from Alaska. The remaining vessels earn revenue from participating in the Crab fishery (included in the "Other fisheries" category in Figure 29). Of the vessels that participated in the Groundfish fixed gear with trawl endorsement fishery, 17 vessels also participated in the Other fisheries category (Figure 29 (bottom)).

Net Revenue

Average revenue for vessels participating in the Groundfish fixed gear with trawl endorsement fishery was $193,000, average variable cost net revenue was $67,500, and average total cost net revenue was $20,800 in 2014 (Figure 30). Average revenue was highest in 2011 due to high sablefish prices (Figure 3), but higher fixed and variable costs resulted in a decrease in average net revenue in 2012. Although the average ex-vessel revenue in 2012 was

[13] For more information, see: www.opc.ca.gov/2010/05/central-coast-groundfish-project/.

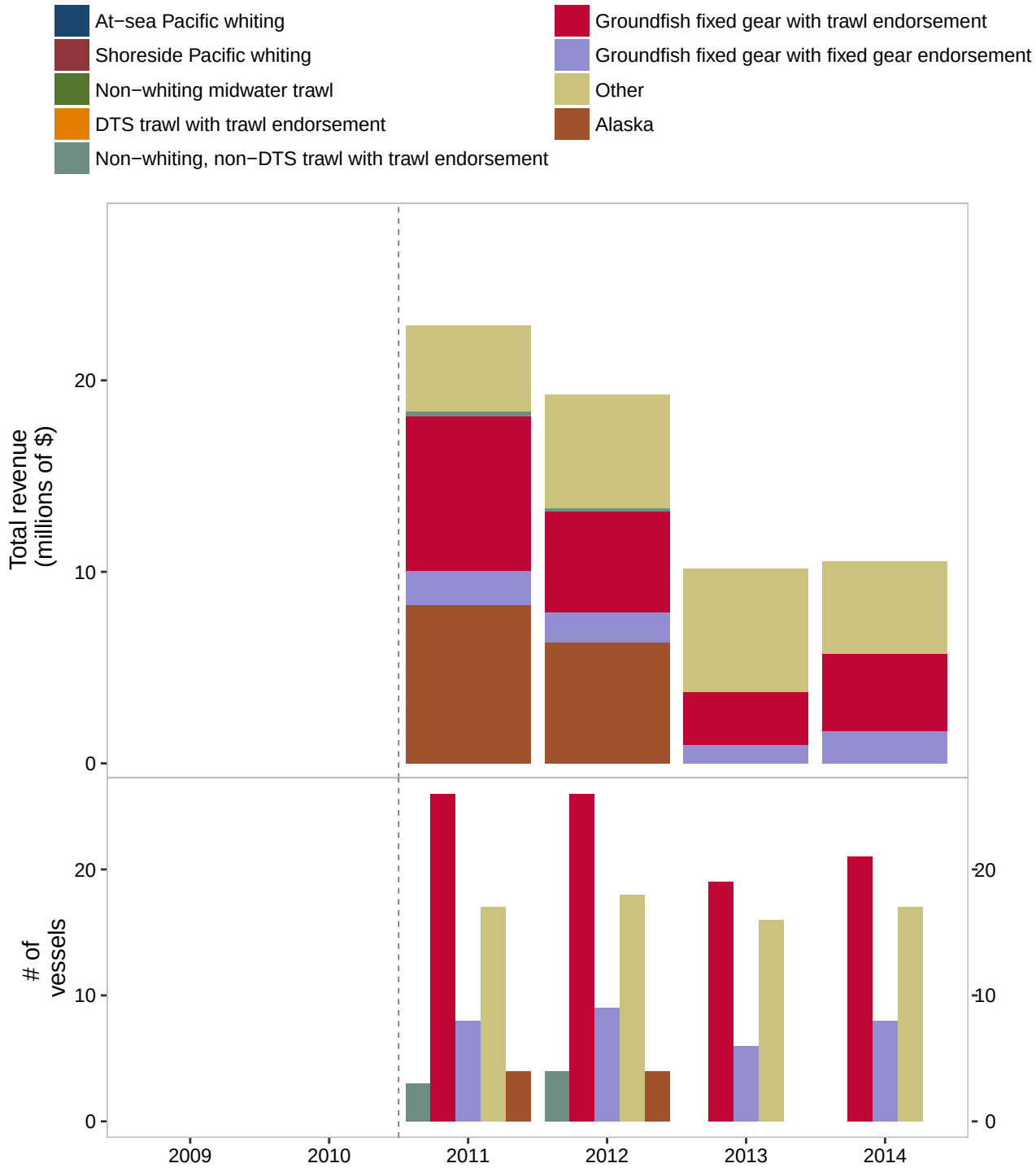

Figure 29: Total ex-vessel revenue earned by vessels that participated in the Groundfish fixed gear with trawl endorsement fishery by fishery (millions of 2014 $) (top) and number of vessels that participated in each fishery (bottom). *Some values are suppressed to protect confidential data. The revenue for 2009 and 2010 is not shown here because they were collected from a small group of vessels participating in an exempted fishing permit fishery.

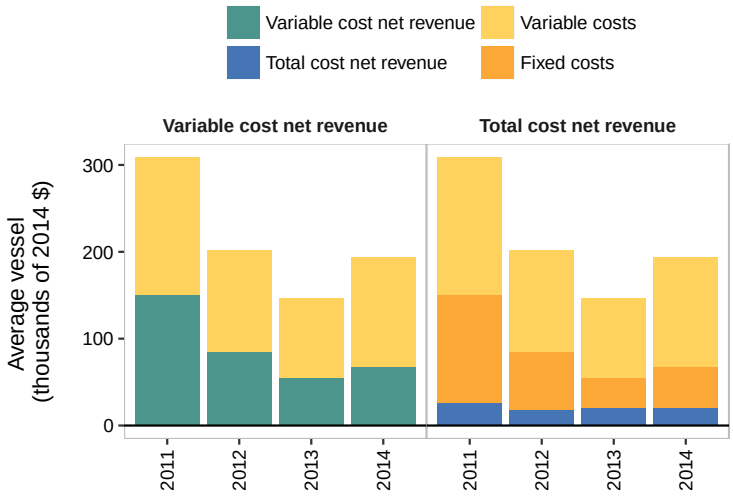

Figure 30: Average variable cost net revenue (ex-vessel revenue minus variable costs) (left), and average total cost net revenue (ex-vessel revenue minus variable costs and fixed costs) (right) from participation in the Groundfish fixed gear with trawl endorsement fishery (thousands of 2014 $). Dashed line represents the beginning of the catch share program.

the same as 2014, the variable cost net revenue was higher in 2012 ($84,600), but the total cost net revenue was lower ($18,200).

Costs

The largest cost in 2014 was crew compensation ($43,100 per vessel), followed by vessel and on-board equipment ($26,300), and captain compensation ($20,500) (Figure 31). Unlike the trawl fisheries, fixed gear vessels have the additional cost of bait. In 2014, the average expenses on bait were $12,300 per vessel. The cost per pound for most cost categories (not shown in the figure) has varied little since the implementation of the catch share program. Two exceptions are the cost per pound for equipment and crew compensation. The cost per pound on equipment experienced the largest change, decreasing from $0.90 in 2011, to $0.20 in 2013 and then rising to $0.34 in 2014. The cost per pound for crew compensation was also highest in 2011 ($0.68), lowest in 2013 ($0.40) and increased again in 2014 ($0.56). Changes in crew compensation per pound are a result of both changes in ex-vessel price as well as changes in the costs deducted from ex-vessel revenue before calculating crew shares.

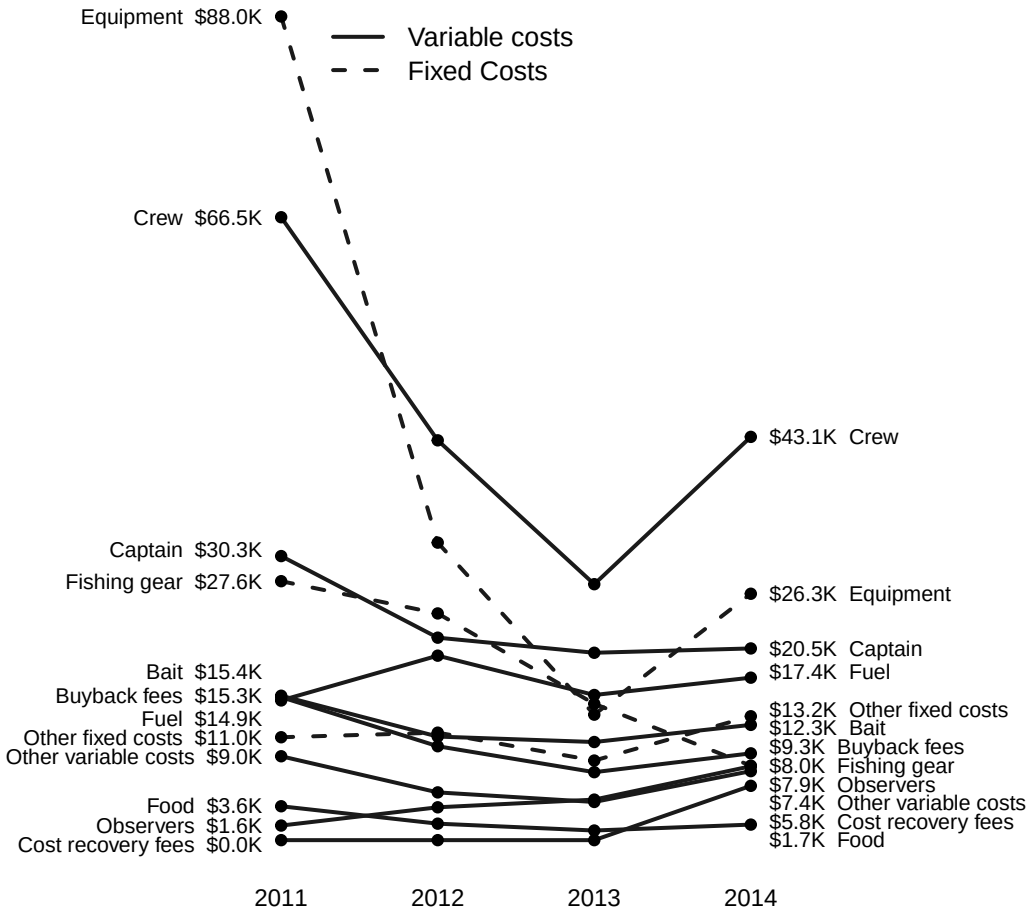

Figure 31: Average fixed (dashed line) and variable costs (solid line) per vessel in the Groundfish fixed gear with trawl endorsement fishery (thousands of 2014 $). The costs for 2009 and 2010 are not shown here because they were collected from a small group of vessels participating in an exempted fishing permit fishery.

Regional Analysis

In addition to examining how the catch share program is affecting different vessels by fishery, it is also important to understand how the effects of the catch share program are being experienced in different regions along the coast. For the purposes of this analysis, we analyze vessels by state: Washington (includes a very small number of vessels that listed Alaska as their home port), Oregon (Newport, Astoria, Tillamook, Brookings, Coos Bay) and California (Crescent City, Eureka, Fort Bragg, San Francisco, Monterey, Morro Bay). Similar to the rest of the Overview, vessels are included in the analysis for a specific year if they fished with a limited entry trawl permit in that year. Vessels were assigned to a state based on the home port declared on their EDC form.

Washington

The number of vessels with a home port in Washington has remained very consistent, with the largest number in

2009 and 2011 (19 vessels) and the fewest in 2013 (16) (Figure 32). In 2014, there were 18 vessels, 10 of which fished in Alaska, a decline from 11 in 2010 and 2011.

In Washington, the majority of EDC vessels' earnings comes from Alaska. Since the beginning of the EDC Program, the highest proportion of revenue from Alaska occurred in 2009 (67% of total revenue). Total West Coast earnings for these vessels was lower in 2009 ($6.46 million), compared to higher revenues in 2013 ($19.9 million) and 2014 ($18.2 million). In addition to Alaska revenue, trawl vessels in Washington earn a significant proportion of their income from the whiting fisheries (both at-sea and shoreside). Total ex-vessel revenue from whiting was lowest in 2009 ($1.41 million) and highest in 2014 ($7.62 million). Meanwhile, the total revenue from the DTS trawl fishery has decreased from $2.09 million during the pre-catch share period to $688,000 in 2014.

The average total cost net revenue from participation in West Coast fisheries for Washington vessels was $255,000, a 51 fold increase compared to the pre-catch share period. The average total cost net revenue for these vessels was highest in 2013 ($353,000). This large increase is mostly a result of higher revenue from whiting resulting from increases in the TAC compared to the pre-catch share period.

Oregon

In 2014, there were 59 vessels that fished in the catch share fisheries with home ports in Oregon, 13 of which also fished in Alaska (Figure 32). This was a 22% decrease from the 76 vessels during the pre-catch share period (Figure 32).

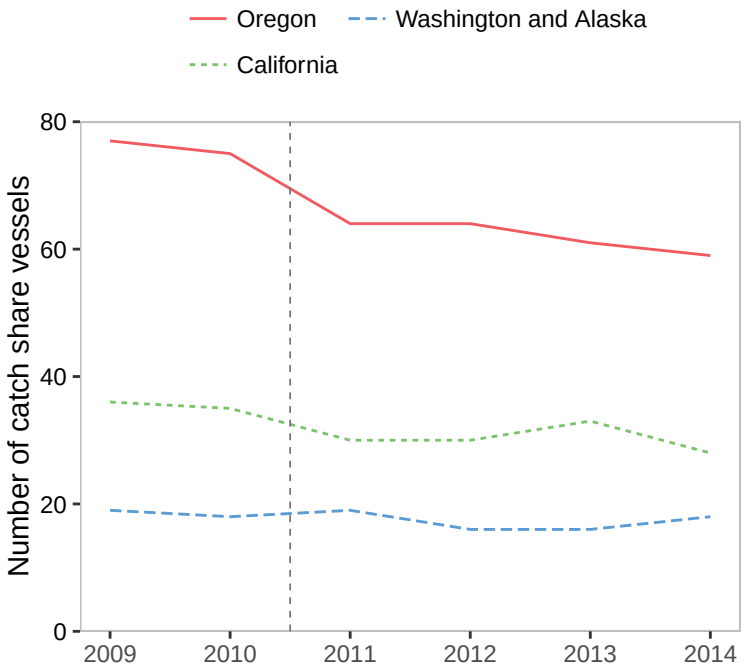

Figure 32: Number of catcher vessels participating in the catch share fisheries by region.

The vessels that have their home port in Oregon receive a large portion of their income from fishing in Alaska, but they also earn much more income from West Coast activities compared to Washington vessels. In contrast to the Washington vessels, about 22% of vessels go to Alaska. In 2014, fishing in Alaska made up 25% of total revenue, a decrease from the pre-catch share period of 31%. Similar to Washington, this decrease in total share of revenue from Alaska is a result of increases in West Coast revenue. In 2009, total West Coast earnings for these vessels was $36.3 million compared to $64.3 million and $59.5 million in 2013 and 2014, respectively. Much of the increase came from the Shoreside whiting fishery ($15.7 million in ex-vessel revenue in 2014), the DTS trawl fishery ($9.6 million), the shrimp fishery ($12.6 million), and the crab fishery ($6.41 million).

The average total cost net revenue for Oregon vessels also increased compared to the pre-catch share period. It was highest in 2014 ($216,000), a 4 fold increase compared to the pre-catch share period. In addition to increased

revenue from participating in the at-sea and shoreside whiting fisheries, there was also increased revenue from the pink shrimp fishery.

California

In 2014, there were 28 vessels with home ports in California, representing a 21% decrease from the 36 vessels during the pre-catch share period (Figure 32). Total ex-vessel revenue has increased 10% for these vessels between the pre-catch share period and 2014. In addition to an increase in revenue, the composition of the revenue has also changed. During the pre-catch share period, earnings from the DTS trawl fishery represented 44% of total ex-vessel revenue. In contrast, since the implementation of the catch share program, the DTS trawl fishery earnings have only represented 24-30% of total ex-vessel revenue. This decrease in the share of total revenue was a result of a decrease in total revenue from the DTS trawl fishery (24% decrease) and an increase in shrimp revenue (3 fold increase). In 2009 and 2010, shrimp only made up 14% and 21% of revenue, respectively, compared with 28% to 45% of total revenue since the implementation of the catch share program. The highest value of shrimp revenue was in 2014, when the vessels caught $4.39 million worth, compared to $1.6 million during the pre-catch share period.

The average total cost net revenue was higher in 2011 ($118,000) and 2014 ($108,000) than in either of the two years prior to the implementation of catch shares ($63,900) for California vessels. Total cost net revenue was the lowest in 2012 ($21,600), even though the ex-vessel revenue was 14% higher than the pre-catch share period. This was the result of a spike in average fixed costs per vessel in 2012 ($49,300) compared to $24,800 during the pre-catch share period.

Catcher Vessel Report

CATCHER VESSEL REPORT

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Catcher Vessel Data Summaries

1 Introduction

1.1 Background

The US West Coast groundfish fishery takes place off the coasts of Washington, Oregon and California, and is comprised of over 90 different species of fish. The fish are harvested both commercially and recreationally. The commercial fishery has four components: limited entry with a trawl endorsement, limited entry with a fixed gear endorsement, open access, and tribal. In January 2011, the West Coast Limited Entry Groundfish Trawl fishery transitioned to the West Coast Groundfish Trawl Catch Share Program. The catch share program consists of cooperatives for the at-sea mothership (including catcher vessels and motherships) and catcher-processor fleets, and an individual fishing quota (IFQ) program for the shorebased trawl fleet.[1]

The Economic Data Collection (EDC) Program[2] was implemented as part of these new regulations to monitor the economic effects of the catch share program. Annual economic data submissions are required from all fishery participants: catcher vessels, motherships, catcher-processors, and first receivers and shorebased processors §50 CFR 660.114. Baseline, pre-catch share, data were submitted in 2011 for the 2009 and 2010 operating years. Data for the first year the fishery operated under the catch share program (2011) were submitted in 2012. The most recent data (2014) were collected in 2015.

This report summarizes the 2009-14 EDC catcher vessel survey data. The EDC Program has enhanced the quantity and quality of economic information available for analysis and the management of the West Coast groundfish trawl fishery. Prior to the EDC Program, voluntary cost earnings surveys were available for 64% of the shoreside catcher vessels with limited entry groundfish permits with trawl endorsements (trawl fleet) (2003-2004 collection[3]) and 57% of the fleet for the 2007-2008 collection.[4] Moreover, no costs and earnings data were available for catcher vessels that delivered to motherships.

[1] Information about the West Coast Groundfish Trawl Catch Share Program is available online at http://www.westcoast.fisheries.noaa.gov/fisheries/groundfish_catch_shares/.

[2] Additional information on the EDC Program, including the EDC data collection forms can be found at www.nwfsc.noaa.gov/edc

[3] Lian, C.E. 2010. West Coast limited entry groundfish trawl cost earnings survey protocols and results for 2004. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-107, 35 p.

[4] Lian, C.E. 2012. West Coast limited entry groundfish cost earnings survey: Protocol and results for 2008. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-121, 62 p.

1.2 Understanding the report

It is important to remember that the information presented in this report is for all vessels that were required to complete the EDC form, as described above. Throughout the report, these vessels are referred to as EDC vessels. The EDC vessels include: 1) vessels that have historically participated in the trawl fishery and currently still participate; 2) vessels that no longer participate in the trawl fishery but still have a limited entry trawl permit; and 3) vessels that have not historically had a limited entry trawl permit, but have now obtained one to participate in the gear switching program (use of fixed gear is allowed under the program).

The unit of analysis identified in the summary tables varies by the information summarized. There are three different units of analysis, "entities", "vessels", and "participants". An "entity" is defined as a unique combination of an owner or lessee and vessel, whereas a "vessel" refers to all activities related to that vessel, regardless of the number individuals who owned or leased the vessel. Therefore, multiple forms could be submitted for one vessel, because there were multiple owners or lessees. Finally, "participants" refers to the individuals who actually completed the report. Each summary table states whether the count of individuals represents entities or participants.

For each value displayed in the summary data tables, N is displayed. In most cases, N represents the number of responses to the question that are not "NA" and not zero, unless noted otherwise. For example, in Table 9.1, for the 94 vessels that had expenses on ice, the mean expense in 2012 was $6,600. Therefore, to calculate the average expense for ice for the entire fleet, one would need to multiply the mean by 94 and then divide by the total number of vessels (127).

The one major difference between the baseline forms (2009 and 2010) and 2011-current forms is that vessels that did not fish during the survey period were only required to fill out the first few pages of the form during the baseline collection. The vessels that did not fish in 2009 and 2010 only provided the vessel name, vessel ID, home port, length of the vessel, fuel capacity, and horsepower of main engines, contact information, and permit numbers. Starting with the 2011 forms, all participants have been required to complete the entire form to capture information such as capital investments and earnings from lease or sale of quota or permits.

One last guideline when interpreting the aggregated data is the use of fiscal year. Although participants are identified on a calendar year basis, they complete the form using information based on the fiscal year of the entity. In previous reports, the data were reported by fiscal year. This report reallocates the costs reported on the form to calendar year, primarily accomplished by using information from outside of the EDC Program (primarily fish tickets and at-sea hake observer program data). For the 6 years of data collected from catcher vessels, 91% of entities used a fiscal year that is the same as the calendar year.

There is a 3-year lag for fully finalized EDC data, so data from the most recent displayed year (2014) should be considered preliminary. EDC forms are submitted by September 1 each year for the previous fiscal year (FY2011 data are received in September of 2012), allowing companies to "close their books" and file taxes before completing their EDC forms. The QA/QC process requires approximately 6 months. This means that 2011 EDC data were available in March 2013; however, there is one additional complication. Participants submit data by fiscal year which varies by company and may not completely overlap by calendar year. Although the reports are released at a 2-year lag, the data are not considered finalized until the following year once the complete set of data have been received and processed. As a result, finalized calendar year 2014 data will not be available until Spring 2017.

In order to provide information about the level of variability within each measure reported, a symbol is presented

along with all means to indicate the range of the coefficient of variation. The stacked dots included in the tables provide information about the coefficient of variation (CV) of the mean. For 2009-2014, none of the CVs exceeded 2.8. We use the following scoring:

$\cdot$ represents $CV < 0.5$,
$\vdots$ represents $0.5 \leq CV < 1.0$,
$\vdots$ represents $1.0 \leq CV < 2.0$, and
$\vdots$ represents $2.0 \leq CV$.

All data submitted via the EDC Program are confidential under 402(b) of the Magnuson-Stevens Act (16 U.S.C. 1801, et seq.) and under NOAA Administrative Order 216-100. In order to protect these data, a rule of three and a rule of 90-10 are implemented. The rule of three requires a response from at least three entities in order to show a summary statistic. The 90-10 rule requires that no single entity's response should comprise over 90 percent of all relevant responses. The tables show a "***" for data points where there were less than three entities reporting the information, and/or if one entity's responses accounted for greater than 90 percent of the average value. Zeroes are shown if all entities only reported zeroes and/or NAs. More information about how confidential data are protected in the EDC Program can be found in the Administration and Operations Report. Simple means are reported for statistics that denote the performance of an average entity (i.e., net revenue) while weighted means are reported for statistics that describe characteristics of the fishery (i.e., ex-vessel prices, markup, recovery rates, etc.). Additionally, "—" is used to denote fields where the question was not asked on the form in that survey year.

Unlike the Overview, all numbers reported in the Data Summaries are generated from the raw responses received from participants and, therefore, are in nominal dollars.

1.3 Purpose of the report

This report, like the other four EDC reports,[5] has multiple objectives. The first is to provide basic economic data summaries that can be used for a variety of purposes associated with fishery management. Since much of the data collected are confidential under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 2007, the data are summarized as averages or totals for each question on the EDC forms. Thus summarized, the reports make the data available to the public for both research and informational purposes.

Second, to provide information about the performance of the catch share program. This includes information that can be used to monitor whether and to what degree the goals of the program are being met. It is expected that additional modeling will provide increased detail about program impacts. These reports will serve as the basis for the 5-year review of the catch share program that is mandated in the MSA, as well as the NOAA Fisheries National Catch Shares Performance Indicators.

[5] In addition to the catcher vessel report, there are four companion reports:

- Economic Data Collection Program, Administration and Operations Report (May 2016)
- Economic Data Collection Program, Catcher-Processor Report, 2009-2014 (September 2016)
- Economic Data Collection Program, Mothership Report, 2009-2014 (September 2016)
- Economic Data Collection Program, First Receiver and Shorebased Processor Report, 2009-2014 (September 2016)

Third, the reports serve as the basis for economic models that are used as part of the Pacific Fishery Management Council's (PFMC) biennial specification process for groundfish management. These models include the IO-PAC model,[6] as well as estimates of revenue, costs, and net revenue.

Lastly, and perhaps most importantly, the data reports are expected to provide a useful catalyst for feedback on the data collected and its analysis.

The Administration and Operations Report describes the EDC Program administration and fielding of the surveys, the EDC forms, data quality controls and quality checks and data processing, and safeguarding confidential information. The other EDC reports provide basic data summaries of the catcher-processor, mothership, and first receiver and shorebased processor forms.

1.4 Catcher vessel form administration

Completion of EDC forms is mandatory for participants in the catch share program. Any owner, lessee, or charterer of a catcher vessel registered to a limited entry groundfish permit with a trawl endorsement (limited entry trawl permit) is required to complete an EDC form §660.114(b)(1). For a permit owner, a limited entry trawl permit application (including MS/CV-endorsed limited entry trawl permit) will not be considered complete until the required EDC form for that permit owner associated with that permit is submitted, as specified at §660.25(b)(4)(i). For a vessel owner, participation in the groundfish fishery (including, but not limited to, changes in vessel registration, vessel account actions, or if own QS permit, issuance of annual QP or IBQ pounds) will not be authorized until the required EDC form for that owner for that vessel is submitted, as specified, in part, at §660.25(b)(4)(v) and §660.140(e). For a vessel lessee or charterer, participation in the groundfish fishery (including, but not limited to, issuance of annual QP or IBQ pounds if own QS or IBQ) will not be authorized, until the required EDC form for their operation of that vessel is submitted.

A calendar year is used to determine which vessels meet the criteria. For example, in 2015, data were collected from all owners, lessees, and charters of a catcher vessel registered to a limited entry trawl permit during 2014. The forms are fielded on this schedule in order to allow participants the time necessary to complete their taxes, which may contain some information that is required on the EDC forms. Participants are identified using contact information provided by the Northwest Regional Office - Permit Office (Permit Office).

If a form has missing information, or the information provided on the form is believed to be incorrect, EDC Program staff attempt to contact the participant to correct the information. On occasion, the participant cannot be reached or the participant cannot provide the missing information. In these cases, the missing or inaccurate data are treated on a case-by-case basis during analysis as documented in the Administration and Operations Report. Data are validated and verified with external data sources whenever possible. These data sources include the Permit Office, state fish tickets, the At-Sea Hake Observer Program data, and the Coast Guard.

1.5 About the survey participants

The EDC catcher vessel participants are identified as any owner, lessee, or charterer of a vessel with a limited entry trawl permit. This includes catcher vessels that deliver Pacific whiting to motherships at sea (at-sea whiting fishery), catcher vessels that deliver whiting to shorebased facilities (shorebased whiting fishery), and catcher

[6] Leonard, J., and P. Watson. 2011. Description of the input-output model for Pacific Coast fisheries. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-111, 64 p.

vessels that delivery non-whiting groundfish to shorebased facilities (non-whiting groundfish fishery). Additionally, the non-whiting groundfish fishery can be further classified into two additional fisheries, characterized by the composition of target species groups. These fisheries are the DTS fishery which includes dover sole, thornyheads, and sablefish and the near-shore fishery (includes all non-whiting, non-DTS species groups). In addition to these fisheries, many vessels also participate in one or both of the state fisheries for shrimp and crab. The other prevalent activity is fishing in Alaska.

The individuals that complete the forms are as diverse as the types of fisheries in which the vessels participate. This adds to the complexity of developing the EDC forms, because the questions on the forms must be understood by fishermen, family members, accountants, bookkeepers, and chief financial officers, to name a few. Oftentimes, the forms are completed by multiple individuals since different people manage different parts of the business. For example, the captain of the vessel might know best how much fuel the vessel uses on a daily basis, but the bookkeeper might have the best information about how much was spent on fuel during the year.

2 Survey Response Rates

For the 2014 Catcher Vessel EDC forms, 99.3% of all required forms were complete.[7] This is an increase from the 2009 and 2010 collection, when 88.6% and 92.5% were complete, respectively (Table 2.1). To date, no entity[8] has been unable to renew a limited entry trawl groundfish permit due to a missing or incomplete EDC form. This means that the remaining forms that were received incomplete or never received correspond to participants that are no longer in any West Coast federal fishery.

Table 2.1: Form status. Number of complete forms, number of incomplete forms, and number of forms that were never received (N = number of forms, % = percent of all forms due in survey year).

Form status	2009		2010		2011		2012		2013		2014	
	N	%	N	%	N	%	N	%	N	%	N	%
Complete	148	88.6%	149	92.5%	166	96.5%	154	98.7%	150	98.7%	148	99.3%
Incomplete	6	3.6%	1	0.6%	2	1.2%	0	0.0%	0	0.0%	0	0.0%
Not received	13	7.8%	11	6.8%	4	2.3%	2	1.3%	2	1.3%	1	0.7%

For most of the forms, there is a one-to-one relationship between a vessel, vessel owner, and vessel operator. In these cases, there are no lessees of the vessel and one form is submitted for the vessel each year. More than one form is submitted for a particular vessel when the vessel is leased by a third party, or when the vessel is sold during the survey year. The most common occurrence with two forms submitted for one vessel is when the owner of the vessel submits one form and the lessee of the vessel submits another form. Generally, only the lessee operated the vessel during the fiscal year, but occasionally both the owner and the lessee will operate the vessel (Table 2.2).

[7] For explanation of the term complete, please refer to the Administration and Operations Report section regarding regulations for complete EDC forms

[8] An "entity" is defined as a unique combination of an owner or lessee and vessel, whereas a "vessel" refers to all activities related to that vessel, regardless of the number individuals who owned or leased the vessel.

Table 2.2: Information about forms, entities, and vessels. Number of required forms, number of entities that harvested fish, number of vessels that harvested fish by location, number of vessels that were leased, number of lease contracts, number of vessels that were fished by more than one entity, and number of vessels that were sold during the annual survey qualifying period. An entity is defined as a unique combination of an owner or lessee and vessel, whereas a vessel refers to all activities related to that vessel, regardless of the number of individuals who owned or leased the vessel.

Activity	2009	2010	2011	2012	2013	2014
Number of required forms	167	161	172	156	152	149
Number of entities that harvested fish	133	130	143	133	127	129
Number of vessels that harvested fish on the West Coast or Alaska	132	129	138	132	124	127
Number of vessels that harvested fish on the West Coast	126	129	130	128	124	123
Number of vessels that harvested fish in Alaska	27	27	28	25	24	24
Number of vessels that were leased	10	8	9	7	7	6
Number of lease contracts	11	9	9	7	7	6
Number of vessels that were fished by more than one entity	***	***	5	***	***	3
Number of vessels sold	***	8	8	3	7	3

3 Vessel Participation on the West Coast and in Alaska

Participants provide the total number of days spent fishing by fishery on the West Coast and in Alaska. Participants are instructed to count partial days as full days when recording days at sea on the forms. The West Coast fisheries categories on the EDC form are whiting with trawl gear, non-whiting groundfish with trawl gear, groundfish with fixed gear, shrimp, crab, Pacific halibut, California halibut, salmon, tuna, and other. The days spent fishing in all Alaskan fisheries is also requested. In the 2009-2011 data collection, participants provided the total number of days spent chartering or doing research, on the West Coast and Alaska. Starting in 2012, participants provided separate days at sea for chartering and research in Alaska and chartering and research on the West Coast. Most vessels that participate in the catch share fisheries are also involved in other fishing activities.

Although these data provide most of the information necessary for examining fishery participation, several of the days at sea need to be further split into subfisheries using information from state fish tickets obtained from the PacFIN database, data collected by the At-Sea Hake Observer Program (A-SHOP) obtained from the NORPAC database, and EDC data (ex-vessel revenue from at-sea deliveries). The whiting fishery is split into At-sea Pacific whiting and Shoreside Pacific whiting, the non-whiting groundfish with trawl gear is further split into dover-thornyhead-sablefish (DTS) with trawl gear and Non-whiting, non-DTS groundfish with trawl gear, and the fixed gear fishery is split into groundfish caught with a trawl permit, and groundfish caught with a fixed gear permit.

Historically there was a non-whiting midwater groundfish fishery, targeting semi-pelagic rockfish such as yellowtail and widow rockfish. The fishery was shut down after widow rockfish was declared overfished in 2001. In 2011, widow rockfish was taken off the overfished list.[9] As a result, a few vessels reentered the fishery in 2012, and the annual catch limit for widow rockfish was raised starting in 2013. Between 2011 and 2014, the total quota for widow increased 3 fold from 755,000 pounds to 2.19 million pounds. The annual catch limit is expected to increase

[9] http://www.pcouncil.org/wp-content/uploads/Widow_2011_Assessment.pdf

again in 2017. In contrast, yellowtail rockfish quota has remained relatively constant since the implementation of the catch share program (6.49 million pounds).

Allocation of the reported days at sea into the subfisheries is a two-step process. First, ex-vessel revenue is used to categorize each delivery into a subfishery (At-sea Pacific whiting, Shoreside Pacific whiting, Non-whiting midwater trawl, DTS trawl with trawl endorsement, Non-whiting, non-DTS with trawl endorsement, Groundfish fixed gear with trawl endorsement). Fish ticket data are used to designate each unique delivery to a fishery by compiling data from the start date of the vessel's fiscal year through one full year. A delivery is assigned to a particular fishery based on the species or species group that resulted in the highest revenue for that delivery. For example, if a fish ticket for a particular vessel on a specific day had a mix of rockfish and Pacific whiting, and the Pacific whiting landings accounted for the majority of the revenue, then all landings associated with that trip are designated as "Pacific whiting fishery".

DTS revenue is identified using the landings of dover sole, thornyheads, and sablefish. Blackgill rockfish is also included because it is also a deep-water species which is commonly caught in combination with the other three species. In almost all cases, the daily deliveries where blackgill rockfish had the highest revenue, sablefish yielded the next highest revenue. Gear and permit are also used to distinguish trawl trips from fixed gear trips and trips with a limited entry permit with a trawl endorsement and trips with a limited entry permit with a fixed gear endorsement.

Once each landing/delivery is classified into a subfishery, the reported days at sea are distributed to the subfisheries proportional to the weight of landings/deliveries in each subfishery. The average and total fleet-wide allocated days at sea in each of the subfisheries is summarized in Tables 3.1 and 3.2, respectively. Days at sea are not available for all fisheries and all years due to changing conditions within the fishery and/or changes in survey data collection. Vessels did not begin participating in the non-whiting midwater trawl fishery until 2012. Starting in 2012, the form was changed to ask vessels to report chartering and research activity by location (Alaska or West Coast), rather than reporting them jointly.

Landings weight was explored as an alternative to using revenue to classify deliveries by fishery. We compared the results of two approaches: using the highest revenue method versus the highest landings weight method for designating the fishery. The two methods resulted in identification of the same fishery for 95% of all cases. Given that there were few differences in identification of the fisheries, revenue was selected over landings weight because it is assumed to represent the target species more accurately.

In 2009 through 2011, relatively few entities participated in the halibut, salmon, tuna, and other fisheries. These fisheries are grouped together into the "Other fisheries" category. Additionally, groundfish that was caught without a limited entry groundfish permit is also included in the "Other fisheries" category. The number of entities that participated in each of these fisheries ranged from zero, for salmon in 2009, to 15, for tuna in 2012. In 2012, there were more vessels that participated in the salmon (12 vessels) and tuna (15 vessels) fisheries than in the previous years. Most of these participants' information cannot be shown due to confidentiality restrictions. Comparing 2013 and 2014 to 2012, there were fewer vessels participating in the salmon and tuna fisheries, but slightly more vessels fishing in the halibut fisheries.

Table 3.1: Average days at sea. Average days at sea by activity for EDC vessels. The Other fisheries category includes salmon, tuna, halibut, and groundfish caught without a limited entry permit. See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Activity	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
At-sea Pacific whiting	21.0	19	30.0	21	39.5	18	41.9	16	37.7	18	45.0	17
Shoreside Pacific whiting	27.5	34	39.6	35	52.4	26	55.3	24	58.4	24	63.6	24
Non-whiting midwater trawl	—	—	—	—	—	—	9.1	6	12.9	6	11.1	10
DTS trawl with trawl endorsement	55.5	97	51.7	91	44.9	64	40.5	58	41.9	60	38.0	49
Non-whiting, non-DTS trawl with trawl endorsement	22.8	77	15.8	67	19.1	50	25.8	50	25.2	52	23.3	53
Groundfish fixed gear with trawl endorsement	***	***	49.1	5	35.2	25	38.3	26	19.5	19	30.8	20
Groundfish fixed gear with fixed gear endorsement	37.3	4	23.7	3	20.0	8	27.7	10	32.3	9	61.8	9
Crab	42.1	54	42.3	58	38.4	65	39.9	61	40.7	67	41.3	61
Shrimp	32.1	30	35.8	35	42.5	40	46.5	39	44.4	38	57.4	40
Alaska	96.0	27	106.3	27	115.1	28	93.6	25	108.5	24	103.5	24
Other fisheries	19.8	23	29.1	27	19.4	25	25.5	27	19.6	20	31.2	17
Chartering or research on the West Coast or Alaska	34.2	11	33.3	11	36.2	12	—	—	—	—	—	—
Chartering or research in Alaska	—	—	—	—	—	—	43.4	5	59.8	5	67.0	7
Chartering or research on the West Coast	—	—	—	—	—	—	46.3	7	51.8	9	63.2	9

Table 3.2: Total days at sea. Total days at sea for EDC vessels. The Other fisheries category includes salmon, tuna, halibut, and groundfish caught without a limited entry permit. See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Activity	2009		2010		2011		2012		2013		2014	
	Total	N	Total	N	Total	N	Total	N	Total	N	Total	N
At-sea Pacific whiting	398	19	631	21	712	18	671	16	678	18	765	17
Shoreside Pacific whiting	934	34	1,387	35	1,363	26	1,328	24	1,401	24	1,527	24
Non-whiting midwater trawl	—	—	—	—	—	—	54	6	77	6	111	10
DTS trawl with trawl endorsement	5,387	97	4,705	91	2,876	64	2,346	58	2,514	60	1,863	49
Non-whiting, non-DTS trawl with trawl endorsement	1,754	77	1,061	67	955	50	1,291	50	1,310	52	1,233	53
Groundfish fixed gear with trawl endorsement	***	***	246	5	880	25	997	26	371	19	616	20
Groundfish fixed gear with fixed gear endorsement	149	4	71	3	160	8	277	10	291	9	556	9
Crab	2,274	54	2,453	58	2,498	65	2,436	61	2,730	67	2,520	61
Shrimp	962	30	1,252	35	1,700	40	1,812	39	1,686	38	2,296	40
Alaska	2,592	27	2,869	27	3,222	28	2,339	25	2,603	24	2,483	24
Other fisheries	456	23	786	27	484	25	689	27	393	20	530	17
Chartering or research on the West Coast or Alaska	376	11	366	11	434	12	—	—	—	—	—	—
Chartering or research in Alaska	—	—	—	—	—	—	217	5	299	5	469	7
Chartering or research on the West Coast	—	—	—	—	—	—	324	7	466	9	569	9

3.1 Trips to Alaska

The number of trips that were made between the West Coast and Alaska provide additional insight into the patterns of participation. Table 3.3 shows the number of vessels that took up to four one-way trips to Alaska.

Table 3.3: Trips to Alaska. Count of vessels by number of one-way trips between the West Coast and Alaska. (N = number of EDC vessels).

Number of one-way trips	2009	2010	2011	2012	2013	2014
	N	N	N	N	N	N
1	—	3	***	***	***	***
2	21	19	25	23	24	23
3	***	***	***	***	***	***
4	5	6	3	3	***	***

3.2 Vessel participation in multiple fisheries

A key characteristic of vessels on the West Coast is participation in multiple fisheries. In 2014, only 8.7% of all entities participated in just one fishery. There are several reason why a vessel would participate in several fisheries. These reasons include maintaining employment throughout different seasonal fisheries and diversification of participation to protect individuals or communities from variability in the abundance of target species. Table 3.4 and Figures 33 - 38 provide additional insight into the portfolio of fisheries in which vessels participate.

Table 3.4: Participation in multiple fisheries. Number of entities that participated in one or more fisheries by year (N = number of entities, % = percent of total entities in survey year. An entity is defined as a unique combination of an owner or lessee and vessel, whereas a vessel refers to all activities related to that vessel, regardless of the number individuals who owned or leased the vessel).

Number of fisheries	2009		2010		2011		2012		2013		2014	
	N	%	N	%	N	%	N	%	N	%	N	%
1	6	4.7%	4	3.1%	6	4.6%	11	8.5%	6	4.8%	11	8.7%
2	35	27.6%	44	34.1%	52	40.0%	44	34.1%	50	39.7%	53	42.1%
3	52	40.9%	47	36.4%	44	33.8%	48	37.2%	41	32.5%	34	27.0%
4	26	20.5%	25	19.4%	21	16.2%	19	14.7%	24	19.0%	21	16.7%
4+	8	6.3%	9	7.0%	7	5.4%	7	5.4%	5	4.0%	7	5.6%

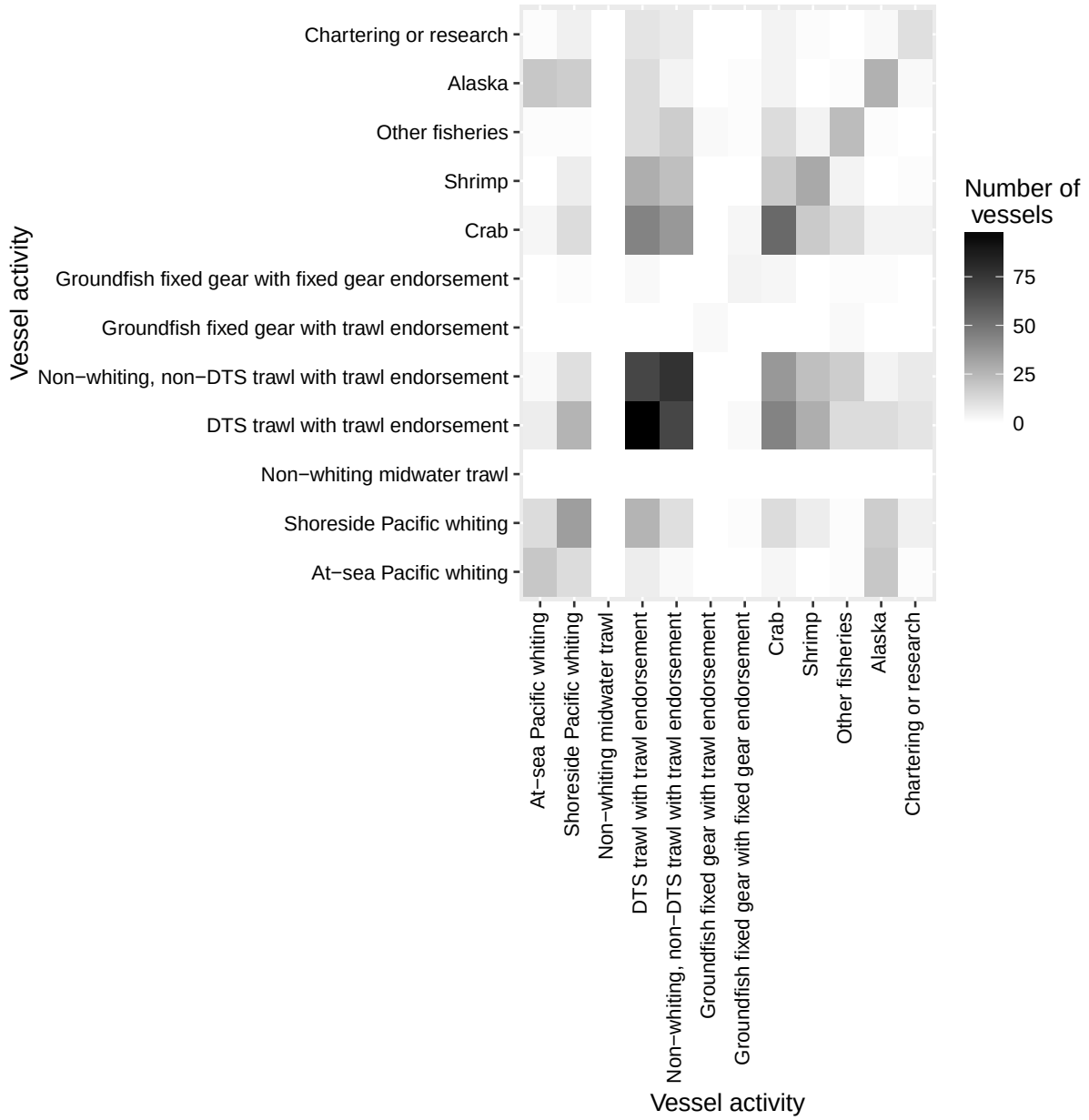

Figure 33: Participation in multiple fisheries - 2009. Frequency of participation in multiple fisheries during 2009 fiscal year.

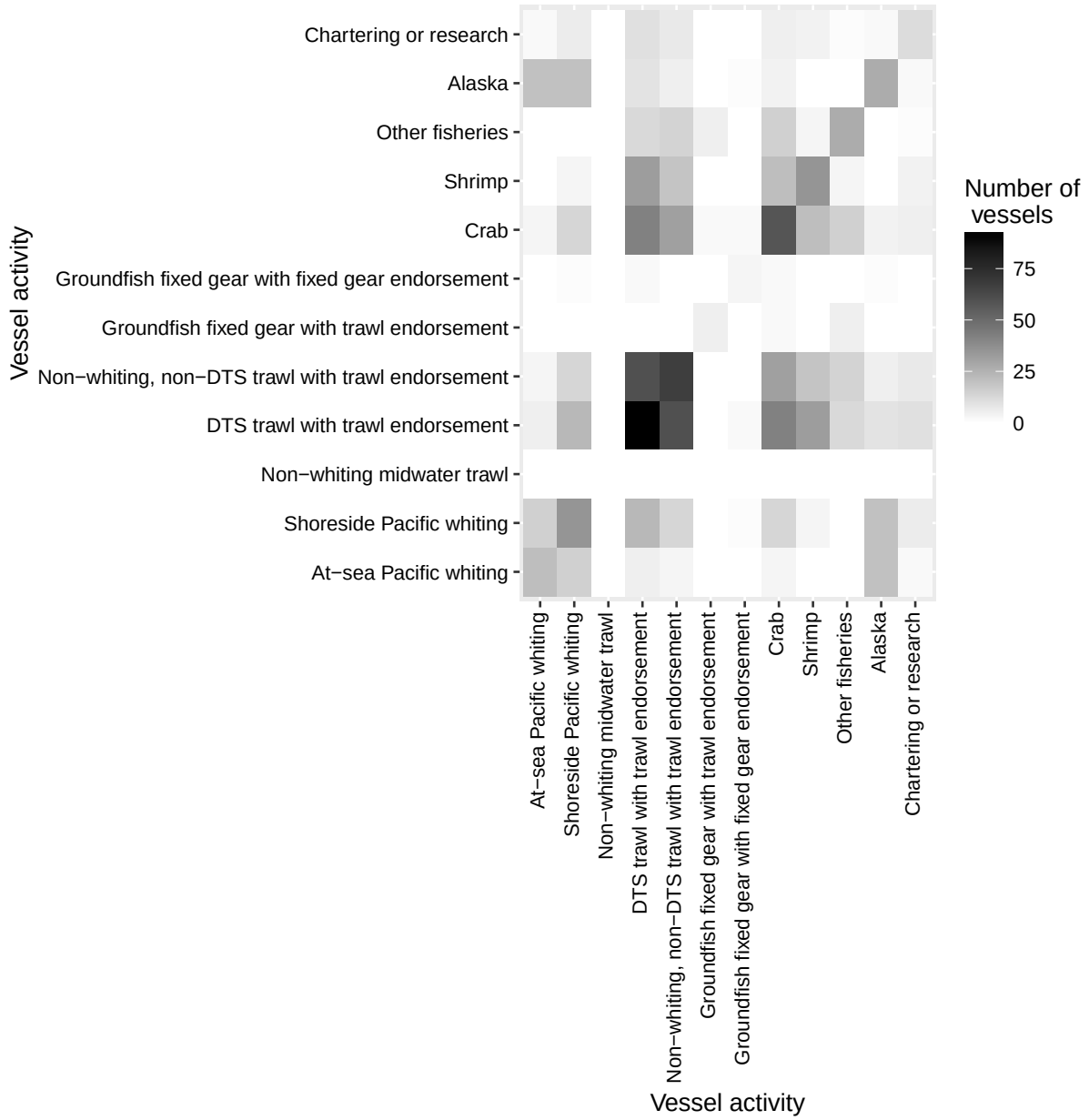

Figure 34: Participation in multiple fisheries - 2010. Frequency of participation in multiple fisheries during 2010 fiscal year.

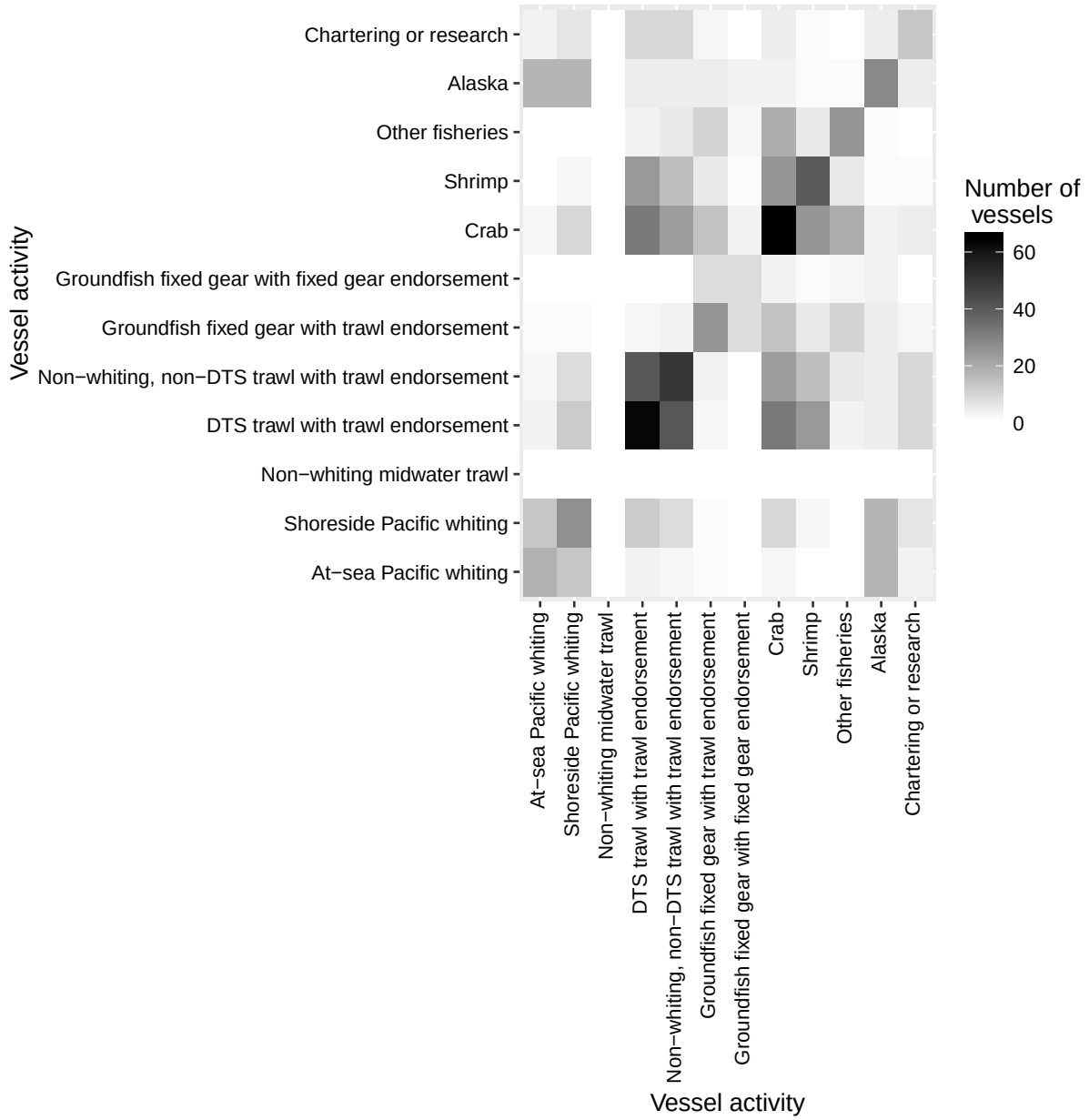

Figure 35: Participation in multiple fisheries - 2011. Frequency of participation in multiple fisheries during 2011 fiscal year.

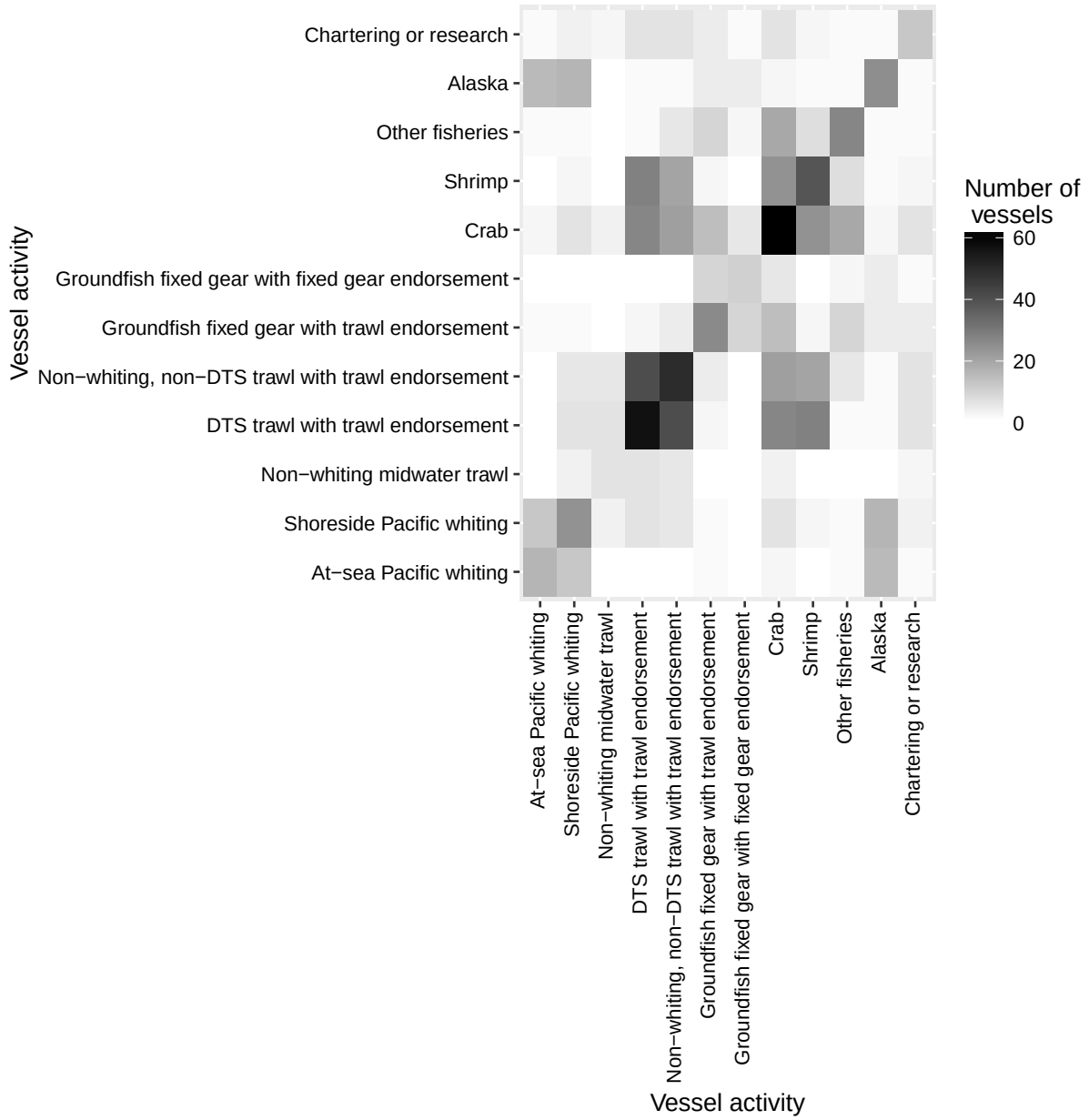

Figure 36: Participation in multiple fisheries - 2012. Frequency of participation in multiple fisheries during 2012 fiscal year.

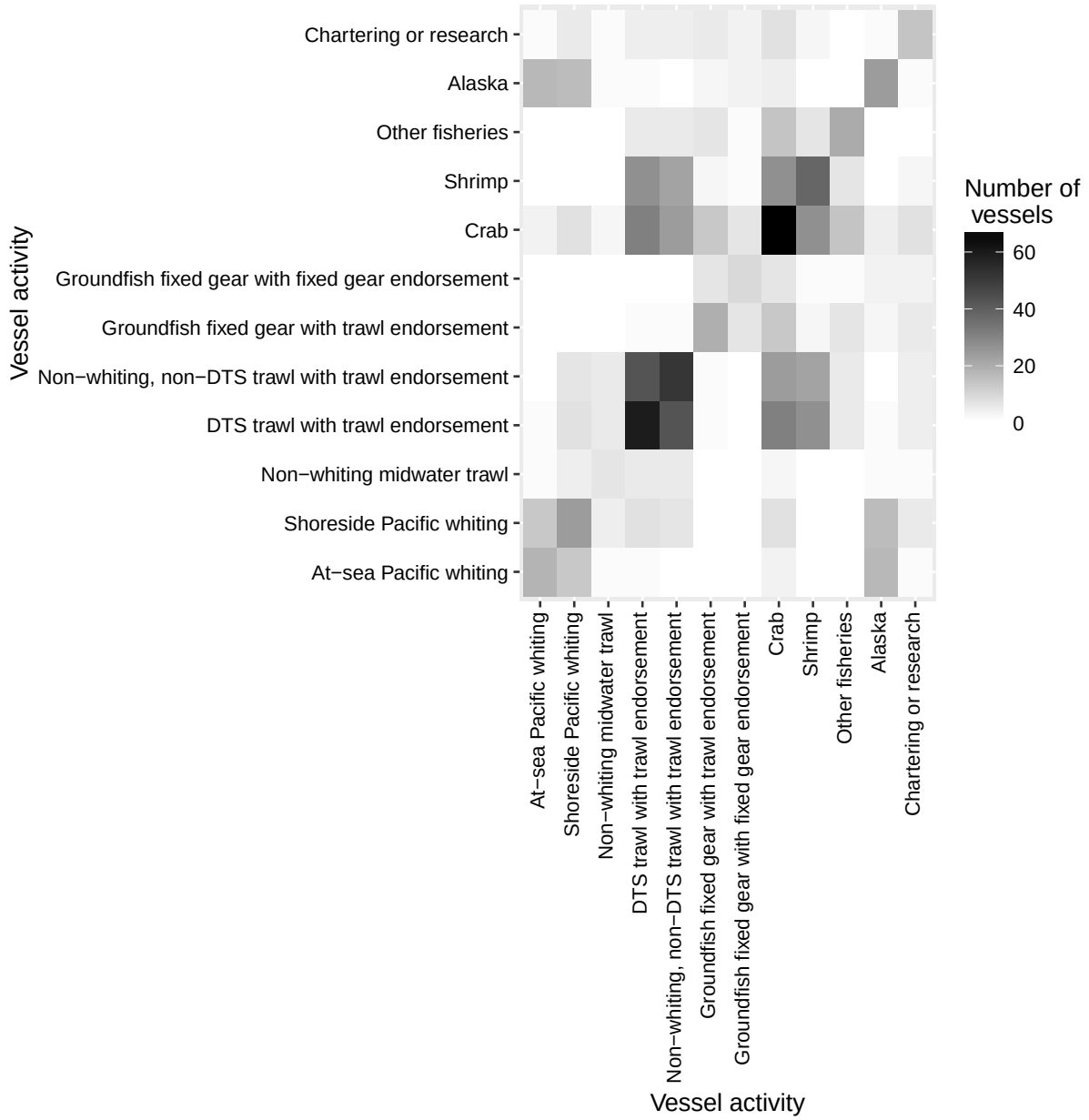

Figure 37: Participation in multiple fisheries - 2013. Frequency of participation in multiple fisheries during 2013 fiscal year.

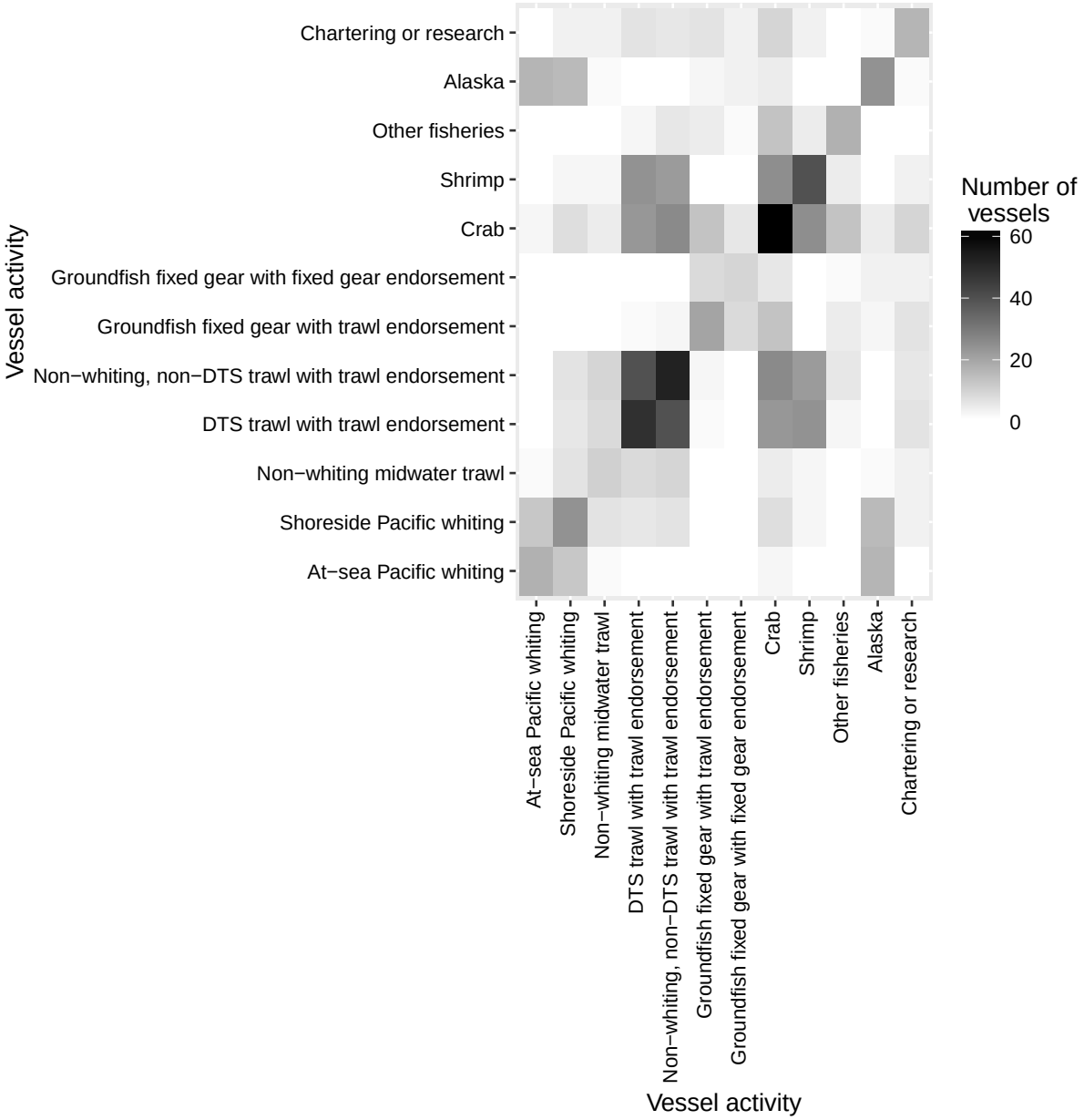

Figure 38: Participation in multiple fisheries - 2014. Frequency of participation in multiple fisheries during 2014 fiscal year.

4 Home Port

Vessel home port information will be particularly useful for understanding how the catch share program may affect communities. Among other uses, home port is commonly used as a method for assigning economic activity to communities. There are many measures of home port, including the home port listed on Coast Guard registrations and the port where the vessel made the most landings. Table 4.1 shows the number of entities by home port according to information submitted by participants. Home ports provided on the EDC forms are mapped to the IO-PAC port groupings.[10] These port groupings are also consistent with those used in the PFMC's biennial groundfish management specification process. The ports with the highest concentration of EDC entities are Newport, Astoria, and the Puget Sound region.

Table 4.1: Vessel home port. Number of entities by home port as reported on the EDC form (N = number of entities, % = percent of total entities in survey year. An entity is defined as a unique combination of an owner or lessee and vessel, whereas a vessel refers to all activities related to that vessel, regardless of the number individuals who owned or leased the vessel).

Home port	2009		2010		2011		2012		2013		2014	
	N	%	N	%	N	%	N	%	N	%	N	%
Alaska	***	***	***	***	3	2.0%	***	***	***	***	***	***
Puget Sound	14	10.0%	14	10.2%	17	11.3%	13	9.4%	12	9.1%	14	10.5%
South and central WA coast	4	2.9%	4	2.9%	4	2.7%	4	2.9%	4	3.0%	4	3.0%
Astoria	20	14.3%	20	14.6%	26	17.3%	23	16.5%	23	17.4%	20	15.0%
Tillamook	6	4.3%	6	4.4%	4	2.7%	5	3.6%	***	***	3	2.3%
Newport	23	16.4%	23	16.8%	25	16.7%	21	15.1%	23	17.4%	25	18.8%
Coos Bay	20	14.3%	19	13.9%	19	12.7%	19	13.7%	17	12.9%	18	13.5%
Brookings	7	5.0%	7	5.1%	8	5.3%	9	6.5%	8	6.1%	9	6.8%
Crescent City	14	10.0%	14	10.2%	14	9.3%	12	8.6%	12	9.1%	10	7.5%
Eureka	9	6.4%	9	6.6%	9	6.0%	7	5.0%	7	5.3%	8	6.0%
Fort Bragg	7	5.0%	7	5.1%	7	4.7%	8	5.8%	7	5.3%	7	5.3%
San Francisco	6	4.3%	8	5.8%	7	4.7%	7	5.0%	7	5.3%	6	4.5%
Monterey	3	2.1%	***	***	***	***	4	2.9%	***	***	3	2.3%
Morro Bay	6	4.3%	4	2.9%	6	4.0%	6	4.3%	6	4.5%	4	3.0%

In addition to understanding where vessels call their home port, it is important to examine how the home port relates to particular fisheries. Tables 4.2 through 4.15 show the average days at sea by home port and fishery. This provides information about how changes in management for a particular fishery could affect specific port communities. For example, changes in the Shoreside Pacific whiting fishery could have a strong effect on Coos Bay, but a change in the At-sea Pacific whiting fishery might not have a noticeable effect in that port.

[10] Leonard, J., and P. Watson. 2011. Description of the input-output model for Pacific Coast fisheries. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-111, 64 p.

Table 4.2: Alaska fishery days at sea by home port. Average number of days vessels fished in the Alaska fishery by home port reported on EDC form. (N = number of EDC vessels with non-zero, non-NA responses).

Home port	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Alaska	***	***	***	***		0		0	***	***	***	***
Puget Sound	108.6˙	9	129.6˙	9	129.4˙	10	102.6˙	8	117.1˙	8	118.4˙	9
Astoria	***	***	***	***	***	***	***	***		0		0
Tillamook		0		0	***	***		0		0		0
Newport	91.9˙	12	105.2:	12	105.2˙	11	90.8:	11	109.3˙	12	102.5:	12
Coos Bay	***	***	***	***	***	***	***	***		0		0
Brookings	***	***	***	***	***	***	***	***	***	***	***	***
San Francisco	***	***	***	***	***	***	***	***		0		0

Table 4.3: At-sea Pacific whiting fishery days at sea by home port. Average number of days vessels fished in the At-sea Pacific whiting fishery on the West Coast by home port reported on EDC form. (N = number of EDC vessels with non-zero, non-NA responses).

Home port	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Alaska	***	***	***	***		0		0	***	***		0
Puget Sound	20.9˙	6	36.0˙	8	43.2˙	7	47.9:	6	40.6˙	7	50.8˙	7
Astoria	***	***	***	***	***	***	***	***		0		0
Newport	22.2˙	9	28.5˙	9	34.0˙	9	34.4:	8	36.5:	9	43.7˙	9
Brookings	***	***	***	***		0		0	***	***	***	***
San Francisco	***	***	***	***	***	***	***	***		0		0

Table 4.4: Shoreside Pacific whiting fishery days at sea by home port. Average number of days vessels fished in the Shoreside Pacific whiting fishery on the West Coast by home port reported on EDC form. (N = number of EDC vessels with non-zero, non-NA responses).

Home port	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Alaska	***	***	***	***		0		0	***	***	***	***
Puget Sound	28.1 ⁝	6	36.7 ⁝	9	47.8 ˙	5	37.3 ⁝	5	50.5 ⁝	5	53.6 ⁝	4
South and central WA coast	***	***	***	***	***	***	***	***	***	***	***	***
Astoria	48.4 ⁝	3	61.1 ⁝	3	47.5 ⁝	3	***	***	***	***	***	***
Tillamook	***	***	***	***		0		0		0		0
Newport	23.8 ˙	14	37.4 ˙	14	54.2 ˙	14	53.9 ⁝	13	54.2 ˙	14	59.9 ˙	14
Coos Bay	25.6 ˙	4	***	***	***	***	***	***		0		0
Brookings	***	***	***	***	***	***	***	***	***	***	***	***
Crescent City	***	***	***	***		0		0		0		0
Eureka	***	***	***	***		0		0		0		0

Table 4.5: Non-whiting, non-DTS trawl with trawl endorsement fishery days at sea by home port. Average number of days vessels fished in the Non-whiting, non-DTS trawl with trawl endorsement fishery on the West Coast by home port reported on EDC form. (N = number of EDC vessels with non-zero, non-NA responses).

Home port	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Alaska		0	***	***		0		0		0		0
Puget Sound	10.6 ⁝	5	11.2 ˙	4	22.9 ⁝	3	***	***	***	***	***	***
South and central WA coast	25.3 ⁝	3	***	***	***	***	***	***	50.1 ⁝	3	***	***
Astoria	23.6 ⁝	16	19.5 ⁝	13	25.8 ⁝	14	37.5 ⁝	15	37.8 ⁝	14	46.0 ⁝	12
Tillamook	***	***	***	***	***	***	***	***		0		0
Newport	16.5 ⁝	8	10.0 ⁝	6	8.3 ⁝	7	6.3 ⁝	7	10.6 ⁝	6	7.6 ⁝	7
Coos Bay	20.8 ⁞	11	16.8 ⁞	11	15.9 ⁝	7	20.7 ⁞	9	14.3 ⁝	10	13.1 ⁞	10
Brookings	1.7 ˙	3	2.8 ˙	4	4.6 ⁝	4	3.5 ˙	3	7.5 ⁝	3	5.3 ⁝	3
Crescent City	2.6 ˙	4	3.4 ˙	4	***	***	***	***	***	***	4.8 ˙	3
Eureka	9.6 ⁝	9	6.5 ⁝	6	3.1 ˙	3	***	***	21.6 ⁝	4	22.3 ⁞	5
Fort Bragg	11.9 ⁞	7	11.4 ⁝	6	13.1 ⁝	4	15.3 ⁝	4	15.8 ˙	5	18.9 ⁝	5
San Francisco	71.4 ⁞	5	24.2 ⁝	5	44.2 ⁝	4	58.1 ⁝	4	39.3 ⁝	4	***	***
Monterey	***	***	***	***		0	***	***		0	***	***
Morro Bay	***	***	***	***		0		0	***	***	***	***

Table 4.6: Groundfish fixed gear with trawl endorsement fishery days at sea by home port. Average number of days vessels fished in the Groundfish fixed gear with trawl endorsement fishery on the West Coast by home port reported on EDC form. (N = number of EDC vessels with non-zero, non-NA responses).

Home port	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Alaska		0		0	***	***		0		0	***	***
Puget Sound		0		0	36.6 ⁝	4	39.8 ⁝	5	***	***	38.1 ⁝	3
South and central WA coast		0		0		0		0	***	***		0
Astoria		0		0	43.6 ˙	4	41.3 ⁝	7	37.8 ⁝	5	41.1 ˙	5
Newport		0		0	29.5 ˙	3	39.5 ˙	3	***	***	51.7 ⁞	3
Coos Bay		0		0	***	***	***	***		0		0
Brookings		0		0	***	***	***	***		0		0
Eureka		0		0		0		0		0	***	***
Fort Bragg		0		0	***	***	***	***	***	***	***	***
San Francisco		0	***	***	***	***	***	***	***	***	***	***
Monterey		0		0		0	***	***		0		0
Morro Bay	***	***	62.4 ⁝	3	51.6 ⁞	6	64.7 ⁞	4	15.8 ⁝	4	15.3 ⁝	3

Table 4.7: Groundfish fixed gear with fixed gear endorsement fishery days at sea by home port. Average number of days vessels fished in the Groundfish fixed gear with fixed gear endorsement fishery on the West Coast by home port reported on EDC form. (N = number of EDC vessels with non-zero, non-NA responses).

Home port	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Alaska		0		0	***	***		0		0	***	***
Puget Sound		0		0	***	***	32.7 ⁝	4	22.7 ⁝	3	40.7 ⁝	3
Astoria	***	***	***	***	***	***	***	***	***	***	***	***
Tillamook	***	***	***	***		0		0		0		0
Newport	***	***	***	***	***	***	***	***	***	***	***	***
Coos Bay		0		0	***	***	***	***		0		0
Brookings		0		0	***	***	***	***	***	***		0
Morro Bay	***	***		0	***	***	***	***	***	***	***	***

Table 4.8: Crab fishery days at sea by home port. Average number of days vessels fished in the Crab fishery on the West Coast by home port reported on EDC form. (N = number of EDC vessels with non-zero, non-NA responses).

Home port	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Alaska		0		0		0	***	***		0	***	***
Puget Sound	***	***	***	***	***	***	***	***	***	***	***	***
South and central WA coast	***	***	47.7 :	3	25.7 :	3	***	***	***	***	***	***
Astoria	59.3 ˙	6	52.0 ˙	5	40.7 ˙	9	50.3 :	9	47.7 :	10	39.6 ˙	9
Tillamook	***	***	***	***	***	***	***	***	***	***	***	***
Newport	31.8 ˙	10	25.1 :	10	39.2 :	10	23.1 :	10	33.1 :	10	30.4 :	9
Coos Bay	43.4 :	10	34.4 ˙	9	40.3 :	11	35.0 ˙	12	45.2 :	12	43.2 ˙	13
Brookings	24.6 :	5	13.2 ˙	5	12.5 ˙	6	21.5 ˙	3	19.9 ˙	6	***	***
Crescent City	48.5 :	4	42.7 :	5	34.3 :	7	34.0 :	5	50.8 ˙	5	33.2 ˙	5
Eureka	64.2 :	7	63.5 :	7	57.2 :	6	37.5 :	6	45.5 :	6	51.5 :	7
Fort Bragg	27.0 ˙	3	36.5 ˙	4	49.0 ˙	4	53.8 ˙	4	40.5 ˙	4	43.5 ˙	4
San Francisco	38.0 ˙	3	69.5 :	4	42.5 ˙	4	53.2 ˙	4	46.4 ˙	4	34.8 :	4
Monterey		0		0		0		0		0	***	***
Morro Bay	***	***	***	***	47.0 ˙	3	***	***	***	***	***	***

Table 4.9: DTS trawl with trawl endorsement fishery days at sea by home port. Average number of days vessels fished in the DTS trawl with trawl endorsement fishery on the West Coast by home port reported on EDC form. (N = number of EDC vessels with non-zero, non-NA responses).

Home port	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Alaska		0		0		0	***	***		0		0
Puget Sound	67.8 :	5	44.5 :	4	36.4 :	3	***	***	***	***		0
South and central WA coast	95.8 :	4	90.5 :	3	***	***	51.1 :	3	41.4 .	3	***	***
Astoria	70.9 :	17	73.0 :	16	58.1 :	16	54.8 :	14	64.5 :	14	46.0 :	12
Tillamook	72.3 :	4	47.5 :	4	***	***	***	***	***	***		0
Newport	41.2 :	18	38.3 :	16	18.6 :	8	25.1 .	6	32.4 .	6	38.0 .	5
Coos Bay	43.8 :	16	44.6 :	16	43.2 :	9	41.6 :	9	21.9 :	11	14.3 :	7
Brookings	51.2 :	7	55.9 :	7	47.2 :	6	43.0 .	5	65.7 :	5	59.8 :	5
Crescent City	46.9 :	5	37.9 :	5	21.2 :	3	35.0 .	4	26.2 .	4	28.6 .	3
Eureka	59.5 .	9	53.2 :	8	51.9 .	7	45.5 :	6	46.3 .	6	40.4 :	6
Fort Bragg	54.9 .	7	46.9 :	7	35.4 :	6	29.6 :	5	35.2 :	6	33.4 .	6
San Francisco	***	***	***	***	***	***	***	***	***	***	***	***
Monterey	***	***	***	***	***	***	***	***	***	***	***	***
Morro Bay	***	***	***	***		0		0	***	***	***	***

Table 4.10: Shrimp fishery days at sea by home port. Average number of days vessels fished in the Shrimp fishery on the West Coast by home port reported on EDC form. (N = number of EDC vessels with non-zero, non-NA responses).

Home port	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Alaska		0		0		0	***	***		0		0
Puget Sound	***	***	***	***		0		0		0	***	***
South and central WA coast		0	***	***		0	***	***		0	***	***
Astoria	45.3 :	3	38.9 :	4	48.6 :	6	61.3 :	4	56.4 :	5	84.3 .	3
Tillamook	***	***	***	***	***	***	***	***	***	***	***	***
Newport	10.2 .	5	***	***	41.5 :	6	70.1 .	5	65.8 :	5	92.4 .	5
Coos Bay	37.9 .	10	35.8 :	13	40.3 :	12	43.4 :	11	42.5 .	12	45.1 .	13
Brookings	***	***	31.2 :	4	52.5 .	4	33.9 :	5	40.9 :	5	50.2 :	6
Crescent City	34.7 :	3	49.8 :	4	42.3 :	6	40.2 :	6	39.6 .	5	39.2 .	5
Eureka	28.5 :	4	26.5 :	4	28.5 :	4	35.5 :	4	18.5 :	4	47.8 :	4
Morro Bay	***	***		0		0		0	***	***		0

Table 4.11: Chartering or research on the West Coast or Alaska fishery days at sea by home port. Average number of days vessels fished in the Chartering or research on the West Coast or Alaska fishery on the West Coast by home port reported on EDC form. (N = number of EDC vessels with non-zero, non-NA responses).

Home port	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Alaska		0		0	***	***		0		0		0
Puget Sound	***	***	***	***	***	***		0		0		0
Astoria	***	***	***	***	***	***		0		0		0
Tillamook		0	***	***		0		0		0		0
Newport	35.5 :	4	36.0 :	4	48.8 :	4		0		0		0
Coos Bay	21.2 :	4	***	***	***	***		0		0		0
Brookings	***	***	***	***	***	***		0		0		0
Fort Bragg		0		0	***	***		0		0		0

Table 4.12: Other fisheries fishery days at sea by home port. Average number of days vessels fished in the Other fisheries fishery on the West Coast by home port reported on EDC form. (N = number of EDC vessels with non-zero, non-NA responses).

Home port	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Puget Sound		0		0		0	***	***		0		0
South and central WA coast		0	***	***		0		0		0		0
Astoria	34.5˙	3	36.5⁝	3	18.9⁝	4	7.7⁝	3	***	***		0
Tillamook	***	***	***	***	***	***	***	***		0	***	***
Newport	19.7⁝	3	24.8⁝	3	***	***	20.3⁝	3	***	***	***	***
Coos Bay	4.0˙	4	8.6⁝	4	17.4⁝	6	12.7⁝	7	20.5⁝	4	16.9⁝	6
Brookings	***	***		0	***	***	***	***		0	***	***
Crescent City		0	***	***		0	***	***	***	***		0
Eureka	***	***	***	***		0		0		0	***	***
Fort Bragg	***	***	***	***	***	***	56.6⁝	3	***	***	***	***
San Francisco	37.5⁝	3	62.3⁝	5	16.4⁝	4	37.0⁝	3	30.9˙	4	57.9˙	3
Monterey	***	***	***	***		0		0	***	***	***	***
Morro Bay	22.2⁝	5	23.9˙	3	21.9⁝	4	32.7˙	4	16.6˙	3	***	***

Table 4.13: Non-whiting midwater trawl fishery days at sea by home port. Average number of days vessels fished in the Non-whiting midwater trawl fishery on the West Coast by home port reported on EDC form. (N = number of EDC vessels with non-zero, non-NA responses).

Home port	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Puget Sound		0		0		0	***	***	***	***	***	***
South and central WA coast		0		0		0	***	***		0		0
Astoria		0		0		0	4.8˙	4	15.7˙	3	13.8˙	5
Newport		0		0		0		0	***	***	6.3⁝	4

Table 4.14: Chartering or research in Alaska fishery days at sea by home port. Average number of days vessels fished in the Chartering or research in Alaska fishery on the West Coast by home port reported on EDC form. (N = number of EDC vessels with non-zero, non-NA responses).

Home port	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Puget Sound		0		0	***	***	***	***	***	***	***	***
Astoria		0		0		0	43.3˙	3	***	***	82.7˙	3
Tillamook		0		0		0	***	***	***	***	***	***
Newport		0		0		0		0	***	***	***	***

Table 4.15: Chartering or research on the West Coast fishery days at sea by home port. Average number of days vessels fished in the Chartering or research on the West Coast fishery on the West Coast by home port reported on EDC form. (N = number of EDC vessels with non-zero, non-NA responses).

Home port	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Puget Sound		0		0		0		0		0	***	***
South and central WA coast		0		0		0		0	***	***		0
Astoria		0		0		0	***	***		0	***	***
Tillamook		0		0		0	***	***		0		0
Newport		0		0		0	29.3:	3	32.2:	4	15.0:	3
Coos Bay		0		0		0		0		0	***	***
Brookings		0		0		0	***	***	***	***	***	***
San Francisco		0		0		0		0	***	***		0
Monterey		0		0		0	***	***		0		0
Morro Bay		0		0		0		0	***	***		0

5 Vessel Physical Characteristics

5.1 Average market value, replacement value, vessel length, fuel capacity, and horsepower of main engines

Survey participants were asked to provide basic information about the vessel and its physical characteristics, including market value, replacement value, vessel length, horsepower of main engines, and fuel capacity from the most recent marine survey (Table 5.1 and Figures 39, 40, 41, and 42). Marine surveys are done on a regular basis and are often required for insurance, financing, and other purposes.

The market value is the marine surveyor's estimate of what the vessel could be sold for in its current condition, and the replacement value is the estimate of what it would cost to replace the current vessel with a new vessel.

Table 5.1: Average vessel characteristics. Average market value, replacement value, horsepower, fuel capacity and length. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel characteristic	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Market value ($ millions)	1.1⁝	123	1.1⁝	121	1.2⁝	138	1.1⁝	135	1.2⁝	131	1.3⁝	130
Replacement value ($ millions)	2.0⁝	121	2.0⁝	120	2.2⁝	135	2.2⁝	131	2.4⁝	126	2.7⁝	127
Vessel length (feet)	72.8˙	140	72.6˙	143	72.2˙	153	68.5˙	149	68.8˙	143	70.0˙	140
Vessel fuel capacity (thousand gallons)	12.4⁝	139	12.2⁝	142	12.1⁝	154	11.4⁝	143	11.4⁝	140	11.7⁝	139
Horsepower of main engines	650.1⁝	140	635.8⁝	143	634.4⁝	151	624.0⁝	143	634.0⁝	136	665.4⁝	137

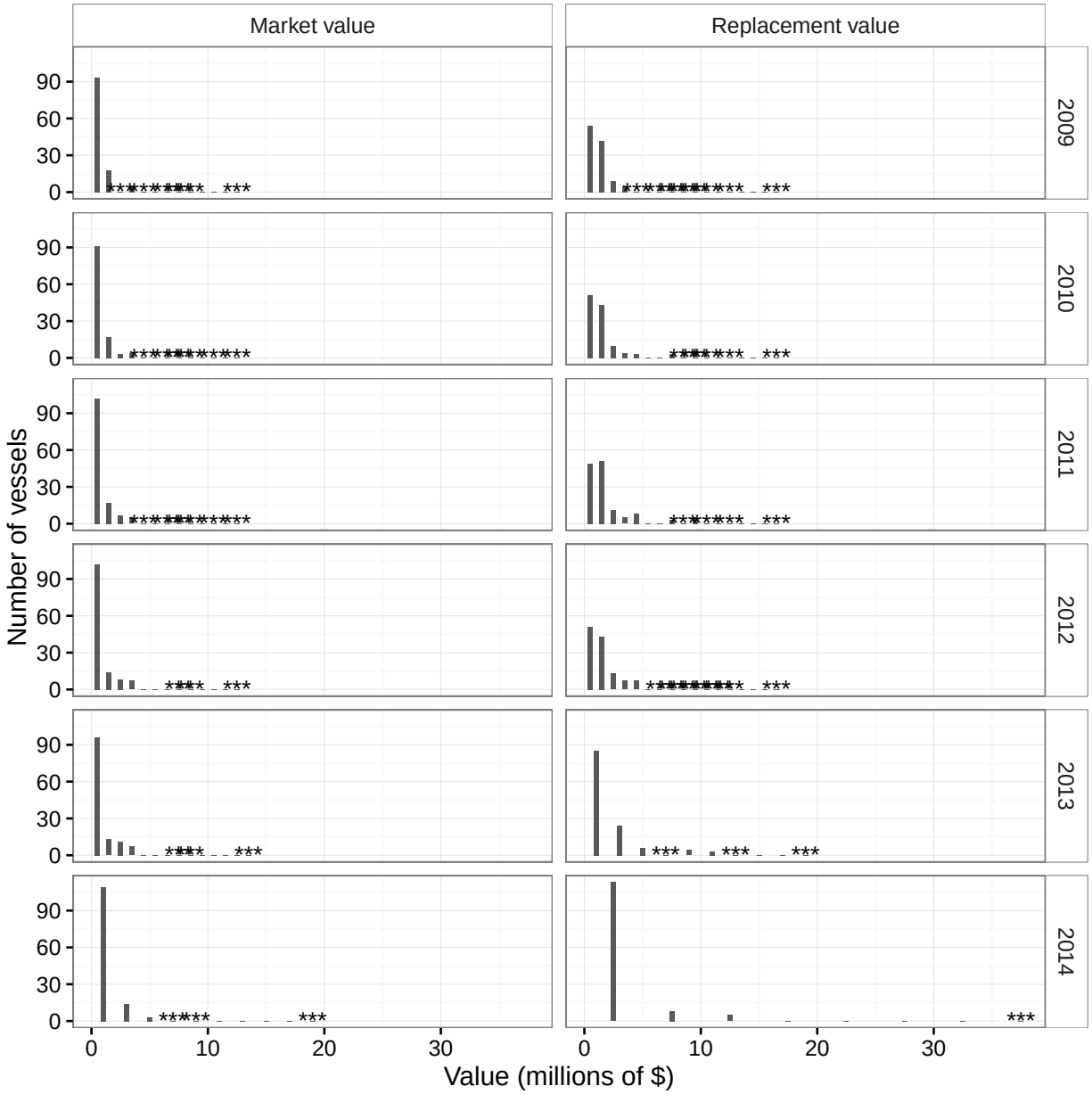

Figure 39: Market value and replacement value (millions of dollars) of all vessels that completed a survey. *** indicate that values were suppressed for confidentiality reasons.

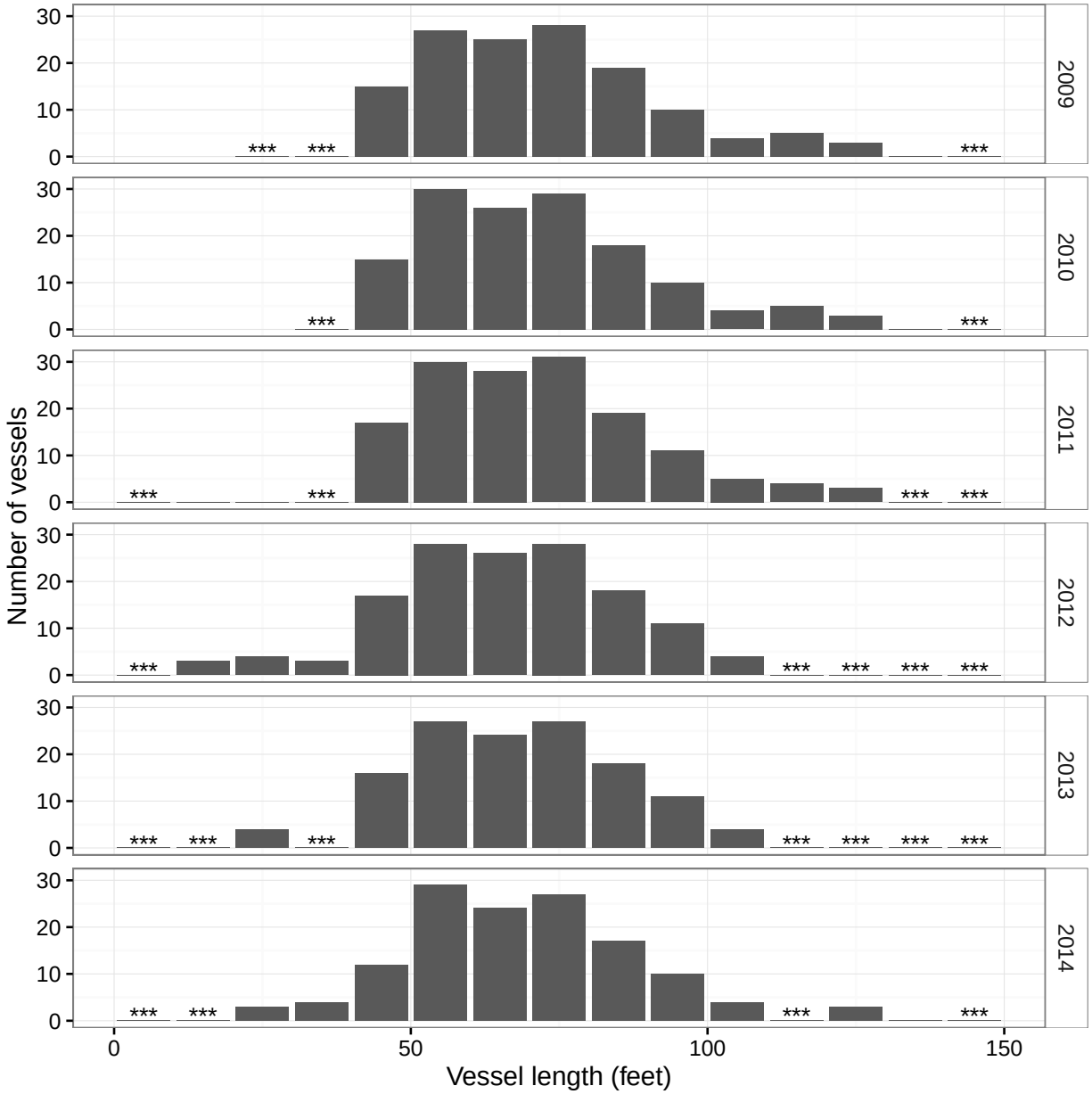

Figure 40: Vessel length (feet) of all vessels that completed a survey. *** indicate that values were suppressed for confidentiality reasons.

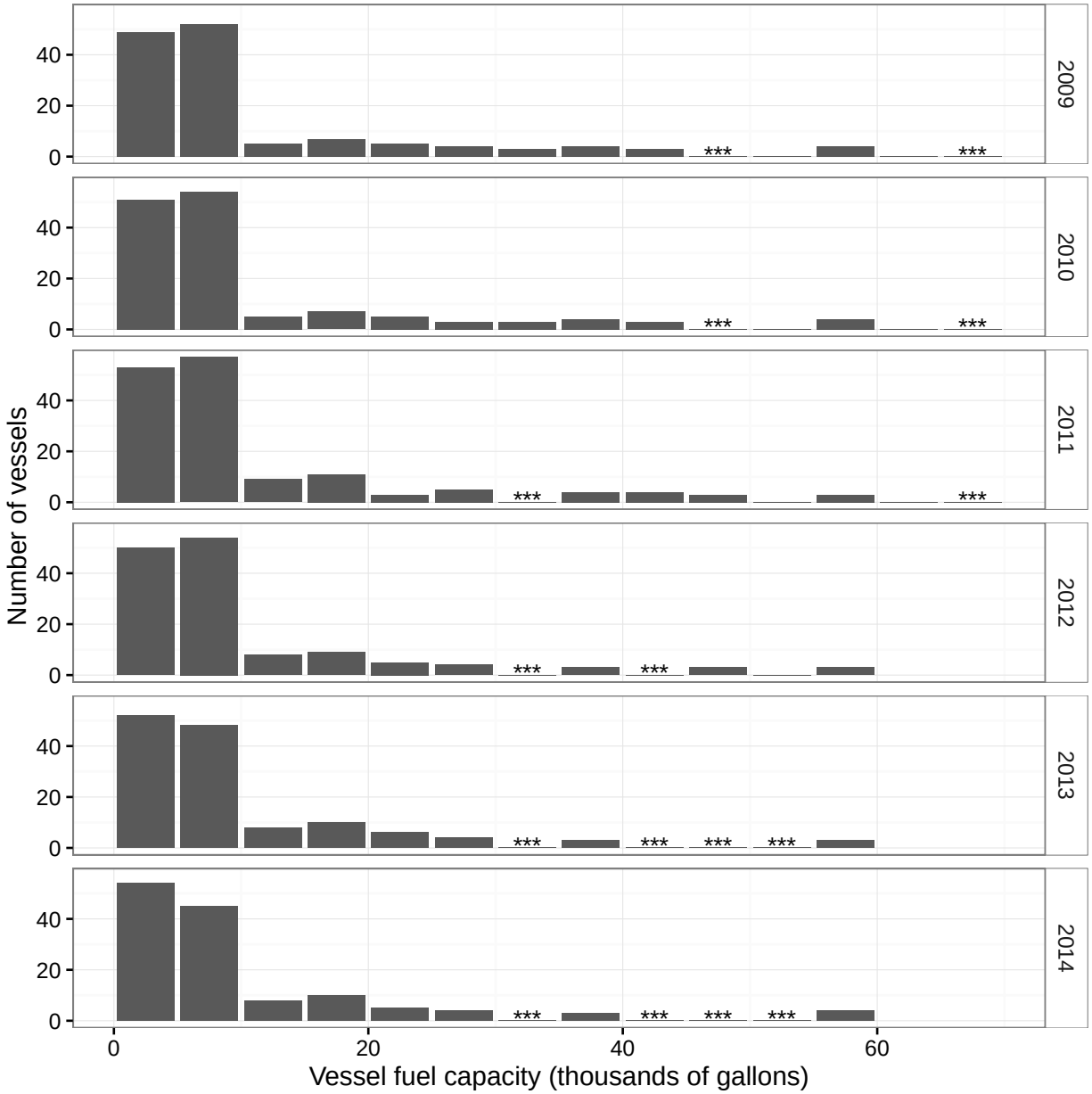

Figure 41: Vessel fuel capacity (thousands of gallons) of all vessels that completed a survey. *** indicate that values were suppressed for confidentiality reasons.

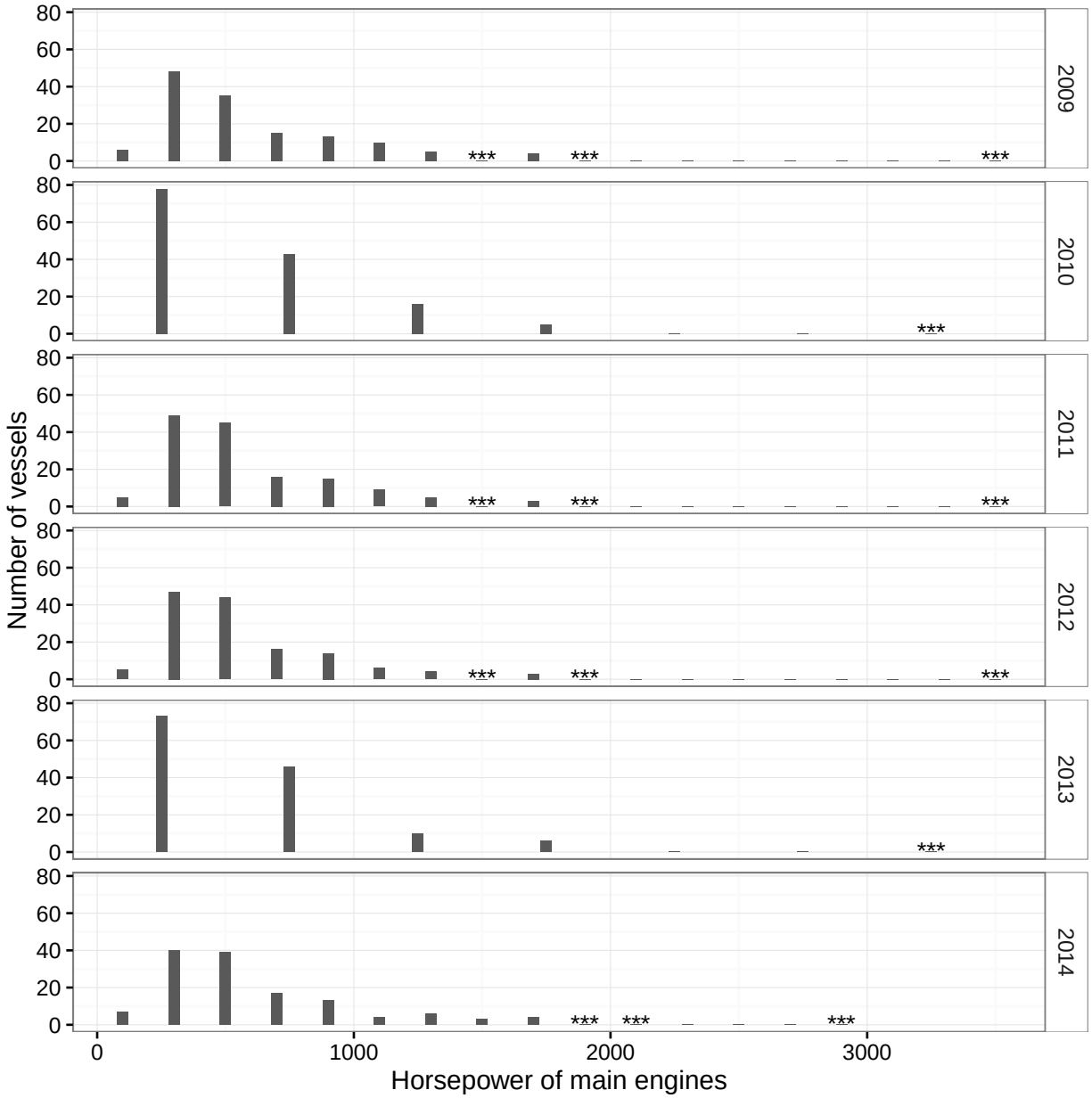

Figure 42: Horsepower of main engines of all vessels that completed a survey. *** indicate that values were suppressed for confidentiality reasons.

The participants provide information about whether the vessel was hauled out (vessel was removed from the water for maintenance and repairs). Each year, a significant portion of all active fishing vessels are hauled out. The information shown below in Table 5.2 provides context that may be used to explain major costs associated with vessel repair and maintenance.

Participants also note whether they process fish at-sea, which has increased over time (Table 5.3). The most common occurrence of at-sea processing is heading and gutting sablefish before delivering the fish.

Table 5.2: Haul outs. Number (N) and percentage (%) of EDC vessels that hauled the vessel during the year.

Haul out	2009		2010		2011		2012		2013		2014	
	N	%	N	%	N	%	N	%	N	%	N	%
YES	80	63.5%	63	49.2%	83	62.9%	81	63.3%	60	48.4%	78	63.9%
NO	46	36.5%	62	48.4%	49	37.1%	47	36.7%	63	50.8%	44	36.1%
No response	0	0.0%	3	2.3%	0	0.0%	0	0.0%	***	***	0	0.0%

Table 5.3: Catcher vessels that processed at-sea. Number (N) and percentage (%) of vessels that processed or headed and gutted fish on-board the vessel in survey year.

Processed at-sea	2009		2010		2011		2012		2013		2014	
	N	%	N	%	N	%	N	%	N	%	N	%
YES	6	4.8%	6	4.7%	15	11.4%	17	13.3%	13	10.6%	14	11.4%
NO	120	95.2%	119	93.0%	115	87.1%	111	86.7%	108	87.8%	108	87.8%
No response	0	0 %	3	0	0 %	***	—	—	***	***	***	***

5.2 Vessel characteristics by whether the vessel fished on the West Coast and in Alaska, only fished on the West Coast, only fished in Alaska, or did not fish

The physical characteristics of vessels can vary depending on fishery participation and where the vessel operates. Vessel characteristics have been delineated based on whether vessels fished on the West Coast, Alaska, both, or did not fish at all in a given year (Tables 5.4 through 5.8).

Table 5.4: Average horsepower. Average horsepower of EDC vessels that fished only on the West Coast, only in Alaska, both on the West Coast and in Alaska, or did not fish. (N = number of entities with non-zero, non-NA responses).

Activity	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Fished only on the West Coast	457 ˙	106	439 ˙	105	452 ˙	112	464 ˙	107	482 ˙	103	506 ˙	104
Fished only in Alaska	1,483 ˙	3	***	***	1,092 ˙	6	1,055 ˙	6	1,010 ˙	5	1,342 ⁝	6
Fished on the West Coast and Alaska	1,255 ˙	32	1,267 ˙	32	1,120 ⁝	34	1,206 ⁝	26	1,262 ⁝	25	1,268 ˙	24
Did not fish	716 ⁝	9	710 ⁝	11	874 ⁝	9	643 ⁝	8	480 ⁝	10	514 ⁝	9

Table 5.5: Average replacement value. Average replacement value (millions of $) of vessels that fished only on the West Coast, only in Alaska, both on the West Coast and in Alaska, or did not fish. In 2009 and 2010, there was no question specifically for Alaska and if the vessel did not fish in 2009 and 2010, the owner was not required to provide the market value of the vessel. (N = number of entities with non-zero, non-NA responses).

Activity	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Fished only on the West Coast	$1.04 ⁝	89	$1.05 ⁝	88	$1.28 ⁝	97	$1.40 ⁝	95	$1.48 ⁝	96	$1.62 ⁝	97
Fished only in Alaska	$6.08 ⁝	3	***	***	$6.15 ⁝	6	$3.52 ⁝	6	$2.39 ˙	5	$7.98 ⁝	6
Fished on the West Coast and Alaska	$4.47 ⁝	29	$4.99 ⁝	30	$4.48 ⁝	32	$5.26 ⁝	26	$6.23 ⁝	26	$5.92 ⁝	25
Did not fish	***	***	***	***	$2.05 ⁝	8	$0.40 ⁝	6	$0.30 ⁝	4	***	***

Table 5.6: Average market value. Average market value (millions of $) of vessels that fished only on the West Coast, only in Alaska, both on the West Coast and in Alaska, or did not fish. In 2009 and 2010, there was no question specifically for Alaska and if the vessel did not fish in 2009 and 2010, the owner was not required to provide the replacement value of the vessel. (N = number of entities with non-zero, non-NA responses).

Activity	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Fished only on the West Coast	$0.4	91	$0.4	89	$0.5	98	$0.6	98	$0.6	99	$0.7	98
Fished only in Alaska	$4.2	3	***	***	$3.9	6	$1.9	6	$1.5	5	$4.6	6
Fished on the West Coast and Alaska	$2.8	29	$3.3	30	$2.9	33	$3.1	26	$3.7	26	$3.4	25
Did not fish	***	***	***	***	$0.7	9	$0.1	7	$0.2	6	$0.2	5

Table 5.7: Average vessel fuel capacity. Average vessel fuel capacity (gallons) of vessels that fished only on the West Coast, only in Alaska, both on the West Coast and in Alaska, or did not fish. In 2009 and 2010, there was no question specifically for Alaska. (N = number of entities with non-zero, non-NA responses).

Activity	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Fished only on the West Coast	6,666	106	6,746	105	7,114	112	7,403	107	7,868	105	7,633	105
Fished only in Alaska	29,846	3	***	***	33,476	6	18,485	6	15,000	5	22,167	6
Fished on the West Coast and Alaska	28,738	32	31,242	32	24,291	34	27,444	26	29,084	26	29,597	25
Did not fish	21,058	8	12,263	10	18,319	9	9,982	8	5,372	11	6,705	9

Table 5.8: Average vessel length. Average length (feet) of vessels that did not fish on the West Coast or Alaska, fished on the West Coast and Alaska, fished only in Alaska, and fished only on the West Coast. In 2009 and 2010 there was no question specifically for Alaska. (N = number of entities with non-zero, non-NA responses).

Activity	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Fished only on the West Coast	65˙	106	65˙	105	65˙	112	65˙	107	65˙	106	66˙	105
Fished only in Alaska	98˙	3	***	***	98˙	6	93˙	6	90˙	4	104˙	4
Fished on the West Coast and Alaska	98˙	32	100˙	32	93˙	34	95˙	26	96˙	26	95˙	25
Did not fish	76˙	9	69˙	11	70˙	12	41˙	14	41˙	13	44˙	12

6 Vessel Fuel Use, Speed, and Crew Size

6.1 Fuel use

Participants provide information about fuel use, which can be delineated according to fishery participation and vessel size. There was a change to the EDC forms, starting with the 2014 data collection. Through 2013, participants were asked to report their average fuel use per day for all fishing for groundfish with fixed gear; starting in 2014, participants were asked to provide average fuel use separately for fixed gear with a trawl permit and fixed gear with a fixed gear permit. Similarly, in 2014, participants reported fuel use for Pacific halibut separately from California halibut.

Participants are asked to estimate the average daily fuel use while fishing. On average, more fuel is used per day in the Pacific whiting fishery than any other fishery (Table 6.1). Information about average daily fuel use is summarized by fishery and vessel length class in Tables 6.2 through 6.14. Lastly, participants provide information about total annual fuel use, summarized in Table 6.15.

Average fuel use per day by fishery

Table 6.1: Daily fuel use. Average daily fuel use (gallons per day) by fishery. See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Activity	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Pacific whiting	790.6⁝	39	822.5⁝	41	823.6⁝	33	813.7⁝	30	780.8⁝	32	716.0˙	30
Groundfish with trawl gear	300.0⁝	103	307.3⁝	96	330.0⁝	79	321.2⁝	73	324.1⁝	76	328.2⁝	69
Groundfish with fixed gear	155.6⁝	8	143.3⁝	9	141.5⁝	26	168.0⁝	24	166.8⁝	21	—	—
Groundfish fixed gear with a trawl permit	—	—	—	—	—	—	—	—	—	—	141.2⁝	19
Groundfish fixed gear with a fixed gear permit	—	—	—	—	—	—	—	—	—	—	212.5˙	8
Crab	177.1⁝	53	179.1⁝	55	170.1⁝	66	185.2⁝	65	195.6⁝	66	182.1⁝	66
Halibut	271.4⁝	7	206.3⁝	6	141.1⁝	7	202.7⁝	6	151.8⁝	5	—	—
Pacific halibut	—	—	—	—	—	—	—	—	—	—	***	***
California halibut	—	—	—	—	—	—	—	—	—	—	160.2⁝	4
Salmon	***	***	38.8⁝	4	70.0⁝	5	45.2⁝	10	46.0⁝	5	51.0⁝	10
Shrimp	243.2˙	35	230.3˙	35	223.5˙	42	242.3˙	41	255.7˙	40	244.2˙	42
Tuna	128.9⁝	15	120.1⁝	14	77.9˙	8	101.5⁝	12	109.3⁝	7	70.7⁝	10
Steaming between West Coast and Alaska	875.4⁝	28	870.8⁝	31	803.6⁝	31	816.7⁝	28	759.1˙	26	770.0˙	27

Average fuel use per day by fishery and vessel length class

Table 6.2: Pacific whiting fishery fuel use. Average fuel use (gallons per day) of vessels that fished in the Pacific whiting fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)		0		0	***	***		0		0		0
Medium vessel (> 60 ft, <= 80 ft)	399˙	9	407˙	9	396˙	5	481˙	5	487˙	5	487˙	5
Large vessel (> 80 ft)	908⁝	30	939⁝	32	924⁝	27	880⁝	25	835⁝	27	762˙	25

Table 6.3: Groundfish with trawl gear fishery fuel use. Average fuel use (gallons per day) of vessels that fished in the groundfish with trawl gear fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	180˙	35	190˙	29	241:	20	220:	19	224:	19	223:	18
Medium vessel (> 60 ft, <= 80 ft)	290˙	47	291˙	47	292˙	43	304˙	42	303˙	44	307˙	38
Large vessel (> 80 ft)	522˙	21	516˙	20	543˙	16	541:	12	543˙	13	535˙	13

Table 6.4: Groundfish with fixed gear fishery fuel use. Average fuel use (gallons per day) of vessels that fished in the groundfish with fixed gear fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	91˙	6	84˙	7	116:	18	102˙	14	133˙	14	—	—
Medium vessel (> 60 ft, <= 80 ft)	***	***	***	***	200:	7	231˙	8	235˙	7	—	—
Large vessel (> 80 ft)	***	***	***	***	***	***	***	***		0	—	—

Table 6.5: Groundfish fixed gear with a trawl permit fishery fuel use. Average fuel use (gallons per day) of vessels that fished in the groundfish fixed gear with a trawl permit fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	—	—	—	—	—	—	—	—	—	—	102:	13
Medium vessel (> 60 ft, <= 80 ft)	—	—	—	—	—	—	—	—	—	—	227˙	6
Large vessel (> 80 ft)	—	—	—	—	—	—	—	—	—	—		0

Table 6.6: Groundfish fixed gear with a fixed gear permit fishery fuel use. Average fuel use (gallons per day) of vessels that fished in the groundfish fixed gear with a fixed gear permit fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	—	—	—	—	—	—	—	—	—	—	127 :	3
Medium vessel (> 60 ft, <= 80 ft)	—	—	—	—	—	—	—	—	—	—	264 ·	5
Large vessel (> 80 ft)	—	—	—	—	—	—	—	—	—	—		0

Table 6.7: Crab fishery fuel use. Average fuel use (gallons per day) of vessels that fished in the crab fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	98 ·	28	98 :	28	99 :	33	97 :	31	101 :	31	94 :	34
Medium vessel (> 60 ft, <= 80 ft)	242 ·	19	239 ·	21	224 ·	26	250 ·	27	262 ·	26	254 ·	25
Large vessel (> 80 ft)	342 ·	6	350 ·	6	303 ·	7	324 ·	7	330 ·	9	350 ·	7

Table 6.8: Halibut fishery fuel use. Average fuel use (gallons per day) of vessels that fished in the halibut fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	100 :	4	50 ·	3	54 ·	4	***	***	82 ·	3	—	—
Medium vessel (> 60 ft, <= 80 ft)	***	***	363 ·	3	258 :	3	272 :	4	***	***	—	—
Large vessel (> 80 ft)	***	***		0		0		0		0	—	—

Table 6.9: Pacific halibut fishery fuel use. Average fuel use (gallons per day) of vessels that fished in the Pacific halibut fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	—	—	—	—	—	—	—	—	—	—		0
Medium vessel (> 60 ft, <= 80 ft)	—	—	—	—	—	—	—	—	—	—	***	***
Large vessel (> 80 ft)	—	—	—	—	—	—	—	—	—	—		0

Table 6.10: California halibut fishery fuel use. Average fuel use (gallons per day) of vessels that fished in the California halibut fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	—	—	—	—	—	—	—	—	—	—	***	***
Medium vessel (> 60 ft, <= 80 ft)	—	—	—	—	—	—	—	—	—	—	***	***
Large vessel (> 80 ft)	—	—	—	—	—	—	—	—	—	—		0

Table 6.11: Salmon fishery fuel use. Average fuel use (gallons per day) of vessels that fished in the salmon fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	***	***	39:	4	70:	5	45:	10	46:	5	51:	10
Medium vessel (> 60 ft, <= 80 ft)		0		0		0		0		0		0
Large vessel (> 80 ft)		0		0		0		0		0		0

Table 6.12: Shrimp fishery fuel use. Average fuel use (gallons per day) of vessels that fished in the shrimp fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	160˙	11	153˙	10	169˙	13	167˙	11	175˙	11	156˙	12
Medium vessel (> 60 ft, <= 80 ft)	268˙	20	241˙	20	240˙	24	257˙	22	278:	22	258˙	22
Large vessel (> 80 ft)	350˙	4	340˙	5	285˙	5	306˙	8	314˙	7	338˙	8

Table 6.13: Tuna fishery fuel use. Average fuel use (gallons per day) of vessels that fished in the tuna fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	98:	12	98˙	12	75˙	7	79˙	9	88˙	5	75:	8
Medium vessel (> 60 ft, <= 80 ft)	251:	3	***	***	***	***	168˙	3	***	***	***	***
Large vessel (> 80 ft)		0		0		0		0		0		0

Table 6.14: Steaming between West Coast and Alaska fishery fuel use. Average fuel use (gallons per day) of vessels that steamed between West Coast and Alaska by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)		0		0	***	***	***	***	***	***	***	***
Medium vessel (> 60 ft, <= 80 ft)	488˙	3	483˙	3	321:	4	327:	5	376˙	4	482:	6
Large vessel (> 80 ft)	922:	25	912:	28	918:	25	985:	21	884˙	20	913˙	19

Average total fuel use

Table 6.15: Average total fuel use. Average total fuel use (gallons) per entity. (N = number of EDC vessels with non-zero, non-NA responses. An entity is defined as a unique combination of an owner or lessee and vessel, whereas a vessel refers to all activities related to that vessel, regardless of the number individuals who owned or leased the vessel).

Activity	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Other fuel use on West Coast	336 ⁝	7	280 ⁝	6	***	***	125 ⁝	4	***	***	86 ⁝	4
Total diesel	25,054 ⁝	125	28,071 ⁝	124	25,605 ⁝	132	26,965 ⁝	129	27,925 ⁝	124	27,905 ⁝	123

6.2 Speed while fishing or steaming

Participants provide the average speed of the vessel while participating in each fishery (Table 6.16). This value is only required for trawl fisheries, and therefore, no speed is provided for halibut, crab, or groundfish with fixed gear. These data are delineated by fishery and vessel length class, as summarized in Tables 6.17 through 6.23. Speed data are not available for all fisheries across all years due to changes in the survey data collection. Starting in 2014, participants report fuel use for Pacific halibut separately from California halibut.

Average speed by fishery

Table 6.16: Average speed. Average speed (knots) by fishery. See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Fishery	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Pacific whiting	3.1 ˙	39	3.1 ˙	41	3.2 ˙	33	3.1 ˙	30	3.4 ˙	32	3.1 ˙	30
Groundfish with trawl gear	2.6 ⁝	103	2.6 ⁝	96	2.8 ⁝	78	2.7 ⁝	72	2.9 ⁝	72	2.8 ⁝	68
California halibut	—	—	—	—	—	—	—	—	—	—	2.8 ˙	4
Salmon	***	***	2.5 ˙	4	2.5 ˙	5	2.8 ⁝	10	2.6 ˙	5	2.6 ˙	10
Shrimp	2.0 ˙	35	1.9 ˙	35	2.7 ⁝	41	2.7 ⁝	40	2.1 ˙	39	2.2 ⁝	42
Tuna	5.0 ˙	15	5.2 ˙	15	5.2 ˙	8	5.3 ˙	12	5.5 ˙	7	6.2 ˙	10
Steaming between West Coast and Alaska	9.0 ˙	28	9.0 ˙	30	8.9 ˙	31	9.0 ˙	28	9.0 ˙	26	9.1 ˙	25

Average speed by fishery and vessel length class

Table 6.17: Pacific whiting fishery fishing speed. Average speed (knots) of vessels that fished in the Pacific whiting fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft) (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)		0		0	***	***		0		0		0
Medium vessel (> 60 ft, <= 80 ft)	2.9	9	2.9	9	3.8	5	3.2	5	3.2	5	3.2	5
Large vessel (> 80 ft)	3.1	30	3.1	32	3.1	27	3.1	25	3.4	27	3.1	25

Table 6.18: Groundfish with trawl gear fishery fishing speed. Average speed (knots) of vessels that fished in the groundfish with trawl gear fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft) (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	2.8	35	3.0	29	2.6	20	2.1	19	2.2	18	2.2	17
Medium vessel (> 60 ft, <= 80 ft)	2.4	47	2.4	47	3.0	42	3.0	41	3.1	42	3.2	38
Large vessel (> 80 ft)	2.6	21	2.6	20	2.6	16	2.5	12	3.0	13	2.4	13

Table 6.19: California halibut fishery fishing speed. Average speed (knots) of vessels that fished in the California halibut fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft) (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	—	—	—	—	—	—	—	—	—	—	***	***
Medium vessel (> 60 ft, <= 80 ft)	—	—	—	—	—	—	—	—	—	—	***	***
Large vessel (> 80 ft)	—	—	—	—	—	—	—	—	—	—		0

Table 6.20: Salmon fishery fishing speed. Average speed (knots) of vessels that fished in the salmon fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft) (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	***	***	2.5	4	2.5	5	2.8	10	2.6	5	2.6	10
Medium vessel (> 60 ft, <= 80 ft)		0		0		0		0		0		0
Large vessel (> 80 ft)		0		0		0		0		0		0

Table 6.21: Shrimp fishery fishing speed. Average speed (knots) of vessels that fished in the shrimp fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft) (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	2.3	11	1.9	10	2.2	12	2.3	10	2.3	10	2.7	12
Medium vessel (> 60 ft, <= 80 ft)	1.8	20	1.9	20	3.1	24	3.2	22	2.0	22	2.1	22
Large vessel (> 80 ft)	1.9	4	2.0	5	1.9	5	1.9	8	2.0	7	2.0	8

Table 6.22: Tuna fishery fishing speed. Average speed (knots) of vessels that fished in the tuna fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft) (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	4.9	12	5.1	12	5.1	7	5.1	9	5.6	5	6.3	8
Medium vessel (> 60 ft, <= 80 ft)	5.7	3	5.7	3	***	***	5.8	3	***	***	***	***
Large vessel (> 80 ft)		0		0		0		0		0		0

Table 6.23: Steaming between West Coast and Alaska fishery fishing speed. Average speed (knots) of vessels that steamed between West Coast and Alaska by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft) (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)		0		0	***	***	***	***	***	***	***	***
Medium vessel (> 60 ft, <= 80 ft)	9.0	3	8.7	3	8.5	4	8.4	5	8.1	4	8.5	5
Large vessel (> 80 ft)	9.0	25	9.1	27	9.0	25	9.1	21	9.1	20	9.3	19

6.3 Crew size

Participants submit information about crew size for each fishery in which they participate (Table 6.24). These data provide information about the total number of jobs or positions on vessels; they do not reflect the total number of individuals who worked as crew members in any given year. A new question was added for the 2013 data collection that asks participants to provide the total number of individuals that worked on the vessel during the year (Table 6.38), also delineated by vessel length (Table 6.39). The total number of individuals employed across all vessels serves as an upper bound of the total number of individuals employed in the fishery (Table 6.40).

Crew size data are not available for all fisheries across all years due to changes in fishery participation and the survey data collection. Starting in 2014, participants were asked to provide average fuel use for both fixed gear with a trawl permit and fixed gear with a fixed gear permit rather than reporting them as combined. Similarly, starting in 2014, participants report fuel use for Pacific halibut separately from California halibut. Crew size is delineated by fishery and vessel length class in Tables 6.25 through 6.37.

Average crew size by fishery

Table 6.24: Average crew size. Average crew size (excluding captain) by fishery. See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Activity	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Pacific whiting	2.5	40	2.6	42	2.7	33	2.8	30	2.9	31	2.8	30
Groundfish with trawl gear	2.0	103	2.0	96	2.1	79	2.1	73	2.1	75	2.1	69
Groundfish with fixed gear	1.9	8	2.0	8	2.6	26	2.8	24	2.7	20	—	—
Groundfish fixed gear with a trawl permit	—	—	—	—	—	—	—	—	—	—	2.5	19
Groundfish fixed gear with a fixed gear permit	—	—	—	—	—	—	—	—	—	—	3.6	8
Crab	2.8	54	2.9	56	2.9	66	3.0	63	2.9	65	2.9	65
Halibut	1.8	7	1.6	6	1.9	7	2.1	6	2.5	4	—	—
Pacific halibut	—	—	—	—	—	—	—	—	—	—	***	***
California halibut	—	—	—	—	—	—	—	—	—	—	1.2	4
Salmon	***	***	1.7	3	1.7	3	1.4	7	1.7	3	1.0	8
Shrimp	2.0	36	2.0	36	2.0	42	2.1	41	2.1	40	2.2	42
Tuna	1.5	15	1.6	14	1.5	7	1.6	11	1.9	7	1.3	9
Steaming between West Coast and Alaska	2.9	28	3.0	31	3.0	30	2.9	28	3.0	26	2.9	27

Average crew size by fishery and vessel length class

Table 6.25: Pacific whiting fishery crew size. Average crew size (not including captain) on vessels that fished in the Pacific whiting fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)		0		0	***	***		0		0		0
Medium vessel (> 60 ft, <= 80 ft)	2.2˙	10	2.2˙	10	2.2˙	6	2.6˙	5	2.6˙	5	2.6˙	5
Large vessel (> 80 ft)	2.6˙	30	2.8˙	32	2.8˙	26	2.8˙	25	3.0˙	26	2.8˙	25

Table 6.26: Groundfish with trawl gear fishery crew size. Average crew size (not including captain) on vessels that fished in the groundfish with trawl gear fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	1.8˙	34	1.8˙	28	1.8˙	20	1.9˙	19	1.8˙	19	1.9˙	18
Medium vessel (> 60 ft, <= 80 ft)	2.1˙	48	2.1˙	48	2.1˙	43	2.1˙	42	2.2˙	44	2.2˙	38
Large vessel (> 80 ft)	2.3˙	21	2.3˙	20	2.4˙	16	2.3˙	12	2.3˙	13	2.4˙	13

Table 6.27: Groundfish with fixed gear fishery crew size. Average crew size (not including captain) on vessels that fished in the groundfish with fixed gear fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	1.3:	6	1.5:	6	2.1˙	18	2.1:	14	2.5:	13	—	—
Medium vessel (> 60 ft, <= 80 ft)	***	***	***	***	3.6˙	7	3.5˙	8	3.1˙	7	—	—
Large vessel (> 80 ft)	***	***	***	***	***	***	***	***		0	—	—

Table 6.28: Groundfish fixed gear with a trawl permit fishery crew size. Average crew size (not including captain) on vessels that fished in the groundfish fixed gear with a trawl permit fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	—	—	—	—	—	—	—	—	—	—	2.2 :	13
Medium vessel (> 60 ft, <= 80 ft)	—	—	—	—	—	—	—	—	—	—	3.2 :	6
Large vessel (> 80 ft)	—	—	—	—	—	—	—	—	—	—		0

Table 6.29: Groundfish fixed gear with a fixed gear permit fishery crew size. Average crew size (not including captain) on vessels that fished in the groundfish fixed gear with a fixed gear permit fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	—	—	—	—	—	—	—	—	—	—	2.7 :	3
Medium vessel (> 60 ft, <= 80 ft)	—	—	—	—	—	—	—	—	—	—	4.2 ˙	5
Large vessel (> 80 ft)	—	—	—	—	—	—	—	—	—	—		0

Table 6.30: Crab fishery crew size. Average crew size (not including captain) on vessels that fished in the crab fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	2.3 ˙	28	2.4 ˙	28	2.4 ˙	33	2.5 ˙	30	2.5 ˙	30	2.4 ˙	33
Medium vessel (> 60 ft, <= 80 ft)	3.4 ˙	20	3.4 ˙	22	3.3 ˙	26	3.3 ˙	26	3.2 ˙	26	3.4 ˙	25
Large vessel (> 80 ft)	3.6 ˙	6	3.3 ˙	6	3.5 ˙	7	3.5 ˙	7	3.6 ˙	9	3.4 ˙	7

Table 6.31: Halibut fishery crew size. Average crew size (not including captain) on vessels that fished in the halibut fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	1.6 :	4	1.5 :	3	1.6 :	4	***	***	***	***	—	—
Medium vessel (> 60 ft, <= 80 ft)	***	***	1.7 .	3	2.2 .	3	2.8 .	4	***	***	—	—
Large vessel (> 80 ft)	***	***		0		0		0		0	—	—

Table 6.32: Pacific halibut fishery crew size. Average crew size (not including captain) on vessels that fished in the Pacific halibut fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	—	—	—	—	—	—	—	—	—	—		0
Medium vessel (> 60 ft, <= 80 ft)	—	—	—	—	—	—	—	—	—	—	***	***
Large vessel (> 80 ft)	—	—	—	—	—	—	—	—	—	—		0

Table 6.33: California halibut fishery crew size. Average crew size (not including captain) on vessels that fished in the California halibut fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	—	—	—	—	—	—	—	—	—	—	***	***
Medium vessel (> 60 ft, <= 80 ft)	—	—	—	—	—	—	—	—	—	—	***	***
Large vessel (> 80 ft)	—	—	—	—	—	—	—	—	—	—		0

Table 6.34: Salmon fishery crew size. Average crew size (not including captain) on vessels that fished in the salmon fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	***	***	1.7˙	3	1.7˙	3	1.4˙	7	1.7˙	3	1.0˙	8
Medium vessel (> 60 ft, <= 80 ft)		0		0		0		0		0		0
Large vessel (> 80 ft)		0		0		0		0		0		0

Table 6.35: Shrimp fishery crew size. Average crew size (not including captain) on vessels that fished in the shrimp fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	1.8˙	11	1.7˙	10	1.9˙	13	2.1˙	11	2.0˙	11	2.1˙	12
Medium vessel (> 60 ft, <= 80 ft)	2.0˙	21	2.0˙	21	2.1˙	24	2.0˙	22	2.2˙	22	2.3˙	22
Large vessel (> 80 ft)	2.1˙	4	2.1˙	5	2.0˙	5	2.1˙	8	2.1˙	7	2.1˙	8

Table 6.36: Tuna fishery crew size. Average crew size (not including captain) on vessels that fished in the tuna fishery on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	1.5˙	11	1.6˙	11	1.4˙	6	1.8˙	8	1.8˙	5	1.3˙	7
Medium vessel (> 60 ft, <= 80 ft)	1.8˙	4	1.7˙	3	***	***	1.3˙	3	***	***	***	***
Large vessel (> 80 ft)		0		0		0		0		0		0

Table 6.37: Steaming between West Coast and Alaska fishery crew size. Average crew size (not including captain) on vessels that steamed between West Coast and Alaska by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft). See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)		0		0	***	***	***	***	***	***	***	***
Medium vessel (> 60 ft, <= 80 ft)	3.0˙	3	3.0˙	3	3.2˙	4	2.6˙	5	2.8˙	4	2.5˙	6
Large vessel (> 80 ft)	2.9˙	25	3.0˙	28	2.9˙	24	2.9˙	21	2.8˙	20	2.9˙	19

Average total number of individuals employed

Table 6.38: Average number of individuals employed. Average total number of individuals who worked as captain or crew on EDC vessels while fishing on the West Coast. (N = number of EDC vessels with non-zero, non-NA responses).

Activity	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Total number of individuals who worked as captain or crew	—	—	—	—	—	—	—	—	6.5:	124	6.5:	123

Average total number of individuals employed by vessel length class

Table 6.39: Average number of individuals employed. Average total number of individuals who worked as captain or crew on EDC vessels while fishing on the West Coast by length class of vessel (large vessel > 80 ft, 60 ft < medium vessels <= 80 ft, and small vessels <= 60 ft) (N = number of EDC vessels with non-zero, non-NA responses).

Vessel length category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Small vessel (< 60 ft)	—	—	—	—	—	—	—	—	5.1:	42	5.5:	43
Medium vessel (> 60 ft, <= 80 ft)	—	—	—	—	—	—	—	—	7.0:	50	6.7˙	49
Large vessel (> 80 ft)	—	—	—	—	—	—	—	—	7.4˙	32	7.4˙	31

Total number of crew positions and individuals

Table 6.40: Total number of crew positions and individuals employed. Total number of crew positions and individuals employed by EDC vessels in West Coast Fisheries. See above for explanation of changes to the data collection across years.(N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Total	N	Total	N	Total	N	Total	N	Total	N	Total	N
Positions	275	126	277	125	311	131	304	127	305	122	300	122
Individuals	—	—	—	—	—	—	—	—	797	122	796	122

7 At-Sea Deliveries and Shoreside Landings

Vessels in the catch share fishery participate in both shorebased and at-sea fisheries, with total landings summarized in Table 7.1 and Figure 43. The only fishery for which vessels deliver at-sea is the whiting fishery. There is also a shorebased whiting fleet. Information about the weight of landings or deliveries is not requested on the EDC forms because this information is obtained from other sources.

Landings and deliveries information are primarily obtained from state fish ticket data and the At-Sea Hake Observer Program database, respectively, accessed through PacFIN. The weight of landings and deliveries made while fishing in Alaska are obtained from the EDC forms. Species composition is available for West Coast fisheries, but not for Alaska fisheries. Alaska landings weights are provided here because they are used for cost disaggregation in Section 9.

Table 7.1: Total landings and deliveries. Total landings and deliveries in West Coast at-sea and shoreside fisheries and Alaska (round metric tons). (N = number of EDC vessels with non-zero, non-NA responses).

Location of delivery	2009		2010		2011		2012		2013		2014	
	Total	N	Total	N	Total	N	Total	N	Total	N	Total	N
Alaska	81,887	27	92,153	27	101,825	27	90,292	25	98,992	24	103,192	24
At-sea	24,297	19	35,935	21	50,330	18	38,643	16	52,887	18	55,831	17
Shoreside	72,129	120	95,053	123	125,540	125	99,481	124	135,878	119	131,551	118
Total landings	178,313	126	223,141	129	277,696	130	228,416	128	287,757	124	290,573	124

7.1 At-sea deliveries

The at-sea fisheries on the West Coast target Pacific whiting, with very little bycatch (Table 7.2).

Table 7.2: At-sea landings and deliveries. Total at-sea deliveries (metric tons) by species group (N = number of EDC vessels with non-zero, non-NA responses).

Species group	2009		2010		2011		2012		2013		2014	
	Total	N	Total	N	Total	N	Total	N	Total	N	Total	N
Arrowtooth flounder	1	19	3	20	7	18	2	16	3	18	2	19
Coastal pelagics	***	***	0	14	14	10	10	15	86	16	20	16
Crab	0	0	0	0	***	***	0	0	***	***	0	0
Dover sole	0	0	1	11	0	8	0	5	0	10	0	12
English sole	0	0	***	***	***	***	***	***	0	4	0	0
Lingcod	1	13	0	8	0	8	0	9	1	17	1	15
Pacific cod	0	0	0	0	***	***	0	3	0	0	0	0
Pacific halibut	0	13	1	13	0	5	0	7	0	12	0	8
Pacific herring	0	11	***	***	***	***	***	***	***	***	0	14
Pacific whiting	24,090	19	35,713	21	50,051	18	38,480	16	52,450	18	62,098	19
Rex sole	0	0	2	12	2	9	0	10	1	14	1	15
Rockfish	1	19	22	21	13	17	24	16	16	18	15	19
Sablefish	0	5	5	15	2	14	1	9	3	16	1	14
Salmon	1	18	2	20	4	18	7	16	6	18	7	18
Sanddab	0	0	0	0	0	0	0	0	***	***	0	0
Semi pelagic rockfish	191	19	96	21	81	18	50	16	208	18	88	19
Sharks, skates and rays	7	19	57	21	111	18	36	16	45	18	36	19
Shrimp	***	***	0	3	0	4	0	13	0	12	0	8
Squid	4	19	22	21	20	18	28	16	56	18	31	19
Thornyheads	0	0	0	9	1	9	1	10	6	15	2	16
Other flatfish	0	4	***	***	0	4	0	7	0	8	0	5
Other groundfish	0	0	0	0	0	5	0	5	0	6	0	10
Other shellfish	0	4	0	13	***	***	0	4	0	5	0	7
Other species	1	19	10	20	24	18	3	16	4	18	31	19
Total deliveries	24,297	19	35,935	21	50,330	18	38,643	16	52,887	18	62,334	19

7.2 Shoreside landings

Pacific whiting makes up the largest part of the total catch by weight in the shoreside groundfish trawl fisheries (Table 7.3). The next most common species by weight are dover sole, sablefish, petrale sole, and thornyheads. Between 2009 and 2014, there were 9 species grouped into the other groundfish species category. By weight, the most common were sand sole, starry flounder, and rock sole. Crab and shrimp comprise the largest component of total catch by weight in the shoreside non-groundfish trawl fisheries (Table 7.4).

Table 7.3: Shoreside landings and deliveries: groundfish. Total shoreside landings (metric tons) by species group of groundfish (N = number of EDC vessels with non-zero, non-NA responses).

Species group	2009		2010		2011		2012		2013		2014	
	Total	N	Total	N	Total	N	Total	N	Total	N	Total	N
Arrowtooth flounder	3,752	100	3,253	97	2,280	84	2,280	88	1,988	86	1,221	82
Dover sole	11,172	115	10,248	111	7,665	92	7,213	91	7,969	85	6,214	82
English sole	264	110	158	103	110	70	117	72	198	70	194	62
Lingcod	110	121	74	107	253	88	355	90	336	92	247	93
Pacific cod	105	49	143	46	263	44	396	28	154	27	166	31
Pacific whiting	39,808	36	59,090	44	88,080	62	65,633	66	95,731	62	103,107	58
Petrale sole	1,666	114	773	107	789	75	1,065	76	2,092	77	2,240	76
Rex sole	521	117	445	110	364	82	366	83	468	81	379	76
Rockfish	432	128	481	120	291	106	476	105	447	103	377	99
Sablefish	3,219	128	2,904	118	3,071	112	2,690	108	2,197	99	2,243	99
Sanddab	294	58	152	42	141	30	148	32	201	36	253	48
Semi pelagic rockfish	540	122	686	116	1,210	94	1,468	90	1,549	95	2,148	87
Sharks, skates and rays	1,359	119	1,361	114	1,313	92	1,305	90	1,098	94	1,278	87
Thornyheads	2,397	116	2,452	115	1,618	95	1,605	101	1,879	95	1,512	91
Other flatfish	128	68	109	59	101	60	98	51	37	53	63	43
Other groundfish	88	36	116	57	92	47	85	51	58	45	37	42
Total landings	65,854	130	82,445	125	107,640	118	85,300	111	116,400	110	121,680	107

7.3 Shoreside landings by species group

Table 7.4: Shoreside landings and deliveries: non-groundfish. Total shoreside landings (metric tons) by species group of non-groundfish (N = number of EDC vessels with non-zero, non-NA responses).

Species group	2009		2010		2011		2012		2013		2014	
	Total	N	Total	N	Total	N	Total	N	Total	N	Total	N
California halibut	48	7	56	10	48	6	38	4	40	6	38	5
Coastal pelagics	1	32	4	26	24	30	46	30	126	26	314	26
Crab	2,519	77	2,307	75	2,692	90	2,045	76	3,990	79	1,920	74
Echinoderms	0	8	***	***	***	***	0	8	0	6	***	***
Pacific halibut	2	15	***	***	6	25	5	25	4	30	2	27
Pacific herring	0	6	48	12	1	11	0	5	0	8	14	18
Salmon	1	30	17	35	33	31	37	37	34	34	46	38
Sharks, skates and rays	1	26	32	44	7	53	21	42	3	22	6	27
Shrimp	5,207	33	7,515	40	12,921	43	12,211	40	13,163	38	16,611	40
Squid	32	62	118	51	18	45	25	41	19	36	31	39
Sturgeon	0	3	***	***	0	0	0	0	0	0	0	0
Tuna	122	19	171	17	61	10	101	17	18	7	64	8
Other shellfish	3	33	2	32	1	32	2	25	2	24	2	20
Other species	68	59	31	59	12	64	154	63	81	62	56	58
Total landings	8,006	124	10,306	124	15,852	118	14,687	119	17,479	116	19,106	115

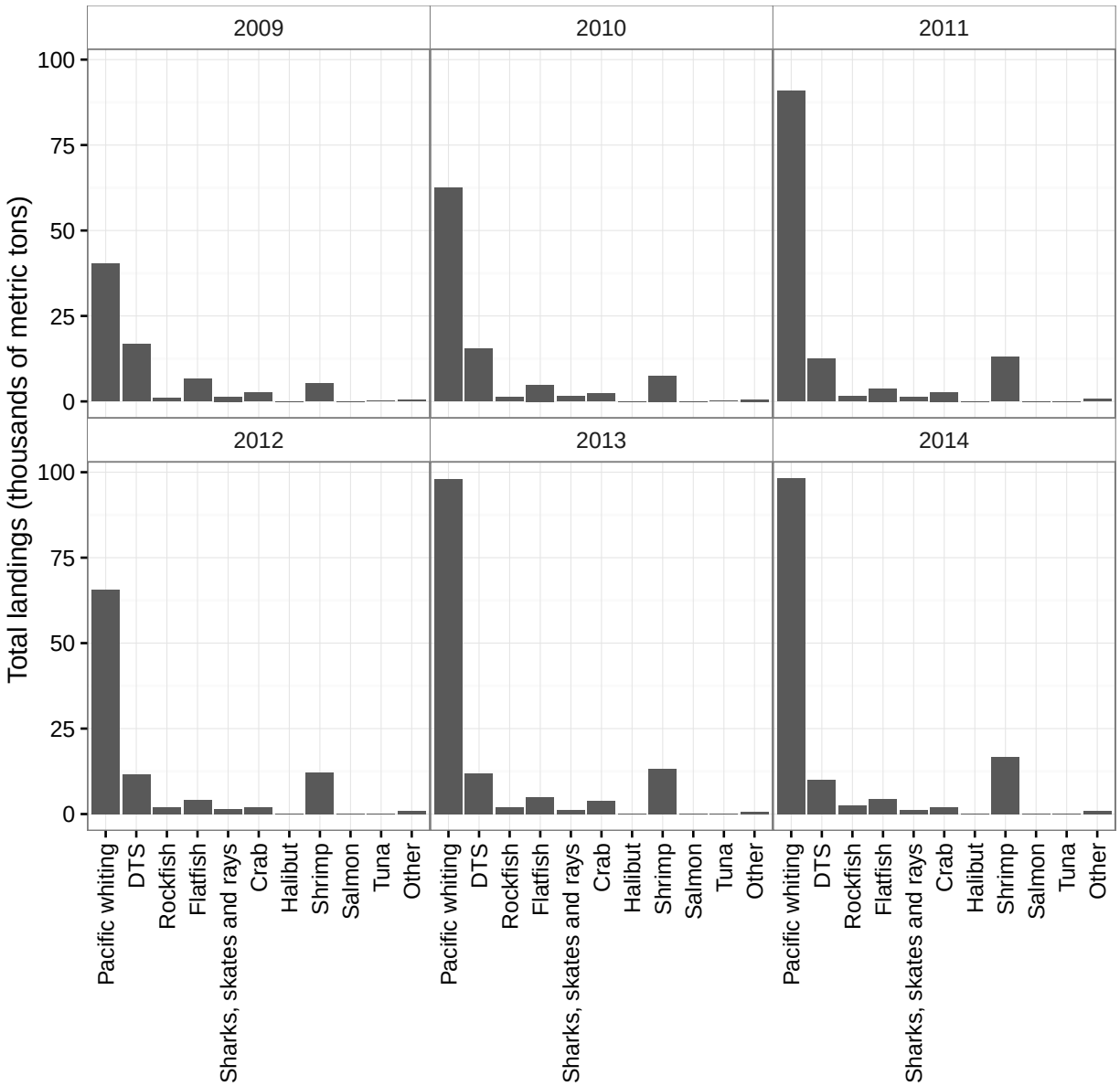

Figure 43: Total landings by species group (thousands of metric tons).

8 Revenues

There are several sources of earnings for vessels on the West Coast. The primary source is revenue from sale of fish. Ex-vessel revenue is available for all shoreside deliveries (Figure 44), but is not available for at-sea deliveries. EDC data are used for all at-sea delivery revenues. Additionally, the EDC Program has information about revenue from sale or lease of permits, quota shares, and quota pounds, and from other activities like chartering and research. The full suite of earnings sources can be found in Table 8.1.

Table 8.1: Average annual revenue. Annual average revenue (thousands of $) for all categories by survey year (N = number of EDC vessels with non-zero, non-NA responses).

Activity	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Alaska shoreside landings and at-sea deliveries	$1,227	31	$1,321	31	$1,841	34	$1,836	28	$1,681	26	$1,680	27
At-sea deliveries	$345	20	$465	20	$576	18	$568	16	$522	19	$665	18
Lease of other permits	***	***	***	***	$142	6	***	***	***	***	—	—
Lease of quota pounds		0	***	***	$67	48	$73	41	$18	10	—	—
Lease of quota shares		0		0	$60	11	$83	12	$97	5	$52	18
Lease of West Coast limited entry trawl permits	***	***	***	***	$82	7	$39	6	$52	4	***	***
Leasing the vessel	—	—	—	—	—	—	***	***	***	***	—	—
Sale of other permits	$136	3	$85	3	$181	5	***	***		0	—	—
Sale of quota pounds	***	***	***	***	$54	12	$20	16	$40	37	—	—
Sale of quota shares	***	***		0	***	***	***	***	***	***	$726	4
Sale of West Coast limited entry trawl permits		0	$403	3	***	***	***	***		0	***	***
Salmon disaster payments	$26	16	$2	3	***	***		0		0		0
Shoreside deliveries	$384	138	$405	132	$659	131	$628	125	$804	119	$768	120
	—	—	—	—	—	—	—	—	***	***	$37	48
Other	$89	16	$117	9	$135	11	$103	8	$118	20	$91	15
Chartering or leasing the vessel	$117	11	$157	11	$180	13	—	—	—	—	$165	5
Chartering, research, or tendering in Alaska	—	—	—	—	—	—	$303	3	$199	7	$238	5
Chartering, research, or tendering on the West Coast	—	—	—	—	—	—	$163	10	$85	11	$138	10
Average total revenue	$697	146	$779	140	$1,201	142	$1,127	133	$1,282	126	$1,248	129

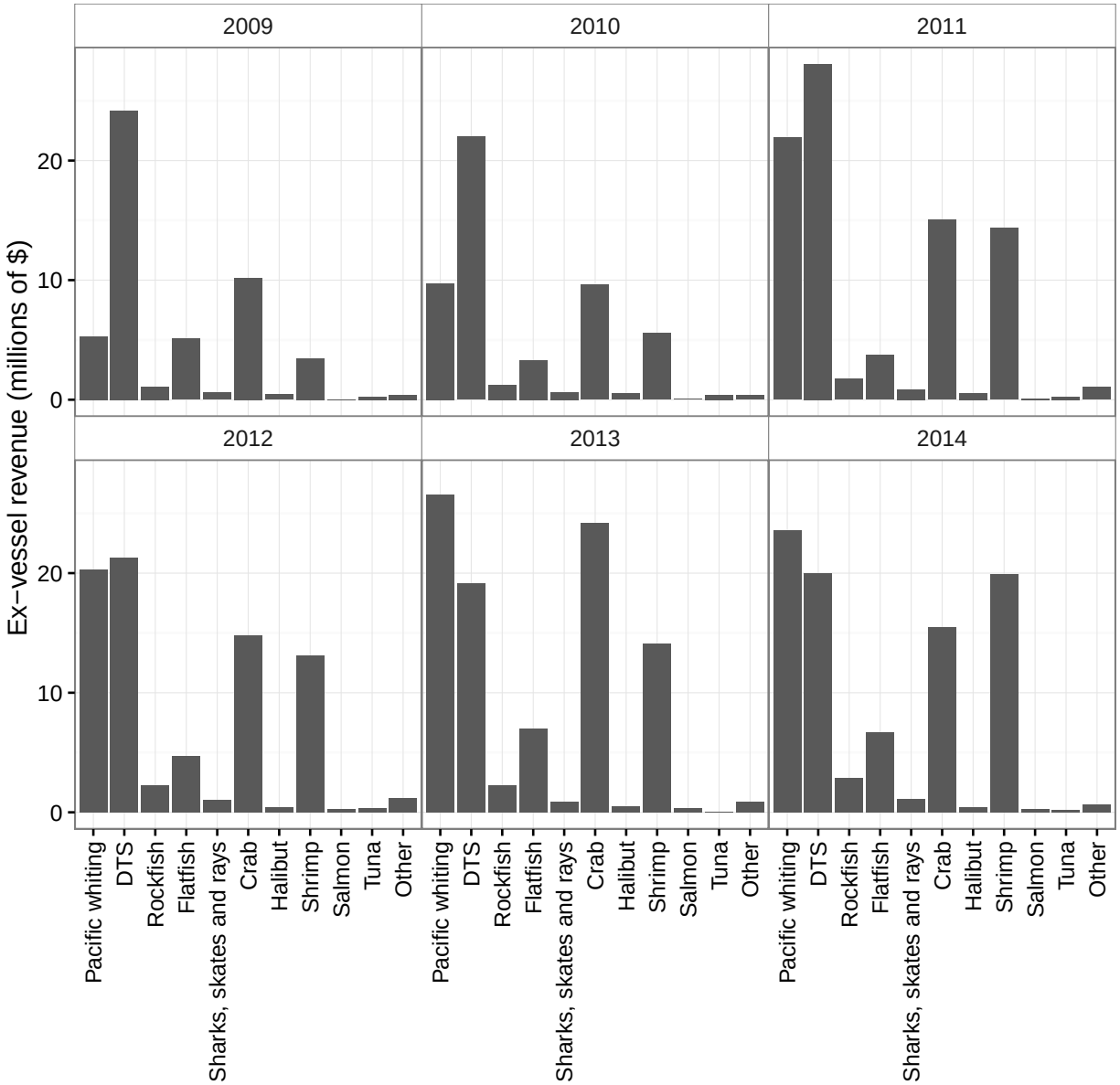

Figure 44: Total ex-vessel shoreside revenue (millions of dollars).

9 Costs

This section summarizes data reported by participants on variable costs, fixed costs, total costs, and how those costs are disaggregated to estimate the proportion of each cost that was incurred for West Coast fisheries.

For the purposes of the EDC Program, costs are divided into two categories, variable costs and fixed costs. Variable costs vary with the level of fishery participation, and generally include items such as fuel and crew payments. Fixed costs do not vary as directly with the level of fishery participation, and generally include items such as vessel capital improvements. The designation of a cost as variable or fixed depends on many factors, including the relevant time horizon and use of the data. While some costs would clearly be considered fixed (e.g., the purchase of a new engine), others are more difficult to categorize as fixed versus variable. For the purposes of this report, we consider the costs listed in Tables 9.2, 9.3 and 9.5 to be fixed, and the costs listed in Table 9.1 to be variable. The EDC Program will continue to explore, and possibly improve, the categorization of these costs.

The EDC form collects both "capitalized expenditures" and "expenses" for vessel improvements and maintenance, fishing gear, and processing equipment. This is because certain costs may be treated for tax accounting purposes as either capitalized or expensed. Capitalized expenditures are depreciated over a number of years. Expensed items are fully deducted as a cost for the year in which they occur. In an effort to reduce the reporting burden and errors, these data are collected as they are reported in the business' accounting system.

In order to conduct economic analyses of specific fisheries it is important to have costs broken out by fishery. For some costs, it may be feasible for participants to break out or track costs at the fishery level. However, for most costs this is impossible, or would require additional burden to do so. During the EDC form development process, a key issue was the determination of which costs could reasonably be broken out by fishery or groups of fisheries. Each cost item was assigned to one or more fishery-group category based on how they are commonly tracked by industry members: 1) used on West Coast fisheries only (West Coast Only); 2) used on the West Coast and in other fisheries (Shared); and 3) used in all fisheries (All) regardless of whether they are used on the West Coast.

Some costs that are required for economic analysis are not asked for on the EDC forms because they are available through other sources, or can be calculated through fish ticket or permit office data. These include fish landings taxes and fees.

Finally, there are a variety of costs that are associated with running a catcher vessel that are not requested on the form because it is difficult to determine the share of the cost associated with the vessel. These costs include items that can be used for activities other than fishing, or are too difficult to allocate to a particular vessel in a multi-vessel company. These expenses include office space, pickup trucks, storage of equipment, professional fees, and marketing. In general, the EDC forms attempt to capture costs that are directly related to vessel maintenance and fishing operations, and not costs that are related to activities or equipment off the vessel. For these reasons, the EDC aggregated measures of costs (variable costs, fixed costs, and total costs) underestimate the true costs of operating a business.

9.1 Variable Costs

Variable costs were collected for all West Coast activities, including chartering or research. Unlike fixed costs, variable costs are directly related to fishing operations, and therefore, it was possible for vessels to separate expenses for activities on the West Coast from other activities. In all three years, the crew compensation made up

the largest portion of total variable expenses, followed by captain compensation, and fuel and lubrication (Table 9.1). Together, these expenses made up 79.7% of all variable costs on the West Coast in 2014.

Table 9.1: Variable expenses. Average variable expenses on the West Coast for EDC vessels (thousands of $) (N = number of EDC vessels with non-zero, non-NA responses).

Expense category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Bait	$9.3	65	$10.1	61	$14.9	75	$17.2	70	$18.3	69	$19.2	64
Buyback fees	$15.5	140	$18.2	138	$29.9	113	$27.6	109	$32.2	108	$32.5	104
Captain	$64.9	131	$69.5	126	$107.1	125	$108.3	117	$131.5	116	$129.5	119
Communication	$2.2	119	$2.6	113	$2.5	131	$2.4	126	$3.1	124	$3.1	124
Cost recovery fees	—	—	—	—	—	—	—	—	—	—	$17.9	105
Crew	$82.6	139	$91.9	135	$145.3	135	$148.5	129	$172.7	122	$176.8	126
Fishing association dues	$3.9	82	$3.9	78	$6.0	95	$7.6	87	$8.0	87	$9.3	101
Food	$5.3	123	$5.6	117	$6.5	107	$7.1	92	$7.3	94	$6.9	96
Freight	$0.6	28	$0.7	25	$2.2	25	$1.1	24	$1.6	24	$1.3	25
Fuel and lubrication	$49.6	141	$69.2	134	$81.2	135	$92.4	130	$92.0	124	$93.5	126
Ice	$6.4	106	$5.7	102	$5.9	103	$6.4	97	$7.4	92	$10.0	91
License fees	—	—	$0.3	13	$3.3	130	$3.8	126	$3.5	122	$2.6	122
Observers	$5.3	22	$5.7	26	$3.0	102	$5.7	103	$10.4	106	$15.1	102
Offloading	$4.2	54	$4.7	52	$5.4	58	$7.9	39	$5.2	35	$4.8	40
Supplies	$8.5	108	$9.8	100	$6.0	101	$6.4	99	$6.9	94	$8.7	90
Travel	$1.8	43	$1.9	39	$1.7	29	$2.2	25	$2.1	29	$3.1	39
Trucking of fish	—	—	$1.4	12	$3.5	10	$4.5	7	$3.9	4	$4.6	10
Washington fish taxes	$3.0	21	$3.0	26	$5.8	30	$6.1	24	$7.4	22	$6.5	30
Average total variable costs	$234.6	141	$265.9	139	$384.1	137	$404.4	130	$464.2	124	$492.7	126

9.2 Fixed costs

Costs on vessel and on-board equipment, fishing gear, and processing equipment

Survey participants are asked to provide capitalized expenditures (Table 9.2) and expenses (Table 9.3) for the survey year associated with the following categories:

- New and used vessel and on-board equipment: Includes all electronics, safety equipment, and machinery not used to harvest fish, but not fishing gear or processing equipment
- Fishing gear: Includes nets, doors, traps, pots, cables, and fishing machinery used for the West Coast fisheries
- Processing Equipment: Includes any equipment used to process or head and gut fish on-board the vessel

Beginning in 2014, the EDC survey was changed and participants are no longer asked to break out expenses and capitalized expenditures.

Table 9.2: Capitalized expenditures on vessel and on-board equipment, fishing gear, and processing equipment. Average capitalized expenditures (thousands of $) on vessel and on-board equipment, fishing gear, and processing equipment. See above for explanation of changes to the data collection across years, and the resulting new summary in Table 11.1 (N = number of EDC vessels with non-zero, non-NA responses).

Expenditure category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Vessel and on-board equipment in all fisheries	$70.4	89	$64.8	82	$70.7	105	$145.1	93	$113.2	79	—	—
Fishing gear shared between the West Coast and other fisheries	$42.1	28	$46.4	28	$90.0	30	$81.8	17	$56.0	12	—	—
Fishing gear used only on the West Coast	$22.8	80	$23.3	73	$40.2	95	$26.8	82	$30.6	34	—	—
Processing equipment shared between the West Coast and other fisheries		0		0	***	***		0	***	***	—	—
Processing equipment used only on the West Coast	$20.9	13	$24.3	9	$2.9	8	***	***	***	***	—	—
Average total capitalized expenditures	$86.0	111	$86.1	99	$110.9	126	$162.7	105	$113.3	94	—	—

Table 9.3: Expenses on vessel and on-board equipment, fishing gear, and processing equipment. Average expenses (thousands of $) on vessel and on-board equipment, fishing gear, and processing equipment. See above for explanation of changes to the data collection across years, and the resulting new summary in Table 9.4 (N = number of EDC vessels with non-zero, non-NA responses).

Expense category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Vessel and on-board equipment in all fisheries	$60.6	131	$59.8	123	$94.5	118	$98.0	117	$80.4	102	—	—
Fishing gear shared between the West Coast and other fisheries	$37.4	40	$49.1	39	$93.6	36	$141.7	29	$134.1	17	—	—
Fishing gear used only on the West Coast	$18.8	115	$20.9	107	$25.1	110	$35.8	107	$34.5	65	—	—
Processing equipment shared between the West Coast and other fisheries	—	—	$1.0	8	$14.0	6	$10.3	4	$2.0	5	—	—
Average total costs on vessel and on-board equipment, fishing gear, and processing equipment	$81.1	143	$84.6	136	$126.8	137	$145.1	134	$111.6	114	—	—

Table 9.4: Capitalized expenditures and expenses on vessel and on-board equipment, fishing gear, and processing equipment. Average expenses (thousands of $) on vessel and on-board equipment, fishing gear, and processing equipment. In 2014, participants reported capitalized expenditures and expenses together, the costs collected in the original format can be found in Tables 9.2 and 9.3 (N = number of EDC vessels with non-zero, non-NA responses).

Expense category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Vessel and on-board equipment in all fisheries	—	—	—	—	—	—	—	—	—	—	$167.0	103
Fishing gear shared between the West Coast and other fisheries	—	—	—	—	—	—	—	—	—	—	$86.3	18
Fishing gear used only on the West Coast	—	—	—	—	—	—	—	—	—	—	$36.3	69
Processing equipment shared between the West Coast and other fisheries	—	—	—	—	—	—	—	—	—	—		0
Processing equipment used only on the West Coast	—	—	—	—	—	—	—	—	—	—	***	***
Average total costs on vessel and on-board equipment, fishing gear, and processing equipment	—	—	—	—	—	—	—	—	—	—	$181.9	117

Other fixed costs

Table 9.5: Other fixed expenses. Average fixed expenses (thousands of $) on all other categories (N = number of EDC vessels with non-zero, non-NA responses).

Expense category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Insurance premium payments	$32.3	131	$35.3	127	$37.8	132	$37.9	127	$42.3	122	$44.4	125
Lease of vessel	$90.7	11	$116.2	9	$89.9	10	$65.9	8	$95.2	9	$94.9	9
Moorage	$5.3	141	$6.0	132	$6.1	140	$6.7	133	$7.2	127	$7.4	130
Average total other fixed costs	$41.5	144	$45.8	138	$47.5	142	$46.6	134	$54.1	128	$56.2	131

Table 9.6: Depreciation. Average depreciation (thousands of $) taken during the survey year (N = number of EDC vessels with non-zero, non-NA responses).

Expense	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Depreciation	$76.2	99	$69.2	91	$106.7	99	$102.9	90	$91.7	87	$83.2	93

9.3 Quota and permit costs on the West Coast

EDC Participants are asked to provide information about the costs related to purchasing or leasing permits, quota shares, and quota pounds. Participants explained that they do not distinguish between a lease or a purchase of quota pounds because they are both considered permanent transfers of the quota pounds, and the survey data collection was changed to combine these two survey response fields starting in 2014.

Table 9.7: Quota and permit costs. Average costs (thousands of $) related to lease and purchase of quota shares, quota pounds, and limited entry groundfish permits. See above for explanation of changes to the data collection across years. (N = number of EDC vessels with non-zero, non-NA responses).

Expense	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Purchase of trawl limited entry permit	$29	8	***	***	***	***	***	***	***	***	***	***
Lease of trawl limited entry permit	$16	9	$14	8	$25	11	$18	10	$10	7	$28	9
Purchase of fixed gear limited entry permit		0		0	***	***		0	***	***	***	***
Lease of fixed gear limited entry permit		0		0	***	***	$101	5	$58	3	***	***
Purchase of quota shares		0		0	***	***	***	***	***	***	***	***
Lease of quota shares		0	***	***	$22	3	$42	5	$97	9	$69	20
Purchase of quota pounds		0	***	***	$17	16	$19	15	$27	9	—	—
Lease of quota pounds	***	***	$35	6	$87	64	$67	60	$50	60	—	—
Purchase or lease of quota pounds	—	—	—	—	—	—	—	—	—	—	$64	51
Average total quota and permit costs	$21	18	$30	24	$101	80	$65	80	$108	78	$71	77

Table 9.8: Revenues and costs on permits and quota. Average revenues and costs (thousands of $) from sale, lease, and purchase of limited entry groundfish permits, quota pounds, and quota shares on the West Coast (N = number of EDC vessels with non-zero, non-NA responses).

Type	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Limited entry permit revenues	***	***	309.3 :	4	114.2 ⁝	11	299.1 ⁝	9	39.3 ⁝	6	141.6 ⁝	10
Limited entry permit costs	20.3 ⁝	23	59.6 ⁝	24	149.6 ⁝	16	40.3 ⁝	17	59.4 ⁝	10	51.2 ⁝	16
Quota pounds revenues	***	***	334.0 :	3	64.3 ⁝	63	59.4 ⁝	58	36.1 ⁝	55	30.2 ⁝	45
Quota pounds costs	19.1 ·	3	48.1 :	4	76.9 ⁝	76	60.9 ⁝	71	53.0 ⁝	67	65.3 ⁝	50
Quota shares revenues	***	***	—	—	64.2 :	13	77.0 ⁝	13	672.0 ⁝	8	174.4 ⁝	22
Quota shares costs	—	—	***	***	***	***	10.8 :	5	433.6 ⁝	11	68.8 ⁝	20

9.4 Landings taxes and buyback fees

Costs associated with landings taxes were not requested on the catcher vessel forms because it can be calculated based on gross shoreside landings information. These costs were calculated according to the table provided on page 14 of Leonard and Watson (2011).[11] Unlike in the description in Leonard and Watson (2011), moorage was requested on the EDC forms.

[11] Leonard, J., and P. Watson. 2011. Description of the input-output model for Pacific Coast fisheries. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-111, 64 p.

Table 9.9: Landings taxes. Average taxes (thousands of $) paid by vessels (N = number of EDC vessels with non-zero, non-NA responses).

Expense	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Buyback fees	$16.0	130	$19.2	129	$29.9	112	$27.6	109	$32.2	108	$31.8	102
Cost recovery fees		0		0		0		0		0	$18.4	106
Washington fish taxes	$3.0	20	$3.1	25	$5.6	28	$6.1	24	$7.4	22	$6.3	30
Average total taxes and fees	$16.5	130	$19.8	129	$30.0	117	$28.2	112	$32.5	112	$47.2	114

10 Crew Share System

The most common system for remunerating crew is the crew share system where crew are paid a percentage of the total revenue earned by the vessel after certain expenses are deducted. Most vessels in the groundfish trawl fishery use this system (Table 10.1).

Table 10.1: Frequency of crew share systems. Number of entities who used a crew share system, did not use a crew share system, or did not respond to the question. An entity is defined as a unique combination of an owner or lessee and vessel, whereas a vessel refers to all activities related to that vessel, regardless of the number individuals who owned or leased the vessel.

Crew share system	2010	2011	2012	2013	2014
YES	2	111	108	102	95
NO	0	2	0	6	6
No response	0	0	0	2	2

Participants were asked to provide the percentage of fishing trips in which the vessel owner served as captain in West Coast groundfish fisheries (Table 10.2). Average crew share distributions when the vessels were owner operated and when they were operated by a hired captain are summarized in Tables 10.3 and 10.4, respectively. In 2012, 11 participants provided the response "NA". These responses are most commonly a result of ownership of a vessel by an LLC that is not identified with a specific person who could operate the vessel as a captain.

Table 10.2: Percentage of trips with owner operated vessels. Average percentage of trips when the vessel owner served as captain.

Share	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Percentage of trips vessel owner served as captain	86.8	48	81.1	49	88.4	49	80.7	42	86.4	37	83.7	38

Table 10.3: Average crew shares when vessels were owner operated. Average share (percent of ex-vessel revenue after deducting certain costs) paid to captain, crew, vessel, and other on trips when the vessel owner served as captain (N = number of EDC vessels with non-zero, non-NA responses).

Share	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Captain share	22.9 :	38	20.4 :	34	22.9 :	38	19.3 :	33	22.5 :	29	19.5 :	27
Crew share	24.1 ˙	50	22.8 ˙	50	25.3 ˙	49	24.9 ˙	45	25.5 ˙	37	24.2 ˙	37
Vessel share	59.7 ˙	49	62.7 ˙	49	59.6 ˙	48	60.5 ˙	45	61.4 ˙	38	61.7 ˙	36
Other share	—	—		0	12.7 :	3	24.0 :	5	14.0 :	5	24.3 :	3

Table 10.4: Average crew shares when using a hired captain. Average share (percent of ex-vessel revenue after deducting certain costs) paid to captain, crew, vessel, and other on trips when the vessel owner did not serve as captain (N = number of EDC vessels with non-zero, non-NA responses).

Share	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Captain share	17.8 ˙	91	17.8 ˙	92	18.0 ˙	89	18.0 ˙	87	17.9 ˙	84	18.6 ˙	82
Crew share	21.8 ˙	95	21.2 ˙	95	22.2 ˙	91	22.4 ˙	89	22.4 ˙	86	23.9 ˙	84
Vessel share	60.7 ˙	93	61.0 ˙	93	59.2 ˙	90	59.3 ˙	89	59.2 ˙	85	58.2 ˙	86
Other share	—	—	***	***	7.5 ˙	4	8.0 ˙	8	14.2 ⁝	9	5.6 :	7

Catcher Vessel Data Analysis

Although the data summaries above provide important information about the vessels that participate in the catch share program, in order to analyze the effect of the program on vessels, additional analysis is necessary. The following sections combine the EDC data with additional data sources such as fish ticket data and observer data to calculate fishery level costs and subsequently, net revenue. The final section presents these measures as rates in order to better understand how changes observed are related to changes in TAC and fishing effort.

11 Cost disaggregation

It is important to conduct economic analyses of specific fisheries. Many vessels and processors that participate in the catch share program also participate in other fisheries, including fishing in Alaska. In order to perform analysis at the West Coast, catch share program, or fishery level, costs must be broken out by fishery. However, EDC participants incur several types of costs that are aggregated across all fisheries. These are called "joint" costs in the economics and accounting literature and include fixed costs (e.g., new vessel equipment), or variable costs (e.g., fuel). The former are joined by the nature of the costs themselves, while the latter are often joined due to observational limitations. It is difficult to assign fixed costs to a particular fishery because the level of the cost does not vary with business activity (at least over the short run). Many variable costs can theoretically be tracked by fishery, but it would be difficult or costly to do so. For example, although an EDC participant could theoretically set up a system to track expenditures on fuel by fishery, doing so would be costly.

Vessels report variable costs for West Coast activities only, but report fixed costs for all activities (including Alaska). The following sections report the fixed costs that have been allocated using cost disaggregation to West Coast activities (removing the portion of costs that have been allocated to Alaska activities).

11.1 West Coast portion of fixed costs

Table 11.1: West Coast capitalized expenditures and expenses on vessel and on-board equipment, fishing gear, and processing equipment. Average capitalized expenditures and expenses (thousands of $) on vessel and on-board equipment, fishing gear, and processing equipment on the West Coast (N = number of EDC vessels with non-zero, non-NA responses). See above for explanation of changes to the data collection across years and the resulting new summary in Tables 9.2 and 9.3.

Cost category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Vessel and on-board equipment	$104.5	136	$97.4	130	$144.0	129	$195.1	128	$151.8	116	$167.2	104
Fishing gear	$48.3	138	$55.0	130	$92.4	137	$89.4	129	$69.2	91	$54.3	78
Processing equipment	$20.9	13	$25.3	9	$11.7	10	$10.4	4	$2.1	5	***	***
Average total costs on vessel and on-board equipment, fishing gear, and processing equipment	$146.9	144	$147.3	136	$222.3	141	$270.6	135	$194.4	123	$184.9	117

Table 11.2: West Coast other fixed expenses. Average other fixed expenses (thousands of $) on the West Coast (N = number of EDC vessels with non-zero, non-NA responses).

Expense category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Insurance premium payments	$22.4	128	$24.6	125	$26.7	126	$28.4	122	$30.4	118	$32.1	120
Lease of vessel	$21.1	11	$48.9	9	$37.8	10	$30.9	7	$24.1	8	$38.1	8
Moorage	$3.6	138	$4.0	130	$4.4	135	$5.0	128	$5.2	123	$5.5	125
Average total other fixed costs	$25.5	141	$29.7	136	$32.0	136	$33.5	129	$35.6	124	$38.5	126

Table 11.3: Summary of costs on the West Coast. Average capitalized expenditures and expenses (thousands of $) on vessel and on-board equipment, fishing gear, and processing equipment, other fixed costs, and all variable costs on the West Coast (N = number of EDC vessels with non-zero, non-NA responses).

Cost category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Total costs on vessel and on-board equipment, fishing gear, and processing equipment	$97.3	141	$105.0	134	$162.7	135	$199.3	130	$145.1	119	$141.6	114
Total variable costs	$218.8	141	$252.7	136	$360.8	136	$380.1	130	$434.9	124	$449.4	126
Total other fixed costs	$25.5	141	$29.7	136	$32.0	136	$33.5	129	$35.6	124	$38.5	126
Taxes	$16.0	140	$18.8	138	$29.8	119	$28.2	112	$32.5	112	$48.7	112
Average total costs	$357.5	141	$396.2	139	$576.1	137	$636.9	130	$639.0	124	$659.3	126

12 Net Revenue and Economic Profit

Net returns from operating a vessel are presented in this section. The level of net returns not only indicates whether a vessel is a viable ongoing business, but also the size of net benefit that is created from society's perspective. Two different measures of net returns are examined. They differ in the types of costs that are taken into account, and therefore, their interpretation and use. The first is a monetary, financial measure that attempts to track a vessel's net cash flow, which we call *net revenue*. It is calculated as revenue minus monetary costs. The only costs that are accounted for are those that are actually paid or associated with a financial transaction. The second measure attempts to track the broader economic performance of a vessel and includes all costs regardless of whether there is a cash or financial transaction. Costs are measured by their true resource costs, which may or may not be equal to monetary outlays. This measure is called *economic profit*.[1] The distinction between the two measures is probably most easily understood through a few examples relevant to fisheries.

Labor costs for the net revenue measure are the total payments to the crew and captain. If work is performed that is not paid for, then it is not included as a cost. This commonly occurs in commercial fishing when the owner of a vessel is also the captain, but does not does not draw a captain's wage. In this case, the net revenue is higher than it would be if the captain drew a wage or hired a captain. In the end, the vessel owner-captain is not necessarily any worse off since s/he is the residual claimant to the net revenue. However, the net revenue would be higher than a comparable vessel that hired a captain.[2] Economic profit, on the other hand, accounts for the cost associated with an owner's time that is used as a captain. This is called an opportunity cost in the economics literature,[3] and is typically approximated by the wage of a comparably productive captain.[4]

[1] Whitmarsh D., James C., Pickering H., Neiland A. 2000. The profitability of marine commercial fisheries: a review of economic information needs with particular reference to the UK. Marine Policy, Vol. 24(3), pp. 257-263.

[2] The same would also be true when a vessel owner does not receive a wage for work performed to repair or maintain a vessel or gear.

[3] See Boardman, Anthony, David Greenberg, and Aidan Vining. Cost-Benefit Analysis: Concepts and Practice, Prentice Hall, NJ. 2000. pp. 31-32.

[4] A more accurate measure would be the owner-captain's most valued wage off the vessel.

A second example of the difference between net revenue and economic profit is the treatment of vessel capital costs. Again, net revenue only includes costs that are actually paid, which includes items such as vessel repair, maintenance, and upgrades. Economic profit would also include the opportunity cost of owning the vessel, a capital asset. By owning a vessel, the owner foregoes other investment opportunities that would provide a rate of return. This is called the opportunity cost of capital, and is typically approximated by the market rate of return associated with businesses of comparable risk, multiplied by the market value of the vessel.

Both net revenue and economic profit are useful measures for fishery management. Net revenue attempts to measure the annual financial well-being of vessel operations. It can be used to determine if there is a monetary gain or loss, or how changes in fishery management may affect the level of monetary gain or loss. Economic profit is a better indicator of the long-term viability of fishery operations since it includes all costs, and values the costs at their opportunity cost. It can be used to estimate whether there are incentives or disincentives to invest in capital, or enter and leave the fishery. It is also a better measure of the net benefit of the fishery to the nation.

Calculations of net revenue are included in this report. The cost categories used in net revenue, based on those reported in the EDC forms, are discussed below. Currently, calculations of economic profit are beyond the scope of the report. Economic profit relies on opportunity costs, which may be different from some of the costs reported on the EDC forms, so additional methods and analyses are required. The EDC Program economists will continue to work on developing measures of economic profit so that it may be included in future reports.

Net revenue is calculated two ways: using only variable costs, and using variable costs plus fixed costs (total costs).[5] The first calculation is called *variable cost net revenue*, while the second is called *total cost net revenue* (Figure 45). Variable cost net revenue is useful to examine changes in fishery operations that are not so great as to affect fixed costs. For example, the cost of fishing an additional day, or catching an additional metric ton of fish, is better represented by only considering variable costs. Total cost net revenue is usually a better summary measure of financial gain or loss for an entire year, season, or fishery.

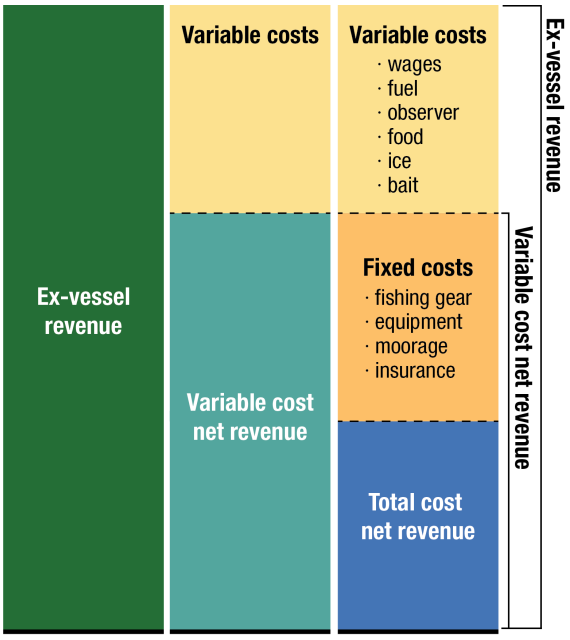

Figure 45: Composition and derivation of variable and total cost net revenue used in the EDC Program analysis of revenue, costs, and economic performance.

There are several caveats associated with the net revenue calculations in this report. As noted in Section 9, there are a variety of costs that are associated with running a vessel that are not requested by the EDC form because it is difficult to determine the share of the cost associated with the vessel. These costs include items that can be used for activities other than fishing, or are too difficult to allocate to a particular vessel in a multi-vessel company. These expenses include office space, vehicles and transport trucks, storage

[5] See Section 9 for a more complete discussion of variable and fixed costs used in this report.

of equipment, professional fees, and marketing. In general, the EDC forms attempt to capture only costs that are directly related to vessel maintenance and fishing operations, and not costs that are related to activities or equipment off the vessel. Therefore, the EDC calculated net revenue is an overestimate of the true net revenue. The difference is likely much greater for total cost net revenue than variable cost net revenue since most of the excluded costs are fixed costs.

Another caveat is that the EDC forms do not collect information about income taxes or financing costs. This has several implications. The first is that these costs are not included in the net revenue calculations. Therefore, net revenue is greater than it would be otherwise. The second is that in lieu of financing information (principal and interest payments), EDC total cost net revenue uses the total costs associated with vessel and gear purchases, repair, maintenance and improvements. For example, if a new engine is purchased, the total cost of the engine is used, even though the actual cash outlay, if it were financed, would only be the principal and interest payments made that year. It is likely that many larger capital costs, and perhaps some operating costs, are financed. This would mean that the actual cash outlays in a particular year for those items would be less than what is used in the EDC calculation of net revenue. This may balance out over time, because previously financed or purchased capital and equipment are also not included, except for the year in which they are purchased.[6] Total cost net revenue is expected to be representative of actual total cost net revenue only when averaged over many years and across vessels because relatively large capital costs occur periodically.

12.1 Net revenue for all West Coast fishing activities

Average net revenue is calculated for all activities on the West Coast for EDC vessels, and it is reported by fishery for EDC vessels. West Coast revenue includes all revenue from at-sea deliveries and shoreside landings. The variable and fixed costs do not include costs related to acquiring limited entry permits, quota shares, or quota pounds.

$$\text{Variable cost net revenue} = \text{West Coast revenue} - \text{West Coast variable costs}$$

$$\text{Total cost net revenue} = \text{West Coast revenue} - (\text{West Coast variable costs} + \text{West Coast fixed costs})$$

The following pages contain tables and figures depicting revenue, costs, variable cost net revenue, and total cost net revenue for all of the fisheries combined (Table 12.2) and different fishery combinations (Tables 12.3 through 12.16 and Figures 47 through 60), including All West Coast fisheries (only catch share vessels), All West Coast fisheries (all EDC vessels[7]), Whiting (shoreside and at-sea), All catch share vessels[8] (whiting and non-whiting groundfish), and Non-whiting catch share groundfish (see Table 12.1 for a list of where to find each of these individual tables).

[6] At best it is just a partial balancing out because the interest payments are not accounted for in the EDC data.

[7] An EDC vessel is defined as any vessel that had a limited entry trawl permit on the vessel in the designated year.

[8] A catch share vessel is any vessel that participated in the West Coast Groundfish Trawl Catch Share Program at any time in the designated year.

Table 12.1: Table of contents for net revenue tables. An EDC vessel is defined as any vessel that had a limited entry trawl permit on the vessel in the designated year. A catch share vessel is any vessel that participated in the West Coast Groundfish Trawl Catch Share Program at any time in the designated year.

Fishery	Table
All West Coast fisheries (all EDC vessels)	Table 12.2
All West Coast fisheries (only catch share vessels)	Table 12.3
All catch shares (whiting and non-whiting groundfish)	Table 12.4
Whiting (shoreside and at-sea)	Table 12.5
Non-whiting groundfish (catch shares only)	Table 12.6
At-sea Pacific whiting	Table 12.7
Shoreside Pacific whiting	Table 12.8
Non-whiting midwater trawl	Table 12.9
DTS trawl with trawl endorsement	Table 12.10
Non-whiting, non-DTS trawl with trawl endorsement	Table 12.11
Groundfish fixed gear with trawl endorsement	Table 12.12
Groundfish fixed gear with fixed gear endorsement	Table 12.13
Crab	Table 12.14
Shrimp	Table 12.15
Other fisheries	Table 12.16
All catch shares with quota earnings and quota	Table 12.17
Whiting vessels with quota earnings and quota	Table 12.18
Groundfish vessels with quota earnings and quota	Table 12.19

Table 12.2: West Coast average variable cost and total cost net revenue for EDC vessels. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) on the West Coast, for all vessels that were required to submit an EDC form. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$396.9	141	$459.3	136	$721.0	137	$682.1	130	$854.9	124	$822.7	126
(Variable costs)	($234.6)	141	($271.6)	136	($384.1)	137	($404.4)	130	($464.2)	124	($492.7)	126
Variable cost net revenue	**$162.3**	**141**	**$187.7**	**136**	**$336.9**	**137**	**$277.7**	**130**	**$390.7**	**124**	**$329.9**	**126**
(Fixed costs)	($122.9)	141	($133.2)	136	($192.1)	137	($232.5)	130	($174.8)	124	($166.6)	126
Total cost net revenue	**$39.4**	**141**	**$54.6**	**136**	**$144.8**	**137**	**$45.2**	**130**	**$215.9**	**124**	**$163.3**	**126**

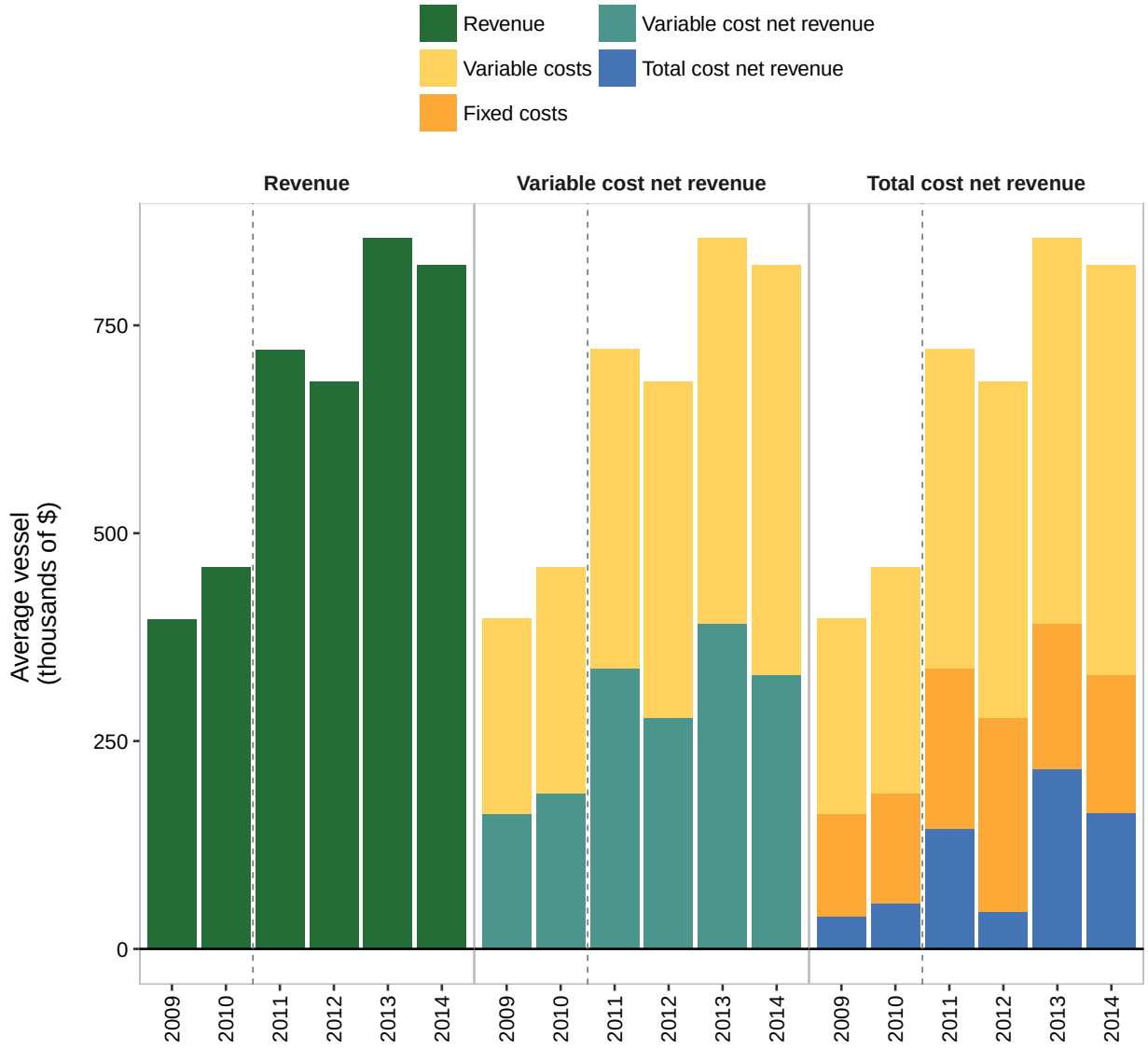

Figure 46: West Coast average variable cost and total cost net revenue for EDC vessels. Average total revenue, variable costs, variable cost net revenue (VCNR), fixed costs, and total cost net revenue (TCNR) on the West Coast, for EDC vessels. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. Dashed line represents the beginning of the catch share program.

Table 12.3: West Coast average variable cost and total cost net revenue for catch share vessels. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) on the West Coast for only vessels that participated in the catch share program. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$411.4	132	$477.1	127	$805.4	113	$748.8	110	$894.5	109	$894.6	105
(Variable costs)	($241.4)	132	($279.2)	127	($430.7)	113	($444.2)	110	($490.7)	109	($539.2)	105
Variable cost net revenue	**$169.9**	**132**	**$197.9**	**127**	**$374.6**	**113**	**$304.6**	**110**	**$403.8**	**109**	**$355.4**	**105**
(Fixed costs)	($128.8)	132	($139.4)	127	($213.1)	113	($241.5)	110	($184.4)	109	($171.4)	105
Total cost net revenue	**$41.1**	**132**	**$58.5**	**127**	**$161.6**	**113**	**$63.1**	**110**	**$219.4**	**109**	**$184.0**	**105**

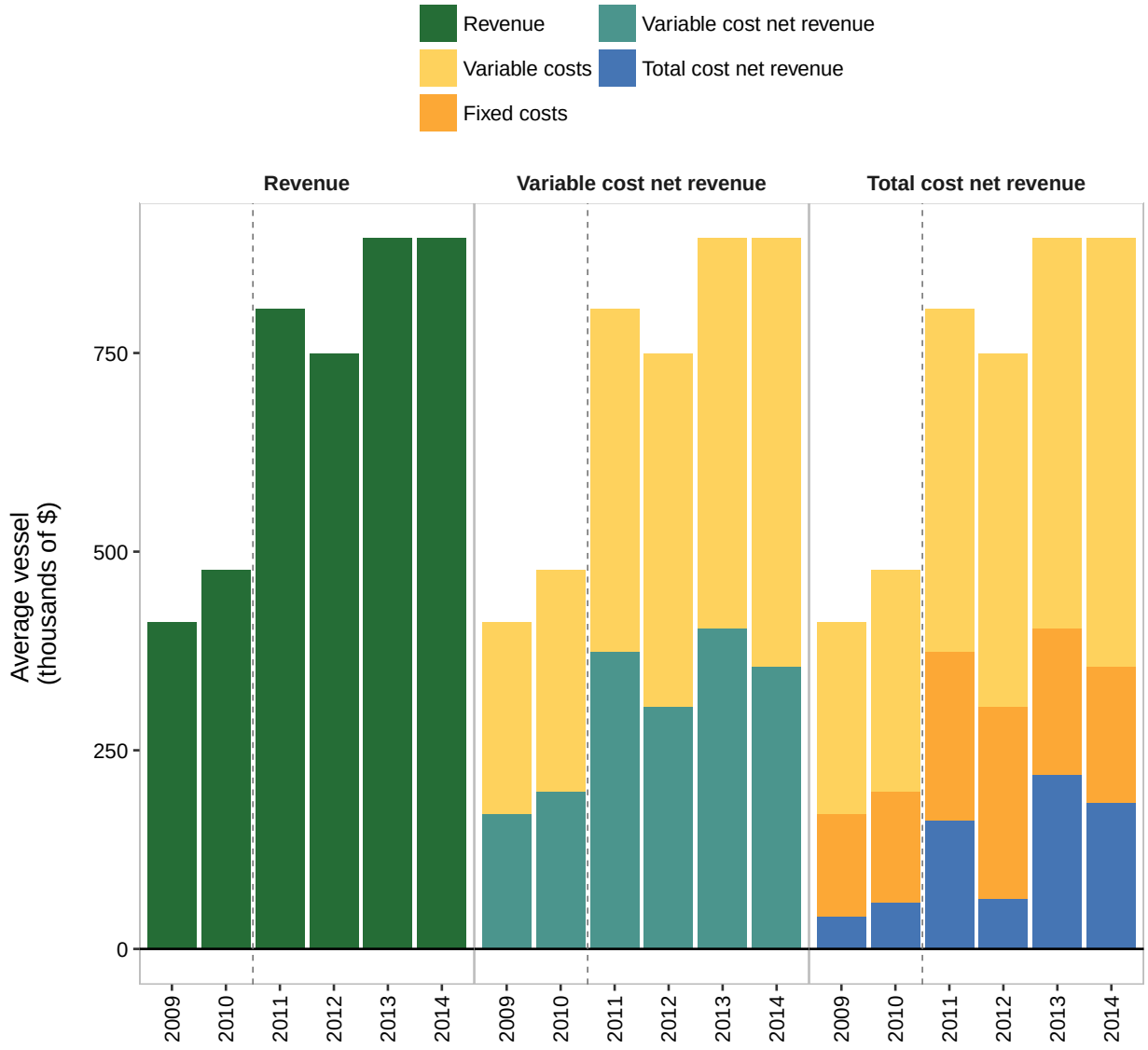

Figure 47: West Coast average variable cost and total cost net revenue for catch share vessels. Average total revenue, variable costs, variable cost net revenue (VCNR), fixed costs, and total cost net revenue (TCNR) on the West Coast, only for vessels that participated in the catch share program. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. Dashed line represents the beginning of the catch share program.

Table 12.4: All catch shares (whiting and non-whiting groundfish) average variable cost and total cost net revenue for catch share vessels. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) for all participation in the catch share (whiting and non-whiting groundfish) fisheries. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$305.8	132	$357.3	127	$585.8	113	$529.7	110	$600.8	109	$621.2	105
(Variable costs)	($184.4)	132	($211.9)	127	($316.8)	113	($322.3)	110	($346.4)	109	($393.3)	105
Variable cost net revenue	**$121.4**	**132**	**$145.4**	**127**	**$269.1**	**113**	**$207.3**	**110**	**$254.4**	**109**	**$228.0**	**105**
(Fixed costs)	($103.3)	132	($110.9)	127	($160.9)	113	($179.2)	110	($126.0)	109	($129.6)	105
Total cost net revenue	**$18.1**	**132**	**$34.5**	**127**	**$108.1**	**113**	**$28.1**	**110**	**$128.4**	**109**	**$98.4**	**105**

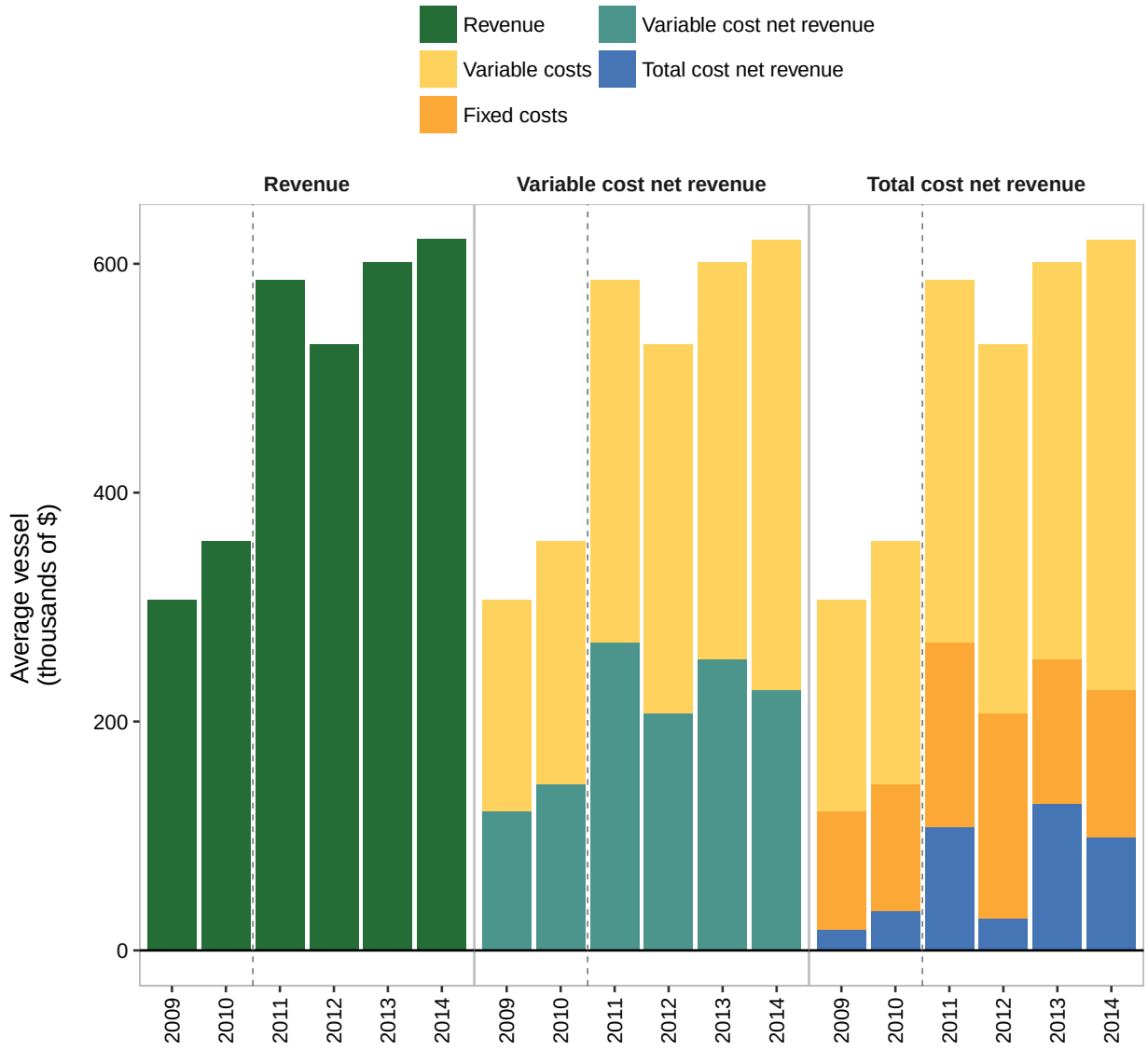

Figure 48: All catch shares (whiting and non-whiting groundfish) average variable cost and total cost net revenue for catch share vessels. Average total revenue, variable costs, variable cost net revenue (VCNR), fixed costs, and total cost net revenue (TCNR) for all participation in the catch share (whiting and non-whiting groundfish) fisheries. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. Dashed line represents the beginning of the catch share program.

Table 12.5: Whiting (shoreside and at-sea) average variable cost and total cost net revenue for catch share vessels. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) for the whiting fisheries (shoreside and at-sea). Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$252.8	41	$481.3	41	$1,091.2	31	$1,067.6	28	$1,275.6	29	$1,222.7	30
(Variable costs)	($136.8)	41	($254.2)	41	($542.2)	31	($642.4)	28	($693.7)	29	($761.3)	30
Variable cost net revenue	**$116.0**	**41**	**$227.2**	**41**	**$549.0**	**31**	**$425.2**	**28**	**$581.8**	**29**	**$461.4**	**30**
(Fixed costs)	($121.4)	41	($176.5)	41	($341.5)	31	($408.7)	28	($303.3)	29	($296.2)	30
Total cost net revenue	**-$5.4**	**41**	**$50.7**	**41**	**$207.5**	**31**	**$16.5**	**28**	**$278.5**	**29**	**$165.2**	**30**

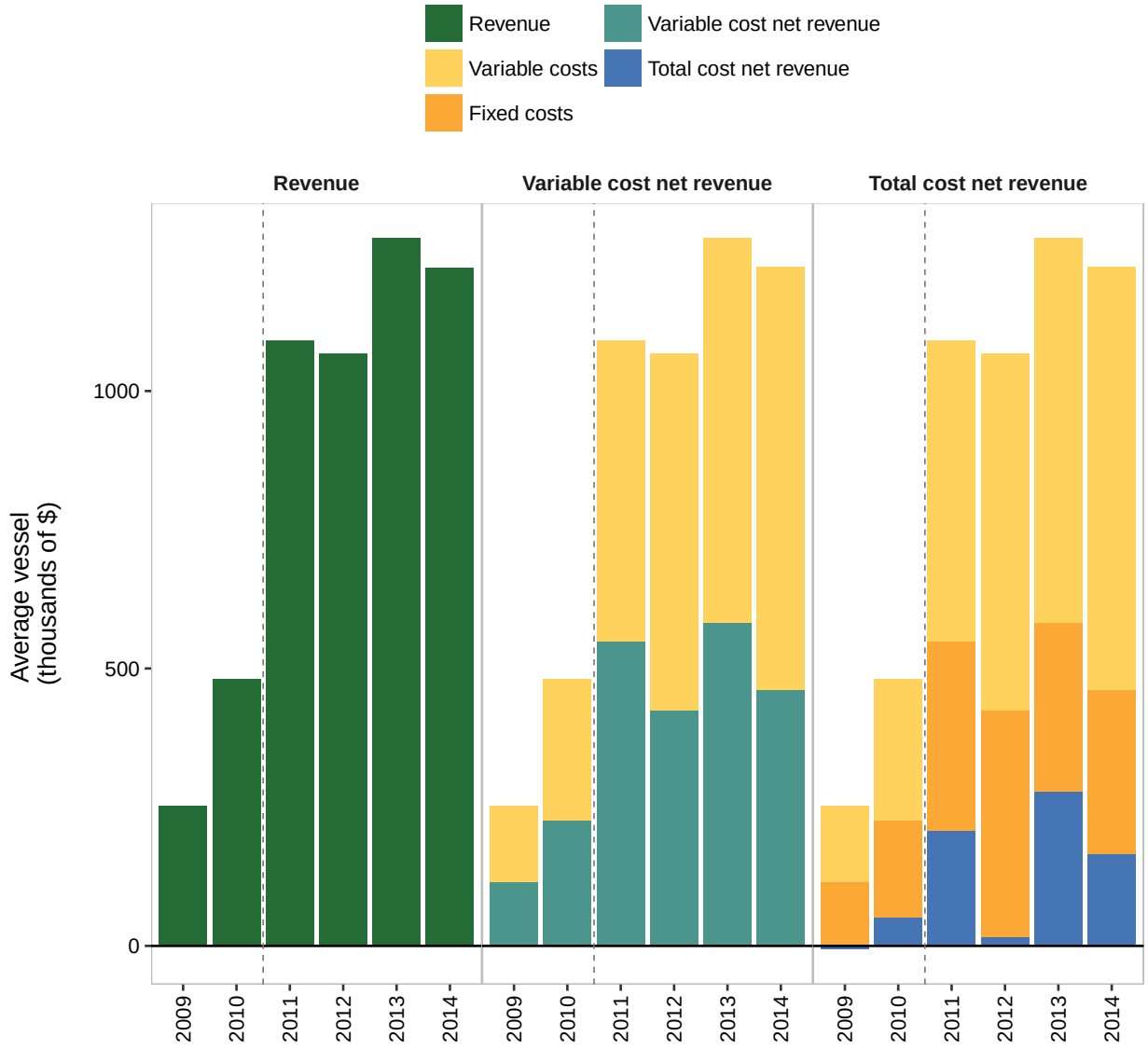

Figure 49: Whiting (shoreside and at-sea) average variable cost and total cost net revenue for catch share vessels. Average total revenue, variable costs, variable cost net revenue (VCNR), fixed costs, and total cost net revenue (TCNR) in whiting fisheries (at-sea and shoreside). Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. Dashed line represents the beginning of the catch share program.

Table 12.6: Groundfish (non-whiting) average variable cost and total cost net revenue for catch share vessels. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) for the groundfish fisheries (non-whiting). Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$252.1	119	$233.2	110	$337.2	96	$318.8	89	$323.8	88	$344.0	83
(Variable costs)	($157.4)	119	($149.9)	110	($197.8)	96	($196.2)	89	($200.4)	88	($222.3)	83
Variable cost net revenue	**$94.7**	**119**	**$83.3**	**110**	**$139.4**	**96**	**$122.5**	**89**	**$123.4**	**88**	**$121.6**	**83**
(Fixed costs)	($72.8)	119	($62.3)	110	($79.2)	96	($92.9)	89	($56.0)	88	($56.9)	83
Total cost net revenue	**$21.9**	**119**	**$21.0**	**110**	**$60.3**	**96**	**$29.6**	**89**	**$67.3**	**88**	**$64.7**	**83**

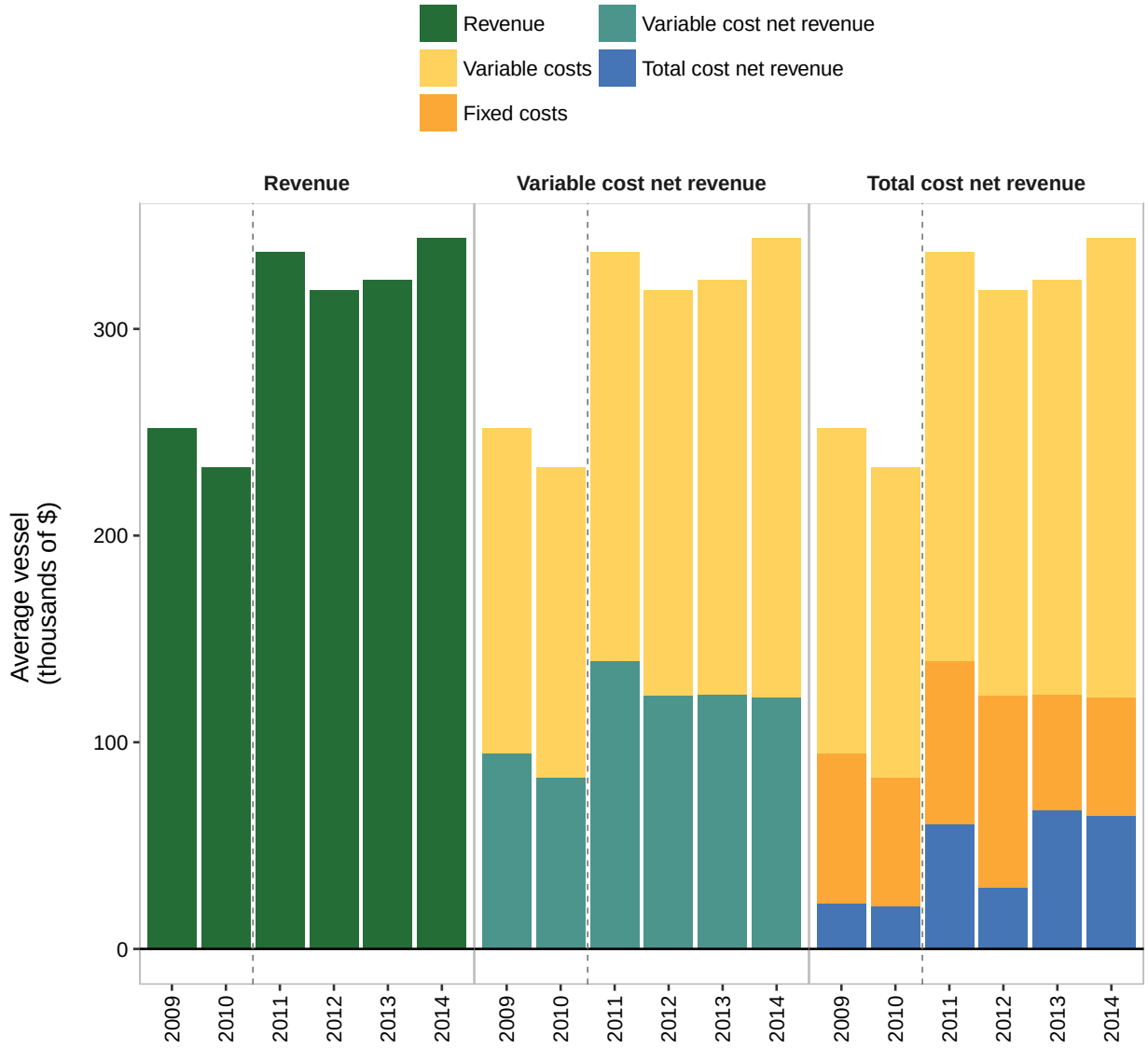

Figure 50: Groundfish (non-whiting) average variable cost and total cost net revenue. Average total revenue, variable costs, variable cost net revenue (VCNR), fixed costs, and total cost net revenue (TCNR) in groundfish fisheries (non-whiting). Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. Dashed line represents the beginning of the catch share program.

12.2 Net revenue for West Coast catch share fisheries, crab, shrimp, and other fisheries

Table 12.7: At-sea Pacific whiting fishery average variable cost and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) in the At-sea Pacific whiting fishery. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$259.8	19	$462.8	21	$618.8	18	$560.2	16	$564.2	18	$650.9	19
(Variable costs)	($121.1)	19	($205.6)	21	($306.6)	18	($371.8)	16	($328.3)	18	($413.8)	19
Variable cost net revenue	**$138.7**	**19**	**$257.3**	**21**	**$312.3**	**18**	**$188.4**	**16**	**$235.9**	**18**	**$237.1**	**19**
(Fixed costs)	($92.7)	19	($89.2)	21	($190.3)	18	($204.8)	16	($114.1)	18	($153.0)	19
Total cost net revenue	**$46.0**	**19**	**$168.1**	**21**	**$122.0**	**18**	**-$16.4**	**16**	**$121.9**	**18**	**$84.0**	**19**

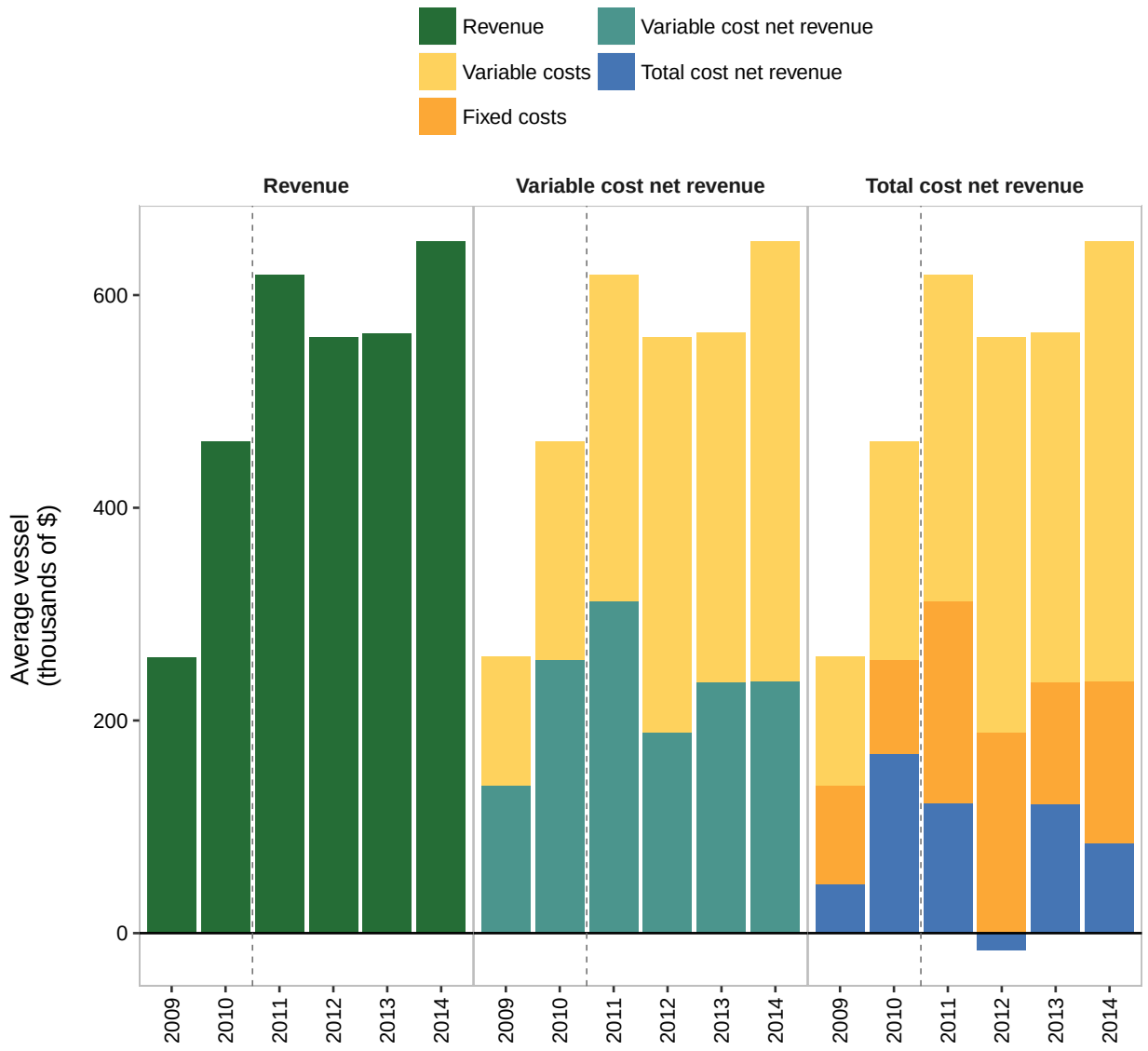

Figure 51: At-sea Pacific whiting fishery variable cost net revenue and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue in the at-sea Pacific whiting fishery. Dashed line represents the beginning of the catch share program.

Table 12.8: Shoreside Pacific whiting fishery average variable cost and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) in the Shoreside Pacific whiting fishery. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$159.6	34	$286.1	35	$872.6	26	$872.0	24	$1,118.1	24	$972.5	25
(Variable costs)	($97.3)	34	($174.4)	35	($434.3)	26	($501.6)	24	($592.0)	24	($599.1)	25
Variable cost net revenue	**$62.4**	**34**	**$111.7**	**35**	**$438.4**	**26**	**$370.4**	**24**	**$526.1**	**24**	**$373.5**	**25**
(Fixed costs)	($94.6)	34	($153.2)	35	($275.4)	26	($340.2)	24	($281.0)	24	($239.1)	25
Total cost net revenue	**-$32.2**	**34**	**-$41.5**	**35**	**$162.9**	**26**	**$30.2**	**24**	**$245.1**	**24**	**$134.4**	**25**

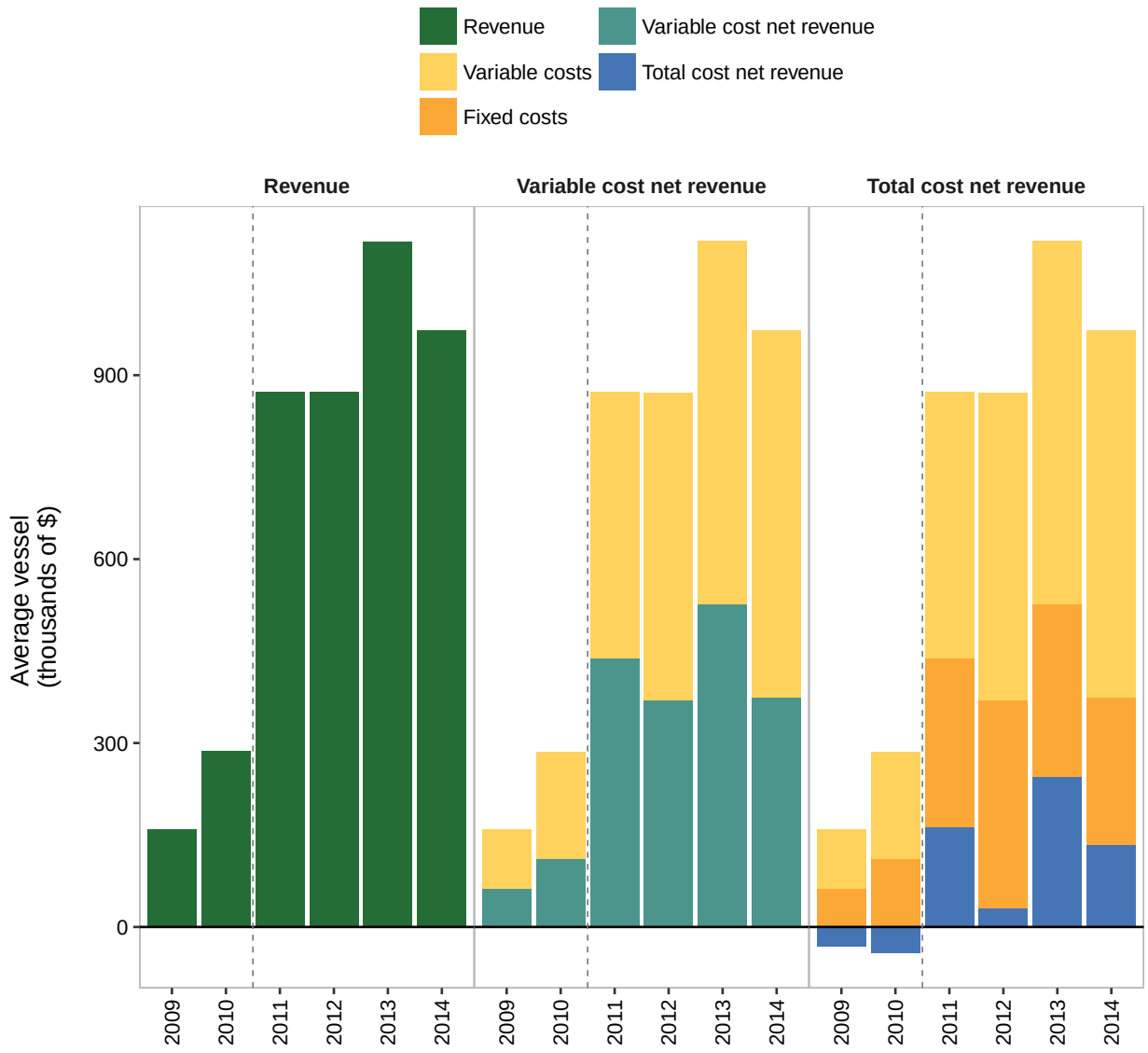

Figure 52: Shoreside Pacific whiting fishery variable cost net revenue and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue in the shoreside Pacific whiting fishery. Dashed line represents the beginning of the catch share program.

Table 12.9: Non-whiting midwater trawl fishery average variable cost and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) in the Non-whiting midwater trawl fishery. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	—	—	—	—	—	—	$49.9	6	$111.8	6	$92.4	10
(Variable costs)	—	—	—	—	—	—	($32.2)	6	($61.7)	6	($58.9)	10
Variable cost net revenue	**—**	**—**	**—**	**—**	**—**	**—**	**$17.8**	**6**	**$50.1**	**6**	**$33.5**	**10**
(Fixed costs)	—	—	—	—	—	—	($8.4)	6	($15.1)	6	($40.5)	10
Total cost net revenue	**—**	**—**	**—**	**—**	**—**	**—**	**$9.3**	**6**	**$35.0**	**6**	**-$7.0**	**10**

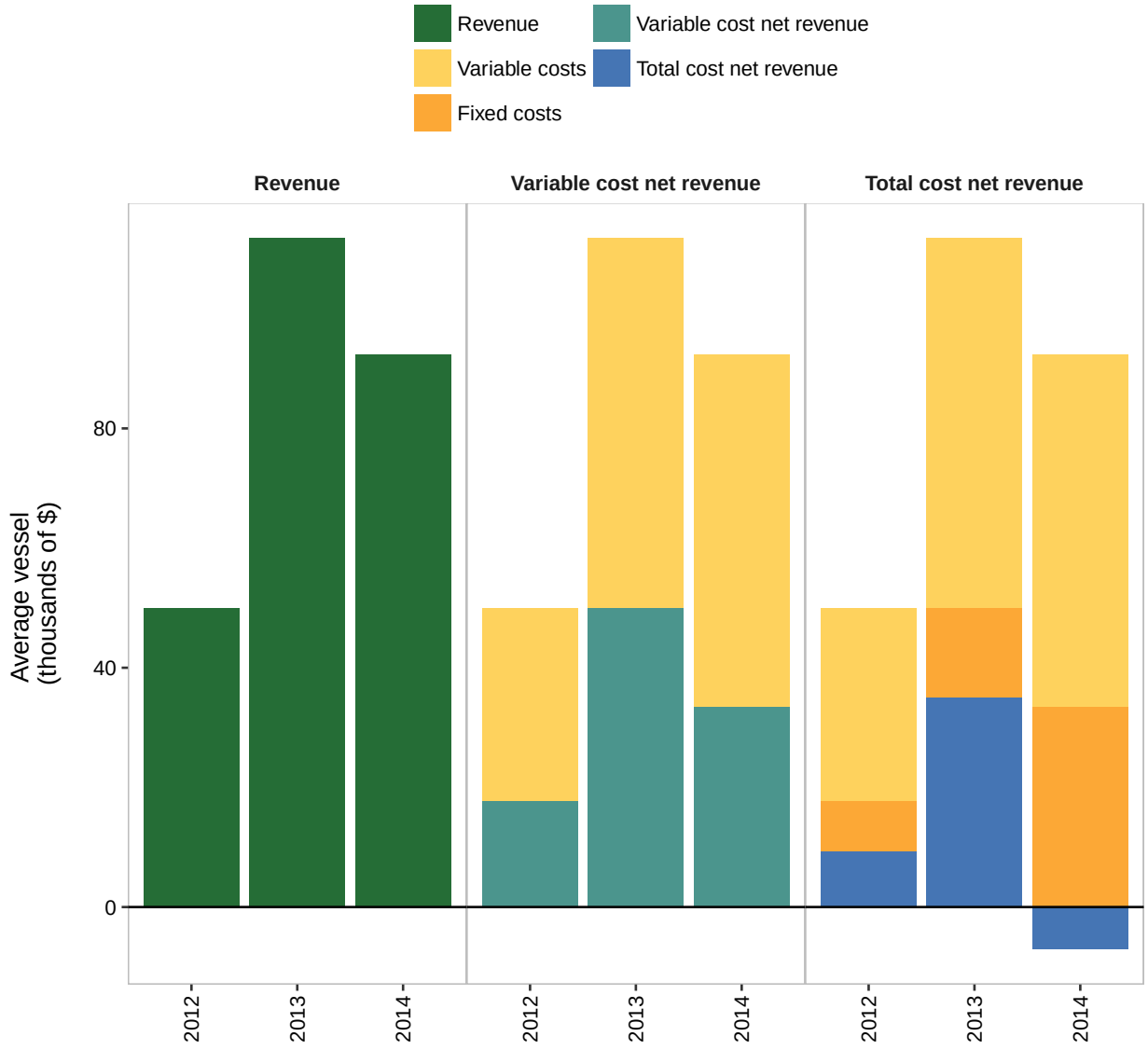

Figure 53: Non-whiting midwater trawl fishery variable cost net revenue and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue in the Non-whiting midwater trawl. Vessels did not begin targeting non-whiting groundfish with midwater trawl gear until 2012. Dashed line represents the beginning of the catch share program.

Table 12.10: DTS trawl with trawl endorsement fishery average variable cost and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) in the DTS trawl with trawl endorsement fishery. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$240.6	106	$224.8	97	$308.2	64	$266.9	58	$278.1	60	$299.0	50
(Variable costs)	($144.3)	106	($143.3)	97	($184.8)	64	($166.6)	58	($173.1)	60	($192.1)	50
Variable cost net revenue	**$96.3**	**106**	**$81.5**	**97**	**$123.5**	**64**	**$100.2**	**58**	**$105.0**	**60**	**$107.0**	**50**
(Fixed costs)	($67.8)	106	($59.2)	97	($56.8)	64	($84.3)	58	($50.0)	60	($46.9)	50
Total cost net revenue	**$28.5**	**106**	**$22.3**	**97**	**$66.6**	**64**	**$15.9**	**58**	**$55.0**	**60**	**$60.0**	**50**

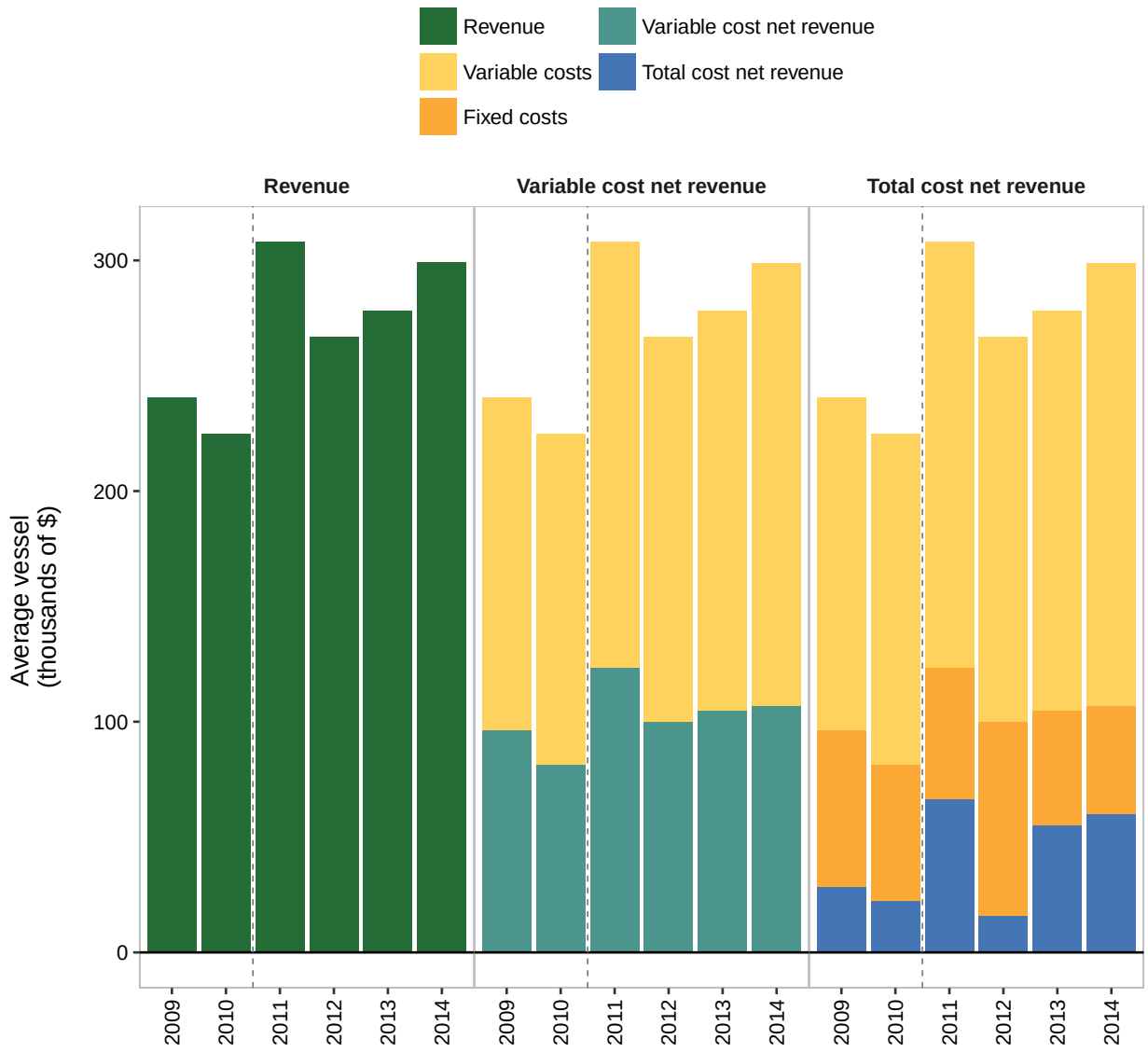

Figure 54: DTS trawl with trawl endorsement fishery variable cost net revenue and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue in the DTS trawl with trawl endorsement fishery. Dashed line represents the beginning of the catch share program.

Table 12.11: Non-whiting, non-DTS trawl with trawl endorsement fishery average variable cost and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) in the Non-whiting, non-DTS trawl with trawl endorsement fishery. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$48.9	88	$40.9	72	$98.1	51	$150.6	50	$161.3	52	$159.5	54
(Variable costs)	($38.0)	88	($30.1)	72	($63.7)	51	($93.5)	50	($99.4)	52	($104.0)	54
Variable cost net revenue	**$10.9**	**88**	**$10.8**	**72**	**$34.4**	**51**	**$57.1**	**50**	**$61.9**	**52**	**$55.5**	**54**
(Fixed costs)	($16.0)	88	($13.7)	72	($17.2)	51	($33.2)	50	($22.9)	52	($18.3)	54
Total cost net revenue	**-$5.1**	**88**	**-$2.9**	**72**	**$17.2**	**51**	**$23.9**	**50**	**$39.0**	**52**	**$37.2**	**54**

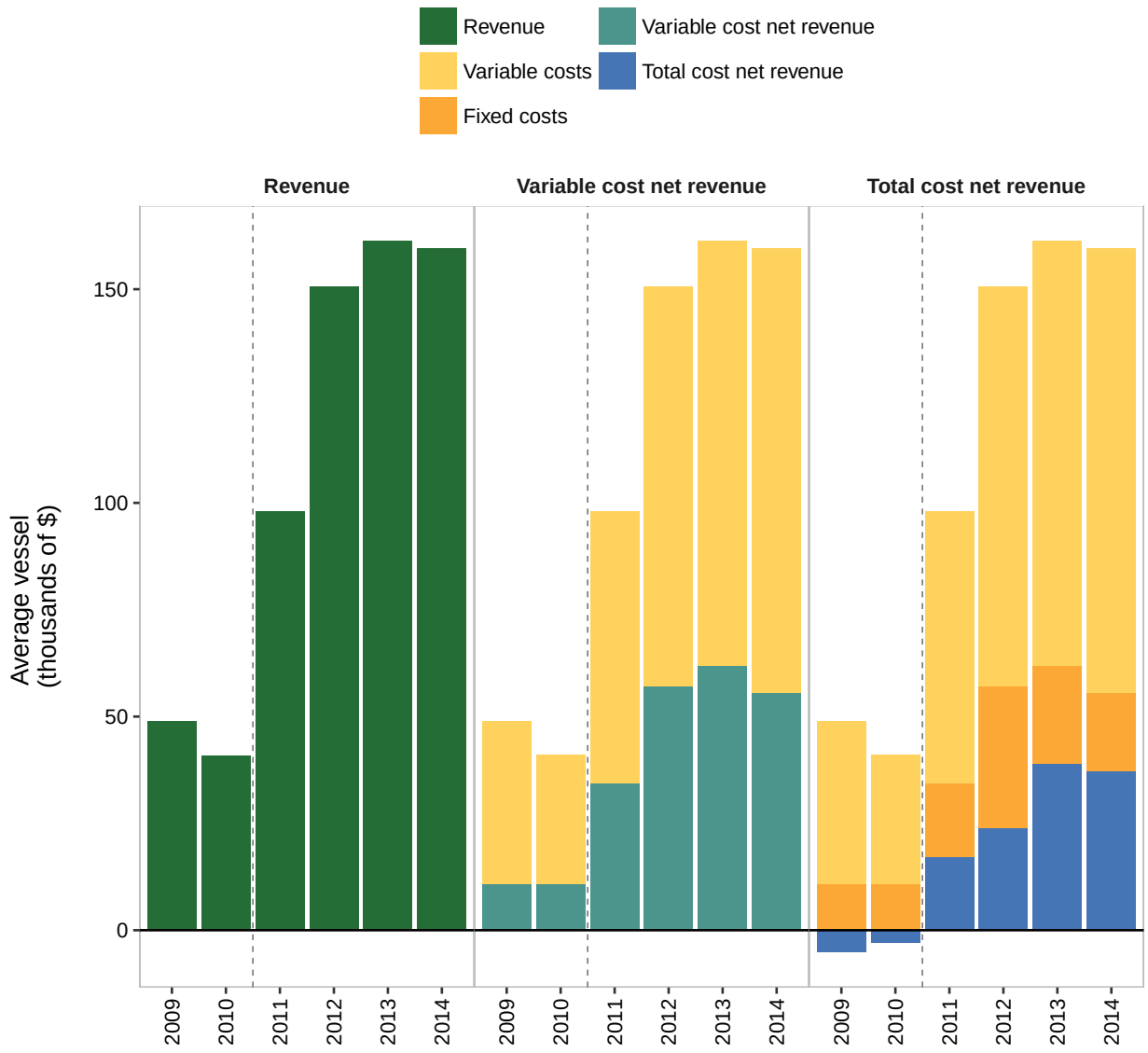

Figure 55: Non-whiting, non-DTS trawl with trawl endorsement fishery variable cost net revenue and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue in the non-whiting, non-DTS trawl with trawl endorsement fishery. Dashed line represents the beginning of the catch share program.

Table 12.12: Groundfish fixed gear with trawl endorsement fishery average variable cost and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) in the Groundfish fixed gear with trawl endorsement fishery. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$67.0	3	$149.1	6	$294.0	26	$194.7	26	$144.7	19	$193.4	21
(Variable costs)	($32.8)	3	($69.9)	6	($150.4)	26	($112.8)	26	($90.0)	19	($125.9)	21
Variable cost net revenue	**$34.2**	**3**	**$79.2**	**6**	**$143.5**	**26**	**$81.9**	**26**	**$54.7**	**19**	**$67.5**	**21**
(Fixed costs)	($23.5)	3	($20.9)	6	($118.8)	26	($64.3)	26	($34.4)	19	($46.8)	21
Total cost net revenue	**$10.7**	**3**	**$58.3**	**6**	**$24.8**	**26**	**$17.6**	**26**	**$20.3**	**19**	**$20.8**	**21**

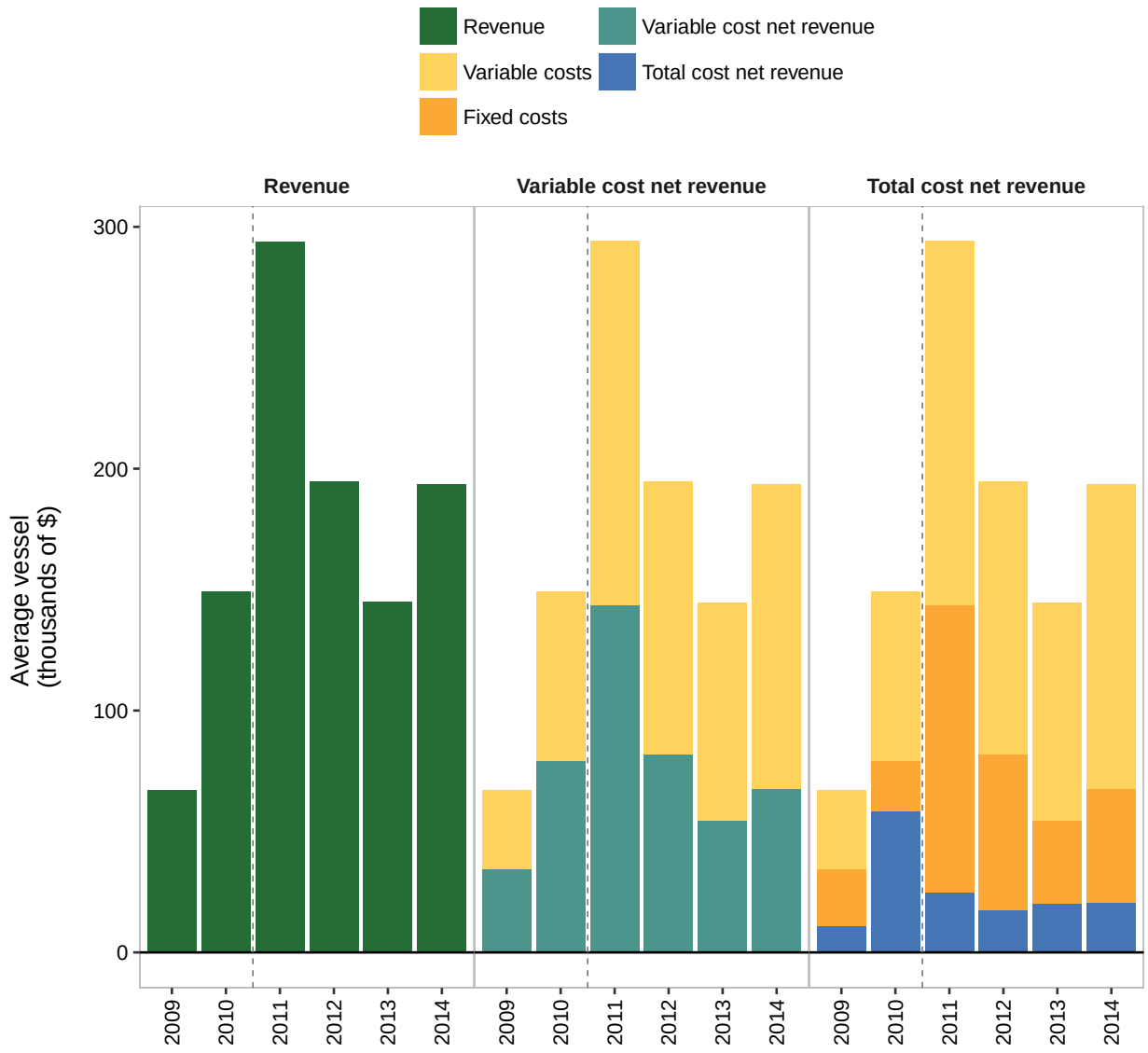

Figure 56: Groundfish fixed gear with trawl endorsement fishery variable cost net revenue and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue in the groundfish fixed gear with trawl endorsement fishery.

Table 12.13: Groundfish fixed gear with fixed gear endorsement fishery average variable cost and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) in the Groundfish fixed gear with fixed gear endorsement fishery. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$214.4	4	$253.9	3	$220.8	9	$162.0	10	$161.6	9	$205.4	10
(Variable costs)	($140.6)	4	($189.7)	3	($92.7)	9	($93.2)	10	($99.9)	9	($115.7)	10
Variable cost net revenue	**$73.8**	**4**	**$64.2**	**3**	**$128.1**	**9**	**$68.8**	**10**	**$61.8**	**9**	**$89.6**	**10**
(Fixed costs)	($34.1)	4	($35.6)	3	($38.3)	9	($46.4)	10	($36.5)	9	($38.6)	10
Total cost net revenue	**$39.7**	**4**	**$28.6**	**3**	**$89.8**	**9**	**$22.3**	**10**	**$25.2**	**9**	**$51.0**	**10**

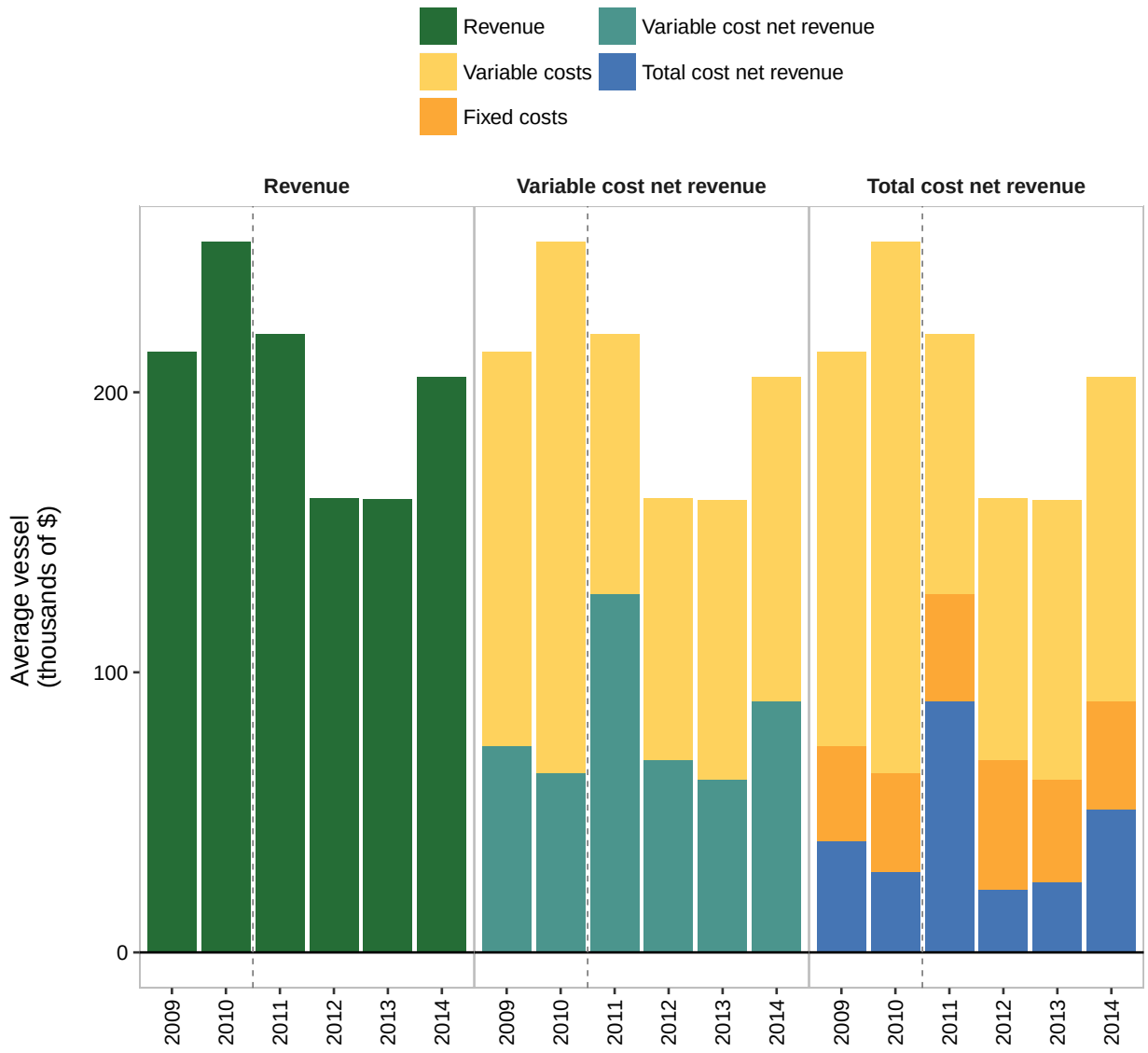

Figure 57: Groundfish fixed gear with trawl endorsement fishery variable cost net revenue and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue in the groundfish fixed gear with fixed gear endorsement fishery. Dashed line represents the beginning of the catch share program.

Table 12.14: Crab fishery average variable cost and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) in the Crab fishery. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$167.2	61	$155.7	60	$218.2	69	$242.5	61	$361.6	67	$250.1	62
(Variable costs)	($89.0)	61	($87.3)	60	($116.8)	69	($137.5)	61	($170.8)	67	($143.6)	62
Variable cost net revenue	**$78.1**	**61**	**$68.4**	**60**	**$101.4**	**69**	**$105.1**	**61**	**$190.8**	**67**	**$106.5**	**62**
(Fixed costs)	($31.8)	61	($28.5)	60	($56.7)	69	($86.1)	61	($66.7)	67	($55.5)	62
Total cost net revenue	**$46.3**	**61**	**$40.0**	**60**	**$44.7**	**69**	**$19.0**	**61**	**$124.1**	**67**	**$51.0**	**62**

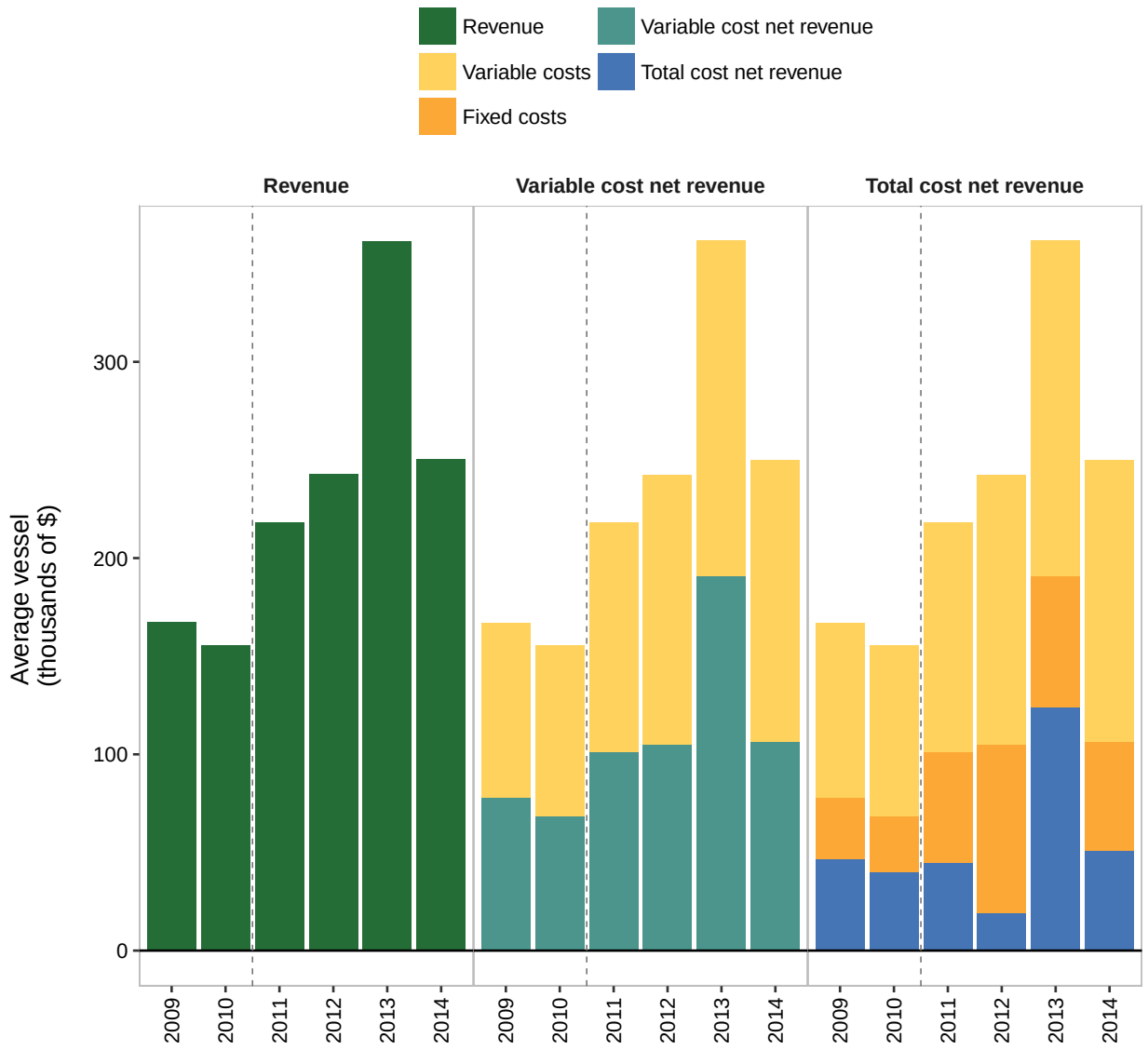

Figure 58: Crab fishery variable cost net revenue and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue in the crab fishery. Dashed line represents the beginning of the catch share program.

Table 12.15: Shrimp fishery average variable cost and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) in the Shrimp fishery. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$112.1	31	$154.7	36	$341.5	42	$326.9	40	$370.5	38	$498.5	40
(Variable costs)	($64.4)	31	($92.7)	36	($175.9)	42	($179.3)	40	($185.5)	38	($256.6)	40
Variable cost net revenue	**$47.6**	**31**	**$62.0**	**36**	**$165.6**	**42**	**$147.5**	**40**	**$185.0**	**38**	**$241.9**	**40**
(Fixed costs)	($42.1)	31	($52.0)	36	($85.8)	42	($106.5)	40	($76.0)	38	($85.1)	40
Total cost net revenue	**$5.5**	**31**	**$9.9**	**36**	**$79.8**	**42**	**$41.0**	**40**	**$108.9**	**38**	**$156.8**	**40**

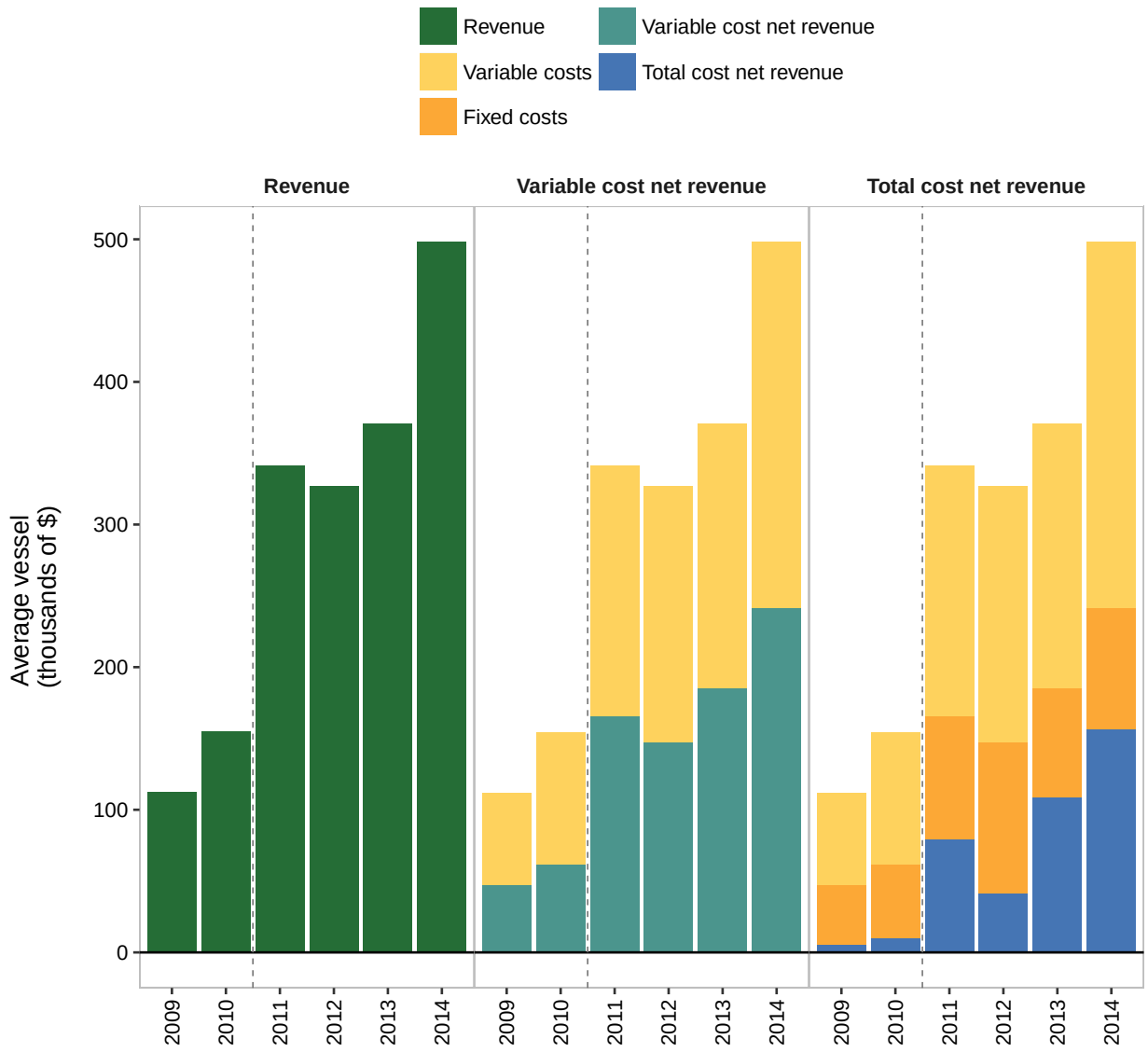

Figure 59: Shrimp fishery variable cost net revenue and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue in the shrimp fishery. Dashed line represents the beginning of the catch share program.

Table 12.16: Other fisheries fishery average variable cost and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) in the Other fisheries fishery. Fixed costs include capitalized expenditures, capital expenses, and other fixed costs. (N = number of EDC vessels with non-zero, non-NA responses).

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$38.0	28	$45.6	31	$42.5	28	$33.1	28	$38.3	20	$51.5	18
(Variable costs)	($26.7)	28	($28.4)	31	($19.5)	28	($22.4)	28	($20.6)	20	($26.1)	18
Variable cost net revenue	**$11.3**	**28**	**$17.2**	**31**	**$23.0**	**28**	**$10.7**	**28**	**$17.8**	**20**	**$25.4**	**18**
(Fixed costs)	($10.8)	28	($11.0)	31	($9.4)	28	($19.3)	28	($13.2)	20	($8.5)	18
Total cost net revenue	**$0.4**	**28**	**$6.3**	**31**	**$13.6**	**28**	**-$8.5**	**28**	**$4.5**	**20**	**$17.0**	**18**

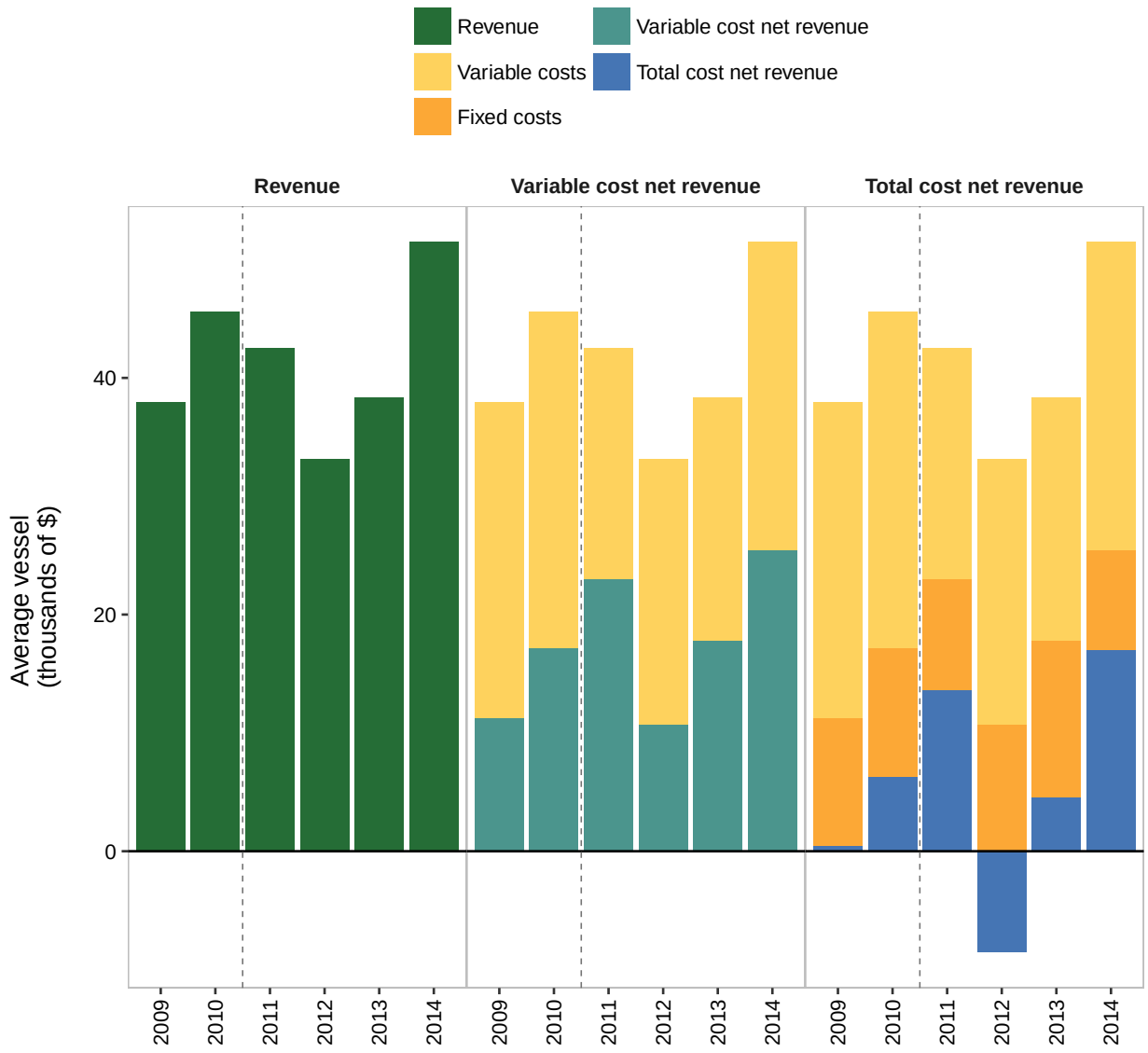

Figure 60: Other fisheries variable cost net revenue and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue in Other fisheries (including salmon, tuna, and halibut). Dashed line represents the beginning of the catch share program.

Net revenue variability for all catch shares participation and by fishery

There is high variability in economic performance among vessels that participate in the catch share program. To display that variability while protecting confidential information, variable cost net revenue is calculated and displayed by groups of three vessels (Figures 61 through 69). To calculate the three-vessel averages, the vessels are ranked from lowest to highest by ex-vessel revenue, aggregated into groups of three and then the average costs and net revenue are calculated for these aggregations of vessels. Total cost net revenue is not shown because the fixed costs for one vessel in a group of three are often greater than 90% of the total fixed costs for all three vessels, breaking the EDC Program "90-10 rule" for confidentiality.

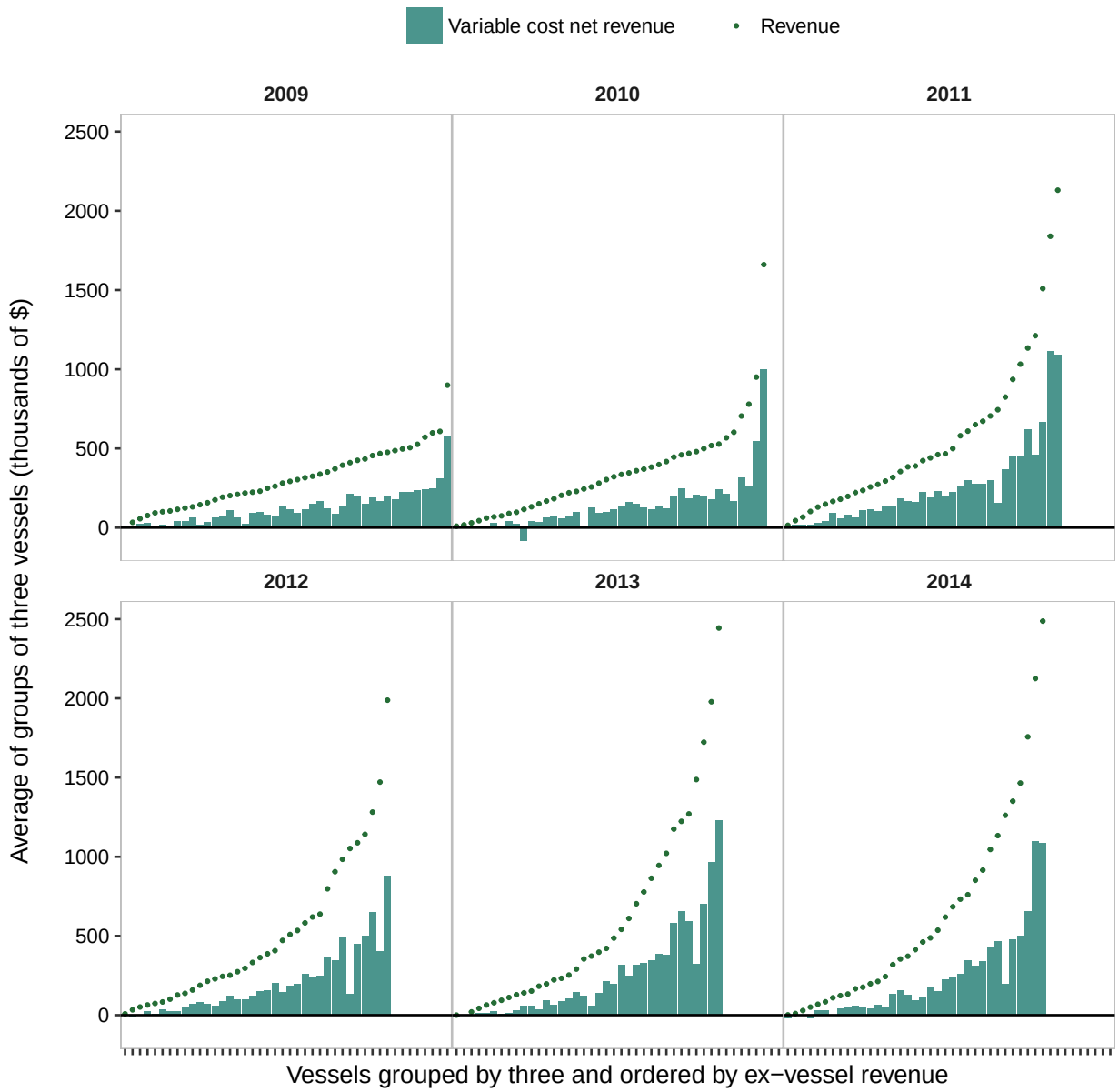

Figure 61: Net revenue in all catch shares fisheries (whiting and non-whiting groundfish) by vessel groups. Revenue (green dots) and variable cost net revenue (blue-green bars) in all catch shares fisheries (whiting and non-whiting groundfish). To protect confidentiality, vessels were sorted by revenue, put into groups of three vessels, and then means were calculated on the group of vessels.

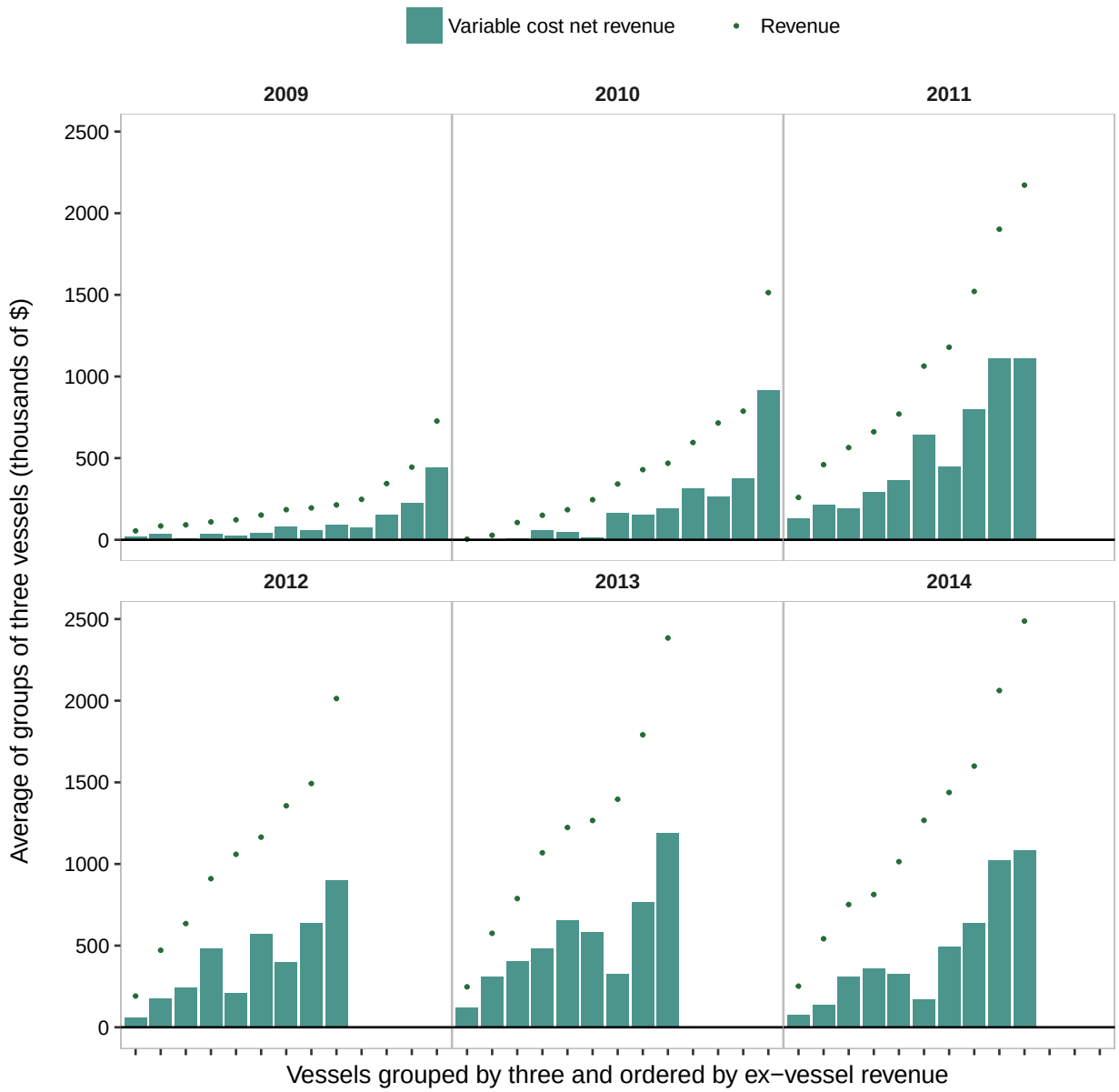

Figure 62: Net revenue in all whiting fisheries (shoreside and at-sea) by vessel groups. Revenue (green dots) and variable cost net revenue (blue-green bars) in all catch shares fisheries (whiting and non-whiting groundfish). To protect confidentiality, vessels were sorted by revenue, put into groups of three vessels, and then means were calculated on the group of vessels.

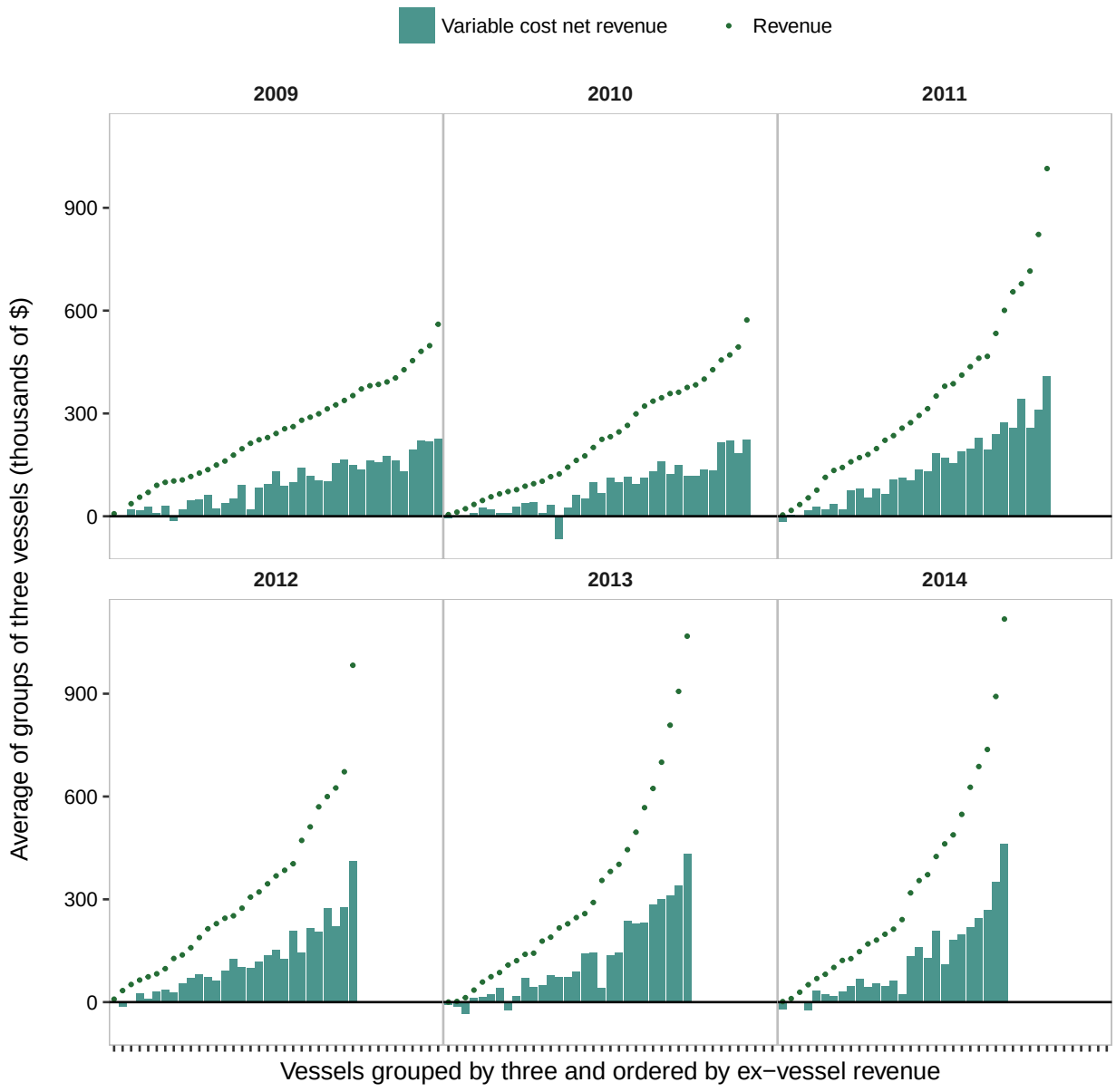

Figure 63: Net revenue in all non-whiting groundfish fisheries (catch shares only) by vessel groups. Revenue (green dots) and variable cost net revenue (blue-green bars) in all catch shares fisheries (whiting and non-whiting groundfish). To protect confidentiality, vessels were sorted by revenue, put into groups of three vessels, and then means were calculated on the group of vessels.

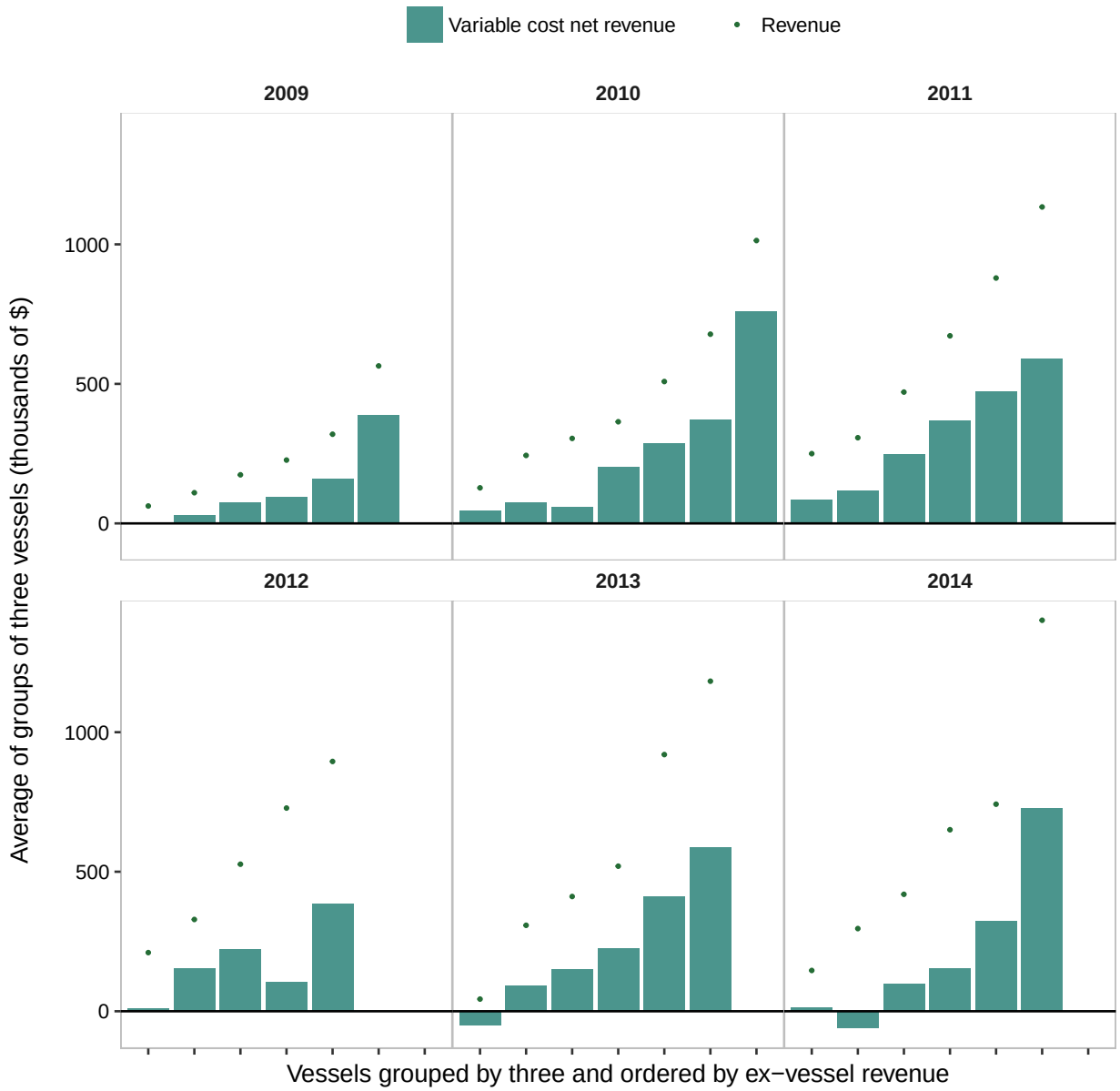

Figure 64: Net revenue in the at-sea Pacific whiting fishery by vessel groups. Revenue (green dots) and variable cost net revenue (blue-green bars) in the at-sea Pacific whiting fishery. To protect confidentiality, vessels were sorted by revenue, put into groups of three vessels, and then means were calculated on the group of vessels.

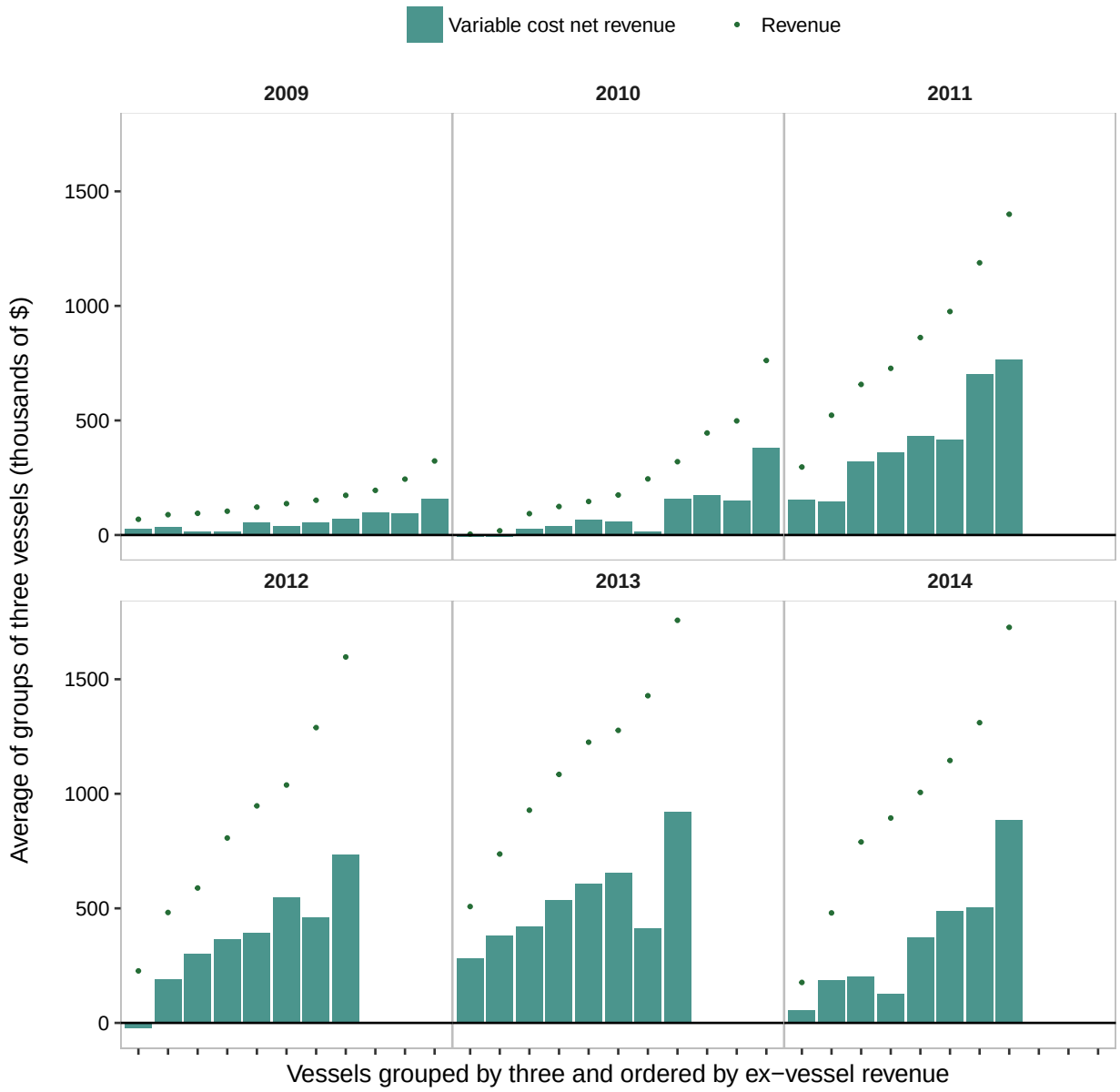

Figure 65: Net revenue in the shoreside Pacific whiting fishery by vessel groups. Revenue (green dots) and variable cost net revenue (blue-green bars) in the shoreside Pacific whiting fishery. To protect confidentiality, vessels were sorted by revenue and means were calculated on groups of three vessels.

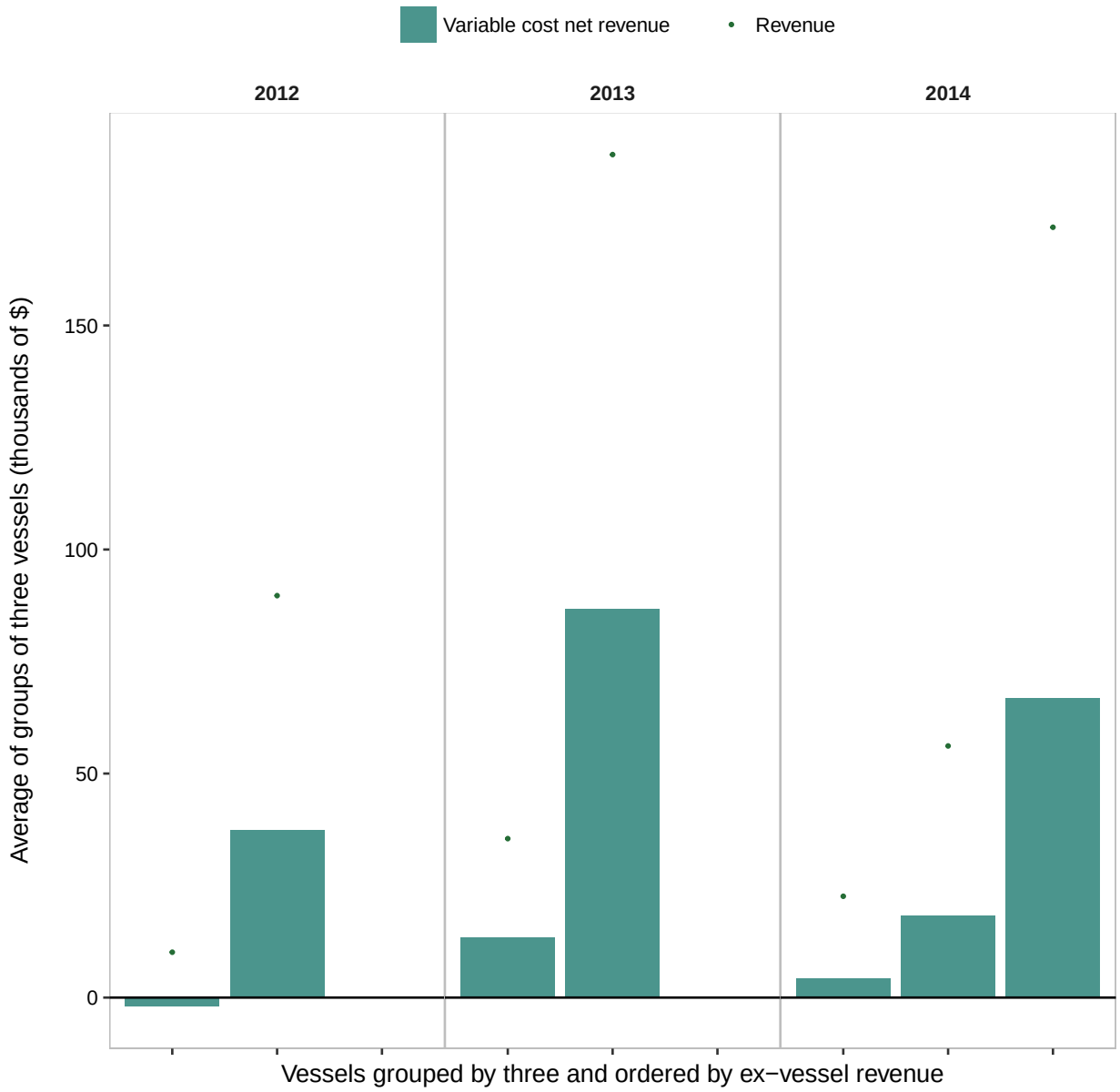

Figure 66: Net revenue in the Non-whiting midwater trawl fishery by vessel groups. Revenue (green dots) and variable cost net revenue (blue-green bars) in the Non-whiting midwater trawl fishery. To protect confidentiality, vessels were sorted by revenue and means were calculated on groups of three vessels.

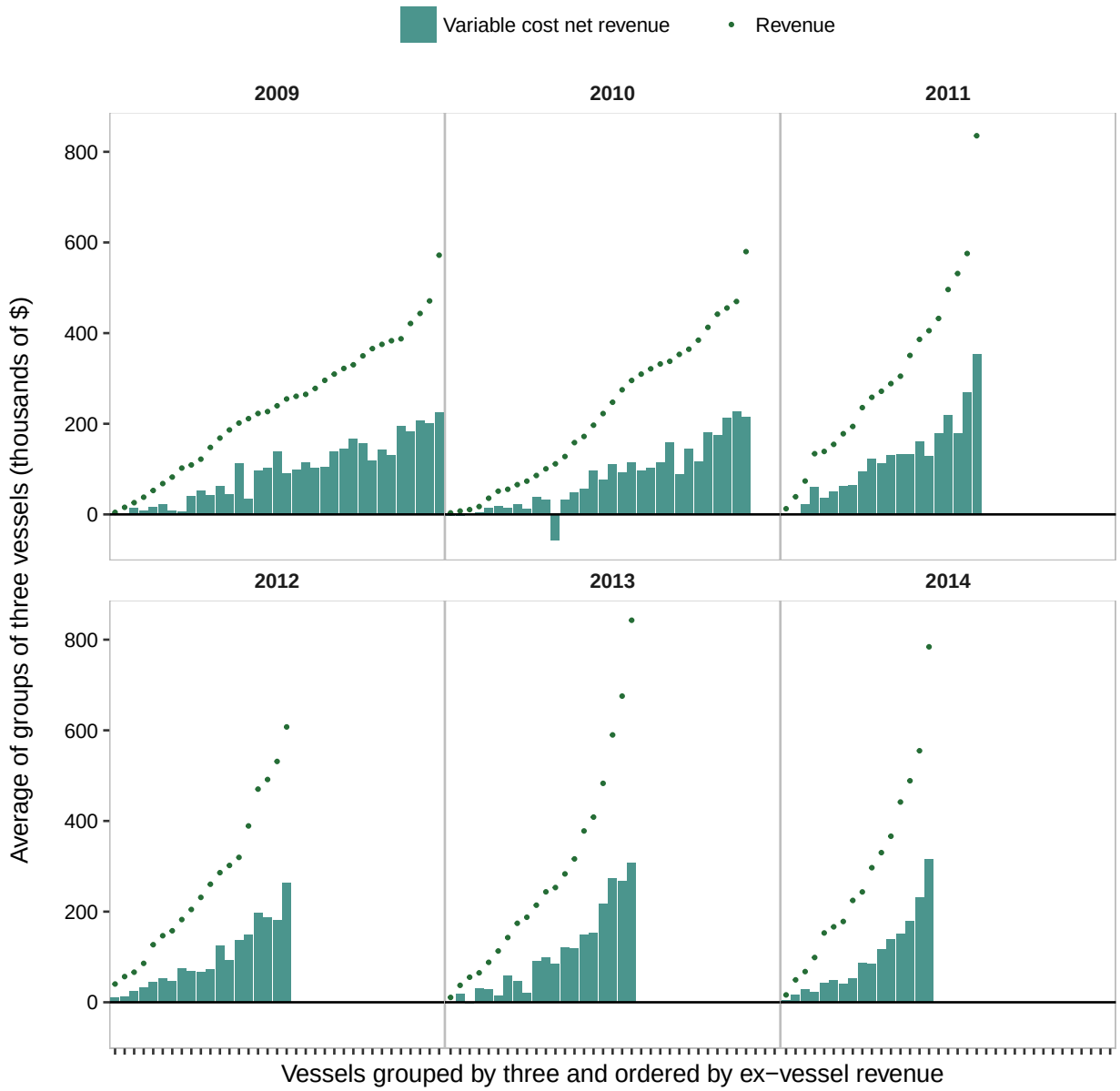

Figure 67: Net revenue in the DTS trawl with trawl endorsement fishery by vessel groups. Revenue (green dots) and variable cost net revenue (blue-green bars) in the DTS trawl with trawl endorsement fishery. To protect confidentiality, vessels were sorted by revenue and means were calculated on groups of three vessels.

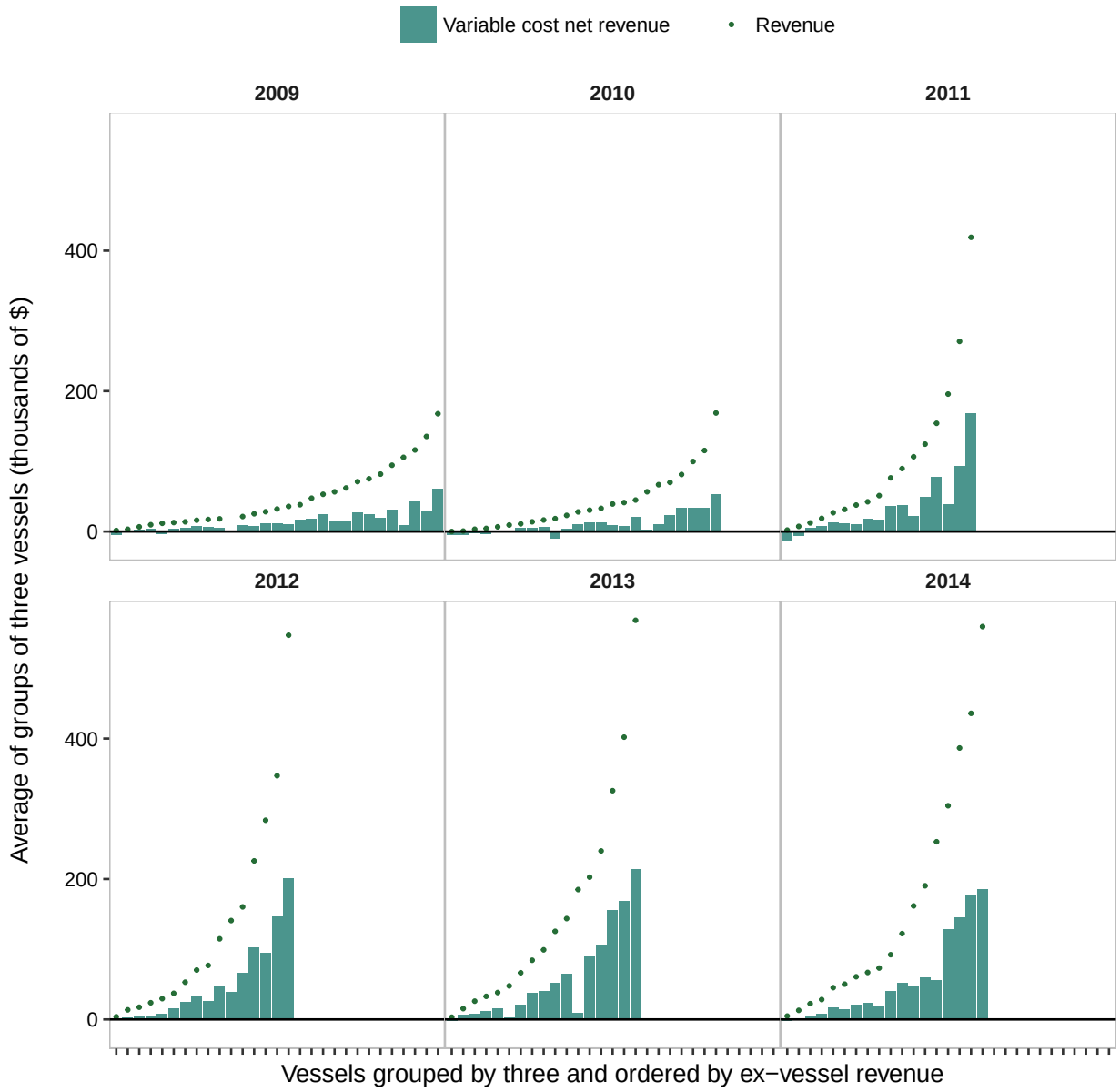

Figure 68: Net revenue in the non-whiting, non-DTS trawl with trawl endorsement fishery by vessel groups. Revenue (green dots) and variable cost net revenue (blue-green bars) in the non-whiting, non-DTS trawl with trawl endorsement fishery. To protect confidentiality, vessels were sorted by revenue and means were calculated on groups of three vessels.

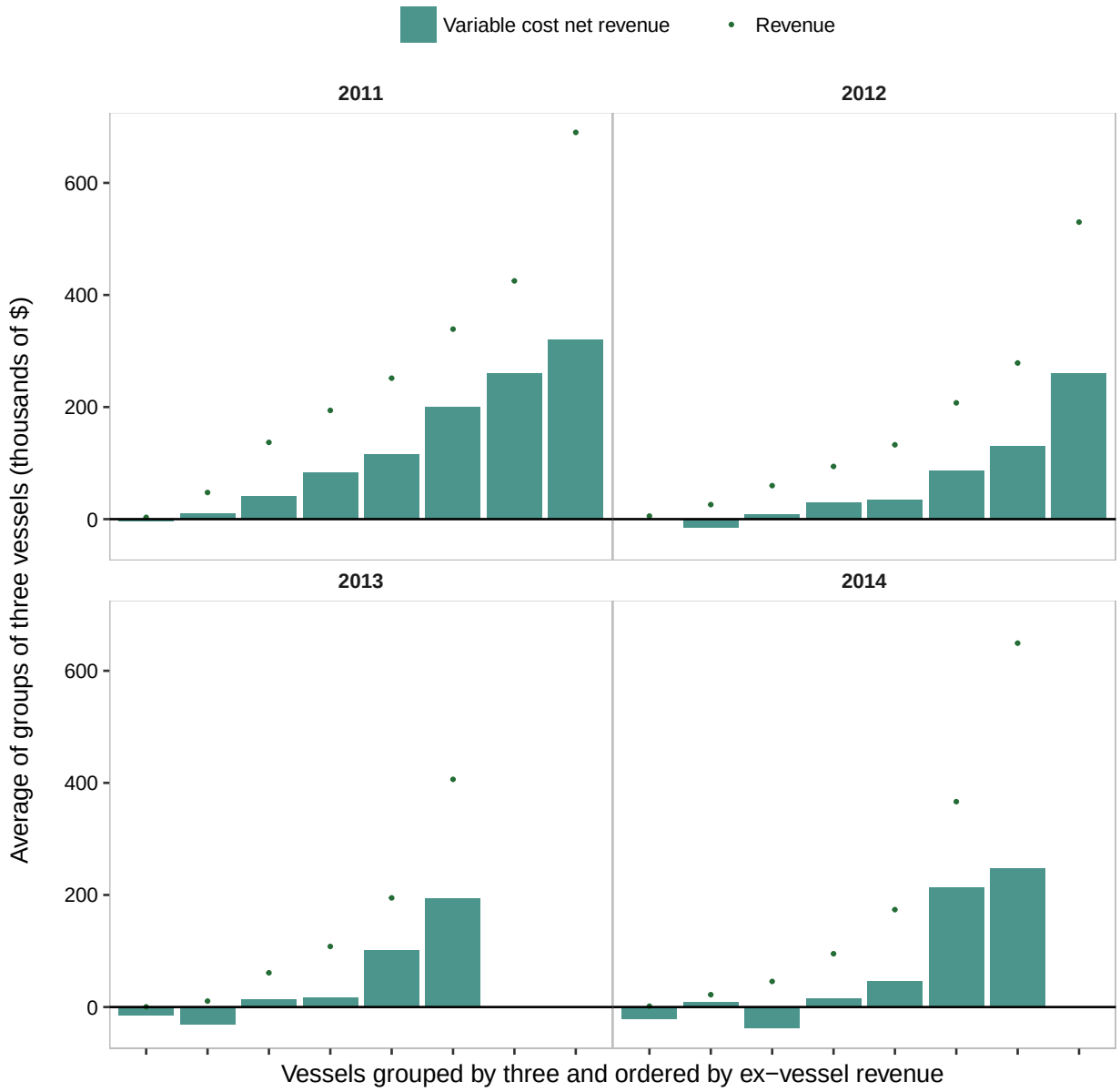

Figure 69: Net revenue in the groundfish fixed gear with trawl endorsement fishery by vessel groups. Revenue (green dots) and variable cost net revenue (blue-green bars) in the groundfish fixed gear with trawl endorsement fishery. To protect confidentiality, vessels were sorted by revenue and means were calculated on groups of three vessels.

12.3 Net Revenue: Including quota costs and earnings

The costs and earnings from quota are an important component of the economic health of the companies that fish in the catch share program. The value of quota is theoretically equal to the profitability of the asset. In theory, a quota pound owner will fish the quota if the profit they earn from fishing the quota is higher than the price they would receive if they sold the quota. Net revenue including earnings and costs from quota will be less than net revenue without considering quota transactions if quota is purchased from quota owners who do not currently participate in the catch share program.

In the previous sections, we presented net revenue by fishery and calendar year. This was accomplished by using cost disaggregation to allocate variable and fixed costs to each delivery. Unlike the other costs, there is no method for allocating the financial cost of quota to individual deliveries because the source of quota used to cover an individual delivery is not known. Therefore, this section is presented by survey year (fiscal year) and for all catch share fisheries combined rather than by calendar year by individual fishery. The figures are presented in pairs, the first of each pair depicts the survey year/catch share net revenue without including quota revenues or costs and the second pair includes the quota revenues and costs. The pairs are presented for all catch shares, all whiting vessels (includes all catch share activity), and all non-whiting groundfish vessels. The categorization of whiting or non-whiting groundfish vessel is mutually exclusive (if a vessel fished in both the whiting portion of the catch share program or the non-whiting groundfish portion, they are classified as a whiting vessel only).

All Catch Shares Net Revenue: Including quota costs and earnings

Table 12.17: All catch share (whiting and non-whiting groundfish) average variable cost and total cost net revenue by survey year with and without quota revenue and quota costs. Average ex-vessel revenue, variable cost net revenue, and total cost net revenue (thousands of $) for all participation in the catch share (whiting and non-whiting groundfish) fisheries by survey year with and without accounting for quota costs.

	2009		2010		2011		2012		2013		2014	
	With	Without	With	Without	With	Without	With	Without	With	Without	With	Without
Revenue	$327.7	$327.7	$356.3	$356.3	$597.2	$563.3	$560.2	$525.7	$613.5	$596.5	$644.7	$630.2
Variable cost net revenue	$136.8	$136.8	$144.9	$144.9	$236.8	$254.6	$202.7	$206.7	$227.9	$251.4	$201.1	$233.2
Total cost net revenue	$23.4	$23.4	$45.7	$45.7	$70.8	$88.7	$25.6	$29.6	$95.5	$119.0	$71.5	$103.7

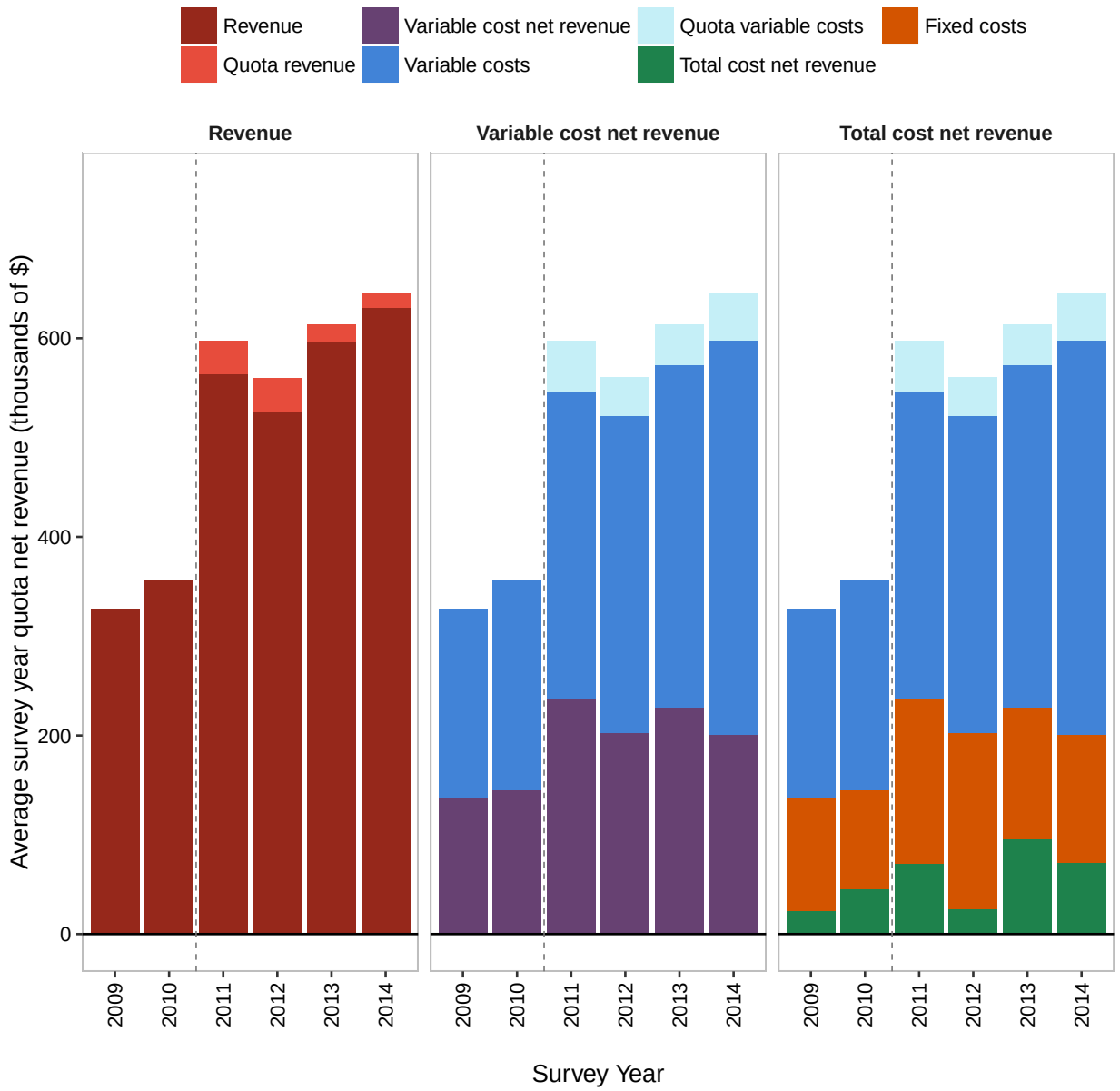

Figure 70: All catch share (whiting and non-whiting groundfish) average net revenue with quota earnings and costs by survey year. Average ex-vessel revenue, quota revenue, variable costs, variable quota costs, variable cost net revenue, fixed costs, and total cost net revenue for all participation in the catch share (whiting and non-whiting groundfish) fisheries by survey year. There are too few observations to display fixed quota costs (purchase or sale of quota shares).

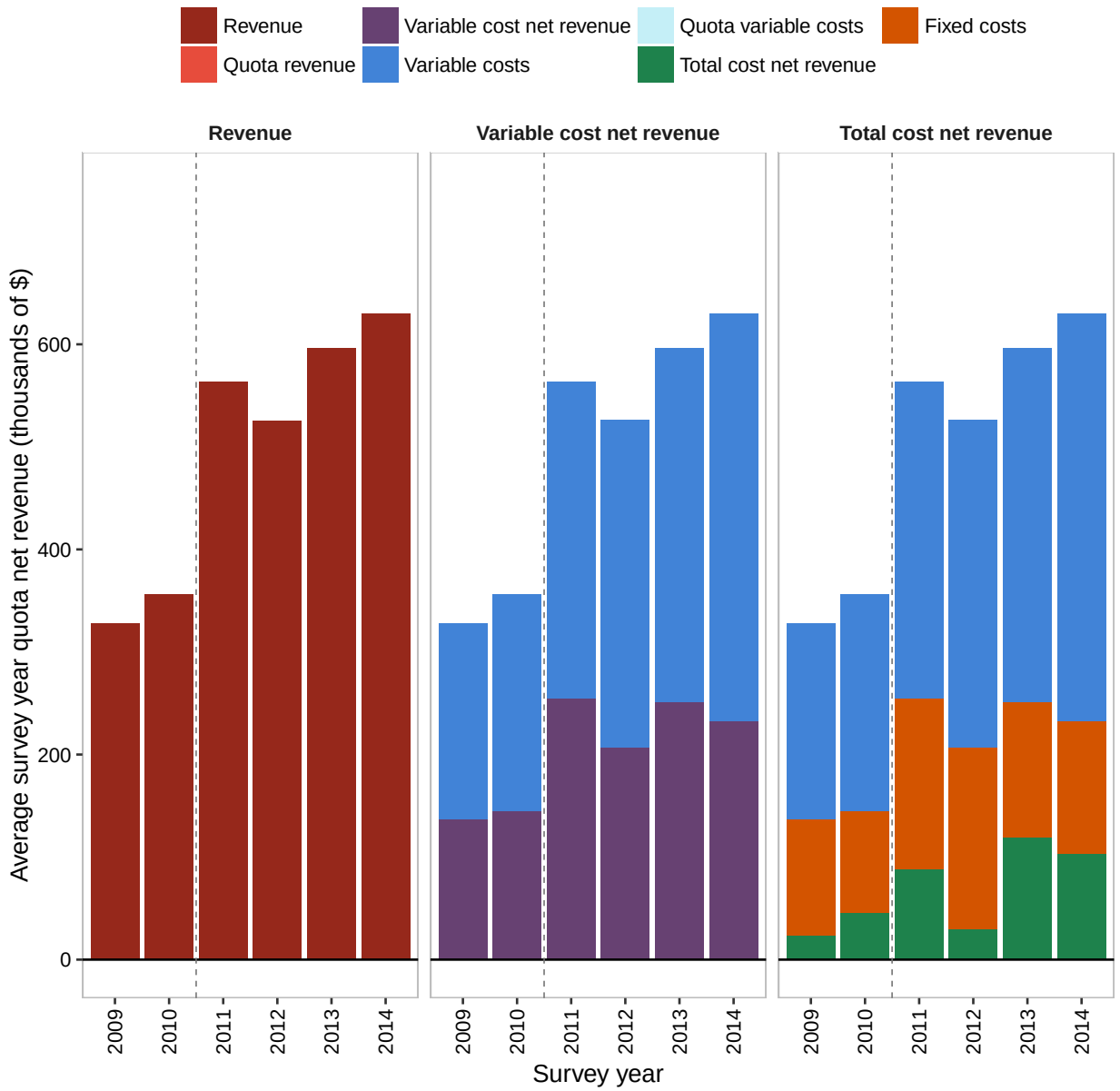

Figure 71: All catch share (whiting and non-whiting groundfish) average net revenue without quota earnings and costs by survey year. Average ex-vessel revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue for all participation in the catch share fisheries (whiting and non-whiting groundfish) by survey year. Dashed line represents the beginning of the catch share program.

Catch Shares Net Revenue for Whiting Vessels: Including quota costs and earnings

Table 12.18: All catch share average revenue, variable cost and total cost net revenue by survey year with and without quota revenue and quota costs for whiting vessels. Average revenue, variable cost net revenue, and total cost net revenue (millions of $) for all whiting vessels by survey year with and without quota costs.

	2009		2010		2011		2012		2013		2014	
	With	Without	With	Without	With	Without	With	Without	With	Without	With	Without
Revenue	$0.49	$0.49	$0.60	$0.60	$1.13	$1.10	$1.17	$1.13	$1.37	$1.35	$1.37	$1.35
Variable cost net revenue	$0.24	$0.24	$0.27	$0.27	$0.50	$0.53	$0.44	$0.45	$0.56	$0.62	$0.47	$0.52
Total cost net revenue	$0.04	$0.04	$0.10	$0.10	$0.13	$0.16	$0.01	$0.03	$0.22	$0.27	$0.14	$0.19

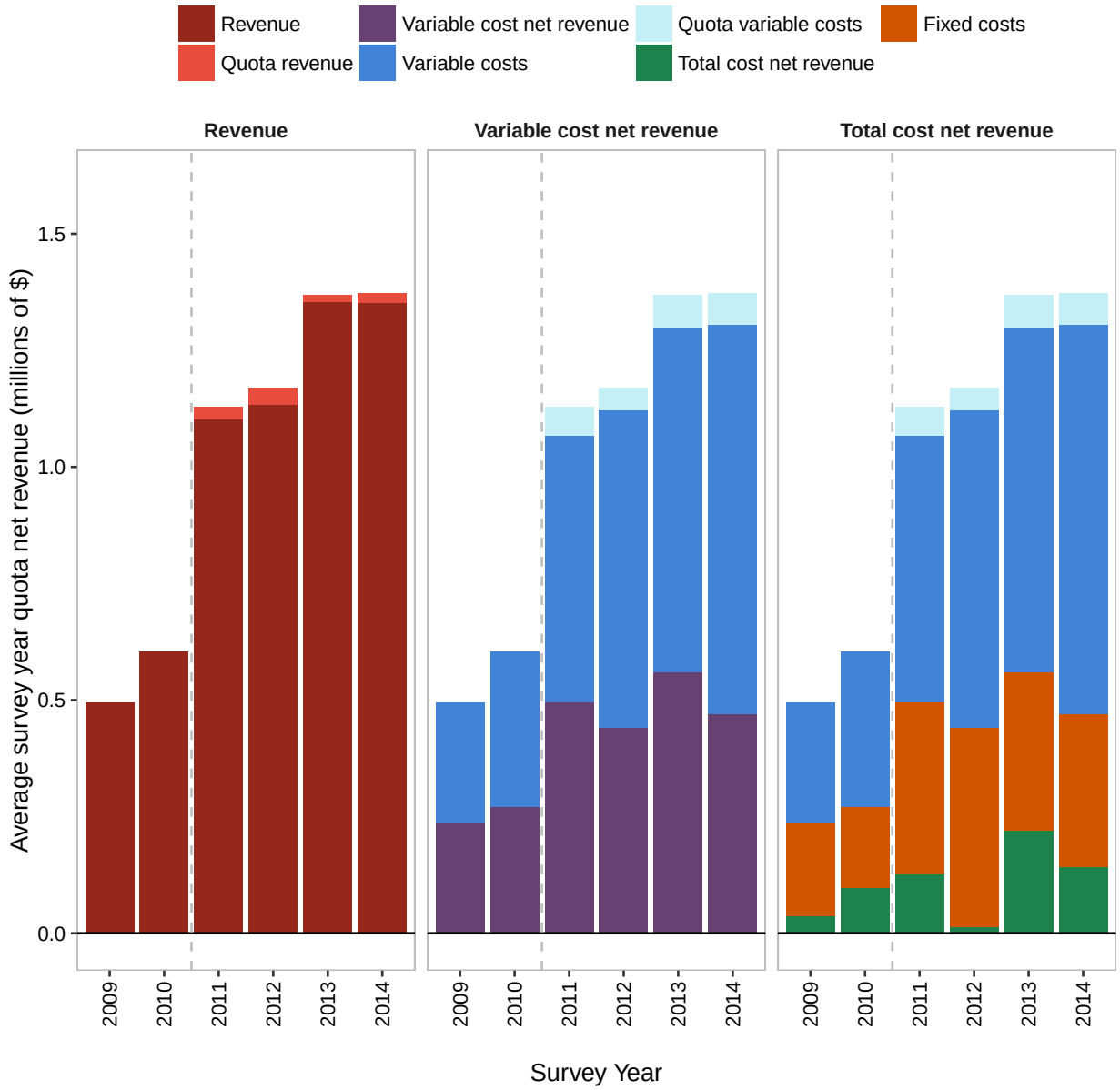

Figure 72: Whiting vessel average net revenue for all catch shares participation with quota earnings and costs by survey year. Average ex-vessel revenue, quota revenue, variable costs, variable quota costs, variable cost net revenue, fixed costs, and total cost net revenue for whiting vessel participation in the catch share fisheries (whiting and non-whiting groundfish) by survey year. There are too few observations to display fixed quota costs (purchase or sale of quota shares). Dashed line represents the beginning of the catch share program.

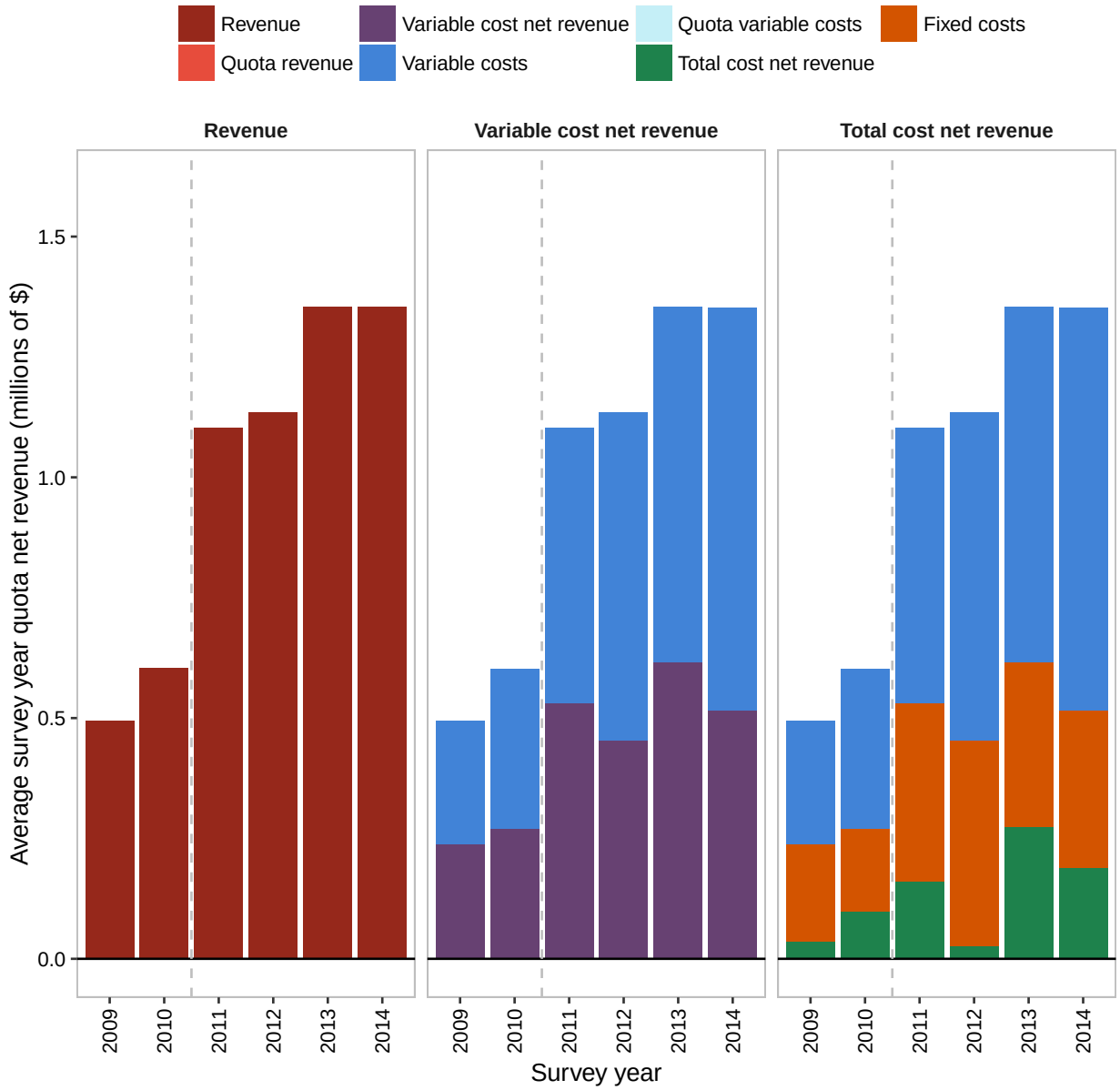

Figure 73: Whiting vessel average net revenue for all catch shares participation without quota earnings and costs by survey year. Average ex-vessel revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue for whiting vessel participation in the catch share fisheries (whiting and non-whiting groundfish) by survey year. Dashed line represents the beginning of the catch share program.

Catch Shares Net Revenue for Non-whiting Groundfish Vessels: Including quota costs and earnings

Table 12.19: All catch share average revenue, variable cost and total cost net revenue by survey year with and without quota revenue and quota costs for non-whiting groundfish vessels. Average revenue, variable cost net revenue, and total cost net revenue (thousands of $) for non-whiting groundfish vessels by survey year with and without accounting for quota costs.

	2009		2010		2011		2012		2013		2014	
	With	Without	With	Without	With	Without	With	Without	With	Without	With	Without
Revenue	$250.6	$250.6	$241.4	$241.4	$389.7	$353.1	$352.0	$317.8	$340.0	$322.1	$353.4	$341.0
Variable cost net revenue	$89.8	$89.8	$86.3	$86.3	$135.6	$146.9	$121.5	$122.8	$107.4	$119.5	$93.7	$119.8
Total cost net revenue	$17.4	$17.4	$21.5	$21.5	$49.3	$60.7	$29.4	$30.6	$50.6	$62.7	$43.2	$69.3

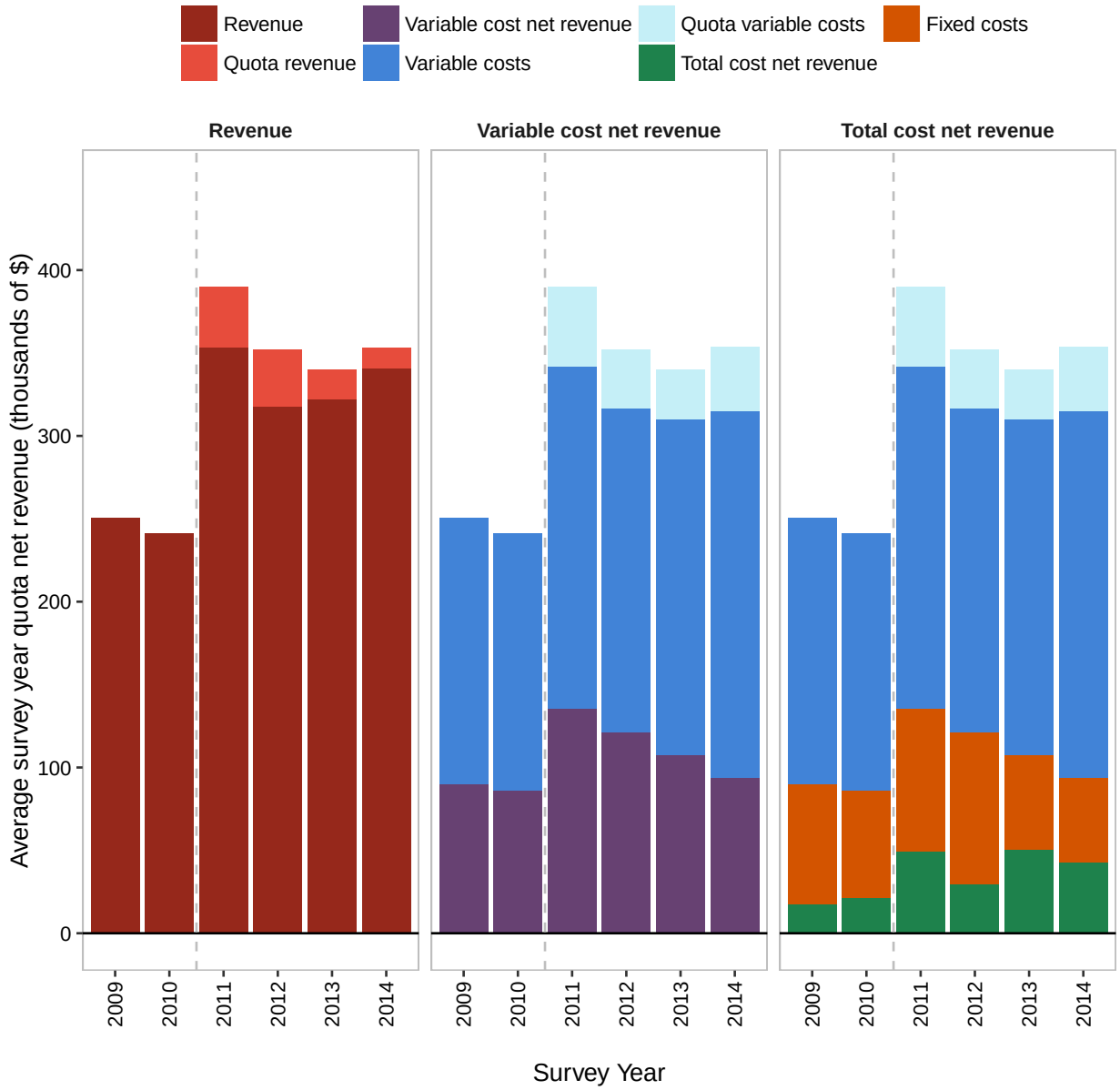

Figure 74: Non-whiting groundfish vessel average net revenue for all catch shares participation with quota earnings and costs by survey year. Average ex-vessel revenue, quota revenue, variable costs, variable quota costs, variable cost net revenue, fixed costs, and total cost net revenue for non-whiting groundfish vessel participation in catch share fisheries (non-whiting groundfish) by survey year. There are too few observations to display fixed quota costs (purchase or sale of quota shares). Dashed line represents the beginning of the catch share program.

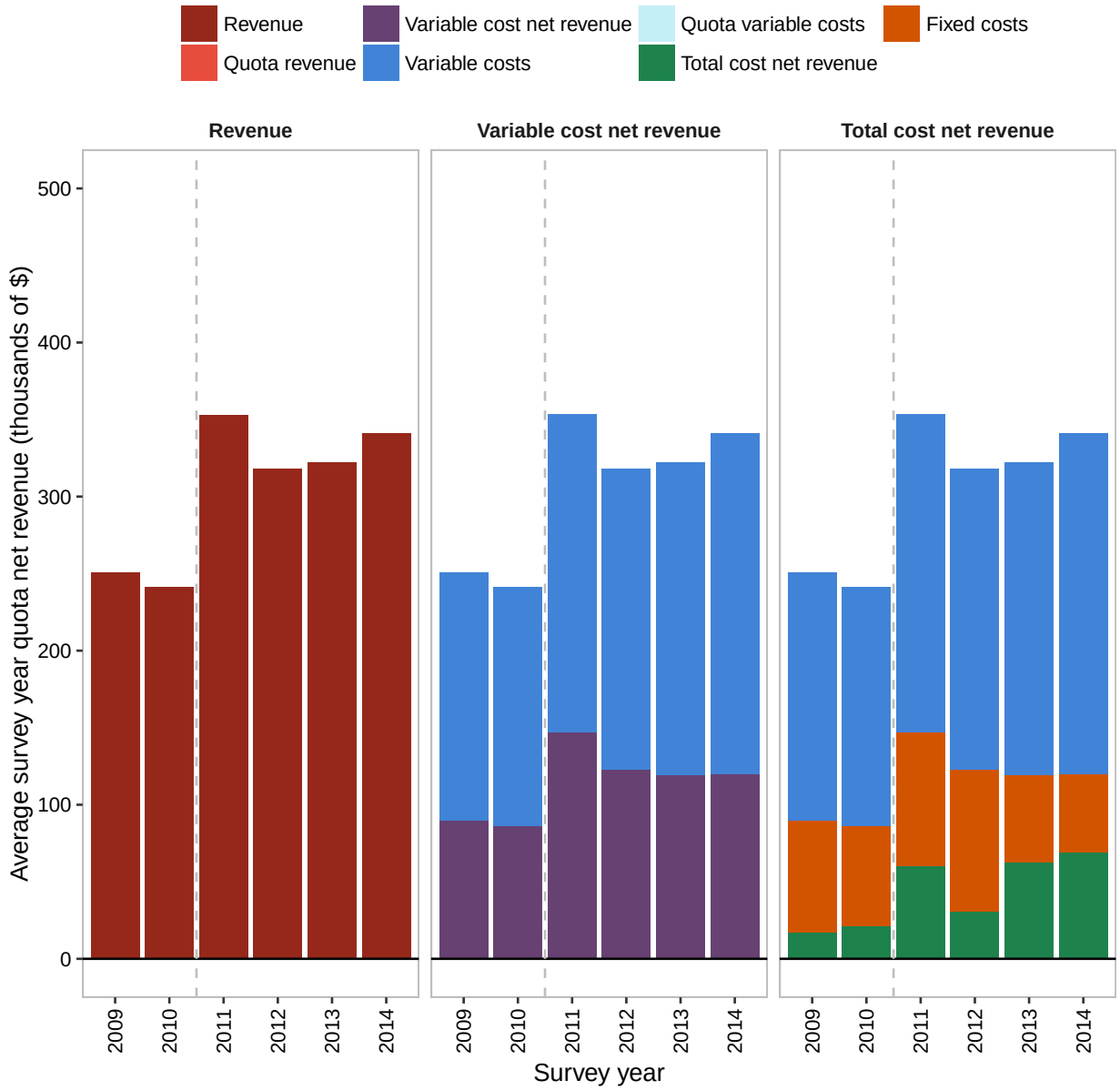

Figure 75: Non-whiting groundfish vessel average net revenue for all catch shares participation without quota earnings and costs by survey year. Average ex-vessel revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue for all non-whiting groundfish vessels by participation in catch share fisheries (non-whiting groundfish) by survey year. Dashed line represents the beginning of the catch share program.

13 Economic Performance: Cost, Revenue, and Net Revenue Rates

As an indication of changes in efficiency and profitability, rates are calculated for revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue by days at sea and per metric ton of fish landed for all West Coast vessels (Table 13.1), delineated by vessel size (Tables 13.2 through 13.4), and home port state (Tables 13.5 through 13.7).

13.1 All West Coast Operations

Table 13.1: Mean and median rates for all vessels that fished on the West Coast. Mean and median revenue, costs, and net revenue ($) per day and per metric ton harvested. ($N_{2009} = 126$, $N_{2010} = 126$, $N_{2011} = 130$, $N_{2012} = 128$, $N_{2013} = 124$, $N_{2014} = 123$).

Description	2009		2010		2011		2012		2013		2014	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Revenue per day	$5,323.9	$4,565.1	$6,016.0	$4,617.2	$8,592.9	$7,606.2	$8,070.2	$6,676.0	$9,511.0	$8,673.1	$8,665.8	$8,170.5
Revenue per metric ton landed	$1,261.9	$1,103.6	$1,374.6	$1,066.4	$2,462.9	$1,498.4	$2,504.7	$1,394.7	$2,320.1	$1,533.4	$2,674.7	$1,519.2
Variable costs per day	$3,090.8	$2,579.8	$3,453.9	$2,759.1	$4,658.8	$4,020.6	$4,841.3	$3,963.2	$5,373.1	$4,653.1	$5,336.6	$4,710.0
Variable cost per metric ton landed	$965.9	$632.1	$841.7	$670.3	$1,579.5	$849.8	$1,613.4	$878.4	$4,147.6	$839.4	$2,519.2	$906.8
Variable cost net revenue per day	$2,233.1	$1,770.4	$2,562.1	$1,577.6	$3,934.1	$3,192.5	$3,228.9	$2,420.1	$4,137.9	$3,700.2	$3,329.2	$3,113.8
Variable cost net revenue per metric ton landed	$296.0	$360.8	$532.9	$391.1	$883.5	$609.6	$891.3	$543.6	-$1,827.5	$633.5	$155.5	$614.2
Fixed costs per day	$1,780.3	$991.0	$1,563.2	$940.4	$6,832.2	$1,481.9	$4,097.6	$1,723.4	$2,121.8	$1,361.2	$2,187.1	$1,046.9
Fixed costs per metric ton landed	$382.3	$239.5	$349.4	$223.0	$5,024.8	$295.2	$1,908.9	$350.8	$1,644.9	$241.5	$3,600.4	$217.6
Total cost net revenue per day	$452.8	$499.1	$998.9	$602.1	-$2,898.1	$1,424.6	-$868.7	$708.1	$2,016.1	$1,908.4	$1,142.2	$1,823.0
Total cost net revenue per metric ton landed	-$86.3	$105.1	$183.5	$118.7	-$4,141.3	$229.0	-$1,017.6	$135.7	-$3,472.3	$346.6	-$3,444.9	$343.6

13.2 All West Coast Operations by Vessel Length

Table 13.2: Small vessel (< 60 ft) mean and median rates for West Coast operations. Mean and median revenue, costs, and net revenue ($) per day and per metric ton harvested. ($N_{2009} = 43$, $N_{2010} = 42$, $N_{2012} = 49$, $N_{2013} = 47$, $N_{2014} = 46$).

Description	2009		2010		2011		2012		2013		2014	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Revenue per day	$3,357.3	$2,919.5	$3,429.2	$3,242.9	$5,415.4	$4,586.2	$4,530.3	$3,521.6	$5,590.1	$4,711.8	$4,762.7	$4,675.8
Revenue per metric ton landed	$2,049.4	$1,590.4	$2,356.0	$1,819.9	$3,850.7	$4,080.1	$3,980.0	$4,303.3	$3,770.5	$3,215.5	$4,371.0	$3,013.3
Variable costs per day	$1,874.1	$1,644.8	$1,878.6	$1,720.4	$3,068.4	$2,872.3	$2,682.8	$2,370.9	$3,333.6	$2,642.3	$2,942.6	$2,729.0
Variable cost per metric ton landed	$1,159.7	$884.7	$1,245.1	$990.0	$2,849.1	$1,718.5	$2,645.3	$2,245.5	$9,597.9	$1,612.9	$5,163.5	$1,984.2
Variable cost net revenue per day	$1,483.2	$1,060.4	$1,550.7	$1,290.1	$2,347.0	$2,030.1	$1,847.5	$1,511.0	$2,256.6	$1,978.0	$1,820.1	$1,751.1
Variable cost net revenue per metric ton landed	$889.7	$603.4	$1,110.9	$757.1	$1,001.6	$1,199.2	$1,334.8	$798.0	-$5,827.5	$1,114.4	-$792.5	$888.2
Fixed costs per day	$731.9	$600.0	$651.4	$587.1	$13,309.1	$1,072.8	$3,786.2	$958.0	$1,261.6	$906.8	$1,581.6	$573.8
Fixed costs per metric ton landed	$467.2	$351.1	$498.4	$362.1	$12,616.6	$609.1	$3,997.4	$804.9	$3,755.3	$485.8	$8,730.1	$426.6
Total cost net revenue per day	$751.3	$357.6	$899.3	$631.2	-$10,962.1	$1,024.7	-$1,938.7	$510.3	$995.0	$1,268.5	$238.5	$1,191.5
Total cost net revenue per metric ton landed	$422.5	$317.5	$612.5	$377.8	-$11,615.0	$508.2	-$2,662.6	$389.9	-$9,582.8	$637.5	-$9,522.6	$559.9

Table 13.3: Medium vessel ($>$ 60 ft, $<=$ 80 ft) mean and median rates for West Coast operations. Mean and median revenue, costs, and net revenue ($) per day and per metric ton harvested. ($N_{2009} = 52$, $N_{2010} = 51$, $N_{2012} = 55$, $N_{2013} = 53$, $N_{2014} = 53$).

Description	2009		2010		2011		2012		2013		2014	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Revenue per day	$4,468.1	$4,153.4	$4,567.7	$4,207.5	$7,580.0	$7,432.3	$7,113.9	$6,699.3	$8,338.6	$8,561.1	$8,235.1	$8,324.3
Revenue per metric ton landed	$1,220.1	$1,143.1	$1,282.3	$1,077.0	$2,176.6	$1,425.9	$2,250.3	$1,383.2	$2,160.3	$1,509.2	$2,527.7	$1,580.3
Variable costs per day	$2,757.6	$2,496.8	$3,091.4	$2,721.0	$4,311.2	$4,119.9	$4,369.5	$3,962.3	$4,684.7	$4,432.7	$4,895.8	$4,779.0
Variable cost per metric ton landed	$840.6	$708.4	$948.4	$674.3	$1,190.0	$827.6	$1,381.2	$870.6	$1,214.4	$800.8	$1,426.4	$910.3
Variable cost net revenue per day	$1,710.5	$1,547.6	$1,476.4	$1,222.6	$3,268.7	$3,175.0	$2,744.4	$2,376.6	$3,653.9	$3,468.0	$3,339.3	$3,113.8
Variable cost net revenue per metric ton landed	$379.4	$353.9	$333.9	$412.2	$986.6	$609.6	$869.1	$555.7	$945.9	$655.3	$1,101.3	$617.0
Fixed costs per day	$1,332.6	$994.1	$1,308.7	$929.0	$1,987.8	$1,374.9	$2,969.5	$1,605.0	$1,748.8	$1,150.9	$1,831.5	$1,094.1
Fixed costs per metric ton landed	$401.9	$269.5	$389.9	$263.6	$541.6	$274.8	$951.2	$358.8	$520.9	$242.1	$794.8	$217.6
Total cost net revenue per day	$377.9	$423.6	$167.7	$557.4	$1,281.0	$1,489.9	-$225.0	$802.5	$1,905.1	$1,898.1	$1,507.8	$2,078.9
Total cost net revenue per metric ton landed	-$22.4	$105.2	-$56.1	$104.1	$444.9	$314.8	-$82.1	$209.1	$425.0	$405.5	$306.5	$419.4

Table 13.4: Large vessel (> 80 ft) mean and median rates for West Coast operations. Mean and median revenue, costs, and net revenue ($) per day and per metric ton harvested. (N_{2009} = 37, N_{2010} = 38, N_{2012} = 32, N_{2013} = 32, N_{2014} = 31).

Description	2009		2010		2011		2012		2013		2014	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Revenue per day	$8,659.8	$7,799.8	$10,577.3	$8,111.6	$14,399.3	$15,925.1	$14,459.3	$13,927.8	$16,533.4	$15,860.8	$14,763.9	$14,658.8
Revenue per metric ton landed	$438.7	$233.1	$408.5	$240.8	$1,007.7	$268.5	$714.6	$314.8	$511.4	$269.4	$486.1	$233.2
Variable costs per day	$4,915.6	$4,797.7	$5,598.8	$5,295.1	$7,359.6	$7,372.0	$8,564.9	$7,710.7	$9,090.6	$7,807.2	$9,360.9	$8,366.1
Variable cost per metric ton landed	$916.7	$124.6	$259.8	$133.1	$385.0	$136.8	$416.1	$188.6	$298.4	$139.5	$293.2	$179.2
Variable cost net revenue per day	$3,744.2	$2,976.2	$4,978.5	$3,101.5	$7,039.7	$6,795.5	$5,894.5	$6,131.5	$7,442.8	$6,881.7	$5,403.0	$5,984.1
Variable cost net revenue per metric ton landed	-$478.0	$89.8	$148.7	$99.4	$622.7	$138.4	$298.4	$143.2	$213.1	$144.1	$192.8	$102.3
Fixed costs per day	$3,512.1	$2,022.1	$2,844.3	$1,955.5	$4,092.8	$3,536.8	$7,348.1	$2,967.9	$3,780.9	$2,983.0	$3,597.9	$2,112.3
Fixed costs per metric ton landed	$253.7	$77.8	$128.6	$65.0	$303.1	$86.5	$376.6	$111.2	$122.8	$51.8	$127.1	$40.4
Total cost net revenue per day	$232.1	$749.3	$2,134.2	$1,058.2	$2,946.9	$3,293.8	-$1,453.6	$1,857.9	$3,661.9	$3,460.1	$1,805.0	$3,448.1
Total cost net revenue per metric ton landed	-$731.7	$38.4	$20.1	$46.4	$319.6	$74.8	-$78.2	$50.2	$90.3	$78.5	$65.8	$64.2

13.3 All West Coast Operations by Vessel Home port State

Table 13.5: Washington mean and median rates for West Coast operations. Mean and median revenue, costs, and net revenue ($) per day and per metric ton harvested. ($N_{2009} = 16$, $N_{2010} = 17$, $N_{2012} = 15$, $N_{2013} = 15$, $N_{2014} = 17$).

Description	2009		2010		2011		2012		2013		2014	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Revenue per day	$6,636.7	$6,631.4	$8,544.9	$6,479.3	$13,061.7	$11,023.6	$13,545.0	$12,913.9	$15,041.4	$13,120.7	$11,987.6	$9,853.0
Revenue per metric ton landed	$487.3	$386.0	$564.0	$180.1	$2,101.1	$448.3	$1,864.8	$458.0	$1,483.5	$323.3	$2,253.9	$387.8
Variable costs per day	$3,814.5	$4,520.6	$4,558.1	$3,871.3	$6,510.9	$5,921.6	$7,078.4	$6,599.1	$7,169.7	$6,857.6	$6,820.6	$6,708.9
Variable cost per metric ton landed	$308.1	$227.3	$356.5	$109.0	$973.5	$237.5	$954.1	$228.3	$607.8	$179.8	$2,186.5	$208.8
Variable cost net revenue per day	$2,822.2	$2,208.4	$3,986.8	$2,608.0	$6,550.8	$6,353.8	$6,466.6	$5,894.3	$7,871.6	$6,673.3	$5,167.1	$3,989.6
Variable cost net revenue per metric ton landed	$179.2	$139.6	$207.5	$93.5	$1,127.6	$155.5	$910.6	$229.6	$875.7	$193.7	$67.4	$116.0
Fixed costs per day	$2,240.7	$1,655.3	$2,090.3	$1,358.9	$3,814.6	$1,988.6	$4,770.0	$2,623.4	$3,087.2	$2,351.1	$3,393.2	$1,423.1
Fixed costs per metric ton landed	$159.2	$92.7	$172.3	$45.4	$405.8	$193.5	$470.8	$174.4	$397.7	$58.6	$827.7	$189.4
Total cost net revenue per day	$581.5	$610.8	$1,896.6	$1,020.3	$2,736.2	$3,463.9	$1,696.6	$1,570.3	$4,784.5	$3,406.5	$1,773.9	$2,448.2
Total cost net revenue per metric ton landed	$20.0	$26.5	$35.3	$56.3	$721.7	$80.1	$439.8	$55.5	$478.0	$136.0	-$760.3	$80.8

Table 13.6: Oregon mean and median rates for West Coast operations. Mean and median revenue, costs, and net revenue ($) per day and per metric ton harvested. ($N_{2009} = 75$, $N_{2010} = 73$, $N_{2012} = 76$, $N_{2013} = 72$, $N_{2014} = 72$).

Description	2009		2010		2011		2012		2013		2014	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Revenue per day	$5,577.7	$4,724.9	$6,162.1	$4,632.6	$8,551.0	$7,699.8	$7,958.2	$6,484.7	$9,832.0	$9,089.4	$9,124.9	$8,961.1
Revenue per metric ton landed	$1,122.8	$1,022.0	$1,121.2	$961.4	$2,208.6	$1,351.4	$2,136.5	$1,232.1	$1,990.9	$1,399.3	$2,305.5	$1,331.1
Variable costs per day	$3,123.9	$2,566.1	$3,594.0	$2,885.6	$4,521.8	$3,858.9	$4,955.2	$3,973.6	$5,471.1	$4,769.3	$5,746.4	$4,780.5
Variable cost per metric ton landed	$698.6	$525.6	$761.7	$583.1	$1,104.5	$782.4	$1,350.1	$772.7	$1,066.4	$755.2	$1,353.6	$754.1
Variable cost net revenue per day	$2,453.7	$1,849.6	$2,568.2	$1,694.9	$4,029.2	$3,383.2	$3,003.1	$2,359.6	$4,361.0	$3,956.4	$3,378.5	$3,414.4
Variable cost net revenue per metric ton landed	$424.2	$363.3	$359.5	$342.2	$1,104.1	$546.8	$786.3	$490.5	$924.5	$610.9	$951.9	$602.5
Fixed costs per day	$1,994.7	$1,001.9	$1,751.7	$1,067.2	$2,287.7	$1,565.6	$4,193.2	$1,729.9	$2,302.1	$1,367.6	$1,912.2	$1,118.7
Fixed costs per metric ton landed	$313.7	$220.1	$331.9	$221.9	$662.9	$241.9	$1,772.7	$275.6	$425.8	$179.7	$594.4	$166.1
Total cost net revenue per day	$459.1	$685.7	$816.5	$562.0	$1,741.6	$1,373.8	-$1,190.1	$760.2	$2,058.8	$2,209.5	$1,466.3	$1,875.1
Total cost net revenue per metric ton landed	$110.5	$137.8	$27.5	$119.7	$441.2	$232.0	-$986.4	$124.8	$498.7	$388.0	$357.5	$383.7

Table 13.7: California mean and median rates for West Coast operations. Mean and median revenue, costs, and net revenue ($) per day and per metric ton harvested. ($N_{2009} = 40$, $N_{2010} = 41$, $N_{2012} = 43$, $N_{2013} = 41$, $N_{2014} = 38$).

Description	2009		2010		2011		2012		2013		2014	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Revenue per day	$4,259.9	$3,420.4	$4,824.7	$3,997.0	$6,985.5	$6,234.5	$6,532.1	$5,985.4	$6,316.8	$5,682.8	$6,561.1	$6,462.5
Revenue per metric ton landed	$1,839.4	$1,410.0	$2,105.2	$1,377.6	$2,796.9	$1,735.0	$3,234.3	$2,224.4	$3,030.1	$2,393.3	$3,508.7	$2,108.3
Variable costs per day	$2,666.0	$2,544.2	$2,825.6	$2,622.0	$4,086.7	$3,554.5	$3,894.6	$3,323.0	$4,280.4	$3,743.0	$4,109.5	$3,770.3
Variable cost per metric ton landed	$1,719.1	$880.9	$1,193.0	$886.2	$2,364.3	$1,029.3	$2,200.4	$1,214.6	$10,477.5	$1,293.4	$2,698.1	$1,376.3
Variable cost net revenue per day	$1,593.9	$1,367.0	$1,999.1	$1,290.7	$2,898.8	$2,566.3	$2,637.5	$2,310.7	$2,036.4	$2,599.6	$2,451.7	$2,397.2
Variable cost net revenue per metric ton landed	$120.3	$543.7	$912.2	$547.8	$432.5	$769.3	$1,033.9	$768.8	-$7,447.4	$868.6	$810.6	$734.7
Fixed costs per day	$1,109.8	$915.0	$1,002.9	$766.0	$15,196.2	$1,273.9	$3,431.6	$1,592.4	$1,714.8	$1,011.7	$2,241.9	$873.7
Fixed costs per metric ton landed	$597.9	$460.7	$440.9	$288.1	$13,545.4	$470.6	$2,439.8	$772.8	$3,828.7	$443.0	$10,065.6	$335.5
Total cost net revenue per day	$484.1	$246.9	$996.1	$557.4	-$12,297.4	$1,271.5	-$794.2	$588.9	$321.7	$1,243.1	$209.7	$1,659.3
Total cost net revenue per metric ton landed	-$477.6	$75.8	$471.3	$229.2	-$13,112.8	$431.2	-$1,405.8	$251.7	-$11,276.1	$409.3	-$9,255.0	$427.2

Cost Disaggregation

In order to conduct economic analyses of specific fisheries it is important to have costs broken out by fishery. However, vessels participating in multiple fisheries incur costs that are aggregated across fisheries. These are called joint costs in the economics and accounting literature. They may include fixed costs (e.g., a new engine), or variable costs (e.g., fuel). The former are joined by the nature of the costs, while the latter are joined due to observational limitations. It is difficult to assign fixed costs to a particular fishery because the level of the cost does not vary with vessel participation (at least over the short run).

Some variable costs can be tracked by fishery, but would be costly to do so. For example, although a vessel could theoretically set up a system to track fuel expenditures by fishery, doing so is rare among the EDC catcher vessels. Moreover, some types of fuel use are inherently (by their nature) difficult to allocate, even if they are tracked. An example is a vessel that fishes both on the West Coast and in Alaska. It is not obvious what proportion of the fuel consumed while steaming between the fisheries should be allocated to the West Coast.

There are four methods available for cost disaggregation: 1) disaggregation by weight of shoreside landings and at-sea deliveries; 2) disaggregation by value of shoreside landings and at-sea deliveries; 3) disaggregation by days at sea; and, 4) disaggregation by a combination of the other three methods by cost category ("mixed method"). The body of this report uses the "mixed method" for all cost disaggregation.

Use of these methods requires data from various sources. The total weight and ex-vessel revenue from shoreside landings are obtained from fish ticket data. The total weight of at-sea deliveries is obtained from A-SHOP data, and the ex-vessel revenue from at-sea deliveries in obtained from EDC data. The days at sea are also obtained from EDC data. Landings and days at sea are allocated to specific fisheries using the methods described in Section 3: Vessel Participation on the West Coast and in Alaska.

Alaska landings and revenues obtained from EDC data were appended to the information extracted from the West Coast fish ticket data. This was only done for operators who also operated the vessel on the West Coast. If a vessel only participated in Alaska fisheries, the data were excluded from the analyses. If a vessel fished in Alaska, but the operator of the vessel was different from the operator on the West Coast, the Alaska portion was also excluded.

If the vessel was operated by more than one company during the fiscal year, the range of dates that are used to pull the fish ticket records is adjusted. There are two cases when this would occur: the vessel was leased to a different operator, or the vessel was sold mid-year to another company. In cases where the vessel was sold mid-year, information from the Permit Office must be obtained to determine when the vessel was transferred to a new company. Although both the Coast Guard and the Permit Office track vessel ownership information, we

use the Permit Office data as the authoritative source for this information. When the vessel transfers ownership, a new record is made in the Permit Office database and so the dates of operation of the multiple companies can be determined and used as the range of dates for pulling the fish ticket records. Occasionally, the paperwork for vessel sales lags with the change in operation, additional information provided by the participant on the form or other communications is used to adjust the fiscal year used to calculate total revenue to best correspond with the information provided on the form. If the vessel was leased by the owner of the vessel, then the lease dates provided on the EDC form are combined with the fiscal year data to pull the fish ticket records.

Once the total revenues from shoreside landings is calculated, it is then added to the other revenue categories provided on the forms to generate the total revenue. Landings of species associated with zero revenue were excluded entirely from the cost disaggregation analyses.

Listed below are the variables used to disaggregate each cost category for the "mixed" method:

- Costs were disaggregated using ex-vessel revenue for the following cost categories:
  - Capitalized expenditures
  - Crew wages
  - Captain wages
  - Travel
  - Fishery association dues
  - Fees
  - Vessel and on-board equipment.
- Costs were disaggregated using at-sea deliveries and shoreside landings weight for the following cost categories:
  - Bait (only aggregated to non-trawl fisheries)
  - Offload fees
  - Trucking expenses
  - Fishing gear.
- Costs were disaggregated using days at sea for the following cost categories:
  - Food
  - Fuel
  - Ice
  - Insurance
  - Other supplies
  - Communications
  - Lease of the vessel
  - Moorage.

To understand the potential implications of the assumptions associated with the four methods of cost disaggregation, the output of the different methods were examined by looking at the effect on average total cost net revenue on the West Coast. Total cost net revenue by cost disaggregation type are presented in Tables A.1 (cost disaggregation using ex-vessel revenue), Table A.2 (cost disaggregation using at-sea deliveries and shoreside landings),Table A.3 (cost disaggregation using days at sea) and A.4 (cost disaggregation using "mixed method").

Using landings and delivery weight resulted in allocating the largest variable and fixed costs to the West Coast than any other method and therefore, the lowest total cost net revenue. The days at sea method resulted in the highest total cost net revenue. Although the different methods resulted in different allocations of costs, Figure 76 shows that there were no major differences between the methods.

Table A.1: Net revenue using ex-vessel revenue for cost disaggregation. Total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) for all participation in the West Coast groundfish trawl catch share program using ex-vessel revenue to disaggregate costs from other fisheries.

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$317	122	$373	121	$586	112	$530	110	$601	109	$626	104
(Variable costs)	($180)	122	($204)	121	($291)	112	($312)	110	($336)	109	($366)	104
Variable cost net revenue	**$137**	**122**	**$170**	**121**	**$294**	**112**	**$218**	**110**	**$264**	**109**	**$260**	**104**
(Fixed costs)	($110)	122	($111)	121	($155)	112	($182)	110	($135)	109	($142)	104
Total cost net revenue	**$28**	**122**	**$58**	**121**	**$140**	**112**	**$36**	**110**	**$129**	**109**	**$118**	**104**

Table A.2: Net revenue using at-sea deliveries and shoreside landings for cost disaggregation. Total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) for all participation in the West Coast groundfish trawl catch share program using at-sea deliveries and shoreside landings to disaggregate costs from other fisheries.

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$317	122	$373	121	$586	112	$530	110	$601	109	$626	104
(Variable costs)	($199)	122	($221)	121	($309)	112	($328)	110	($366)	109	($388)	104
Variable cost net revenue	**$118**	**122**	**$152**	**121**	**$277**	**112**	**$202**	**110**	**$235**	**109**	**$239**	**104**
(Fixed costs)	($137)	122	($132)	121	($184)	112	($204)	110	($162)	109	($163)	104
Total cost net revenue	**-$19**	**122**	**$20**	**121**	**$93**	**112**	**-$2**	**110**	**$73**	**109**	**$76**	**104**

Table A.3: Net revenue using days at sea for cost disaggregation. Total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) for all participation in the West Coast groundfish trawl catch share program using days at sea to disaggregate costs from other fisheries.

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$317	122	$373	121	$586	112	$530	110	$601	109	$626	104
(Variable costs)	($180)	122	($201)	121	($285)	112	($305)	110	($349)	109	($364)	104
Variable cost net revenue	**$137**	**122**	**$173**	**121**	**$300**	**112**	**$224**	**110**	**$251**	**109**	**$263**	**104**
(Fixed costs)	($106)	122	($111)	121	($148)	112	($179)	110	($134)	109	($140)	104
Total cost net revenue	**$31**	**122**	**$61**	**121**	**$152**	**112**	**$46**	**110**	**$117**	**109**	**$123**	**104**

Table A.4: Net revenue using the mixed method for cost disaggregation. Total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue (thousands of $) for all participation in the West Coast groundfish trawl catch share program using the mixed method to disaggregate costs from other fisheries.

	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	$317	122	$373	121	$586	112	$530	110	$601	109	$626	104
(Variable costs)	($182)	122	($205)	121	($293)	112	($311)	110	($343)	109	($368)	104
Variable cost net revenue	**$135**	**122**	**$168**	**121**	**$293**	**112**	**$219**	**110**	**$258**	**109**	**$258**	**104**
(Fixed costs)	($116)	122	($118)	121	($164)	112	($188)	110	($139)	109	($142)	104
Total cost net revenue	**$20**	**122**	**$50**	**121**	**$128**	**112**	**$31**	**110**	**$119**	**109**	**$116**	**104**

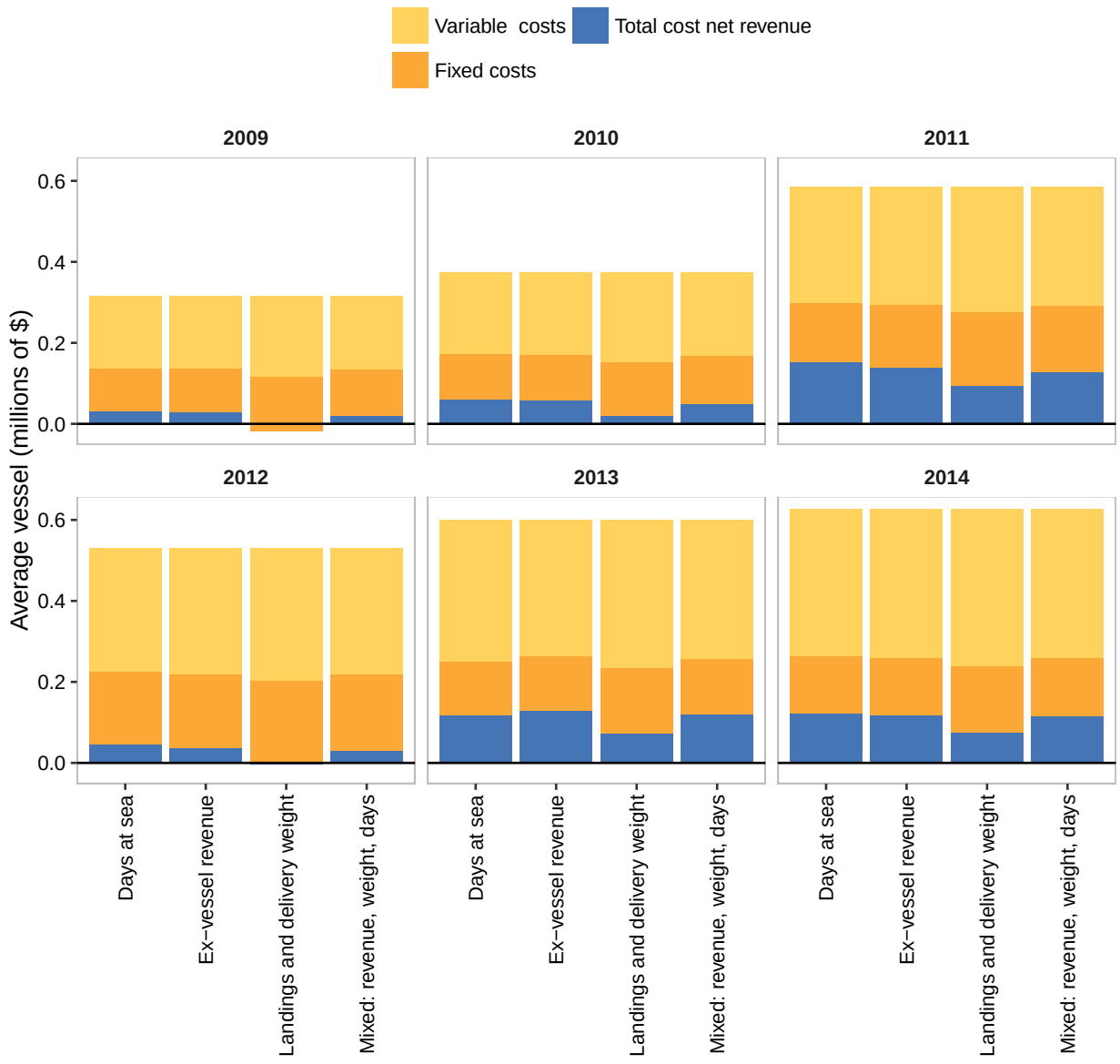

Figure 76: Sensitivity analysis for cost disaggregation methods. Sensitivity analysis of cost disagreggation methods on total cost net revenue for vessel operations in the catch share program (whiting and non-whiting groundfish). The three methods are disaggregation by landings and delivery weight, days at sea, ex-vessel revenue, and "mixed" where costs are disaggregated by one of the three methods depending on the type of cost.