

Economic Data Collection Program  
Catcher-Processor Report (2009-2014)  
Draft Report for PFMC Review

Do Not Cite

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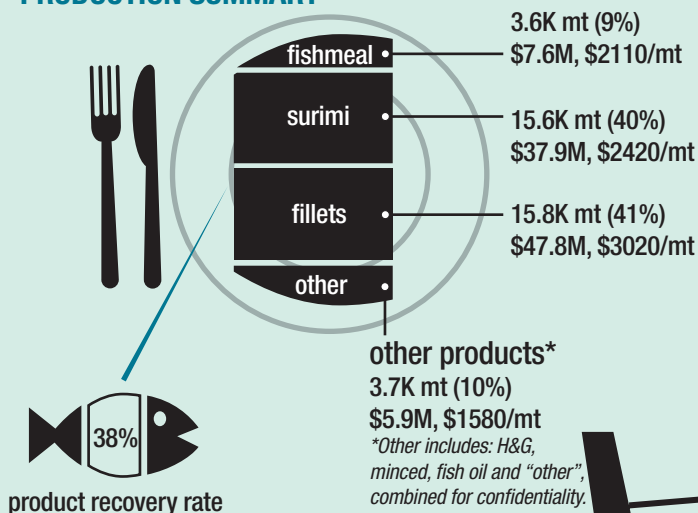
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<sup>1</sup> For questions or comments, please contact the EDC Program at [nwfsc.edc@noaa.gov](mailto:nwfsc.edc@noaa.gov).

# 2014 Economic Data Collection (EDC) West Coast Groundfish Catch Share Program

## CATCHER PROCESSOR

### PACIFIC WHITING FLEET-WIDE PRODUCTION SUMMARY



### ECONOMIC SUMMARY\*

#### Vessel Average

\$11M revenue  
\$4.5M variable costs  
\$6.5M variable cost net revenue  
\$1.1M fixed cost  
\$5.4M total cost net revenue

\$109.7K variable cost net revenue per day

#### Fleet-wide Totals

9 vessels  
\$99.2M revenue  
\$58.7M variable cost net revenue  
\$48.9M total cost net revenue

### FISHERY PARTICIPATION

	Days at Sea
Average days fishing, processing, and steaming on the West Coast	59
Average days steaming to and from Alaska	20
Average days in Alaska	145

### ALASKA PARTICIPATION

9 WC vessels  
332K mt fleet-wide catch

### WC DELIVERY PORTS

# of vessels offloading in each port

● Bellingham (4)

● Seattle\* (4)

● Tacoma (3)

4.3K mt annual production per vessel

(\*all nine catcher processors report Seattle as their home port.)

Engine: 6.6K hp

Vessel market value: \$54.7M

Replacement value: \$89.9M

Fuel use & costs

6.7K gal/day

335K gal/season

Total fuel cost: \$1.2M

Observers:  
\$32.7K

Processing crew: 98  
Compensation: \$16K per person

Non-processing crew: 24  
Compensation: \$28.1K per person

Food cost: \$132 K

AVERAGE VESSEL

### TOTAL CATCH

103,203 mt

Harvest & vessel lengths\*\*

### WHITING ALLOCATION

Total Catcher Processor Allocation: 103,486 mt

Total Non-tribal US Pacific whiting TAC: 304,370 mt

### CP ALLOCATION BY COMPANY

American Seafoods	49.4%
Trident Seafoods Corp	29.6%
Glacier Fish	21.0%

271 ft	272 ft	276 ft	277 ft	286 ft	320 ft	336 ft	341 ft	376 ft
Seattle Enterprise: 9,219 mt	American Dynasty: 10,731 mt	Pacific Glacier: 8,294 mt	Kodiak Enterprise: 12,658 mt	American Triumph: 12,478 mt	Island Enterprise: 7,696 mt	Northern Jaeger: 12,338 mt	Northern Eagle: 17,557 mt	Alaska Ocean: 12,232 mt

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

\*\* PWCC Amendment 20 Catcher/Processor Cooperative Annual Report 2014

[www.nwfsc.noaa.gov/edc/reports](http://www.nwfsc.noaa.gov/edc/reports)

# Catcher-Processor Sector: 2014 Highlights<sup>1</sup>

In 2014, the West Coast at-sea catcher-processor fleet consisted of nine catcher-processors owned by three companies that harvest Pacific whiting on the West Coast.

- The catcher-processor fleet generated \$142 million in income and supported 1,895 jobs from Pacific whiting caught in the catch share program.
- Catcher-processor vessels spent an average of 59 days fishing, processing, and steaming along the West Coast from May through November.
- The fleet spent about 26% of its time operating in the West Coast whiting fishery. Otherwise, they were targeting pollock in Alaska.
- West Coast catcher-processors delivered to three ports: Bellingham, Seattle, and Tacoma. All nine vessels listed Seattle as their homeport.
- The catcher-processor sector caught nearly all of their allocated 103,000 metric tons of Pacific whiting.
- Fillet and surimi production made up 86% of the total production value. Fillets received an average price of \$3,020 per metric ton, followed by surimi and fishmeal at \$2,420 and \$2,110 per metric ton, respectively.
- Approximately 98 processing and 24 non-processing crewmembers worked on each catcher-processor vessel. Average compensation for each processing and non-processing crewmember was about \$16,000 and \$28,100, respectively, representing 6% and 70% growth compared to baseline conditions in 2009 and 2010.
- Vessels generated an average revenue of \$11 million and spent \$5.62 million in fixed and variable costs, leading to an average total cost net revenue of approximately \$5.4 million per vessel for the year.
- Vessels earned a total cost net revenue of \$1,230 per metric ton produced, a 4 fold increase compared to baseline conditions in 2009 and 2010.

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<sup>1</sup> Values reported in inflation adjusted 2014 dollars. The pre-catch share baseline period is defined as the years 2009 and 2010.

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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.<sup>2</sup> 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-processor 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-Processor Overview (beginning on page 9), is an in-depth summary that contains descriptive analyses of the catcher-processor fleet focusing on activities during 2014. The second section, Catcher-Processor Data Summaries (beginning on page 25), 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-Processor Data Analysis (beginning on page 47), 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

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<sup>2</sup> Information about the West Coast Groundfish Trawl Catch Share Program is available online at [http://www.westcoast.fisheries.noaa.gov/fisheries/groundfish\\_catch\\_shares/](http://www.westcoast.fisheries.noaa.gov/fisheries/groundfish_catch_shares/).

quality controls and quality checks, data processing, and safeguarding confidential information can be found in the EDC Administration and Operations Report.<sup>3</sup>

## **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.<sup>3</sup>

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

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<sup>3</sup> 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>.



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<sup>4</sup> is used to estimate regional economic impacts using data from both the EDC survey forms and the voluntary cost earnings survey as model inputs.<sup>5</sup>

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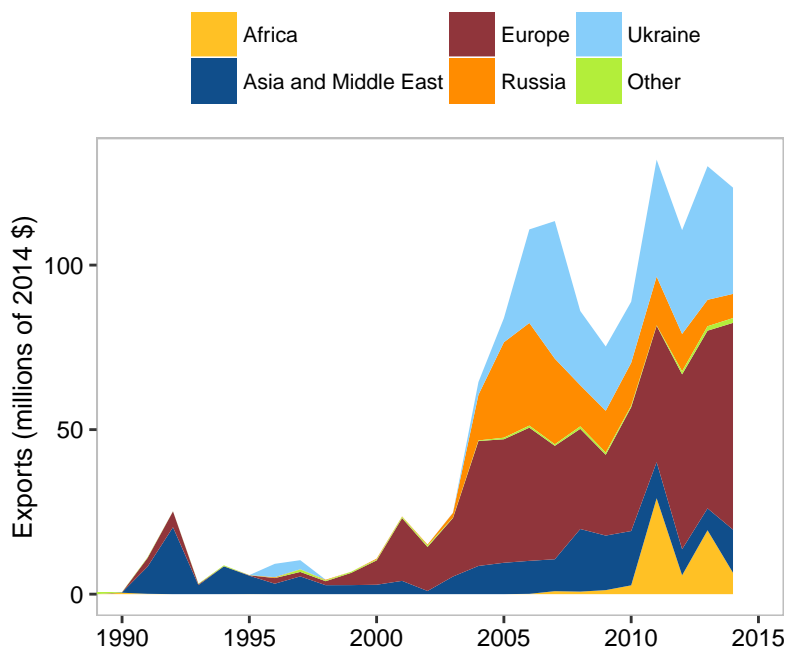
<sup>4</sup> Leonard, J., and P. Watson. 2011. Description of the input-output model for Pacific Coast fisheries. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-111, 64 p.

<sup>5</sup> 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 an individual fishing quota (IFQ) program for the shorebased trawl fleet and cooperatives for the mothership (including catcher vessels and motherships) and catcher-processor fleets. Catcher-processors are vessels that both catch fish and process them on-board. The At-sea Pacific whiting fishery also includes motherships, which are factory vessels that only process fish at sea, and catcher vessels that catch fish and then deliver to motherships. In 2014, the catcher-processor sector generated \$142 million in income and supported 1,895 jobs from Pacific whiting caught in the catch share program.<sup>1</sup>



**Figure 1:** Total exports of fresh and frozen Pacific whiting (including mothership, catcher-processor, and shoreside production) from the U.S. by recipient region (millions of 2014 \$).

The domestic Pacific whiting fishery grew rapidly in the 1990s after the United States banned foreign vessels from processing Pacific whiting harvested off the West Coast. Demand in the international market has continued to rise as a result of improved surimi production methods and Marine Stewardship Council (MSC) certification<sup>2</sup> in 2009. The Pacific whiting fishery has subsequently been transformed into one of the largest fisheries by volume in the United States.

<sup>1</sup> Values calculated using the NWFSC IO-PAC model (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.)

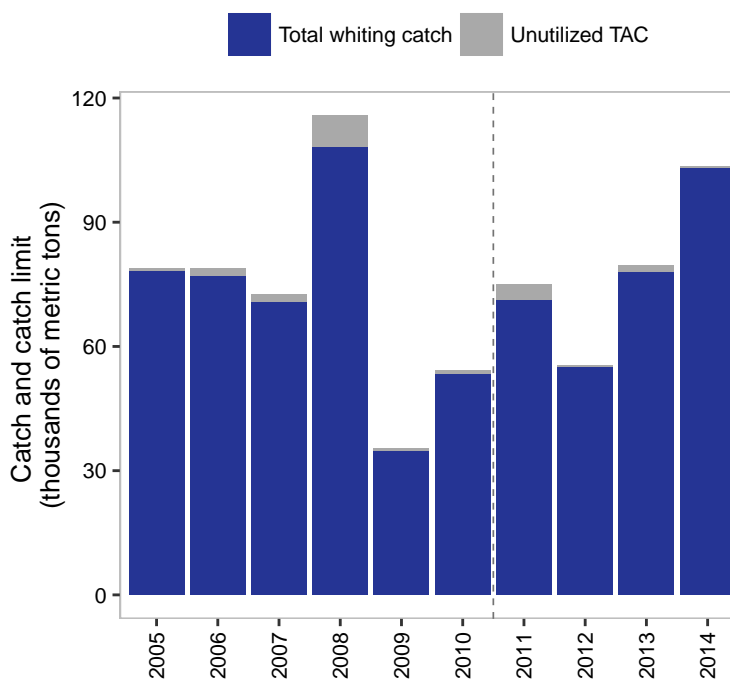
<sup>2</sup> The MSC certification indicates that the West Coast Pacific whiting fishery has met the standard for “good management practices to safeguard jobs, secure fish stocks for the future and to help to protect the marine environment”. This certification has opened new markets, largely in the European Union, for Pacific whiting.

In 2014, nearly 62,000 metric tons of Pacific whiting worth more than \$100 million were exported from the United States<sup>3</sup> (Figure 1). Since 2000, most of these exports went to the European Union, followed by Russia and Ukraine. In 2014, Russia implemented trade sanctions against Europe and the United States, which could lead to declining demand for whiting exports. To date, it is unknown when these sanctions will be lifted.

The catcher-processor fleet on the West Coast has operated as a cooperative since 1997, when the Pacific Whiting Conservation Cooperative (PWCC) was formed. The PWCC consists of all catcher-processor vessels that currently participate in the Pacific whiting fishery on the West Coast. The primary function of the PWCC is to coordinate harvesting efforts of the catcher-processor vessels. While the 2011 catch share program dramatically changed the structure of the shoreside Pacific whiting and mothership fisheries, the catcher-processor sector experienced fewer changes, and has continued to operate as a single cooperative.

The Pacific Fishery Management Council and National Marine Fisheries Service (NMFS) are responsible for managing the U.S. fishery for the coastal stock of Pacific whiting through a bilateral agreement between the United States and Canada, known as the Pacific Whiting Treaty. The United States and Canada signed an agreement in 2003 (which became law in 2007) that allocates a set percentage of the harvest quota to American and Canadian harvesters. The United States is allocated 73.88% and Canada the remaining 26.12%. Managers mainly use annual harvest quotas to regulate the coast-wide catch of Pacific whiting. Regulations prohibit processing at-sea south of the Oregon-California border.

The catcher-processor sector receives 34% of the allocation, and the mothership and shoreside sectors are allocated 24% and 42%, respectively. Towards the end of the season, NMFS often redistributes unfished tribal allocation among the three commercial sectors according to the same proportions. Commercial allocation may also be redistributed

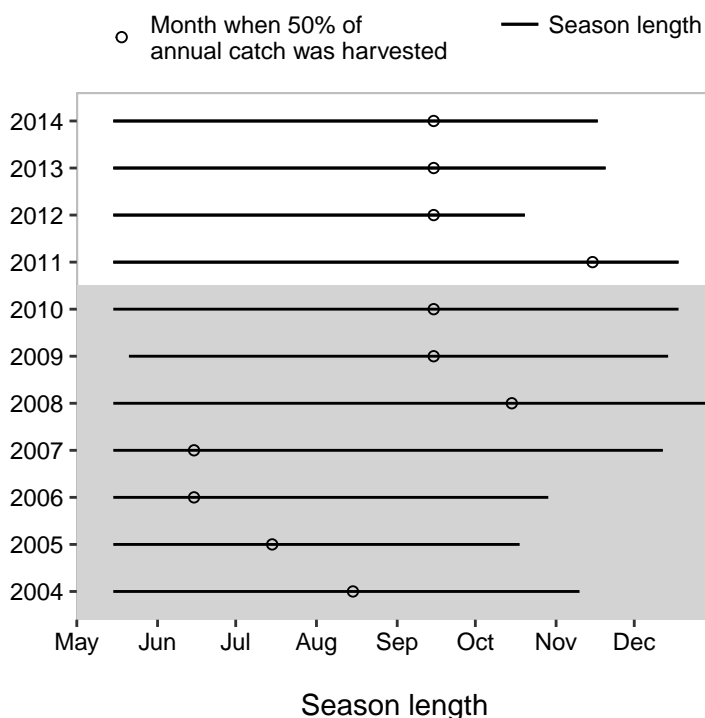


**Figure 2:** Catcher-processor sector Pacific whiting catch limits, including any reapportionments among sectors that may have occurred during the season (thousands of metric tons). Dashed line represents the beginning of the catch share program.

<sup>3</sup> NMFS Science and Technology Commercial Fisheries Statistics, <http://www.st.nmfs.noaa.gov/commercial-fisheries/foreign-trade/index>.

between sectors. For example, in 2008, catcher-processors received an additional 36,724 metric tons of whiting allocation over the original catch limit from the shorebased and mothership surplus Pacific whiting.<sup>4</sup>

Because of high variability in recruitment and other sources of uncertainty in the stock assessments, catch limits have varied substantially during the EDC collections from 2009 to 2014.<sup>5</sup> After several seasons of large Pacific whiting harvests from 2006-2008, managers lowered the catch limit substantially in 2009, but have raised it every year since with the exception of 2012 (Figure 2).



**Figure 3:** Season length for the catcher-processor Pacific whiting fishery from 2004 through 2014, with horizontal lines representing when the first and last whiting was caught each year. The open circle represents the month when half of the cumulative annual catch was caught. The shaded region represents the seven years prior to the implementation of the catch share program.

rockfish, and 6% of allocated canary rockfish. The Pacific whiting fishery on the West Coast has an average bycatch rate of less than 1% of the total Pacific whiting catch.<sup>7</sup> The PWCC also engages in

In 2014, the catcher-processor sector was allocated 103,000 metric tons of Pacific whiting; about 23,900 metric tons more than the allocation in 2013, and about 47,900 metric tons more than the allocation in 2012 (Figure 2). The average catch per vessel was 11,500 metric tons in 2014, and the fleet as a whole caught the entire annual allocation.

In addition to receiving an allocation of Pacific whiting quota, the catcher-processor sector is also allocated quota for bycatch. In 2014, the catcher-processor sector was allocated 10.2 metric tons of Pacific ocean perch, 170.0 metric tons of widow rockfish, 9.0 metric tons of dark blotched rockfish, and 7.6 metric tons of canary rockfish.<sup>6</sup> Vessels caught less than 4% of the allocated Pacific ocean perch, 20% of the widow rockfish, 40% of darkblotched

<sup>4</sup> For allocation and season catch summaries going back through 2005, see [http://www.westcoast.fisheries.noaa.gov/fisheries/management/whiting/whiting\\_reports\\_and\\_rulemakings.html](http://www.westcoast.fisheries.noaa.gov/fisheries/management/whiting/whiting_reports_and_rulemakings.html).

<sup>5</sup> Pacific Fishery Management Council, <http://www.pcouncil.org/groundfish/stock-assessments/by-species/pacific-whiting-hake/>.

<sup>6</sup> Biennial Specifications and Management Measures; Inseason Adjustments, <http://www.gpo.gov/fdsys/pkg/FR-2014-11-20/pdf/2014-27489.pdf>.

<sup>7</sup> Pacific Whiting Conservation Coop Am 20 Catcher/Processor Cooperative Annual Report 2014: [http://www.pcouncil.org/wp-content/uploads/2015/03/IR3\\_2014\\_Co-op\\_Annual\\_Rpt\\_CP\\_APR2015BB.pdf](http://www.pcouncil.org/wp-content/uploads/2015/03/IR3_2014_Co-op_Annual_Rpt_CP_APR2015BB.pdf).

voluntary bycatch avoidance initiatives as part of an effort to reduce the incidental catch of species of concern, such as the Endangered Species Act listed Pacific salmon and overfished rockfish. The catcher-processor fleet caught about four prohibited and protected fish per every 100 metric tons of Pacific whiting in 2014, mostly Chinook salmon, but also eulachon and Pacific Halibut.<sup>8</sup>

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 darkblotched rockfish. In 2011, widow rockfish was taken off the overfished list.<sup>9</sup> 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,<sup>10</sup> and the coast-wide annual catch limit will likely be increased for both widow rockfish and canary rockfish starting in 2017.

## Catcher-Processor Sector Description

In 2014, the catcher-processor fleet consisted of nine catcher-processors owned by three companies that harvest Pacific whiting, also known as Pacific hake (*Merluccius productus*) on the West Coast. Catcher-processors are large vessels with an average length of 306 feet. The average horsepower of the main engines was 6,610 and average fuel capacity was 271,000 gallons in 2014. The West Coast catcher-processor fleet harvested approximately 19% of all West Coast fish, 37% of all Groundfish Trawl Catch Share Program fish, and 39% of Pacific whiting caught within the fishery.

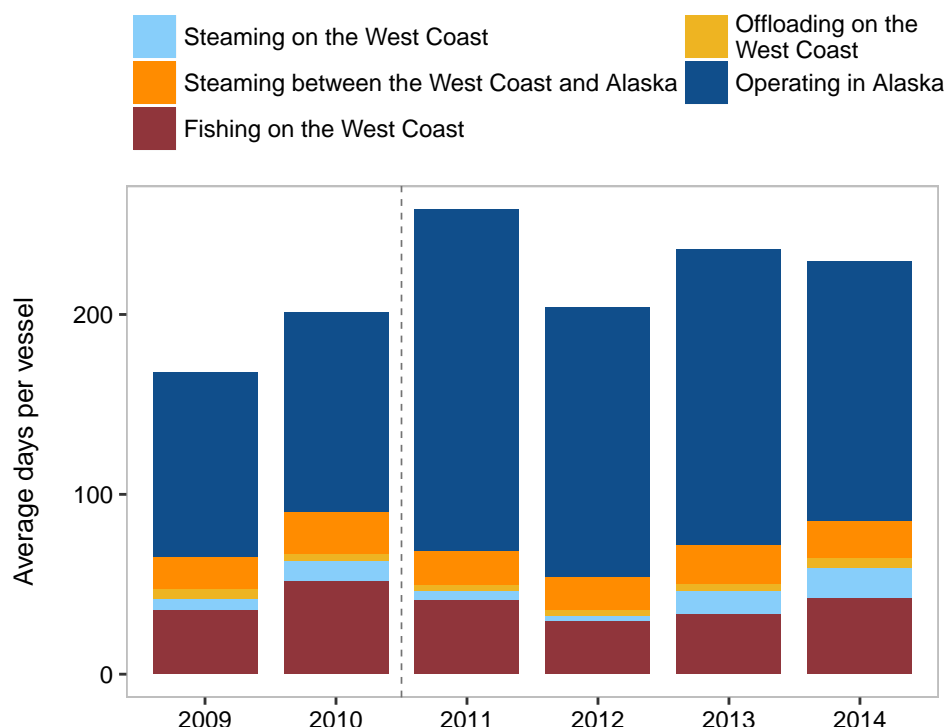
The West Coast Pacific whiting season is open from May 15 through December. Over the last ten years, each season has been at least five months long (extending into October) (Figure 3). In 2014, fishing occurred from May through November, with fishing in every month except July. Catcher-processor vessels spent an average of 59 days engaged in fishing activities on the West Coast in 2014. About 28% of the days at sea were spent steaming, while the remaining days were spent catching and processing fish. West Coast catcher-processors deliver Pacific whiting to three Washington state ports: Blaine/Bellingham, Seattle, and Tacoma.

Catcher-processors also participate in Alaskan fisheries. In 2014, the catcher-processor fleet spent 63% of their total days (days fishing, processing, and steaming on the fishing grounds) fishing for Alaska pollock in the Bering Sea and Aleutian Islands (Figure 4). In 2014, the average catcher-processor spent 20 days steaming between the West Coast and Alaska. A summary of catcher-processor fleet activity is available in Catcher-Processor Data Summaries, Table 2.1.

<sup>8</sup> 2014 Pacific whiting fishery summary: [http://www.westcoast.fisheries.noaa.gov/publications/fishery\\_management/groundfish/whiting/2014-summary.pdf](http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/groundfish/whiting/2014-summary.pdf).

<sup>9</sup> Status of the widow rockfish resource in 2011: [http://www.pcouncil.org/wp-content/uploads/Widow\\_2011\\_Assessment.pdf](http://www.pcouncil.org/wp-content/uploads/Widow_2011_Assessment.pdf).

<sup>10</sup> 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](http://www.pcouncil.org/wp-content/uploads/2015/05/D8_Att1_Canary_2015_FULL-E-Only_JUN2015BB.pdf).



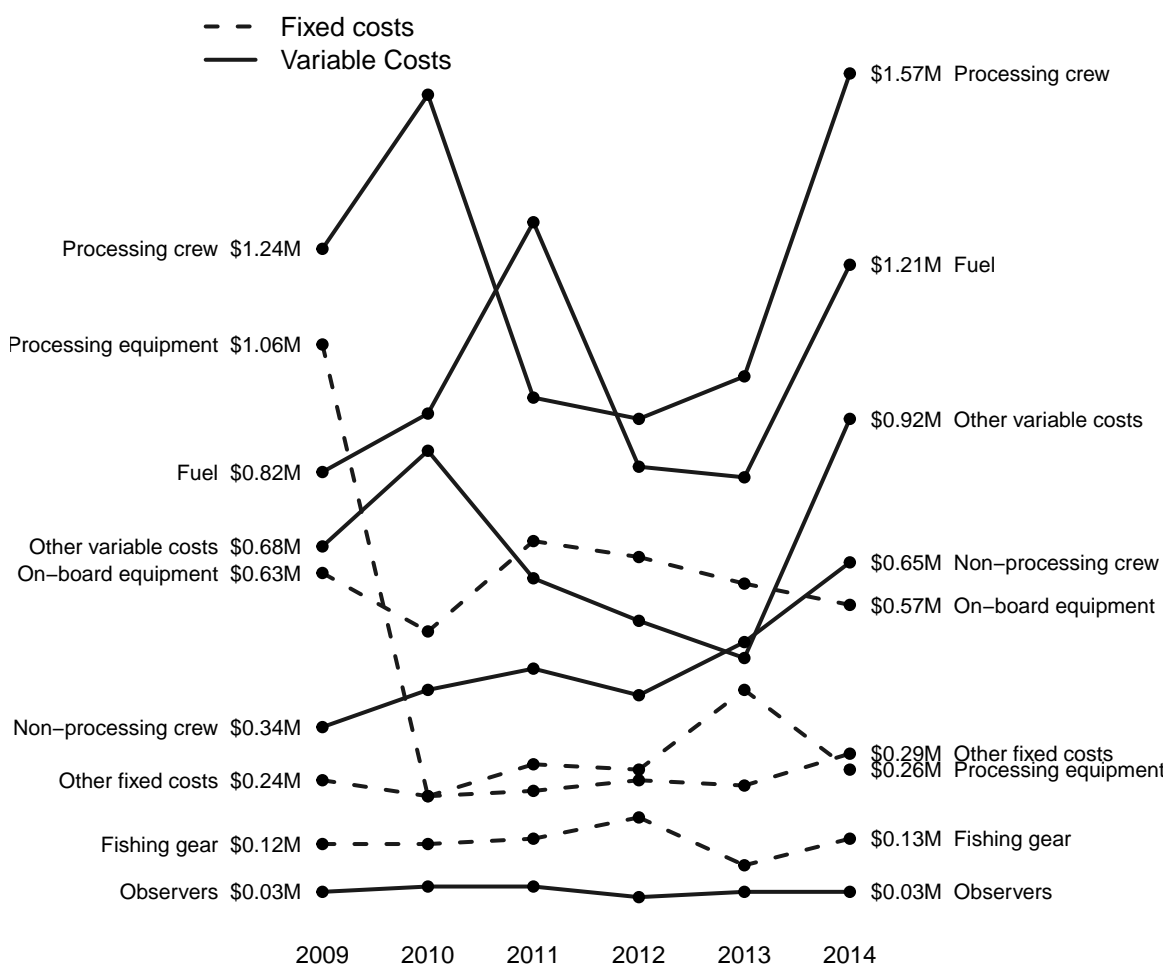
**Figure 4:** Average number of days spent in each activity per catcher-processor vessel. Dashed line represents the beginning of the catch share program.

## 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. All values reported here in the Overview section are inflation adjusted 2014 dollars. 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.

### *Variable Costs*

Vessel costs are separated into two categories: variable costs and fixed costs. Variable costs comprise the majority of a vessel’s total expenditures and include fish purchases, fuel, crew compensation, food, additives, packaging and materials, and observer coverage. Variable costs vary with the level of fishery participation and averaged approximately \$4.5 million per vessel in 2014 (see Catcher-Processor Data Summaries, Table 8.1).



**Figure 5:** Average fixed (dashed line) and variable costs (solid line) per vessel (millions of 2014 \$).

The three largest categories of variable costs are processing crew compensation (\$1.57 million), fuel (\$1.21 million), and non-processing crew compensation (\$653,000) (Figure 5). In 2014, an average of 98 processing crewmembers (including line workers, fishmeal crew, quality control, technicians, cleanup, factory managers, combis, and mechanics) worked on each catcher-processor vessel in the West Coast whiting fishery. There were an average of 24 non-processing crewmembers (including the captain, deckhands, wheelhouse, galley, and engineers). Average compensation for processing and non-processing crewmembers was about \$16,000 and \$28,100 per position, respectively. Average compensation for processing and non-processing crewmembers has grown by 6% and 70%, respectively, compared to baseline conditions in 2009 and 2010.

Average daily fuel use while operating on the West Coast and in Alaska has remained relatively constant compared to baseline conditions, decreasing by just 10% to approximately 6,710 gallons per day in 2014. Fuel and lubrication comprise one of the largest cost categories for the fleet on the West Coast, with total costs varying with fuel prices. The Pacific States Marine Fisheries Commission tracks historical

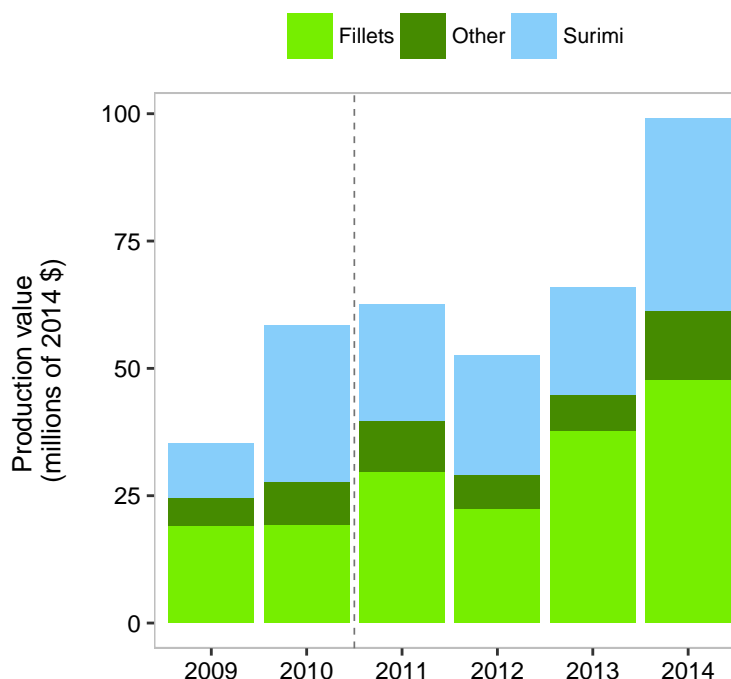
marine fuel prices, which in Washington State increased from \$1.92 in March 2009 to a high of \$4.10 in April 2012.<sup>11</sup> The average cost reported by vessels for fuel expenses on the West Coast has increased by 38% from baseline conditions to 2014. Unlike previous years, in 2014, catcher-processors reported that they no longer burn fish oil for fuel but instead sell it (Catcher-Processor Data Summaries, Tables 5.2 and 7.1).

Observer coverage on catcher-processors dates back to the Fishery Conservation and Management Act of 1976. Catcher-processors, like the rest of the processing fleet, continued to have two observers on board while operating in the West Coast Pacific whiting fishery after the implementation of the catch share program. Observer coverage for catcher-processors cost an average of \$32,700 per vessel for the 2014 year.

The Magnuson-Stevens Act requires that NMFS compute and collect cost recovery fees from participants of limited access privilege programs, such as catch shares, to recover additional government costs attributable to the private sector use of a public resource. Cost recovery fees were implemented for the West Coast groundfish fishery in 2014 and are calculated yearly, not to exceed 3% of ex-vessel value.<sup>12</sup>

### Fixed Costs

Catcher-processor vessel fixed costs include capitalized expenditures and expenses on vessel and on-board equipment, fishing gear, and processing equipment. In general, these do not vary as directly with fishing effort.<sup>13</sup> Average total expenditures on vessel and on-board equipment, fishing gear, and processing equipment has averaged \$522,000 from 2009 to 2014. In 2014, the average West Coast



**Figure 6:** Fleet-wide production value by product type (millions of 2014 \$). The Other category includes fish oil, fishmeal, headed and gutted, minced, roe, and other, these categories are combined to protect confidential data. Dashed line represents the beginning of the catch share program.

<sup>11</sup> PSMFC 2015. West Coast and AK Marine Fuel Prices Annual Report, <http://www.psmfc.org/efin/docs/2014FuelPriceReport.pdf>.

<sup>12</sup> For more information on cost recovery fees, see the Compliance Guide at [http://www.westcoast.fisheries.noaa.gov/publications/fishery\\_management/groundfish/public\\_notices/cost-recovery-compliance-guide.pdf](http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/groundfish/public_notices/cost-recovery-compliance-guide.pdf).

<sup>13</sup> All of the average fixed costs collected, and the breakout for fixed costs on the West Coast, are reported in Catcher-Processor Data Summaries Section 9.1.



portion of other fixed costs, including insurance and moorage, amounted to \$164,000, representing a 32% decrease from baseline conditions.

### Revenue

Participants report three sources of revenue: the total value received for processed product, earnings from quota leasing, and any other sources of revenue. This report summarizes total production value and average values by product, per vessel, and per metric ton. The average production value of Pacific whiting per vessel was close to \$11 million in 2014. The product recovery rate (total weight of production divided by total weight of fish caught) has ranged from 0.34 to 0.38 since the baseline years and was highest in 2014.

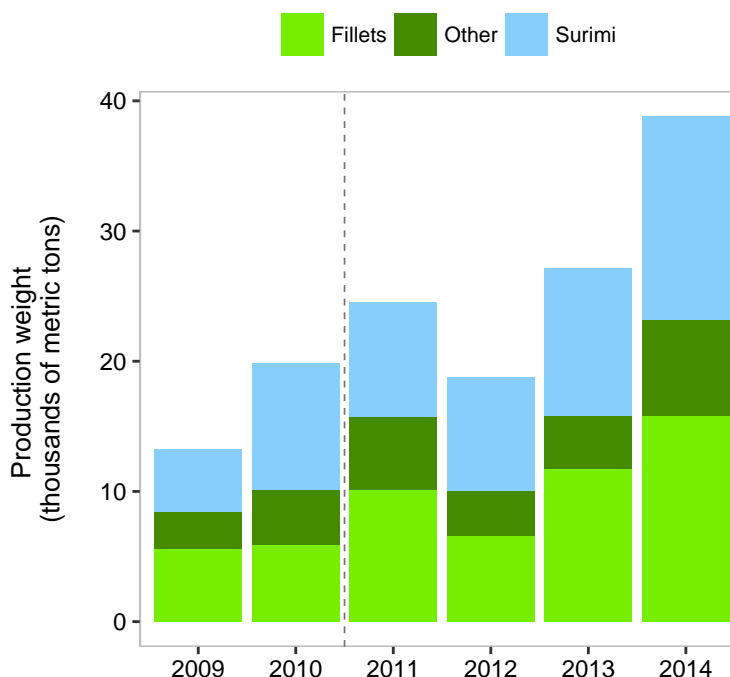
Fillet and surimi production made up 86% of the total production value (Figure 6) and 81% of the total production weight in 2014 (Figure 7). Other production types include fishmeal, minced, headed and gutted, and fish oil. In 2014, fillets received an average price of \$3,020 per metric ton, followed by surimi and fishmeal at \$2,420 and \$2,110 per metric ton, respectively (Figure 8).

### Net Revenue

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.<sup>14</sup>

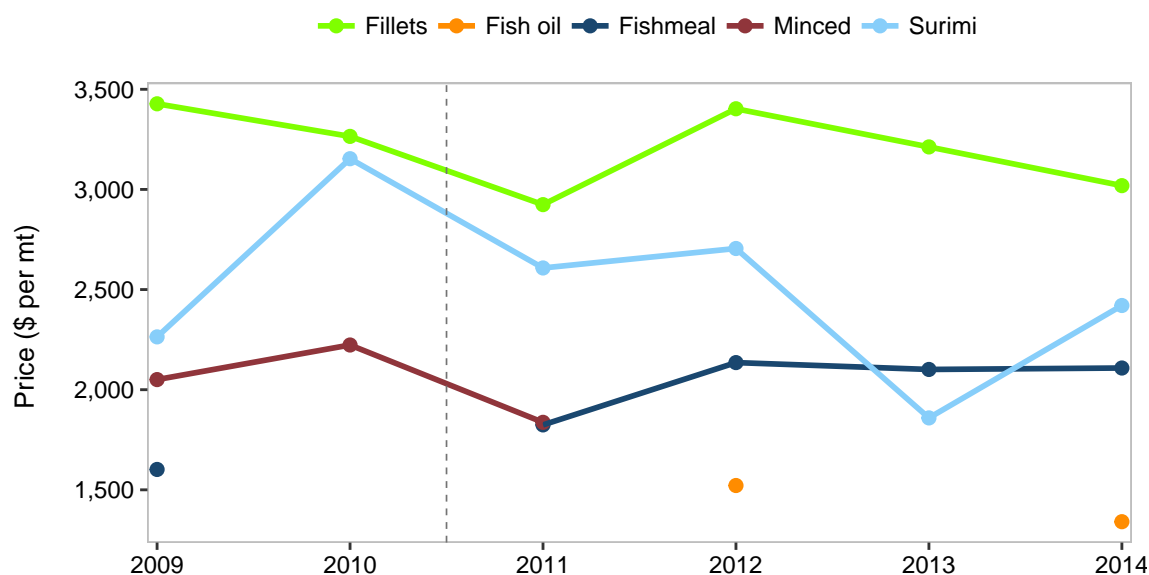
To provide a complete picture of the changes that have occurred, net revenue figures are presented at two scales. Figure 9 shows the fleet-wide revenue, total costs, and net revenue for the fishery, while Figure 10 shows the average revenue, costs, and net revenue per vessel.

Fleet-wide net revenue represents the total value generated by the fishery, while average net revenue shows the value generated by a typical vessel. Both figures only include revenues and costs associated



**Figure 7:** Fleet-wide production weight by product type (thousands of metric tons). The Other category includes fish oil, fishmeal, headed and gutted, minced, roe, and other, these categories are combined to protect confidential data. Dashed line represents the beginning of the catch share program.

<sup>14</sup> See Figure 5 for a categorization of fixed and variable costs.



**Figure 8:** Average price by product type (2014 \$). Some values suppressed to protect confidential information. Product types such as minced, fishmeal, and fish oil delineated here were combined in Figures 6 and 7. Dashed line represents the beginning of the catch share program.

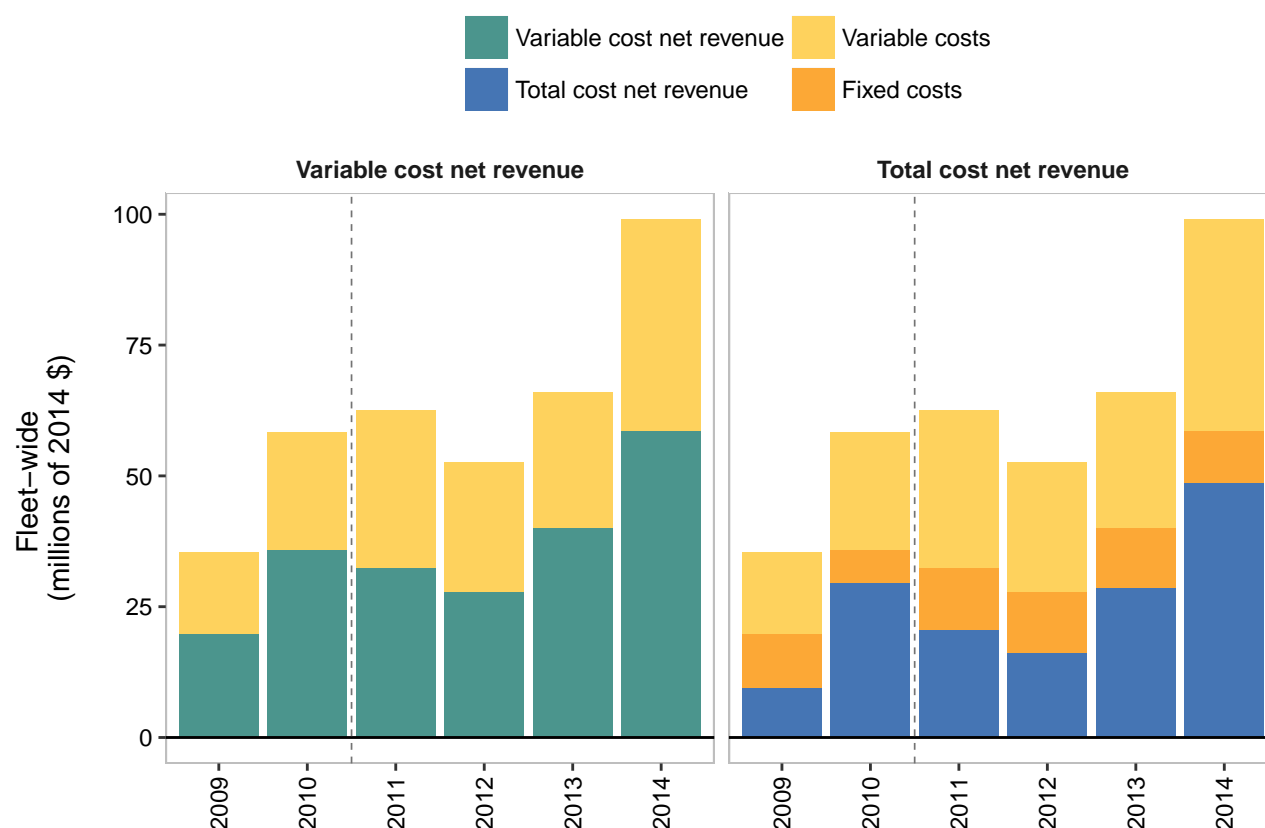
with the catch share program. It is important to note that the EDC forms aim to capture only costs that are directly related to vessel fishing operations, and not costs that are related to activities or equipment off the vessel. Therefore, the net revenue reported here is an overestimate of the true net revenue.<sup>15</sup>

In 2014, catcher-processors generated a total fleet-wide revenue of \$99.2 million and spent about \$50.6 million in fixed and variable costs, leading to a total cost net revenue of approximately 48.6 million for the year. The catcher-processor fleet as a whole experienced increasing variable costs from 2009-2014. However, revenue has kept pace with these increasing costs, having grown by 2 fold from baseline conditions to 2014. As a result, total cost net revenue (revenue minus all costs) has increased by 2 fold compared to baseline years.

In terms of revenue per vessel, catcher-processors generated an average revenue of \$11 million and spent \$5.62 million in fixed and variable costs, leading to a net revenue of approximately 5.4 million per vessel for the year, representing a 58% increase from baseline conditions.

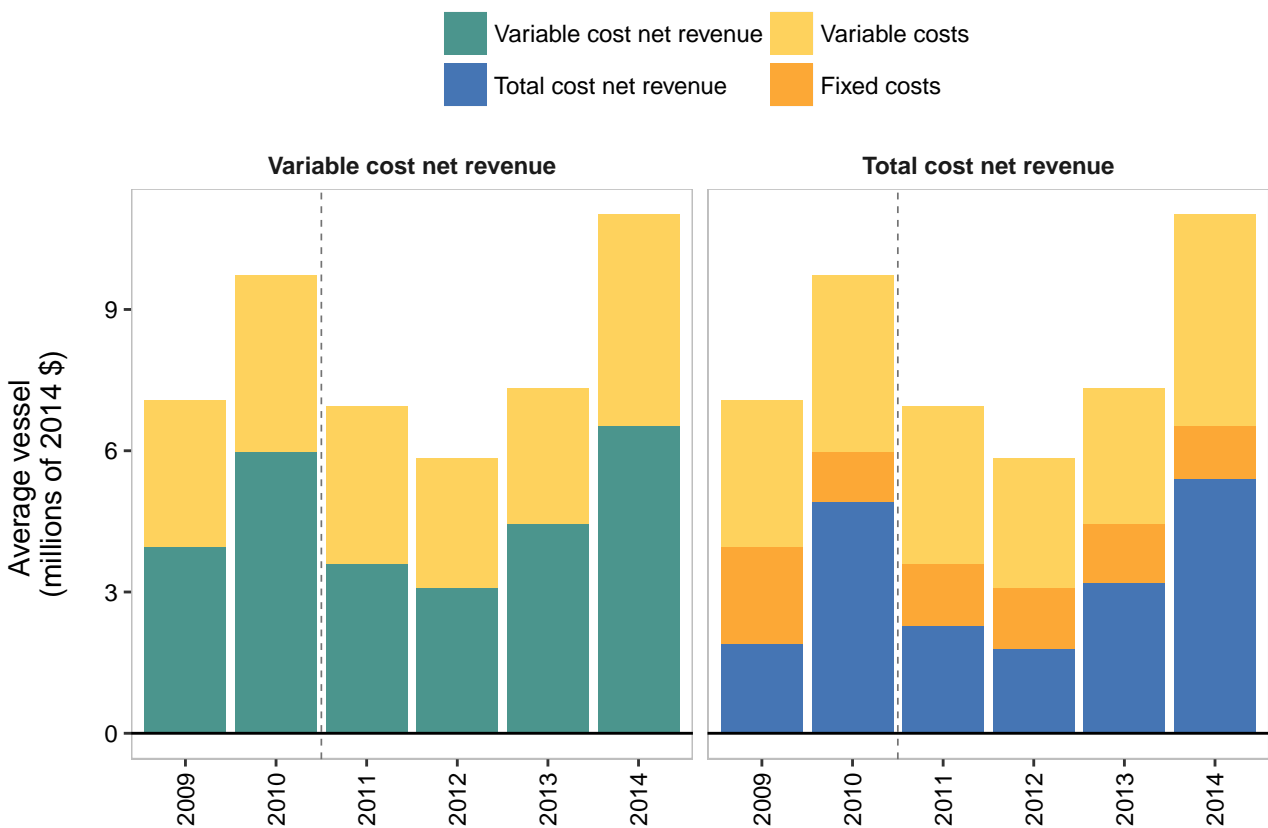
Many of the above patterns in costs and revenue are also evident in daily and production revenue values. While days at sea on the West Coast have remained relatively constant, daily production revenue per vessel rose from a baseline of \$158,000 to \$187,000 in 2014, representing 18% growth. Likewise, after taking costs into consideration, the daily total cost net revenue per vessel has increased 2 fold compared to baseline years. Production value per metric ton of whiting produced was \$2,570 in 2014. Catcher-

<sup>15</sup> See Catcher-Processor Data Summaries Section 8: Costs, and Section 10: Net Revenue and Economic Profit for a complete discussion of variable costs, fixed costs, and the calculation of net revenue.



**Figure 9:** Fleet-wide variable cost net revenue (revenue minus variable costs) (left) and total cost net revenue (revenue minus variable costs and fixed costs) (right) (millions of 2014 \$). Dashed line represents the beginning of the catch share program.

processors earned \$1,230 total cost net revenue per metric ton produced in 2014, a 4 fold increase from baseline conditions (see Catcher-Processor Data Summaries, Table 11.3).



**Figure 10:** Average variable cost net revenue (revenue minus variable costs) (left) and total cost net revenue (revenue minus variable costs and fixed costs) (right) (millions of 2014 \$). Dashed line represents the beginning of the catch share program.

# Catcher-Processor Report

# CATCHER-PROCESSOR REPORT

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# Catcher-Processor 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.<sup>1</sup>

The Economic Data Collection (EDC) program<sup>2</sup> 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, and the 2014 data submitted for this report were collected in 2015.

The EDC Program has enhanced the quantity and quality of economic information available for analysis, and for the management of the West Coast groundfish trawl fishery. While costs and earnings data

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<sup>1</sup> Information about the West Coast Groundfish Trawl Catch Share Program is available online at [http://www.westcoast.fisheries.noaa.gov/fisheries/groundfish\\_catch\\_shares/](http://www.westcoast.fisheries.noaa.gov/fisheries/groundfish_catch_shares/).

<sup>2</sup> Additional information on the EDC Program, including the EDC data collection forms can be found at <http://www.nwfsc.noaa.gov/edc>.

are available for shorebased catcher vessels starting in 2004,<sup>3</sup> this is the first data collection from the catcher-processor fleet. This report summarizes the 2009-2014 EDC catcher-processor survey data, and with its companion reports covering the other sectors, is the third in the series of reports. Northwest Fisheries Science Center economists will expand and refine the scope and methods used with each new publication.

The catcher-processor fleet on the West Coast has operated as a cooperative since 1997, when the Pacific Whiting Conservation Cooperative (PWCC) was formed. The PWCC consists of all catcher-processor vessels that currently participate in the Pacific whiting fishery on the West Coast. The primary function of the PWCC is to coordinate harvesting efforts of the catcher-processor vessels. While the 2011 catch share program dramatically changed the structure of the Pacific whiting shoreside and mothership fisheries, the catcher-processor fishery experienced fewer changes and has continued to operate as a single cooperative.

## 1.2 Understanding the report

The data provided in the summary tables throughout the report are for all vessels that fished on the West Coast during the survey year, unless otherwise noted. 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.

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.<sup>4</sup> 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 companies in order to show a summary statistic. The 90-10 rule requires that no single company's value comprise over 90 percent of the value displayed. In the case of the West Coast whiting catcher-processor fishery, there are only three companies and therefore statistics are only shown in the tables if there was at least one vessel from each catcher-processor company reporting a positive value. The tables show a '\*\*\*' for data points where there were less than three companies reporting the information, and/or if one company's responses accounted for greater than 90 percent of the average value. Zeroes are shown if all entities reported zeroes. 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.

In order to track and assess the variation of data submitted by participants across any given variable or statistic, these reports include the coefficient of variation (CV) of the mean. The stacked dots included

<sup>3</sup> 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.

<sup>4</sup> For more information about form administration, please see the Administration and Operations Report Report.

in the data tables provide information about the coefficient of variation (CV) of the mean. We use the following scoring:

- represents  $CV < 0.5$ ,
- represents  $0.5 \leq CV < 1.0$ ,
- represents  $1.0 \leq CV < 2.0$ , and
- ⋮ represents  $2.0 \leq CV$ . For 2009-2014, none of the CVs exceeded 2.83.

Each year, the EDC Program reviews the survey forms and revises questions for improved clarity while maintaining as much consistency as possible. The 2009 and 2010 EDC catcher-processor forms asked if the participant harvested or processed any fish during that calendar year, and those who answered “No” were not required to respond to any further questions. This option was removed on the 2011 form and every participant was required to complete the form in its entirety. The only other change to the forms from 2009-2010 to 2011 pertained to offload locations, with “Tacoma” substituted for “Westport, Hoquiam” in response to input on the 2009 and 2010 surveys. In 2012, a space was added for participants to provide the total round weight harvested in the West Coast fisheries in addition to that harvested in Alaska/Other, in order to more accurately calculate the proportion of West Coast landings. In 2013 a new question was added, “Provide the total number of individuals who worked for you”. Respondents provide the total number of processing crew and the total number of non-processing crew. These data provide us with an upper bound of the total number of people employed by the sector.

### 1.3 Purpose of the report

This report, like the other four EDC reports,<sup>5</sup> 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.

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<sup>5</sup> In addition to the catcher-processor report, there are four companion reports:

- Economic Data Collection Program, Administration and Operations Report (May 2016)
- Economic Data Collection Program, Mothership Report, 2009-2014 Draft Report for PFMC Review (May 2016)
- Economic Data Collection Program, Catcher Vessel Report, 2009-2014 Draft Report for PFMC Review (May 2016)
- Economic Data Collection Program, First Receiver and Shorebased Processor Report, 2009-2014 Draft Report for PFMC Review (May 2016)

The second objective is 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. 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.

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,<sup>6</sup> as well as estimates of revenue, costs, and net revenue.

Lastly, and perhaps most importantly, the data reports are expected to serve as 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 vessel, mothership, and first receiver and shorebased processor forms.

## **1.4 Catcher-processor form administration**

Completion of EDC forms is mandatory for participants in the catch share program. Survey participants are identified using contact information provided by the Northwest Regional Permit Office. The regulations for defining who is required to complete an EDC form differs between 2009 and 2010 data collection and all annual/ongoing data collections for 2011 onward. For the 2009-2010 period, all owners, lessees, and charterers of a catcher-processor vessel that harvested whiting in 2009 or 2010 as recorded in NOAA Fisheries' NORPAC database §660.114(b)(3)(i) were required to complete an EDC form. For 2011 and beyond, all owners, lessees, and charterers of a catcher-processor vessel registered to a C/P-endorsed limited entry trawl permit at any time are required to complete an EDC form §660.114(b)(3)(ii). For permit owners, a C/P-endorsed limited entry trawl permit application will not be considered complete until the required EDC form for the 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) will not be authorized until the required EDC form for that owner for that vessel is submitted, as specified, at §660.25(b)(4)(v). For a vessel lessee or charterer, participation in the groundfish fishery 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-processor registered to a limited entry trawl permit with a C/P endorsement during 2014. The forms are fielded on this schedule in order to allow

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<sup>6</sup> 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.

participants the time necessary to complete their taxes, which may contain information required on the EDC forms.

If a form has missing information, or the information provided on the form is believed to be incorrect, EDC Program staff will attempt to contact the participant to correct the information. On occasion, the participant cannot be reached or the participant cannot provide the missing information. 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 and the At-Sea Hake Observer Program (A-SHOP) database.

## 2 Vessel Participation on the West Coast and in Alaska

The catcher-processor fleet participates in fisheries on the West Coast and in Alaska. Table 2.1 provides the average days at sea by activity. Participants are instructed to count partial days as full days when reporting days at sea on the survey forms. Table 2.2 presents the average number of one way trips vessels made steaming between Alaska and the West Coast that year. In 2009, not all companies reported steaming trips and thus to preserve confidentiality we cannot report a value for that year. The number of vessels (9) that fished on the West Coast and in Alaska has remained constant since the implementation of the catch share program (Table 2.3).

**Table 2.1: Average days at sea.** Average days at sea by activity on the West Coast and in Alaska for catcher-processor vessels (N = number of 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
Operating on the West Coast	36	5	52	6	42	9	29	9	34	9	43	9
Steaming on the West Coast	6	5	11	6	5	9	3	9	13	9	16	9
Offloading on the West Coast	***	***	***	***	3	9	3	9	4	9	6	9
Steaming between West Coast and Alaska	***	***	23	6	19	9	18	9	22	9	20	9
Fishing in Alaska	***	***	111	6	190	9	150	9	164	9	145	9

**Table 2.2: Average number of trips to Alaska.** Average number of one-way trips between the West Coast and Alaska (N = number of 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
One-way trips to Alaska	***	***	3.3 <sup>*</sup>	6	4.0 <sup>*</sup>	9	3.2 <sup>*</sup>	9	3.3 <sup>*</sup>	9	4.0 <sup>*</sup>	9

**Table 2.3: Number of vessels that fished on the West Coast and in Alaska.** Number of vessels that fished on the West Coast and in Alaska. The value for 2009 is suppressed because not all companies had vessels that fished in Alaska in 2009.

Description	2009	2010	2011	2012	2013	2014
Fishing and processing West Coast whiting fishery		5	6	9	9	9
Fishing in Alaska	***	6	9	9	9	9

### 3 Delivery Ports

Table 3.1 lists the number of vessels delivering to each port. Some vessels delivered to more than one port in a survey year. This frequency table summarizes responses to the question on the EDC form that asks for the percentage of all West Coast whiting products offloaded from the catcher-processor vessel at each major West Coast port.

**Table 3.1: Delivery ports.** Total number of vessels that offloaded in each port. Some vessels delivered to multiple ports in the same year.

Location	2009	2010	2011	2012	2013	2014
Astoria	0	0	0	0	0	0
At-sea	0	0	0	0	0	0
Blaine/Bellingham	0	2	4	4	5	4
Coos Bay	0	0	0	0	0	0
Port Angeles	0	0	0	0	0	0
Seattle	3	3	2	2	1	4
Tacoma	2	3	3	3	3	3
Westport	0	0	—	—	—	—
Other	0	0	0	0	0	0

## 4 Vessel Physical Characteristics

Physical vessel characteristics are shown below in Table 4.1. Survey participants are 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. Marine surveys are done on a regular basis and are often required for insurance, financing, and other purposes.

**Table 4.1: Vessel characteristics.** Average market value (millions of \$), replacement value (millions of \$), vessel length (feet), fuel capacity (thousands of gallons), and horsepower of main engines (thousands) (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	59.7	5	57.6	6	55.2	9	54.8	9	54.7	9	54.7	9
Replacement value	92.0	5	86.8	6	85.9	9	85.9	9	89.9	9	89.9	9
Vessel length	301	5	281	6	304	9	304	9	306	9	306	9
Fuel capacity	265.9	5	212.7	6	277.9	9	270.9	9	269.8	9	270.9	9
Horsepower	6.6	5	6.4	6	6.8	9	6.5	9	6.7	9	6.6	9

The participants provide information about whether the vessel was hauled out (removed from the water for maintenance and repairs). Since 2009, a significant portion of all active fishing vessels have been hauled out in a given year (Table 4.2). This provides context that may be used to explain major costs associated with vessel repair and maintenance.

**Table 4.2: Number of vessels hauled out.** Number (N) and percentage (%) of active vessels that were hauled out during the year.

Haul out	2009		2010		2011		2012		2013		2014	
	N	%	N	%	N	%	N	%	N	%	N	%
YES	2	40%	3	50%	4	44%	2	22%	6	67%	3	33%
NO	3	60%	3	50%	5	56%	7	78%	3	33%	6	67%



## 5 Vessel Fuel Use and Crew Size

### 5.1 Fuel use

Tables 5.1 and 5.2 contains average fuel use per day and total annual fuel use, for propulsion or other uses, when engaged in West Coast activities and steaming between the West Coast and Alaska. As stated above, not all companies have vessels that steam between the West Coast and Alaska every year, leading to values that are suppressed to maintain confidentiality.

**Table 5.1: Average daily fuel use.** Average daily fuel use (thousands of gallons) (N = number of 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
Operating on the West Coast	7.7 <sup>*</sup>	5	7.2 <sup>*</sup>	6	7.7 <sup>*</sup>	9	7.6 <sup>*</sup>	9	7.6 <sup>*</sup>	9	6.7 <sup>*</sup>	9
Steaming between West Coast and Alaska	***	***	5.5 <sup>*</sup>	6	6.2 <sup>*</sup>	9	6.3 <sup>*</sup>	9	6.3 <sup>*</sup>	9	6.4 <sup>*</sup>	9

**Table 5.2: Total annual fuel use.** Average total fuel use (thousands of gallons) (N = number of 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 bunker fuel	0		0		0		0		0		0	
Total diesel	362 <sup>†</sup>	5	337 <sup>†</sup>	6	328 <sup>*</sup>	9	230 <sup>†</sup>	9	215 <sup>*</sup>	9	335 <sup>*</sup>	9
Total fish oil	***	***	***	***	***	***	***	***		0		0

### 5.2 Crew

Participants provide the number of processing and non-processing crewmembers on board at any one time when the vessel was operating in the West Coast whiting fishery during the year (Table 5.3). In 2013, the EDC form was revised to also collect the total number of individuals employed annually (Table 5.4). The total number of individuals employed across all vessels serves as an upper bound of the total number of individuals employed in the fishery. Processing crew includes line workers, fishmeal crew, quality control, technicians, cleanup, factory managers, combis, and mechanics who work on processing equipment. Non-processing crew includes the captain, deckhands, wheelhouse, galley, and engineers.

**Table 5.3: Average crew size.** Average number of non-processing and processing crew positions per vessel (N = number of EDC vessels with non-zero, non-NA responses).

Crew Type	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Non-processing	24.0	5	21.0	6	32.0	9	22.6	9	25.4	9	23.6	9
Processing	87.8	5	91.3	6	83.2	9	96.9	9	97.2	9	97.6	9

**Table 5.4: Average number of individuals employed.** Average total number of individuals employed in non-processing and processing crew positions per vessel throughout the year (N = number of EDC vessels with non-zero, non-NA responses).

Crew Type	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Non-processing crew	—	—	—	—	—	—	—	—	29.0	9	33.3	9
Processing crew	—	—	—	—	—	—	—	—	119.2	9	132.1	9

## 6 Whiting Harvest

Pacific whiting is managed through a bilateral agreement between the United States and Canada, known as the Pacific Whiting Treaty. The agreement allocates a percentage of the harvest quota to the United States. Once the U.S. allocation has been determined, it is then allocated between catcher-processor, mothership, shoreside, and tribal sectors. The final annual allocations to the catcher-processor sector (adjusted for tribal reallocations) are taken from the annual *Pacific Whiting Fishery Summary* provided by the Northwest Regional Office.<sup>7</sup> The West Coast data for the catcher-processor sector annual whiting harvest in Table 6.1 are provided by the A-SHOP through the Pacific Fisheries Information Network (PacFIN) database. Average annual harvest on the West Coast and in Alaska are calculated using information from a question on the EDC form that asks participants to provide the total round weight of all fish harvested by the vessel in all fisheries during the year. Annual whiting allocation to the catcher-processor sector and whiting catch on the West Coast and Alaska are presented in Table 6.1.

<sup>7</sup> 2014 Pacific whiting fishery summary: [http://www.westcoast.fisheries.noaa.gov/publications/fishery\\_management/groundfish/whiting/](http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/groundfish/whiting/).

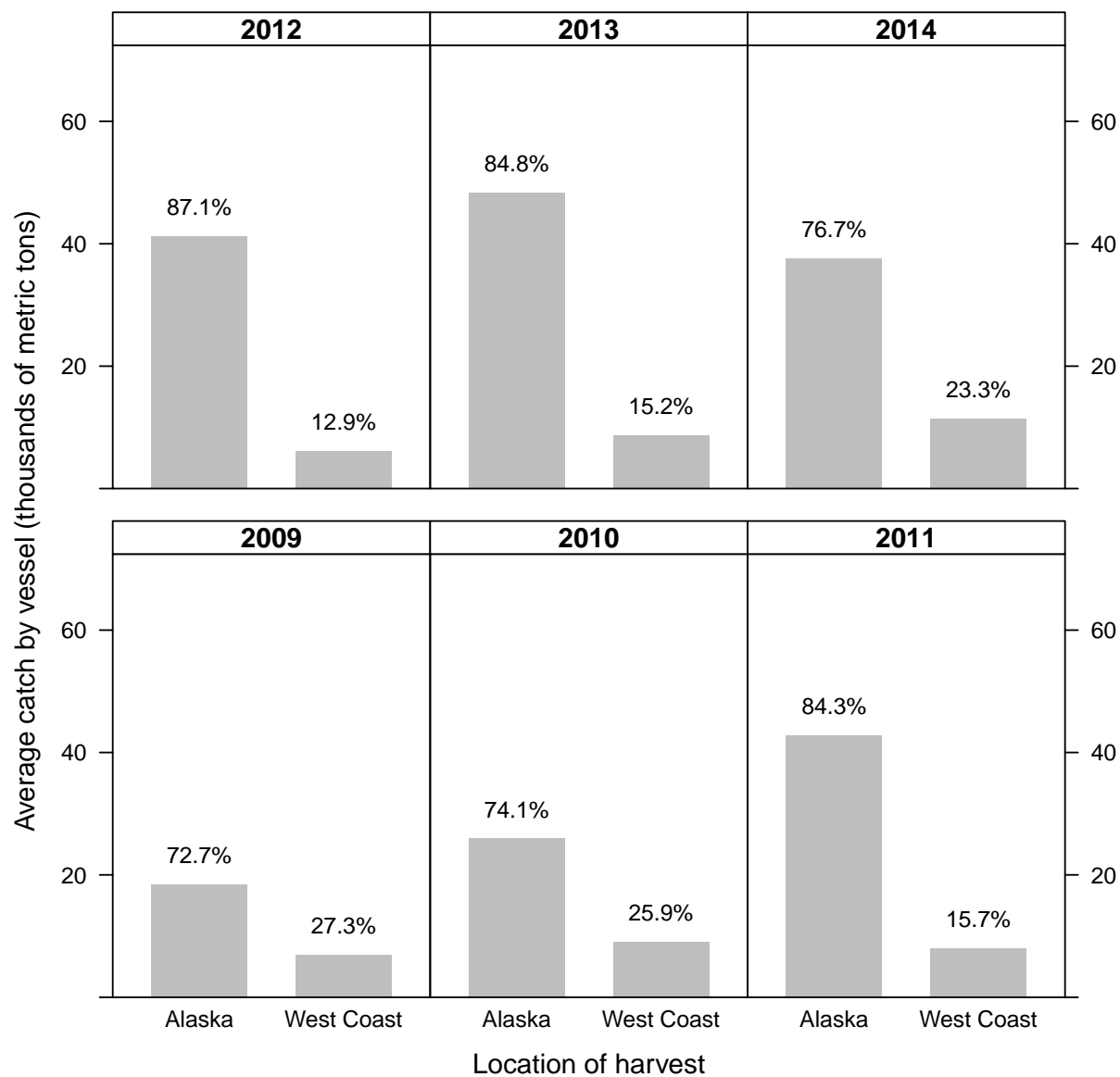
**Table 6.1: Sector annual TAC and whiting harvest.** Final allocation of whiting in the West Coast catcher-processor whiting fishery, total whiting catch on the West Coast, and total catch including catch in Alaska (thousands of metric tons) (N = number of vessels with non-zero, non-NA responses).

Description	2009		2010		2011		2012		2013		2014	
	Total	N	Total	N	Total	N	Total	N	Total	N	Total	N
Whiting allocation	35.4		53.4		75.1		55.6		79.6		103.5	
West Coast whiting catch	34.6	5	54.3	6	71.7	9	55.3	9	77.9	9	103.2	9
West Coast and Alaska catch	126.7	5	209.8	6	457.0	9	426.9	9	512.5	9	442.2	9

## 7 Revenue

Participants submit information about four kinds of revenue: revenue from production of seafood products, revenue from sale or lease of West Coast catcher-processor endorsed permits, revenue from the sale or lease of co-op shares, and revenue from lease or bareboat charter of the vessel. All vessels that fished on the West Coast reported production revenue, but there were no vessels that reported revenue from the other three categories. It is possible that vessels may have made end-of-season informal arrangements regarding leftover quota; however, this type of transfer is not captured by questions on the EDC survey form.

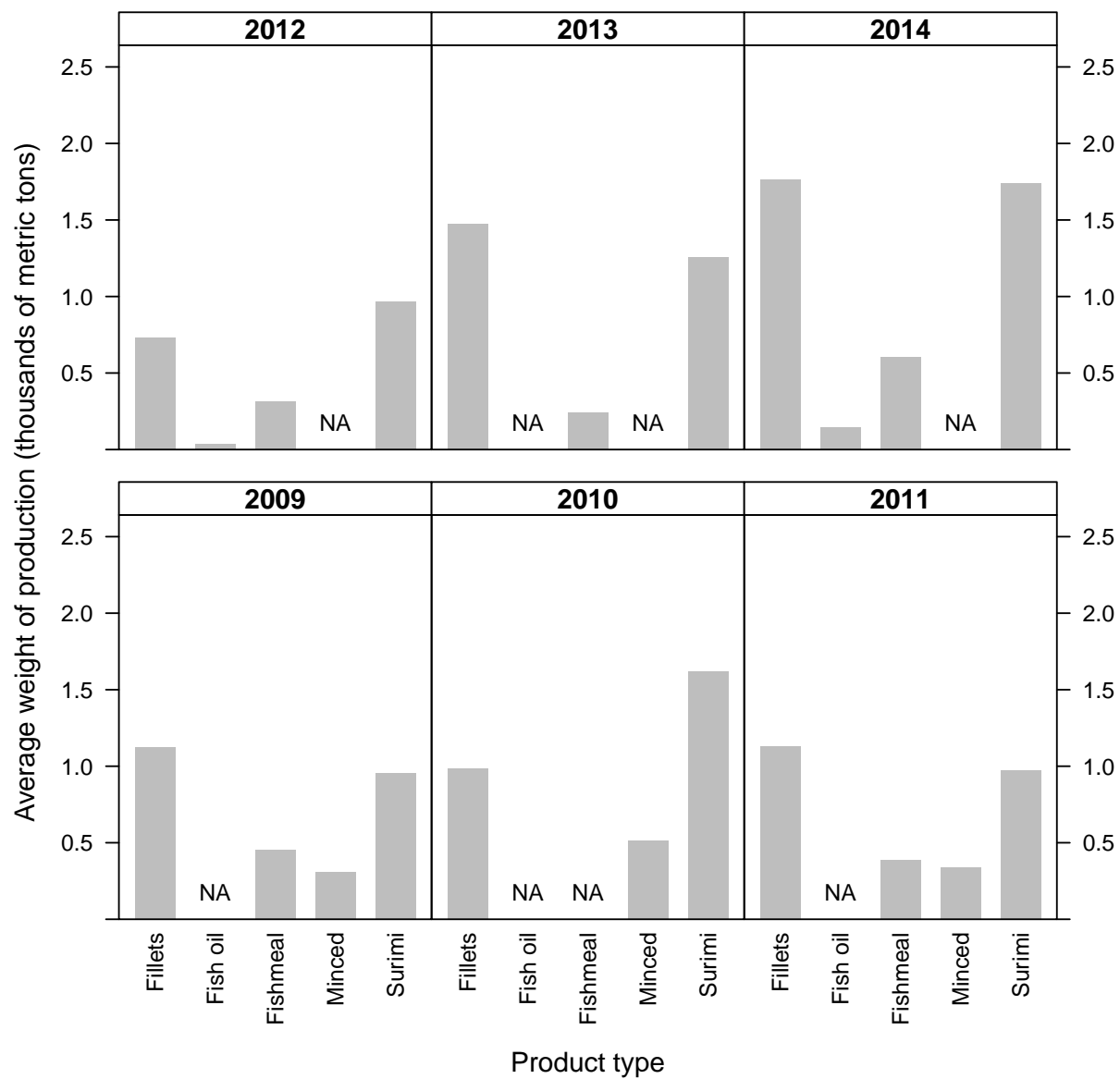
Tables 7.1 and 7.2 provide summary information on annual production in the West Coast whiting catcher-processor sector. Participants provide total weight and value of production by major product categories, including any post-season adjustments for products produced during the survey year. Not included in the value of production are any additional payments received to cover shipping, handling, or storage costs associated with the sale beyond the free-on-board (buyer assumes responsibility and liability for the product and pays shipping costs) port of discharge. Revenue values only include West Coast activities.



**Figure 11: Average annual harvest on the West Coast and Alaska.** Average annual harvest (thousands of metric tons) from 2009 to 2014 on the West Coast and in Alaska. Percentages above each bar indicate the portion of the total harvest caught by location.

**Table 7.1: Whiting production weight.** Average production weight (metric tons) for whiting (N = number of vessels with non-zero, non-NA responses).

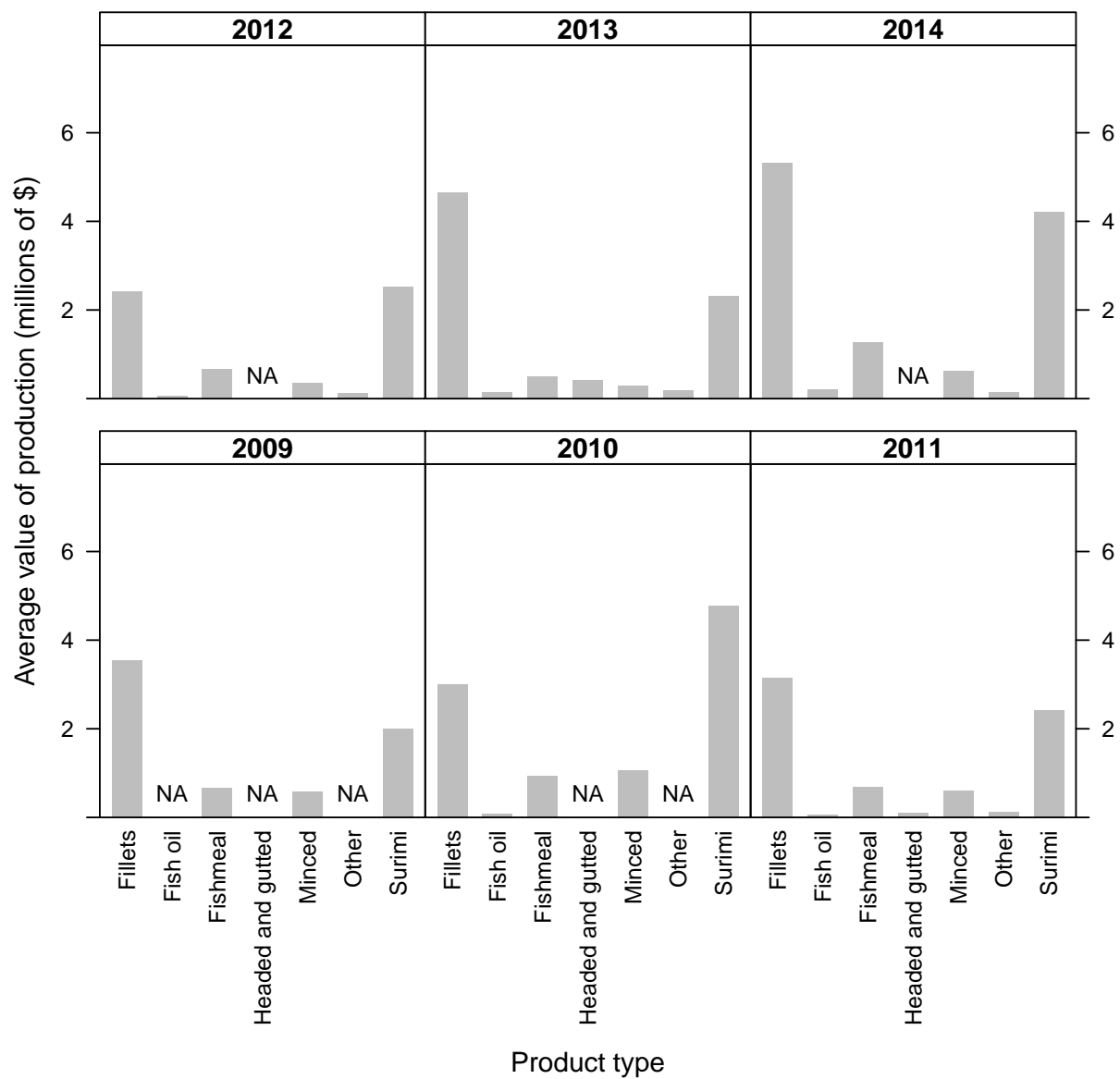
Product Category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Fillets	1,122 <sup>†</sup>	5	987 <sup>†</sup>	6	1,130 <sup>†</sup>	9	732 <sup>†</sup>	9	1,472 <sup>†</sup>	8	1,761 <sup>†</sup>	9
Fish oil	***	***	***	***	***	***	36 <sup>†</sup>	7	***	***	147 <sup>†</sup>	8
Fishmeal	454 <sup>†</sup>	3	***	***	387 <sup>†</sup>	6	316 <sup>†</sup>	6	242 <sup>†</sup>	6	601 <sup>†</sup>	6
Headed and gutted		0	***	***	***	***	***	***	***	***	***	***
Minced	309 <sup>†</sup>	4	511 <sup>†</sup>	4	338 <sup>†</sup>	7	***	***	***	***	***	***
Roe		0	***	***		0		0		0		0
Round		0		0		0		0		0		0
Stomachs		0		0		0		0		0		0
Surimi	953 <sup>†</sup>	5	1,621 <sup>†</sup>	6	975 <sup>†</sup>	9	965 <sup>†</sup>	9	1,258 <sup>†</sup>	9	1,739 <sup>†</sup>	9
Other	***	***	***	***	***	***	***	***	***	***	***	***
Average total weight	2,648 <sup>†</sup>	5	3,310 <sup>†</sup>	6	2,722 <sup>†</sup>	9	2,084 <sup>†</sup>	9	3,012 <sup>†</sup>	9	4,311 <sup>†</sup>	9



**Figure 12: Production weight.** Average whiting production weight by product type and year. Confidential data have been suppressed and replaced with “NA”, product categories where production values were reported as zero for all vessels for all years are not included.

**Table 7.2: Whiting production value.** Average production value (thousands of \$) for whiting (N = number of vessels with non-zero, non-NA responses).

Product Category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Fillets	\$3,540	5	\$3,002	6	\$3,142	9	\$2,412	9	\$4,652	8	\$5,317	9
Fish oil	***	***	***	***	***	***	\$53	7	***	***	\$197	8
Fishmeal	\$669	3	***	***	\$670	6	\$654	6	\$499	6	\$1,267	6
Headed and gutted		0	***	***	***	***	***	***	***	***	***	***
Minced	\$583	4	\$1,058	4	\$590	7	***	***	***	***	***	***
Roe		0	***	***		0		0		0		0
Round (unprocessed)		0		0		0		0		0		0
Stomachs		0		0		0		0		0		0
Surimi	\$1,986	5	\$4,762	6	\$2,418	9	\$2,528	9	\$2,301	9	\$4,208	9
Other	***	***	***	***	***	***	***	***	***	***	***	***
Other species		0		0		0		0		0		0
Average total value	\$6,502	5	\$9,059	6	\$6,602	9	\$5,657	9	\$7,210	9	\$11,020	9



**Figure 13: Production value.** Average whiting production value by product type and year. Confidential data have been suppressed and replaced with "NA", product categories where production values were reported as zero for all vessels for all years are not included.



## 8 Costs

This section of the report describes the cost data that are collected on the EDC catcher-processor form, including variable costs, fixed costs, and total costs.

For EDC Program analyses, 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 compensation. 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. For the purposes of this report, the costs listed in Tables 8.2, 8.3, 8.4, 9.1, and 9.2 are considered to be fixed, and the costs listed in Table 8.1 to be variable. The EDC Program will continue to refine the categorization of these costs.

Fishery participants provide both “capitalized expenditures” and “expenses” for vessel improvements and maintenance, fishing gear, and processing equipment because certain costs may be treated for tax accounting purposes as either capitalized or expensed. Capitalized expenditures are depreciated over a number of years whereas expensed items are fully deducted as a cost for the year in which they are incurred. In an effort to reduce the reporting burden and potential for errors, these data are collected as they are reported in the businesses’ accounting systems.

In order to conduct economic analyses of specific fisheries, it is important to have costs broken out by fishery, i.e. West Coast whiting versus processing in Alaska. It may be feasible for participants to delineate costs at the fishery level for some items, but not for the majority of expenses. During the development of the EDC survey form, a key issue was the determination of which costs could reasonably be broken out by fishery. Each cost item is assigned to one or more categories based on how they are commonly tracked by industry members: 1) used in 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. See below for further details on these methods.

Finally, there are a variety of costs that are associated with operating a catcher-processor 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, vehicles, storage of equipment, professional fees, and marketing. In general, the EDC form aims 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 aggregated measures of costs (variable costs, fixed costs, and total costs) presented here underestimate the true costs of operating a business.

## **8.1 Variable costs**

Variable costs were collected for all West Coast fishing activities only. Variable costs are more directly related to fishing operations than fixed costs, and therefore it is possible for vessels to separate variable expenses for activities on the West Coast from other activities.

**Table 8.1: Variable expenses.** Average variable expenses for catcher-processors on the West Coast (thousands of \$) (N = number of 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
Communication	15.9 <sup>*</sup>	5	21.5 <sup>*</sup>	6	16.8 <sup>*</sup>	9	7.2 <sup>*</sup>	9	11.5 <sup>*</sup>	9	14.6 <sup>*</sup>	9
Food	88.4 <sup>*</sup>	5	108.9 <sup>*</sup>	6	108.9 <sup>*</sup>	9	138.6 <sup>*</sup>	9	87.8 <sup>*</sup>	9	132.3 <sup>*</sup>	9
Freight	***	***	***	***	***	***	***	***	***	***	***	***
Fuel and lubrication	758.1 <sup>†</sup>	5	862.1 <sup>†</sup>	6	1,225.0 <sup>*</sup>	9	808.0 <sup>*</sup>	9	801.0 <sup>*</sup>	9	1,205.0 <sup>*</sup>	9
Marine Stewardship Council fees	***	***	***	***	***	***		0		0	***	***
Non-fish ingredients (additives)	217.9 <sup>†</sup>	5	297.7 <sup>*</sup>	6	142.8 <sup>*</sup>	9	141.8 <sup>*</sup>	9	159.0 <sup>*</sup>	9	256.1 <sup>*</sup>	9
Non-processing crew	314.1 <sup>†</sup>	5	383.4 <sup>*</sup>	6	426.3 <sup>*</sup>	9	386.8 <sup>*</sup>	9	487.3 <sup>*</sup>	9	652.7 <sup>*</sup>	9
Observers	31.4 <sup>†</sup>	5	36.9 <sup>*</sup>	6	35.6 <sup>*</sup>	9	21.6 <sup>*</sup>	9	28.1 <sup>*</sup>	9	32.7 <sup>*</sup>	9
Offloading	***	***	***	***	***	***	***	***	***	***	***	***
On-board cargo/product insurance	***	***	***	***	13.1 <sup>*</sup>	9	76.4 <sup>*</sup>	9	81.6 <sup>*</sup>	9	155.7 <sup>*</sup>	9
Packing materials	204.8 <sup>†</sup>	5	232.2 <sup>*</sup>	6	241.6 <sup>*</sup>	9	142.5 <sup>*</sup>	9	123.5 <sup>*</sup>	9	392.0 <sup>*</sup>	9
Processing crew	1,140.4 <sup>*</sup>	5	1,420.3 <sup>*</sup>	6	908.4 <sup>*</sup>	9	888.3 <sup>*</sup>	9	988.0 <sup>*</sup>	9	1,567.9 <sup>*</sup>	9
Sea State data monitoring	3.7 <sup>*</sup>	5	4.0 <sup>*</sup>	6	***	***	6.3 <sup>*</sup>	9	2.8 <sup>*</sup>	9	9.4 <sup>*</sup>	9
Supplies	***	***	***	***	7.9 <sup>†</sup>	9	***	***	***	***	***	***
Travel	***	***	***	***	***	***	15.0 <sup>*</sup>	8	26.0 <sup>*</sup>	9	34.1 <sup>*</sup>	9
Average total variable costs	2,859.6 <sup>*</sup>	5	3,483.2 <sup>*</sup>	6	3,184.2 <sup>*</sup>	9	2,672.1 <sup>*</sup>	9	2,828.5 <sup>*</sup>	9	4,501.2 <sup>*</sup>	9

## 8.2 Fixed costs

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

Table 8.2 presents average annual capitalized expenditures. Survey participants are asked to provide capitalized expenditures for the survey year associated with the following categories:

- New and used vessel and on-board equipment: excludes processing equipment and fishing gear, includes all electronics, safety equipment, and machinery not used to harvest or process fish. Participants are asked to provide information for **All** fisheries regardless of where the vessel fished.
- Processing Equipment: excludes all equipment, machines, and buildings based primarily on shore, excludes any processing equipment that is not used at least partially in the West Coast whiting fishery, and includes on-board freezers, storage equipment, packing equipment, conveyors, and on-board cargo handling equipment. Participants are asked to separately report costs related to processing equipment **Shared** between the West Coast and other fisheries from those costs related to equipment used only on the **West Coast**.
- Fishing gear: Includes nets, cables, doors, and fishing machinery used in the West Coast whiting fishery, excludes any fishing gear that is not used at least partially in the West Coast whiting fishery. Participants are asked to separately report costs related to fishing gear **Shared** between the West Coast and other fisheries from those costs related to gear used only on the **West Coast**.

Participants are asked to delineate West Coast capitalized expenditures and expenses on fishing gear, and capitalized expenditures on processing equipment from shared expenses.

**Table 8.2: Capitalized expenditures on gear and equipment.** Average capitalized expenditures (thousands of \$) on vessel and on-board equipment, fishing gear, and processing equipment. Note that some expenditures were requested for (a) all fisheries the vessel participates in regardless of where the vessel fished (denoted by "All"), (b) West Coast whiting, Alaska, and other, denoted by "Shared" in the table) and (c) for West Coast fisheries only (Washington, Oregon, and California, denoted by "West Coast"). (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
Fishing gear (Shared)	\$97 <sup>*</sup>	5	***	***	***	***	\$537 <sup>†</sup>	9	***	***	\$440 <sup>†</sup>	9
Fishing gear (West Coast)	***	***	***	***		0		0		0		0
Processing equipment (Shared)	***	***	***	***	***	***	***	***	\$1,112 <sup>†</sup>	9	\$596 <sup>†</sup>	9
Processing equipment (West Coast)		0	***	***		0		0		0		0
Vessel and on-board equipment (All)	\$1,913 <sup>†</sup>	5	***	***	\$2,023 <sup>†</sup>	9	\$1,381 <sup>†</sup>	9	\$1,417 <sup>†</sup>	9	\$1,720 <sup>†</sup>	9
Average total capitalized expenditures	\$7,229 <sup>†</sup>	5	\$1,366 <sup>†</sup>	6	\$2,746 <sup>†</sup>	9	\$2,571 <sup>†</sup>	9	\$2,720 <sup>†</sup>	9	\$2,756 <sup>†</sup>	9

**Table 8.3: Expenses on gear and equipment.** Average expenses (thousands of \$) on vessel and on-board equipment, fishing gear, and processing equipment (N = number of vessels with non-zero, non-NA responses). Note that some expenditures were requested for (a) all fisheries the vessel participates in regardless of where the vessel fished (denoted by "All"), (b) West Coast whiting, Alaska, and other, denoted by "Shared" in the table) and (c) for West Coast fisheries only (Washington, Oregon, and California, denoted by "WC").

Expense category	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Fishing gear repair and maintenance (Shared)	\$280 <sup>·</sup>	5	\$197 <sup>·</sup>	6	\$359 <sup>·</sup>	9	\$368 <sup>·</sup>	9	\$246 <sup>·</sup>	9	\$222 <sup>·</sup>	9
Fishing gear repair and maintenance (West Coast)	***	***	***	***	***	***		0		0		0
Processing equipment (Shared)	\$876 <sup>·</sup>	5	\$685 <sup>·</sup>	6	\$746 <sup>·</sup>	9	\$812 <sup>·</sup>	9	\$919 <sup>·</sup>	9	\$795 <sup>·</sup>	9
Vessel and on-board equipment (All)	\$1,160 <sup>·</sup>	5	\$1,163 <sup>·</sup>	6	\$1,664 <sup>·</sup>	9	\$1,654 <sup>·</sup>	9	\$1,533 <sup>·</sup>	9	\$1,318 <sup>·</sup>	9
Average total expenses	\$2,350 <sup>·</sup>	5	\$2,079 <sup>·</sup>	6	\$2,795 <sup>·</sup>	9	\$2,834 <sup>·</sup>	9	\$2,698 <sup>·</sup>	9	\$2,335 <sup>·</sup>	9

## Other fixed costs

Participants also provide information about other fixed costs and vessel depreciation, which is summarized in Tables 8.4 and 8.5.

**Table 8.4: Other fixed expenses.** Average fixed expenses (thousands of \$) on all other categories (N = number of 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	\$890	5	\$812	6	\$900	9	\$523	9	\$486	9	\$488	9
Lease of vessel		0		0		0		0		0		0
Moorage	\$184	5	\$220	6	\$155	9	\$260	9	\$274	9	\$189	9
Average total fixed costs	\$1,074	5	\$1,032	6	\$1,055	9	\$784	9	\$761	9	\$677	9

**Table 8.5: Depreciation.** Average depreciation (millions of \$) taken during the survey year (N = number of 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
Depreciation	\$2.69	5	\$2.28	6	\$3.07	9	\$3.37	9	\$2.18	9	\$3.31	9

## 8.3 Quota and permit costs

The EDC form requests information on quota and permit expenses. No vessels reported lease or purchase of permits; however, vessels may have made end-of season informal arrangements regarding leftover quota. This type of transfer is not captured by questions on the EDC form.

# Catcher-Processor Data Analysis

To fully evaluate cost information and calculate net revenue for specific fisheries, Northwest Fisheries Science Center economists must do more than summarize data submitted by fishery participants. This section describes the methods used to calculate costs and net revenue for only West Coast fisheries.

## 9 Cost disaggregation

As noted above, not all costs reported on the EDC forms are incurred while only participating in West Coast fisheries. For some costs, it may be feasible for participants to break out or track costs at the fishery level. However, for some costs this is not possible. Some cost categories on the EDC forms are only incurred while participating in West Coast fisheries, while others include costs incurred while operating in Alaska. Therefore, cost disaggregation was required to estimate total costs and total cost net revenue on the West Coast. As part of the EDC development process, NWFSC staff met with participants to determine what cost categories could be reported for only West Coast fisheries and which would could not, and therefore require further disaggregation. Each cost item is assigned to one or more categories based on how it is 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.

To disaggregate the West Coast and Alaska costs, we allocate costs proportional to the weight of fish purchased or harvested in each fishery. We calculate the ratio of total West Coast Pacific whiting weight (for all years the vessel has supplied data) to the weight in all fisheries for the same time span:

$$\frac{\sum_y WT_n^{WestCoast}}{\sum_y WT_n^{AllFisheries}}$$

where  $n$  is an individual vessel in a season, summed over all of the years,  $y$ , that the vessel has supplied EDC data. Thus each vessel's ratio of costs being allocated to the West Coast is the same for all years. This method makes the proportion of costs allocated to the West Coast less sensitive to fluctuations in



the TAC for the West Coast Pacific whiting and Alaska fisheries. Cost disaggregation was only necessary for fixed costs because vessels reported variable costs by fishery.

## 9.1 West Coast portion of fixed costs

**Table 9.1: West Coast fixed costs on gear and equipment.** Capitalized expenditures and expenses on vessel and on-board equipment, fishing gear, and processing equipment incurred while participating in only West Coast fisheries (thousands of \$) (N = number of 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
Fishing gear	\$107	5	\$108	6	\$124	9	\$162	9	\$81	9	\$134	9
Processing equipment	\$979	5	\$196	6	\$254	9	\$254	9	\$403	9	\$257	9
Vessel and on-board equipment	\$579	5	\$481	6	\$654	9	\$643	9	\$597	9	\$565	9
Average total fixed costs	\$1,666	5	\$785	6	\$1,032	9	\$1,059	9	\$1,080	9	\$956	9

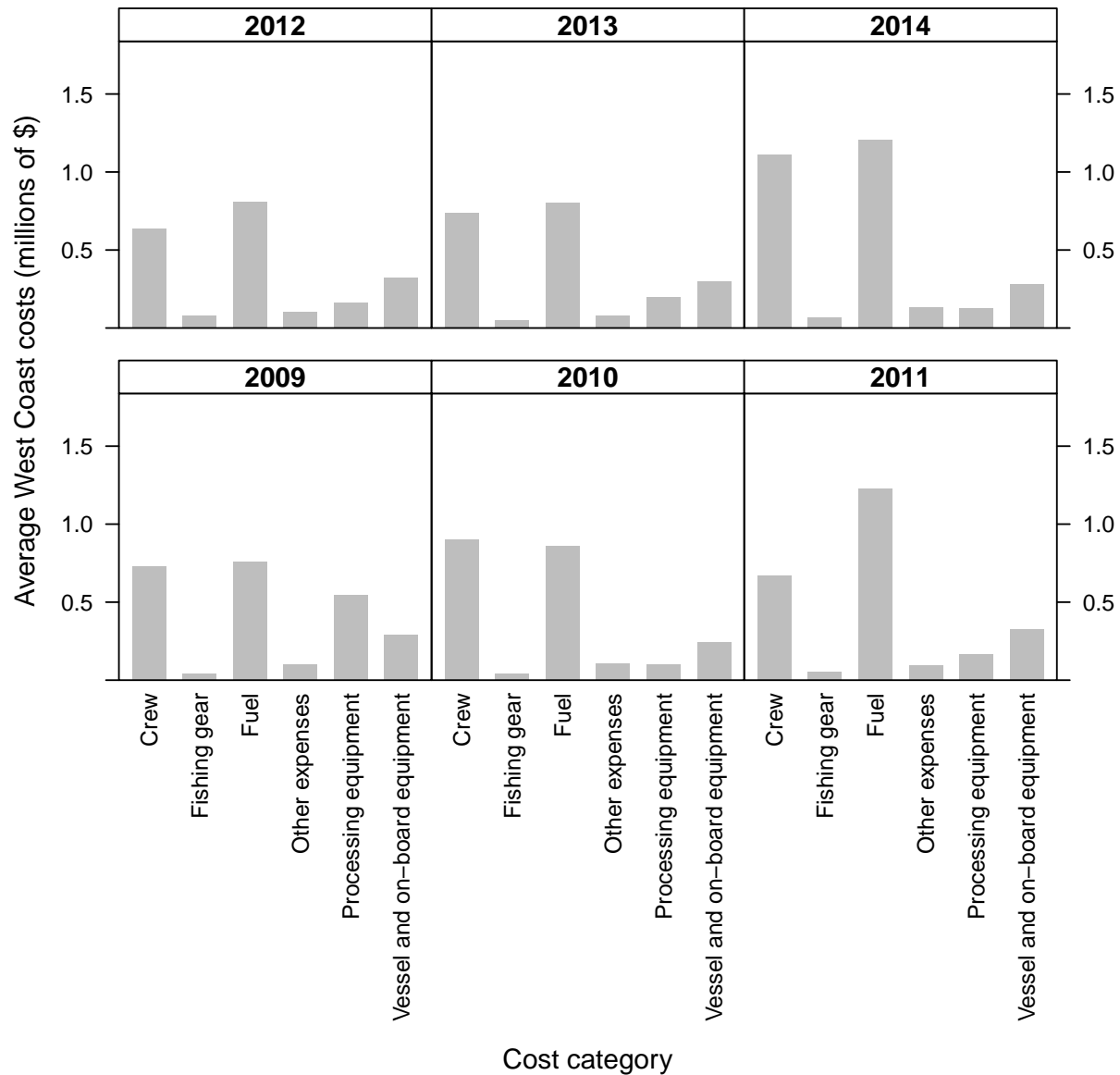
**Table 9.2: West Coast costs on insurance, moorage, and leasing.** Expenses on insurance, moorage, and leasing on the West Coast (thousands of \$) (N = number of vessels with non-zero, non-NA responses).

West Coast portion	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Insurance expenses	\$172.6	5	\$146.9	6	\$165.3	9	\$101.3	9	\$93.4	9	\$93.4	9
Lease expenses	0		0		0		0		0		0	
Moorage expenses	\$38.2	5	\$39.3	6	\$31.2	9	\$50.4	9	\$53.7	9	\$37.9	9
Average total fixed costs	\$210.9	5	\$186.2	6	\$196.5	9	\$151.7	9	\$147.1	9	\$131.3	9

## 9.2 Summary of West Coast portion of costs

**Table 9.3: Summary of West Coast portion of costs.** Average capitalized expenditures and expenses on vessel and on-board equipment, fishing gear, and processing equipment, other fixed costs, and all variable costs on the West Coast (millions of \$) (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	\$1.67 <sup>†</sup>	5	\$0.79 <sup>†</sup>	6	\$1.03 <sup>†</sup>	9	\$1.06 <sup>†</sup>	9	\$1.08 <sup>†</sup>	9	\$0.96 <sup>†</sup>	9
Total variable costs	\$2.86 <sup>†</sup>	5	\$3.48 <sup>†</sup>	6	\$3.18 <sup>†</sup>	9	\$2.67 <sup>†</sup>	9	\$2.83 <sup>†</sup>	9	\$4.50 <sup>†</sup>	9
Total other fixed costs	\$0.23 <sup>†</sup>	5	\$0.21 <sup>†</sup>	6	\$0.21 <sup>†</sup>	9	\$0.19 <sup>†</sup>	9	\$0.17 <sup>†</sup>	9	\$0.16 <sup>†</sup>	9
Average total costs	\$4.76 <sup>†</sup>	5	\$4.48 <sup>†</sup>	6	\$4.43 <sup>†</sup>	9	\$3.92 <sup>†</sup>	9	\$4.08 <sup>†</sup>	9	\$5.62 <sup>†</sup>	9



**Figure 14: Average costs by category on the West Coast.** Average costs by category on the West Coast including capitalized expenditures and annual expenses (millions of \$). Crew includes both processing and non-processing crew expenses. The "Other" category includes expenses on additives, communication, fees, insurance, freight, moorage, observers, offloading, supplies, packing, travel, and Sea-State monitoring. "NA" is shown where data are confidential.

## 10 Net Revenue and Economic Profit

Net returns from operating a catcher-processor 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 for society. Two different measures of net returns are examined. They differ in the types of costs that are taken into account, and therefore, in 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*.<sup>1</sup> 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 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.<sup>2</sup> 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,<sup>3</sup> and is typically approximated by the wage of a comparably productive captain.<sup>4</sup>

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

<sup>1</sup> 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.

<sup>2</sup> 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.

<sup>3</sup> Boardman, Anthony, David Greenberg, and Aidan Vining. *Cost-Benefit Analysis: Concepts and Practice*, Prentice Hall, NJ. 2000. pp. 31-32.

<sup>4</sup> A more accurate measure would be the owner-captain's most valued wage off the vessel.

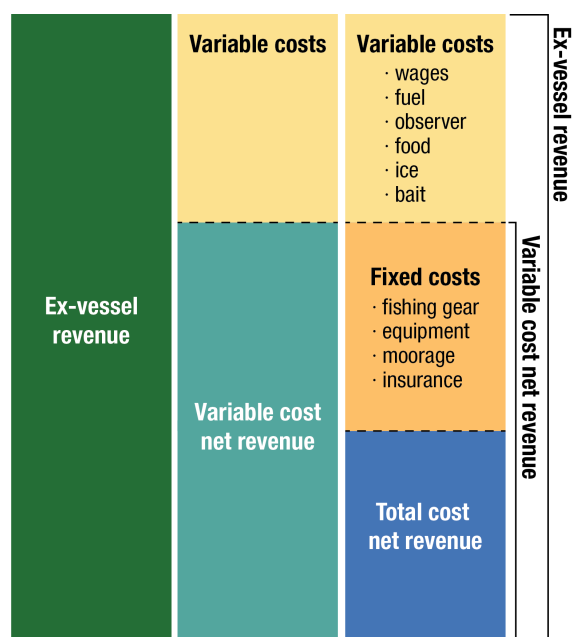
loss. Economic profit is a better indicator of the long-term viability of fishery operations since it includes all costs, and values the costs at their opportunity cost. It can be used to estimate whether there are incentives or disincentives to invest in capital, or enter and leave the fishery. It is 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 these reports. Economic profit relies on opportunity costs, which are not captured by the EDC survey forms, and therefore require additional information and analyses that are not feasible at this time. EDC Program economists will continue to work on developing measures of economic profit so that it may be included in future reports.

## 10.1 Net revenue

Net revenue is calculated two ways: using only variable costs, and using variable costs plus fixed costs (total costs).<sup>5</sup> The first calculation is called *variable cost net revenue*, while the second is called *total cost net revenue* (Figure 15). Variable cost net revenue is useful to examine changes in fishery operations that do not affect fixed costs. For example, the cost of operating for 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.

There are several caveats associated with the net revenue calculations in this report. As noted in Section 8, there are a variety of costs that are associated with operating 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/processing, 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 of equipment, professional fees,



**Figure 15:** Composition and derivation of variable and total cost net revenue used in the EDC Program analysis of revenue, costs, and economic performance.

<sup>5</sup> See Section 8 for a more complete discussion of variable and fixed costs used in this report.

and marketing. In general, the EDC form aims to capture costs that are only directly related to vessel maintenance and fishing/processing operations, and not costs that are related to activities or equipment off the vessel. Therefore, the net revenue calculated here is an overestimate of the true net revenue. The difference is likely much greater for total cost net revenue than variable cost net revenue, as 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), the total cost net revenue calculated here 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 for the net revenue calculation here. Over time, this may balance out to some degree because previously financed or purchased capital and equipment are also not included, except for the year in which they are purchased.<sup>6</sup> Moreover, 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.

### **Net revenue for all West Coast fishing activities**

Average net revenue is calculated for all activities on the West Coast. West Coast revenue only includes revenue from fish production. The variable and fixed costs do not include costs related to acquiring limited entry permits, quota shares, or quota pounds.

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

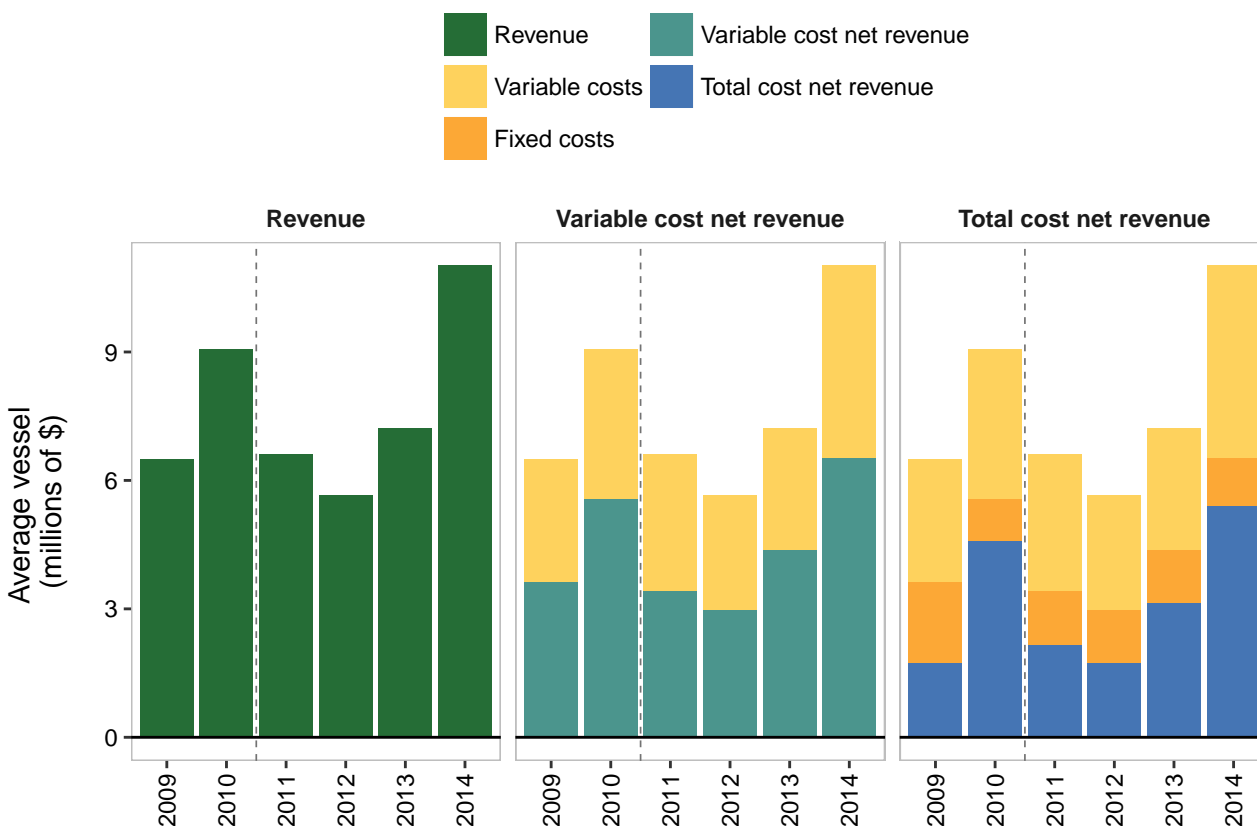
$$\text{Total cost net revenue} = \text{West Coast revenue} - (\text{West Coast variable costs} + \text{West Coast fixed costs})$$

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<sup>6</sup> At best it is just a partial balancing out because the interest payments are not accounted for in the EDC data.

**Table 10.1: West Coast variable cost and total cost net revenue.** Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue on the West Coast (millions of \$) (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	\$6.50	5	\$9.06	6	\$6.60	9	\$5.66	9	\$7.21	9	\$11.02	9
(Variable costs)	\$2.86	5	\$3.48	6	\$3.18	9	\$2.67	9	\$2.83	9	\$4.50	9
<b>Variable cost net revenue</b>	<b>\$3.64</b>	<b>5</b>	<b>\$5.58</b>	<b>6</b>	<b>\$3.42</b>	<b>9</b>	<b>\$2.98</b>	<b>9</b>	<b>\$4.38</b>	<b>9</b>	<b>\$6.52</b>	<b>9</b>
(Fixed costs)	\$1.90	5	\$1.00	6	\$1.25	9	\$1.24	9	\$1.25	9	\$1.12	9
<b>Total cost net revenue</b>	<b>\$1.75</b>	<b>5</b>	<b>\$4.58</b>	<b>6</b>	<b>\$2.17</b>	<b>9</b>	<b>\$1.74</b>	<b>9</b>	<b>\$3.13</b>	<b>9</b>	<b>\$5.40</b>	<b>9</b>



**Figure 16:** Average total reported revenue (left), average variable cost net revenue (revenue minus variable costs) (middle), and average total cost net revenue (revenue minus variable costs and fixed costs) (right) (millions of \$). Dashed line represents the beginning of the catch share program.

## 11 Economic Performance: Cost, Revenue, Net Revenue, and Product Recovery Rates

### 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 (West Coast processing and steaming), metric ton of fish produced, and metric ton of fish harvested (Tables 11.1, 11.2, and 11.3).

**Table 11.1: Revenue, costs, and net revenue per day.** Average vessel revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue per day (thousands of \$) (N = number of EDC vessels with non-zero, non-NA responses).

Per Day	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	\$149.1	5	\$144.2	6	\$139.3	9	\$174.7	9	\$152.8	9	\$186.5	9
(Variable costs)	\$68.5	5	\$57.0	6	\$67.9	9	\$83.2	9	\$63.8	9	\$76.8	9
<b>Variable cost net revenue</b>	<b>\$80.6</b>	<b>5</b>	<b>\$87.2</b>	<b>6</b>	<b>\$71.4</b>	<b>9</b>	<b>\$91.5</b>	<b>9</b>	<b>\$89.0</b>	<b>9</b>	<b>\$109.7</b>	<b>9</b>
(Fixed costs)	\$81.3	5	\$19.0	6	\$30.2	9	\$51.8	9	\$27.1	9	\$20.1	9
<b>Total cost net revenue</b>	<b>-\$0.7</b>	<b>5</b>	<b>\$68.2</b>	<b>6</b>	<b>\$41.3</b>	<b>9</b>	<b>\$39.7</b>	<b>9</b>	<b>\$62.0</b>	<b>9</b>	<b>\$89.6</b>	<b>9</b>

**Table 11.2: Net revenue per metric ton harvested.** Average vessel revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue per metric ton harvested (\$) (N = number of EDC vessels with non-zero, non-NA responses).

Per metric ton Harvested	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Variable cost net revenue	\$491	5	\$591	6	\$416	9	\$472	9	\$450	9	\$565	9
Total cost net revenue	-\$203	5	\$465	6	\$226	9	\$209	9	\$297	9	\$460	9



**Table 11.3: Revenue, costs, and net revenue per metric ton produced.** Average vessel revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue per metric ton produced (\$) (N = number of EDC vessels with non-zero, non-NA responses).

Per mt Produced	2009		2010		2011		2012		2013		2014	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Revenue	\$2,500	5	\$2,743	6	\$2,423	9	\$2,693	9	\$2,358	9	\$2,567	9
(Variable costs)	\$1,162	5	\$1,088	6	\$1,195	9	\$1,298	9	\$1,027	9	\$1,062	9
<b>Variable cost net revenue</b>	<b>\$1,338</b>	<b>5</b>	<b>\$1,656</b>	<b>6</b>	<b>\$1,229</b>	<b>9</b>	<b>\$1,396</b>	<b>9</b>	<b>\$1,331</b>	<b>9</b>	<b>\$1,505</b>	<b>9</b>
(Fixed costs)	\$2,025	5	\$353	6	\$572	9	\$783	9	\$437	9	\$280	9
<b>Total cost net revenue</b>	<b>-\$687</b>	<b>5</b>	<b>\$1,303</b>	<b>6</b>	<b>\$656</b>	<b>9</b>	<b>\$613</b>	<b>9</b>	<b>\$894</b>	<b>9</b>	<b>\$1,225</b>	<b>9</b>

## Product recovery rates

The product recovery rate for the catcher-processor whiting sector is calculated as follows:

$$\frac{\sum_{n=1}^N WT_n^{fishoutputs}}{\sum_{n=1}^N WT_n^{fishinputs}}$$

where  $N$  is the number of catcher-processors that harvested fish on the West Coast,  $WT_n^{fishoutputs}$  is the weight of fish harvested and  $WT_n^{fishinputs}$  is the weight of production for each catcher-processor. The entity average product recovery rate is calculated for each survey year and shown in (Table 11.4).

**Table 11.4: Product recovery rate.** The average product recovery rate (total weight of production divided by total weight of fish purchases) for catcher-processors on the West Coast (N = number of 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
Product recovery rate	0.38	5	0.37	6	0.34	9	0.34	9	0.35	9	0.38	9