

Economic Data Collection Program

Catcher-Processor Report

Draft Report for PFMC Review

Do Not Cite

Northwest Fisheries Science Center¹

May 22, 2013

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

Contents

- List of Tables** **3**
- List of Figures** **4**
- Summary** **5**
- 1 Introduction** **7**
 - 1.1 Background 7
 - 1.2 Purpose of the report 8
 - 1.3 Catcher-processor form administration 9
 - 1.4 About the survey participants 9
 - 1.5 Understanding the report 10
- 2 Vessel Participation on the West Coast and in Alaska** **11**
- 3 Delivery Ports** **13**
- 4 Vessel Physical Characteristics** **14**
- 5 Vessel Fuel Use and Crew Size** **15**
 - 5.1 Fuel use 15
 - 5.2 Crew 16
- 6 Whiting Harvest** **17**
- 7 Revenue** **19**
- 8 Costs** **23**
 - 8.1 Variable costs 24
 - 8.2 Fixed costs 25
 - 8.2.1 Costs on vessel and on-board equipment, fishing gear, and processing equipment 25
 - 8.2.2 Other fixed costs 27
 - 8.3 Fixed costs on the West Coast 28
 - 8.3.1 Costs on vessel and on-board equipment, fishing gear, and processing equipment on the West Coast only 28

8.3.2	Other fixed costs on the West Coast only	28
8.3.3	Summary of West Coast costs	29
8.3.4	Quota and permit costs on the West Coast	29
9	Net Revenue and Economic Profit	31
9.1	Net revenue	32
9.1.1	Net revenue for all West Coast fishing activities	33
10	Cost, Revenue, Net Revenue, and Product Recovery Rates	35

List of Tables

- 2.1 Average days at-sea. 11
- 2.2 One-way trips steaming between West Coast and Alaska. 11
- 2.3 Number of vessels that fished on the West Coast and Alaska. 12

- 3.1 Off-loading. 13

- 4.1 Average vessel characteristics 14
- 4.2 Haul outs. 14

- 5.1 Daily fuel use. 15
- 5.2 Average total fuel use. 15
- 5.3 Average crew size. 16

- 6.1 Annual catcher-processor allocation, average West Coast whiting harvest per vessel and total West Coast and Alaska harvest 17

- 7.1 Average whiting production weight. 20
- 7.2 Whiting production value. 20

- 8.1 Variable expenses. 25
- 8.2 Capitalized expenditures on vessel and on-board equipment, fishing gear, and processing equipment. 26
- 8.3 Expenses on vessel and on-board equipment, fishing gear, and processing equipment. 27
- 8.4 Other fixed expenses. 27
- 8.5 Depreciation. 27
- 8.6 West Coast fixed costs on vessel and on-board equipment, fishing gear, and processing equipment. 28
- 8.7 West Coast costs on insurance, moorage, and leasing. 29
- 8.8 Summary of costs on the West Coast. 29

- 9.1 West Coast variable cost and total cost net revenue. 34

- 10.1 Cost, revenue, variable cost net revenue, and total cost net revenue rates. (N = number of vessels with non-zero, non-NA responses). 36
- 10.2 Product recovery rate. 36

List of Figures

- 6.1 Average annual harvest on the West Coast and Alaska. 18
- 7.1 Production value by product type and year. 21
- 7.2 Production weight by product type and year. 22
- 8.1 Average costs by category on the West Coast. 30

Summary

This report summarizes information collected from the West Coast groundfish trawl catcher-processor fleet as a part of the Economic Data Collection (EDC) program, which was implemented to monitor the economic effects of the 2011 transition of the West Coast groundfish trawl fishery to a catch share program. The catch share program consists of cooperative programs for the at-sea mothership and catcher-processor fleets, and an individual fishing quota (IFQ) program for the shorebased trawl fleet. Annual EDC submissions are required from all fishery participants. The catcher-processor form is available online¹. This catcher-processor report (and its companion reports covering the other sectors) is the first in what is expected to be an annual series of reports. EDC economists will expand and refine the scope and methods used with each new annual publication.

The report covers the years 2009 to 2011. It contains information about annual participation by catcher-processors in the West Coast and Alaska groundfish trawl fisheries, as well as the physical characteristics, fuel use, and crew size of catcher-processor vessels participating in the West Coast groundfish trawl fisheries. Harvest quantity and the ports of delivery for fishing in Alaska and the West Coast are provided for vessels participating in the West Coast groundfish trawl fisheries. The report also contains variable and fixed cost information, production, revenues, and calculated net revenue from West Coast harvest. Finally, a breakdown of costs, revenue, and net revenue per day at sea, per metric ton of production, and per metric ton of harvest provide the basis for a simple metrics of the economic performance of the catcher-processor fleet.

¹http://www.nwfsc.noaa.gov/research/divisions/fram/economic_data.cfm

1 Introduction

1.1 Background

In January 2011, the West Coast groundfish trawl fishery transitioned to a catch share program. The catch share program consists of an individual fishing quota (IFQ) program for the shorebased trawl fleet, and cooperative programs for the at-sea mothership and catcher-processor fleets. The Economic Data Collection (EDC) program¹ 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.

The catcher-processor fleet on the West Coast has been a cooperative since 1997, when the Pacific Whiting Conservation Cooperative was formed. The Cooperative consists of three companies and all catcher-processor vessels that participate in the Pacific whiting fishery on the West Coast. While the 2011 catch share program changed the structure of the whiting shoreside and mothership fisheries, the catcher-processor fishery has continued to operate as a single co-op.

This draft report summarizes the 2009-11 EDC catcher-processor survey data. The EDC Program has enhanced the quantity and quality of economic information available for analysis and the management of the West Coast groundfish trawl fishery. While costs and earnings data are available for shorebased catcher vessels starting in 2004², this is the first data collection from the catcher-processor fleet.

In addition to the catcher-processor report, there are four companion reports:

- Economic Data Collection Program, Administration and Operations Report, Draft Report for the SSC Economic Subcommittee Review (March 2013)
- Economic Data Collection Program, Mothership Report, Draft Report for the SSC Economic Subcommittee Review (March 2013)

¹Additional information on the EDC Program, including the EDC data collection forms can be found at www.nwfsc.noaa.gov/edc

²Lian, C.E. 2010. West Coast limited entry groundfish trawl costs and earnings survey protocols and results for 2004. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-107, 35 p.

- Economic Data Collection Program, Catcher Vessel Report, Draft Report for the SSC Economic Subcommittee Review (March 2013)
- Economic Data Collection Program, First Receiver and Shorebased Processor Report, Draft Report for the SSC Economic Subcommittee Review (March 2013)

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.

This catcher-processor report and other reports, listed above, comprise the first of what is expected to be an annual series of reports. It is envisioned that over time, the scope of these reports will expand, and the methods used will be refined with each annual publication. As such, the data summaries and analyses may change in subsequent years as improvements are implemented. Future reports will contain additional summaries that describe the variation of the data, either numerically or graphically. They are not contained in this report due to time constraints.

1.2 Purpose of the report

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

Second, the data summary reports provide information about the performance of the catch share program. This includes information that can be used to monitor whether and to what degree the goals of the program are being met. It is expected that additional modeling will provide increased detail about program impacts. These reports will serve as the basis for the 5-year review of the catch share program that is mandated in the MSA, as well as the NMFS National Catch Shares Performance Indicators. Currently, with just a single year of catch share EDC data, it may be difficult to draw firm conclusions about the performance of the program. In addition, the catch share program may have a transitional period in the first few years as participants learn about the system and develop new business strategies.

Third, the reports either provide or serve as the basis for economic models that will be used as part of the Pacific Fishery Management Council's (PFMC) biennial specification process for groundfish management. These models include the IO-PAC model³, as well as estimates of

³Leonard, 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.

revenue, costs, and net revenue.

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

1.3 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 Office 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 NMFS' NORPAC database §660.114(b)(3)(i) are 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 2012 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 2011. The forms are fielded on this schedule in order to allow participants the time necessary to complete their taxes, which may contain some information that is required on the EDC forms.

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 database.

1.4 About the survey participants

One distinguishing factor amongst the vessels that affects interpretation of EDC data is whether the vessel fished in Alaska, the West Coast, or Alaska and the West Coast. Although the questions on the EDC form ask about fisheries on the West Coast, Alaska, and other fisheries,

the catcher-processor vessels in the survey population do not fish anywhere other than the West Coast and Alaska. For vessels that participated in the tribal sector of the West Coast at-sea hake fishery, West Coast costs, days at sea, fuel use, and production weight and value have been adjusted to reflect only non-tribal catcher-processor sector activities.

1.5 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.

All data submitted via the EDC Program are confidential under 402(b) of the Magnuson-Stevens Act (16 U.S.C. 1801, et seq.) and under NOAA Administrative Order 216-100. In order to protect these data, a rule of three and a rule of 90-10 are implemented. The rule of three requires a response from at least three companies in order to show a summary statistic. The 90-10 rule requires that no single company's value should 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.

Although participants are identified on a calendar year basis, they complete the form using information based on the fiscal year of the entity. Currently data are presented for survey year, and therefore data assigned to a survey year may not overlap completely with the calendar year. Information obtained from outside of the EDC Program is adjusted to match the fiscal year provided on each form. For the three years of data collected from catcher processors, all catcher-processors used the calendar year for the fiscal year.

The form had very few changes between the 2009-2010 data collection, and the 2011 collection. 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 disappeared 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.

2 Vessel Participation on the West Coast and in Alaska

The catcher-processor fleet participates in fisheries on the West Coast and Alaska. Table 2.1 provides the average days at sea by activity. Participants are instructed to count partial days as full days when recording days at sea on the forms. In 2011, the vessels spent less time on average off-loading and steaming on the West Coast than in 2009 and 2010, and more days fishing in Alaska in 2011.

Table 2.1: Average days at-sea. Average days at sea by activity in West Coast and Alaska activities for catcher-processor vessels (N = number of vessels with non-zero, non-NA responses).

Description	2009 (N)	2010 (N)	2011 (N)
Fishing and processing West Coast whiting fishery	36 (5)	52 (6)	42 (9)
Off-loading in the West Coast whiting fishery	***	4 (5)	3 (9)
Steaming in the West Coast whiting fishery	6 (5)	11 (6)	5 (9)
Steaming between West Coast and Alaska	***	23 (6)	19 (9)
Fishing in Alaska	***	111 (6)	190 (9)

Table 2.2 presents the median 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.

Table 2.2: One-way trips steaming between West Coast and Alaska. Median number of one-way trips between the West Coast and Alaska.

	2009 (N)	2010 (N)	2011 (N)
One-way trips to Alaska	***	4 (6)	4 (9)

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

Description	2009	2010	2011
Number of vessels that fished and processed on the West Coast	5	6	9
Number of vessels that fished and processed in Alaska	*	6	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 that asks for the percentage of all West-Coast whiting products off-loaded from the catcher-processor vessel at each major West Coast port.

Table 3.1: Off-loading. Total number of vessels that off-loaded in each port.

Location	2009	2010	2011
Off-load in Blaine/Bellingham	0	2	4
Off-load in Seattle	3	3	2
Off-load in Tacoma	2	3	3

4 Vessel Physical Characteristics

Physical vessel characteristics are shown below in Table 4.1. Survey participants were asked to provide basic information about the vessel and its physical characteristics, including market value, replacement value, vessel length, horsepower of main engines, and fuel capacity from the most recent marine survey. Marine surveys are done on a regular basis and are often required for insurance, financing, and other purposes.

Table 4.1: Average vessel characteristics.

Description	2009 (N)	2010 (N)	2011 (N)
Market value (\$)	59,706,000 (5)	57,583,333 (6)	55,181,111 (9)
Replacement value (\$)	92,000,000 (5)	86,783,333 (6)	85,944,444 (9)
Length (feet)	301 (5)	281 (6)	304 (9)
Horsepower	6,600 (5)	6,433 (6)	6,800 (9)
Fuel capacity (gallons)	265,884 (5)	212,670 (6)	277,936 (9)

The participants provide information about whether the vessel was hauled out (vessel was removed from the water for maintenance and repairs). Each year about half of all active fishing vessels are hauled out. The information shown below in Table 4.2 provides context that may be used to explain major costs associated with vessel repair and maintenance.

Table 4.2: Haul outs. Number of vessels that were hauled out during their fiscal year.

Hauled Out	2009	2010	2011
Yes	2	3	4
No	3	3	5

5 Vessel Fuel Use and Crew Size

5.1 Fuel use

Table 5.1 contains the vessels' average fuel use per day, for propulsion or other uses, when engaged in West Coast activities. The information in the table below represents the average of the average fuel use provided by participants. As stated for Table 2.3, not all companies had vessels that steamed between the West Coast and Alaska in 2009, and thus this value is suppressed to maintain confidentiality.

Table 5.1: Daily fuel use. Average daily fuel use by activity (gallons per day) (N = number of vessels with non-zero, non-NA responses).

Description	2009 (N)	2010 (N)	2011 (N)
Fishing, processing, and steaming in the West Coast whiting fishery	7,747 (5)	7,229 (6)	7,750 (9)
Steaming between West Coast and Alaska	***	5,503 (6)	6,242 (9)

In 2011, the average total fuel used by the vessel during the survey year for propulsion or other use in the West Coast whiting fishery was less than in 2010 or 2009 (Table 5.2) . This total excludes fuel used for steaming between the West Coast and Alaska.

Table 5.2: Average total fuel use. Average total fuel use (gallons) per entity (N = number of vessels with non-zero, non-NA responses)

Description	2009 (N)	2010 (N)	2011 (N)
Diesel	362,185 (5)	336,836 (6)	327,614 (9)
Fish oil	***	***	***

5.2 Crew

Table 5.3 presents the average number of processing and non-processing crewmembers when the vessel was operating in the West Coast whiting fishery during the survey year. 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 size of non-processing crew and processing crew (N = number of vessels with non-zero, non-NA responses).

Description	2009 (N)	2010 (N)	2011 (N)
Non-processing	24 (5)	21 (6)	32 (9)
Processing	88 (5)	91 (6)	83 (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 U.S. and Canadian fishermen. Once the U.S. allocation has been determined, it is then allocated between catcher-processor, mothership, and shoreside sectors. The annual allocations to the catcher-processor sector (Table 6.1) are taken from the annual *Pacific Whiting Fishery Summary* provided by the Northwest Regional Office¹.

The West Coast data for the catcher-processor sector annual whiting fish purchases in Table 6.1 are provided by the A-SHOP through the Pacific States Information Network (PacFIN) database. The values for average vessel harvest and total fleet harvest in all fisheries (including the West Coast and Alaska) are from a question on the EDC survey that asks participants to provide the total round weight of all fish harvested by the vessel in all fisheries during the survey year.

Table 6.1: Annual catcher-processor allocation, average West Coast whiting harvest per vessel and total West Coast and Alaska harvest in metric tons (N=number of vessels).

Description	2009 (N)	2010 (N)	2011 (N)
Total catcher-processor West Coast whiting allocation	35,376	53,379	75,138
Average West Coast whiting catch by vessel (A-SHOP)	6,910 (5)	9,047 (6)	7,964 (9)
Total West Coast whiting catcher-processor fleet catch (A-SHOP)	34,552 (5)	54,285 (6)	71,679 (9)
Total West Coast and Alaska catcher-processor fleet catch	126,671 (5)	199,475 (6)	453,470 (9)
Average West Coast and Alaska catch by vessel	25,334 (5)	33,246 (6)	50,386 (9)

¹<http://161.55.131.129/Groundfish-Halibut/Groundfish-Fishery-Management/Whiting-Management/2011/upload/2011-summary.pdf>

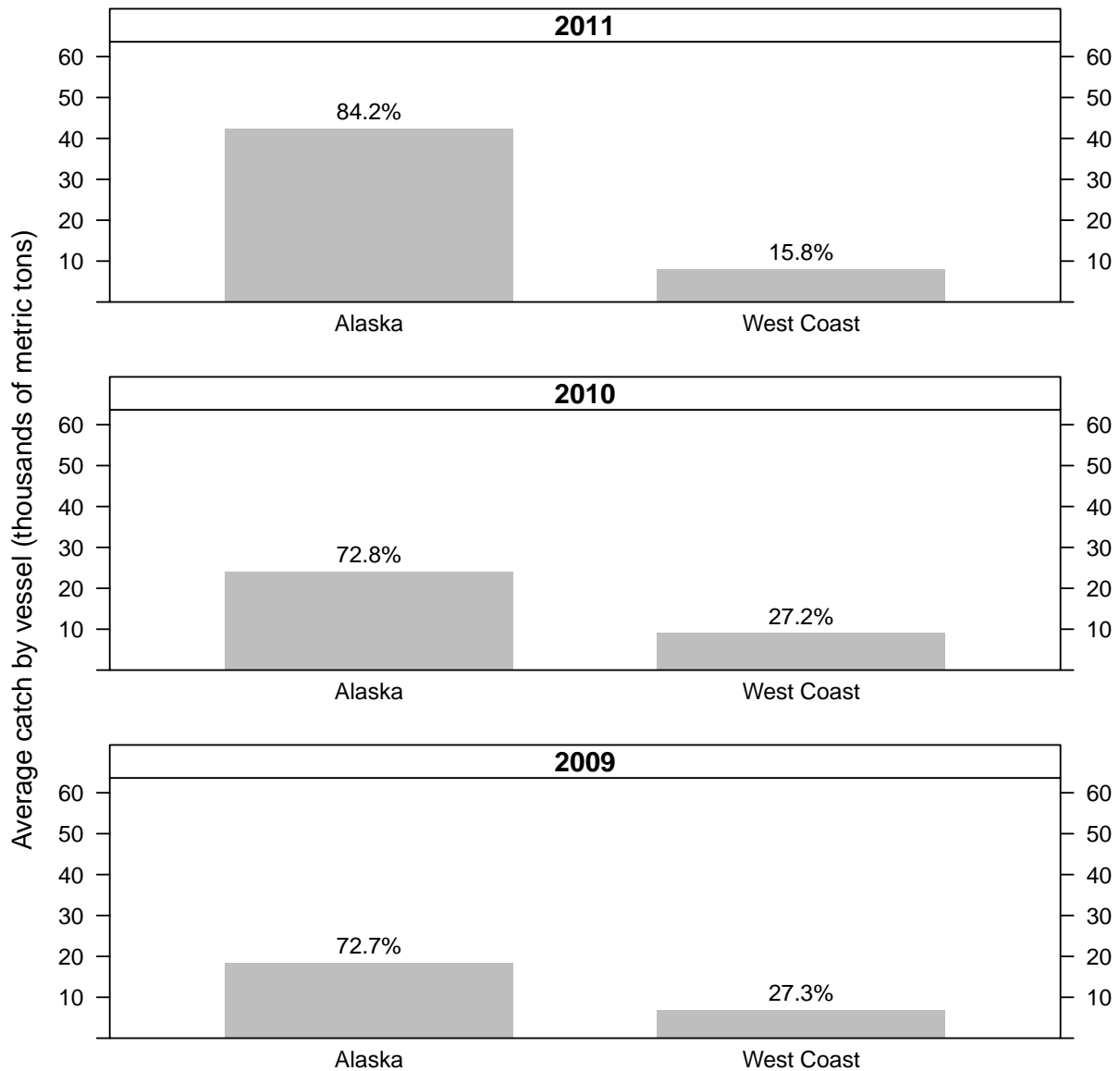


Figure 6.1: Average annual harvest on the West Coast and Alaska. Average annual harvest (thousands of metric tons) from 2009 to 2011 on the West Coast and in Alaska. Percentages above each bar indicate the portion of the total harvest caught in that fishery.

7 Revenue

The EDC forms ask about four forms 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 the EDC 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 of production and value of production by major product categories. These values include 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. The revenue only includes fish caught and processed on the West Coast.

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 MT (N)	2010 MT (N)	2011 MT (N)
Fillets	1,122 (5)	987 (6)	1,130 (9)
Fishmeal	273 (3)	249 (3)	258 (6)
Fish oil	***	65 (5)	38 (7)
Headed and gutted	0 (0)	***	***
Minced	247 (4)	341 (4)	263 (7)
Other	***	***	***
Round	0 (0)	0 (0)	0 (0)
Roe	0 (0)	***	0 (0)
Stomachs	0 (0)	0 (0)	0 (0)
Surimi	953 (5)	1,621 (6)	975 (9)
Average vessel total: all products	2,648 (5)	3,310 (6)	2,722 (9)

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

Product Category	2009 \$ (N)	2010 \$ (N)	2011 \$ (N)
Fillets	3,540,092 (5)	3,001,928 (6)	3,141,512 (9)
Fishmeal	401,632 (3)	464,326 (3)	446,899 (6)
Fish oil	***	56,038 (5)	48,632 (7)
Headed and gutted	0 (0)	***	***
Minced	466,712 (4)	705,643 (4)	458,764 (7)
Other	***	***	***
Round	0 (0)	0 (0)	0 (0)
Roe	0 (0)	***	0 (0)
Stomachs	0 (0)	0 (0)	0 (0)
Surimi	1,985,758 (5)	4,761,903 (6)	2,417,943 (9)
Average vessel total: all products	6,502,348 (5)	9,059,110 (6)	6,601,671 (9)

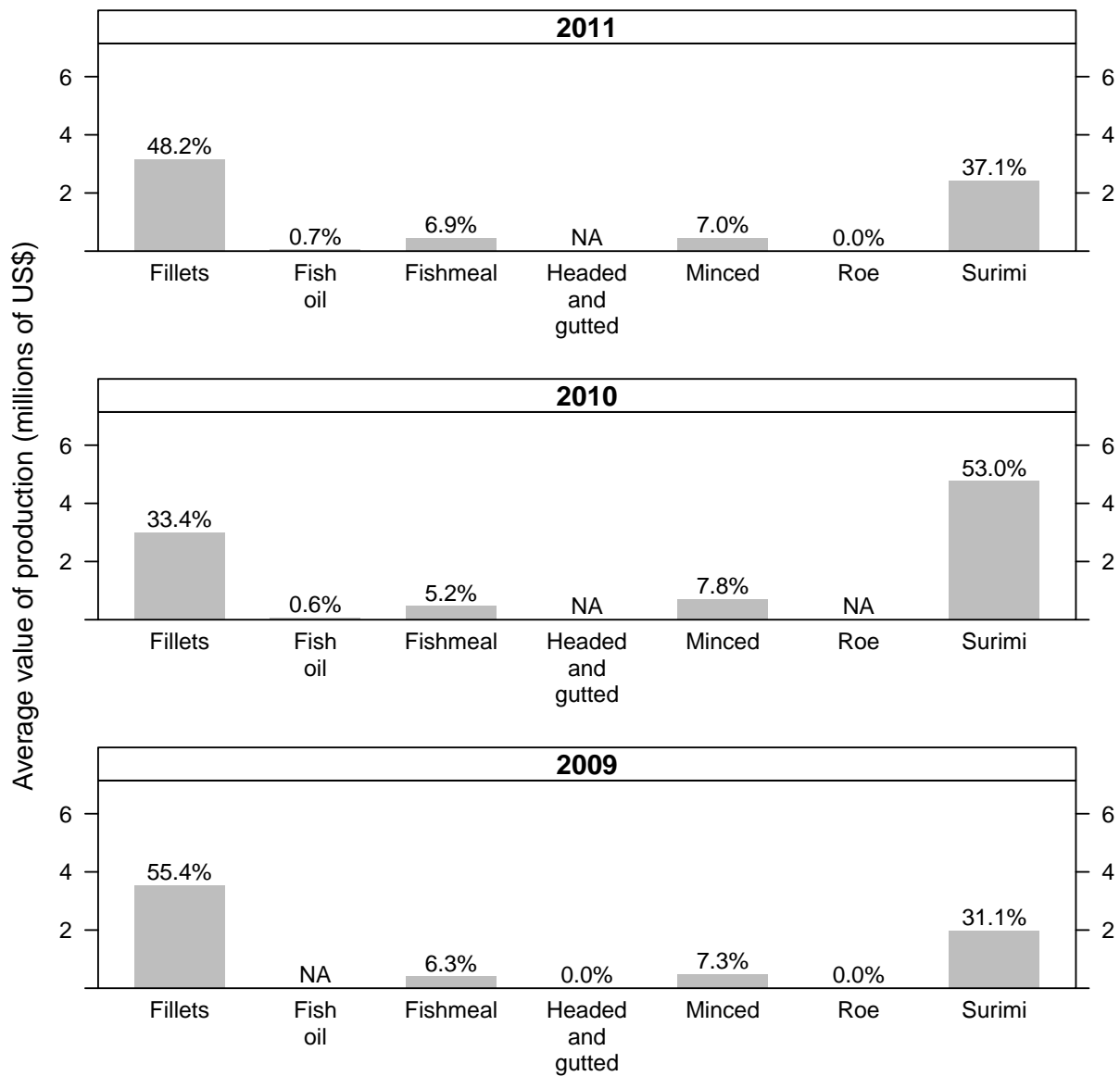


Figure 7.1: Production value by product type and year. Average whiting production value by product type and year. Confidential data have been suppressed and replaced with "NA", product categories where production value was reported as 0 for all vessels for all years are not included. The percentage of each product type of all production is listed on the top of each bar.

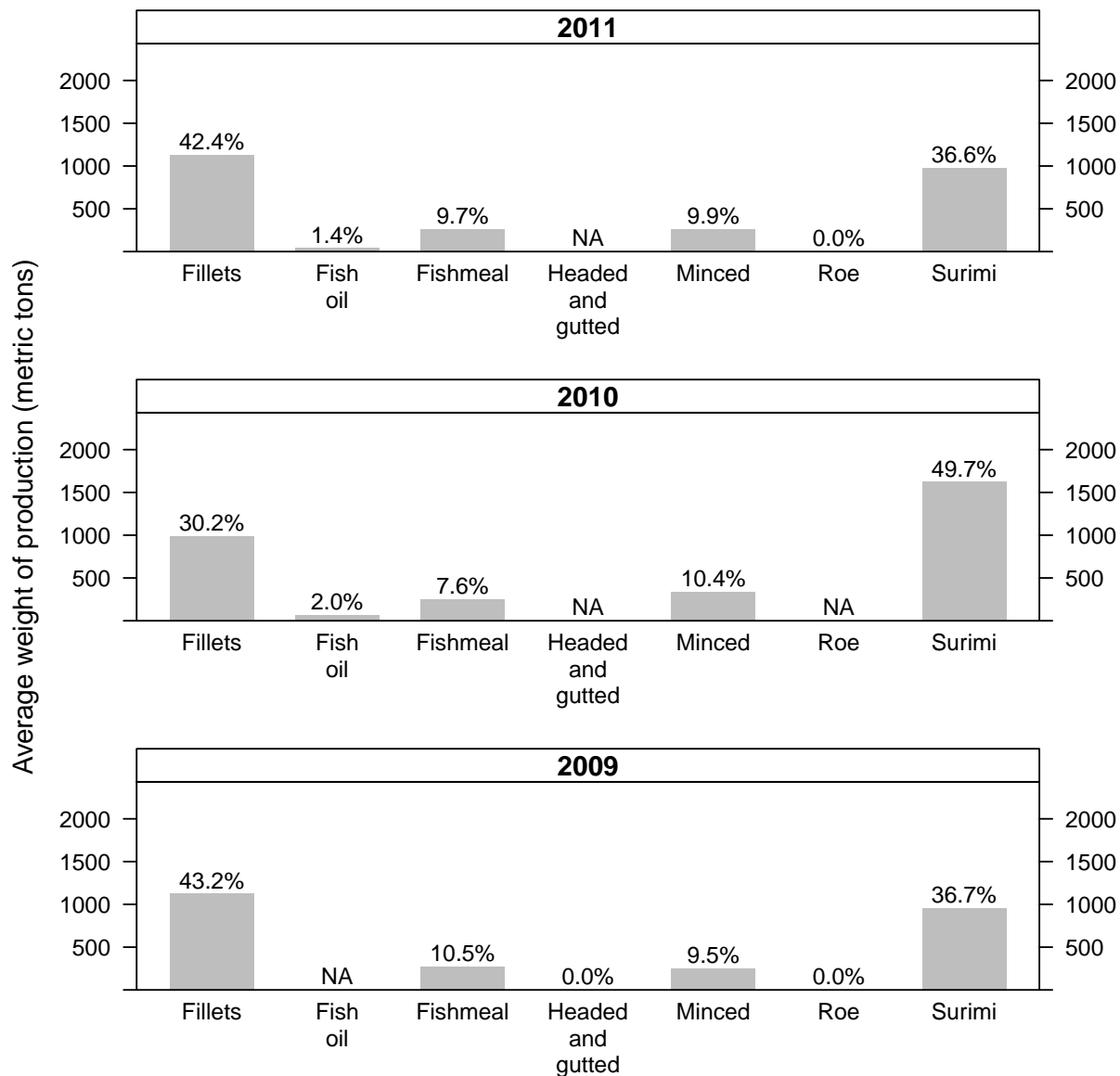


Figure 7.2: Production weight by product type and year. Average whiting production value by product type and year. Confidential data have been suppressed and replaced with “NA”, product categories where production value was reported as 0 for all vessels for all years are not included. The percentage of each product type of all production is listed on the top of each bar.

8 Costs

This section of the report describes the cost data that are collected on the EDC catcher-processor form. It reports variable costs, fixed costs, and total costs, and how those costs are disaggregated to estimate the proportion of costs attributed to West Coast fisheries.

For the purposes of the EDC, costs are divided into two categories: variable costs and fixed costs. Variable costs vary with the level of fishery participation, and generally include items such as fuel and crew payments. Fixed costs do not vary 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, we consider the costs listed in Tables 8.2, 8.3 and 8.4 to be fixed, and the costs listed in Table 8.1 to be variable. The EDC Program will continue to explore, and possibly improve, the categorization of these costs.

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

In order to conduct economic analyses of specific fisheries it is important to have costs broken out by fishery. For some costs, it may be feasible for participants to break out or track costs at the fishery level. However, for most costs this is impossible. During the EDC form development process, a key issue was the determination of which costs could reasonably be broken out by fishery or groups of fisheries. Each cost item 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.

Some costs that are required for economic analysis are not asked for on the EDC forms because they are available through other sources, or can be calculated through the At-Sea Hake Observer Program or Northwest Regional Permit Office data.

Finally, there are a variety of costs that are associated with running a catcher-processor 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 forms attempt to capture costs that are directly related to vessel maintenance and fishing operations, and not costs that are related to activities or equipment off the vessel. For these reasons, the EDC aggregated measures of costs (variable costs, fixed costs, and total costs) underestimate the true costs of operating a business.

8.1 Variable costs

Variable costs were collected for all West Coast activities. Unlike fixed costs, variable costs are directly related to fishing operations, and therefore it is possible for vessels to separate expenses for activities on the West Coast from other activities. Average processing crew expenses fell by about twenty percent from 2009 to 2011, while non-processing crew expenses increased during the same period by about thirty-five percent. Total expenses on fuel increased by more than sixty percent from 2009 to 2011 (Table 8.1).

Table 8.1: Variable expenses. Average variable expenses on the West Coast for EDC vessels (\$) (N = number of vessels with non-zero, non-NA responses).

Expense category	2009 \$ (N)	2010 \$ (N)	2011 \$ (N)
Co-op membership fees	20,016 (5)	27,271 (6)	16,845 (9)
Communication	15,896 (5)	21,514 (6)	16,765 (9)
Food	88,372 (5)	108,934 (6)	108,896 (9)
Freight	***	***	15,843 (7)
Fuel and lubrication	758,126 (5)	862,106 (6)	1,225,046 (9)
Marine Stewardship Council fees	***	***	***
Non-fish ingredients (additives)	217,929 (5)	297,747 (6)	142,759 (9)
Non-processing crew wages	314,131 (5)	383,442 (6)	426,262 (9)
Observers	31,353 (5)	36,923 (6)	35,551 (9)
Offloading	***	***	***
On-board cargo/product insurance	***	***	13,087 (9)
Packing materials	204,837 (5)	232,183 (6)	241,636 (9)
Processing crew wages	1,140,442 (5)	1,420,313 (6)	908,419 (9)
Sea State data monitoring	3,701 (5)	3,982 (6)	4,672 (7)
Supplies	***	***	7,899 (9)
Travel	***	20,917 (5)	25,974 (7)

8.2 Fixed costs

8.2.1 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
- 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

- 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

Table 8.2: Capitalized expenditures on vessel and on-board equipment, fishing gear, and processing equipment. Average capitalized expenditures (\$) on vessel and on-board equipment, fishing gear, and processing equipment (N = number of vessels with non-zero, non-NA responses). Note that some capitalized expenditures were requested for all fisheries the vessel participates in (West Coast, Alaska, and other) and others are for West Coast Fisheries only (Washington, Oregon, and California).

Expenditure category	2009 \$ (N)	2010 \$ (N)	2011 \$ (N)
Fishing gear shared between the West Coast and other fisheries	96,875 (5)	***	251,090 (6)
Fishing gear used only on the West Coast	***	***	0 (0)
Vessel and on-board equipment	1,913,124 (5)	962,737 (6)	2,023,117 (9)
Processing equipment shared between the West Coast and other fisheries	***	***	***
Processing equipment used only on the West Coast	0 (0)	***	0 (0)

Table 8.3: Expenses on vessel and on-board equipment, fishing gear, and processing equipment. Average expenses (\$) on vessel and on-board equipment, fishing gear, and processing equipment (N = number of vessels with non-zero, non-NA responses). Note that some expenses were requested for all fisheries the vessel participates in (West Coast, Alaska, and other) and others are for West Coast Fisheries only (Washington, Oregon, and California).

Expense category	2009 \$ (N)	2010 \$ (N)	2011 \$ (N)
Fishing gear repair and maintenance shared between the West Coast and other fisheries	280,297 (5)	201,289 (6)	360,357 (9)
Fishing gear repair and maintenance on the West Coast	***	41,741 (5)	33,607 (7)
Vessel and on-board equipment	1,160,418 (5)	1,203,127 (6)	1,677,263 (9)
Processing equipment shared between the West Coast and Alaska	875,899 (5)	711,998 (6)	752,766 (9)

8.2.2 Other fixed costs

Table 8.4: Other fixed expenses. Average fixed expenses (\$) on all other categories (N = number of vessels with non-zero, non-NA responses).

Expense category	2009 \$ (N)	2010 \$ (N)	2011 \$ (N)
Insurance premium payments (hull and machinery, protection and indemnity, and pollution insurance)	890,246 (5)	833,454 (6)	901,322 (9)
Moorage	184,240 (5)	228,764 (6)	155,201 (9)
Lease of vessel	0 (0)	0 (0)	0 (0)

Table 8.5: Depreciation. Average depreciation taken during survey year. (N = number of vessels with non-zero, non-NA responses).

Expense category	2009 \$ (N)	2010 \$ (N)	2011 \$ (N)
Depreciation	2,694,639 (5)	2,317,669 (6)	3,077,619 (9)

8.3 Fixed costs on the West Coast

As described above, not all costs reported on the EDC forms are for West Coast only operations. Therefore, cost disaggregation was required both to estimate total costs and total cost net revenue on the West Coast. Estimates of West Coast only costs are calculated using a ratio of pounds caught on the West Coast to pounds caught in all fisheries, including Alaska, Tribal, and any other fisheries, which provides an estimate of the proportion of the vessel costs attributed to the West Coast for costs that are shared. This approximation for the proportion of shared spending on the West Coast is then summed with the West Coast Only spending categories to provide a total estimate for annual West Coast Only spending (Table 8.8).

$$C_n^{WC} = EX_n^{WC} + C_n^{SHD} \times \frac{WT_n^{WC}}{WT_n^{TOT}}, \quad (8.1)$$

where C_n^{WC} is the annual expenses associated with the West Coast for each vessel n , EX_n^{WC} are the West Coast only expenses (as reported on the EDC forms), and C_n^{SHD} are the costs that were shared between the West Coast and Alaska (as reported by the vessels on the EDC forms). The ratio of WT_n^{WC} (total purchases of fish on the West Coast) to WT_n^{TOT} (total purchases in all fisheries) are used to apportion the EX_n^{SHD} between the West Coast and other fisheries. The shared expenses include both the “Shared” and “All” costs described above. The annual expenses on the West Coast are calculated for each survey year.

8.3.1 Costs on vessel and on-board equipment, fishing gear, and processing equipment on the West Coast only

Table 8.6: West Coast fixed costs on vessel and on-board equipment, fishing gear, and processing equipment. Capitalized expenditures and expenses on vessel and on-board equipment, fishing gear, and processing equipment on the West Coast (N = number of vessels with non-zero, non-NA responses).

Cost category	2009 \$ (N)	2010 \$ (N)	2011 \$ (N)
West Coast costs on fishing gear	111,923 (5)	140,977 (6)	93,529 (9)
West Coast costs on on-board and vessel equipment	85,058 (5)	116,742 (6)	81,207 (9)
West Coast costs on processing equipment	683,790 (5)	297,794 (6)	183,549 (9)

8.3.2 Other fixed costs on the West Coast only

Table 8.7: West Coast costs on insurance, moorage, and leasing. (N = number of vessels with non-zero, non-NA responses).

Cost category	2009 \$ (N)	2010 \$ (N)	2011 \$ (N)
West Coast portion of insurance expenses	239,770 (5)	266,940 (6)	142,062 (9)
West Coast portion of moorage expenses	55,166 (5)	68,926 (6)	25,773 (9)

8.3.3 Summary of West Coast costs

Table 8.8: Summary of costs on the West Coast. Average costs on vessel and on-board equipment, fishing gear, and processing equipment, other fixed costs, and all variable costs on the West Coast (N = number of vessels with non-zero, non-NA responses).

Description	2009 \$ (N)	2010 \$ (N)	2011 \$ (N)
Total costs on vessel and on-board equipment, fishing gear, and processing equipment	1,080,915 (5)	727,045 (6)	401,844 (9)
Total other costs	4,465,721 (5)	5,293,487 (6)	4,314,462 (9)
Total costs	5,546,636 (5)	6,020,532 (6)	4,716,306 (9)

8.3.4 Quota and permit costs on the West Coast

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 the EDC form.

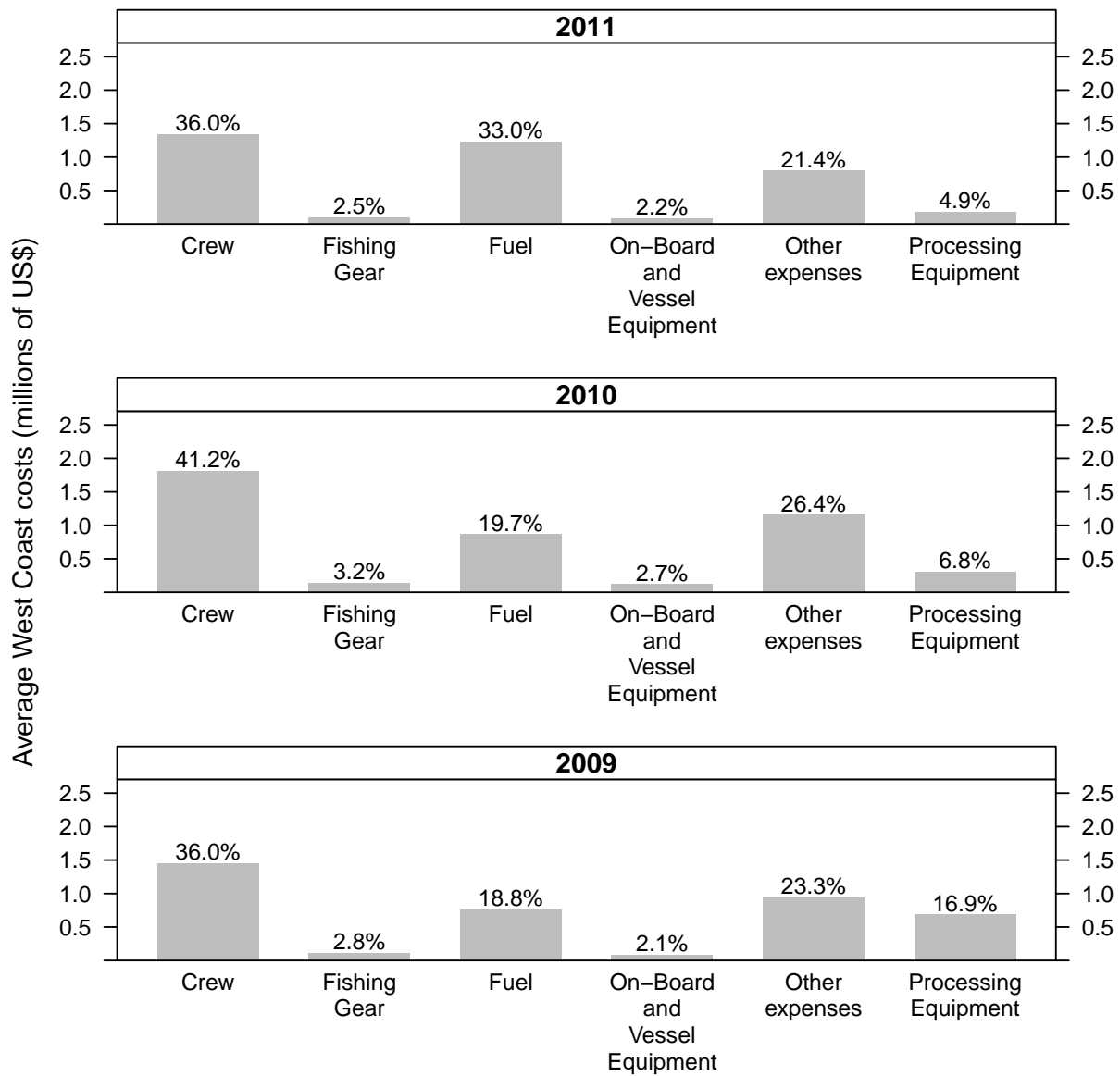


Figure 8.1: Average costs by category on the West Coast. Average costs by category on the West Coast including capitalized expenditures and annual expenses (millions of dollars). Crew includes both processing and non-processing crew expenses shown in Table 8.1. The “Other” category includes expenses on additives, communication, fees, insurance, freight, moorage, observers, offloading, supplies, packing, travel, and Sea-State monitoring. Percentages above each bar indicate the portion the category makes up of total West Coast costs.

9 Net Revenue and Economic Profit

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

Labor costs for the net revenue measure are the total payments to the crew and captain. If work is performed that is not paid for, then it is not included as a cost. This commonly occurs in commercial fishing when the owner of a vessel is also the captain, but does not 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 captain². 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 literature³, and is typically approximated by the wage of a comparably productive captain⁴.

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

¹Whitmarsh 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

²The 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.

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

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

opportunity cost of capital, and is typically approximated by the market rate of return associated with businesses of comparable risk, multiplied by the market value of the vessel.

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

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

9.1 Net revenue

Net revenue is calculated two ways: using only variable costs, and using variable costs plus fixed costs (total costs)⁵. The first calculation is called *variable cost net revenue*, while the second is called *total cost net revenue*. Variable cost net revenue is useful to examine changes in fishery operations that are not so great as to affect fixed costs. For example, the cost of fishing/processing an additional day, or catching/processing 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 the Section 8, there are a variety of costs that are associated with running a vessel that are not requested by the EDC form because it is difficult to determine the share of the cost associated with the vessel. These costs include items that can be used for activities other than fishing/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, and marketing. In general, the EDC forms attempt 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 EDC calculated net revenue is an underestimate of the true net revenue. The difference is likely much greater for total cost net revenue than variable cost net revenue since most of the excluded costs are fixed costs.

⁵See Section 8 for a more complete discussion of variable and fixed costs used in this report

Another caveat is that the EDC forms do not collect information about income taxes or financing costs. This has several implications. The first is that these costs are not included in the net revenue calculations. Therefore, net revenue is greater than it would be otherwise. The second is that in lieu of financing information (principal and interest payments), EDC total cost net revenue uses the total costs associated with vessel and gear purchases, repair, maintenance and improvements. For example, if a new engine is purchased, the total cost of the engine is used, even though the actual cash outlay, if it were financed, would only be the principal and interest payments made that year. It is likely that many larger capital costs, and perhaps some operating costs, are financed. This would mean that the actual cash outlays in a particular year for those items would be less than what is used in the EDC for the net revenue calculation. 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 purchased⁶. 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.

9.1.1 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 production of fish. The variable and fixed costs do not include costs related to acquiring limited entry permits, quota shares, or quota pounds.

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

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

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

Table 9.1: 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 (N = number of vessels). Fixed costs include capitalized expenditures and expenses on vessel and on-board equipment, fishing gear, and processing equipment and other fixed costs (N = number of EDC vessels with non-zero, non-NA responses).

Description	2009 \$ (N)	2010 \$ (N)	2011 \$ (N)
Revenue	6,502,348 (5)	9,059,110 (6)	6,601,671 (9)
(Variable costs)	2,913,037 (5)	3,545,239 (6)	3,227,204 (9)
Variable cost net revenue	3,589,311 (5)	5,513,871 (6)	3,374,466 (9)
(Fixed costs)	1,090,649 (5)	753,658 (6)	444,913 (9)
Total cost net revenue	2,520,528 (5)	4,770,114 (6)	2,941,876 (9)

10 Cost, Revenue, Net Revenue, and Product Recovery Rates

Table 10.1 provides a breakdown of the revenue, variable cost, variable cost net revenue, total cost, 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

The product recovery rate for the catcher-processor whiting sector (Table 10.2) is

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

where N is the total number of catcher-processors that harvested fish on the West Coast, $\sum_{n=1}^N WT_n^{fishoutputs}$ is the total weight of fish harvested and $\sum_{n=1}^N WT_n^{fishinputs}$ is the total weight of production for all catcher processors. The product recovery rate is calculated for each survey year.

Table 10.1: Revenue, cost, and net revenue rates.

Description	2009 (N)	2010 (N)	2011 (N)
Revenue per day (West Coast fishing, processing, and steaming day)	119,970 (5)	120,788 (6)	109,018 (9)
Revenue per metric ton produced	2,456 (5)	2,737 (6)	2,425 (9)
Variable cost per day (West Coast fishing, processing, and steaming day)	53,746 (5)	47,270 (6)	53,293 (9)
Variable cost per metric ton produced	1,100 (5)	1,071 (6)	1,185 (9)
Variable cost net revenue per day (West Coast fishing, processing, and steaming day)	66,223 (5)	73,518 (6)	55,725 (9)
Variable cost net revenue per metric ton produced	1,355 (5)	1,666 (6)	1,240 (9)
Variable cost net revenue per metric ton harvested	519 (5)	609 (6)	424 (9)
Fixed cost per day (West Coast fishing, processing, and steaming day)	20,123 (5)	10,049 (6)	7,347 (9)
Fixed cost per metric ton produced	412 (5)	228 (6)	163 (9)
Total cost net revenue per day (West Coast fishing, processing, and steaming day)	46,504 (5)	63,602 (6)	48,581 (9)
Total cost net revenue per metric ton produced	952 (5)	1,441 (6)	1,081 (9)
Total cost net revenue per metric ton harvested	365 (5)	527 (6)	369 (9)

Table 10.2: Product recovery rate. The 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).

Description	2009 (N)	2010 (N)	2011 (N)
Product recovery rate	0.38 (5)	0.37 (6)	0.34 (9)