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West Coast Open Access Groundfish and Salmon Troller Survey

Protocol and Results for 2005 and 2006

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Protocol and Results for 2005 and 2006

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Table of Contents

List of Tables

Executive Summary

This technical memorandum describes the fielding protocols and empirical results from an economic cost earnings survey of the West Coast open access groundfish and salmon troller fleets. The survey was conducted by the Fishery Resource Analysis and Monitoring Division of the Northwest Fisheries Science Center in cooperation with the Pacific States Marine Fisheries Commission (PSMFC). The population of interest for this survey was all active commercial fishing vessels that 1) landed at least $2,500 of salmon and groundfish combined at West Coast ports during 2005 and 2006, 2) had at least one trip on which groundfish and salmon accounted for a majority of landings revenue, and 3) did not hold a limited entry groundfish permit. Due to the large size of the non-tribal commercial fleet and the difficulty of obtaining contact information for tribal vessel owners, the survey only covered non-tribal commercial fishing vessels. There were 1,152 vessels that met these requirements and were included in the survey population. Vessels with less than $2,500 of combined groundfish and salmon revenue during the 2 years were considered too small to justify the expense of including them in the survey population.

The survey sample consisted of the 532 vessels for which sufficient contact information (name, address, and telephone number) was available for the vessel owner. Each of the 532 vessels in the survey sample was assigned to either the in-person survey sample or the telephone survey sample. Vessels with more than $25,000 of combined groundfish and salmon landings during 2005 and 2006 were assigned to the in-person survey sample. Vessels with less than $25,000 of combined groundfish and salmon landings during 2005 and 2006 were sorted in order of total groundfish and salmon landings during 2005 and 2006. Every third vessel owner was assigned to the in-person survey sample while the remaining two-thirds of vessels owners were assigned to the telephone survey. The in-person survey sample included 349 vessel owners; the telephone survey sample included 133 vessel owners.

The survey was fielded by the PSMFC and its subcontractors, ORC Macro and Gilmore Research. In-person and telephone interviews were completed with the owners of 168 of the 532 vessels in the survey sample, a 32% response rate. The response rate was higher for the in-person interview sample (39%) than the telephone interview sample (25%).

The 168 responses were used for statistical inference of operating costs, revenue from sources other than West Coast landings, and vessel operating characteristics (such as crew size and fuel consumption). Data collected from the survey were combined with economic data available from other sources, such as the Pacific Fisheries Information Network, to provide harvester revenues and costs at the vessel level. This document presents the results of this statistical inference for the entire open access groundfish and salmon troll fleet as well as the primary vessel types within the fleet. Primary vessel types within the survey population include crabbers, other (non-sablefish) groundfish fixed gear vessels, other greater than $15,000 vessels, other less than $15,000 vessels, sablefish fixed gear vessels, and salmon trollers.

Tests for nonresponse bias indicated that differences between survey respondents and nonrespondents did not justify weighting survey responses to correct for nonresponse bias. During 2005 the average survey respondent had West Coast landings revenue of $42,151 and the average nonrespondent had West Coast landings revenue of $38,523. During 2006, the average survey respondent had West Coast landings revenue of $41,074 and the average nonrespondent had West Coast landings revenue of $43,885.

Changes in revenue earned and costs incurred by respondents reflect both the Klamath River salmon disaster that reduced salmon trolling off the California and Oregon coasts and the unusually large West Coast crab harvest during 2006. Over half the vessels that earned a majority of their revenue from salmon trolling during 2005 changed their fishing behavior during 2006 and earned a majority of their revenue from crab, groundfish, or highly migratory species.

Data collected by this survey show that the 2006 Klamath River salmon disaster not only affected the economic performance of vessels in the salmon troll fishery, but also had an adverse impact on other fisheries. While all vessel types operating in the crab, groundfish, and salmon fishery earned positive economic net revenue during 2005, only vessels operating primarily in the crab fishery earned a positive economic net revenue during 2006. During 2005 the average crabber earned economic net revenue of $33,471. Within the open access groundfish fishery, economic net revenues were lower, with sablefish vessels earning an average economic net revenue of $14,476 while other groundfish fixed gear vessels earned an average economic net revenue of $1,506. The average salmon troller earned a small positive economic net revenue of $457.

Economic net revenue declined for every vessel type in the survey population during 2006. The economic net revenue for the average crabber remained positive, but declined from $33,471 in 2005 to $26,240 in 2006. Economic net revenue for sablefish vessels declined from $14,476 in 2005 to –$5,217 in 2006. Economic net revenue for other groundfish fixed gear vessels declined from $1,506 in 2005 to –$3,243 in 2006. For those vessels that continued to operate as salmon trollers during 2006, average economic net revenue declined to –$3,449. The reduced harvest in the salmon fishery during 2006 not only decreased the profitability and number of vessels operating in the salmon fishery, but also adversely affected the economic performance of vessels in other fisheries (such as crab, groundfish, and tuna) to which vessels exiting the salmon fishery entered.

Acknowledgments

The cost earnings survey described in this document was developed through collaboration and consultation with numerous individuals. The following individuals made important contributions to the survey design, fielding protocol, analysis of data, or reporting of data: Leif Anderson, Isaac Kaplan, Todd Lee, Jerry Leonard, and Mark Plummer, Northwest Fisheries Science Center (NWFSC); Dave Colpo, Pacific States Marine Fisheries Commission (PSMFC); and Stephen Freese, NMFS Northwest Regional Office. NWFSC and PSMFC also thank all of the vessel owners who volunteered their time and data for the survey.

1. Introduction

This technical memorandum describes the survey design and fielding protocol for the cost earnings survey of the West Coast open access groundfish and salmon troller fleets, which was conducted by the Fishery Resource Analysis and Monitoring Division of the Northwest Fisheries Science Center (NWFSC) in cooperation with the Pacific States Marine Fisheries Commission (PSMFC). Summary statistics computed with data collected through the survey are provided with accompanying discussion. The survey was fielded between October 2007 and December 2007 and collected data for the 2005 and 2006 fiscal years.

Section 2 discusses survey design and questionnaire development. Section 3 discusses survey fielding, focusing on the development of contact information, methods used to contact survey participants, and techniques used to collect information from survey respondents. Section 4 discusses response rates. Section 5 compares respondents and nonrespondents and summarizes the results of tests for nonresponse bias. Section 6 discusses the issue of correcting for nonresponse bias. Section 7 presents empirical results obtained from analysis of the survey data. Section 8 provides concluding remarks.

2. Survey Design

This survey was designed to provide economic data on vessels that participate in the West Coast open access groundfish and salmon troll fisheries and do not hold limited entry groundfish permits. Vessels holding a limited entry groundfish permit were covered by a separate survey. The objective of this survey was to obtain vessel level information on earnings and expenditures needed to support the calculation of economic performance measures (such as net earnings and efficiency) as well as economics.

2.1. Survey Population and Sample

The population of interest for this survey was all non-tribal commercial fishing vessels that 1) landed at least $2,500 of salmon and groundfish at West Coast ports during 2005 and 2006, 2) had at least one trip on which groundfish and salmon accounted for a majority of revenue from landings, and 3) did not hold a limited entry groundfish permit. There were 1,152 vessels that met these requirements and were included in the survey population. Vessels with less than $2,500 combined landings of groundfish and salmon during the 2 years were considered too small to justify the expense of including them in the survey population. Vessels were required to have at least one trip where groundfish and salmon account for a majority of revenue in order to avoid surveying vessels that only caught groundfish and salmon as bycatch.

Fielding a survey requires contact information on each vessel owner, the members of the survey population. Because completing the survey requires knowledge of financial and physical operating characteristics of the vessel, the vessel owner may in some cases direct questions to his or her accountant or a hired captain. While data were collected in some instances from hired captains or an accountant, the vast majority of interviews were conducted with the vessel owner. This survey did not collect data from crew members.

Vessel registration data provided the name and address of each vessel owner in the survey population. However, vessel registration information did not provide telephone numbers for each owner. As a result, a search of public records was undertaken to obtain telephone numbers for as many members of the survey population as possible. Telephone numbers were obtained for 532 of the 1,152 members of the survey population. The survey population did not include tribal fishing vessels due to difficulties in creating a contact list.

Since West Coast landings data and vessel physical characteristics are available for all 1,152 vessels in the survey population, it was possible to test for differences between the 532 vessels in the survey sample and the 620 vessels not in the survey sample (but in the survey population). These tests were performed using a two sample t-test. As shown in Table 1, the difference between vessels in the survey sample and vessels omitted from the survey sample (due to lack of a telephone number) was statistically significant at the 95% confidence level for vessel length and net tonnage. In both cases, vessels included in the survey sample were smaller than

those not included in the survey sample. While statistically significant, the difference in length was small; vessels in the survey sample had a mean length of 33.4 feet and vessels not in the survey sample had a mean length of 35.4 feet. Vessels included in the survey sample and members of the survey population excluded from the survey sample did not exhibit statistically significant differences in engine horsepower.

Comparison of revenue from West Coast landings during 2005 indicates that vessels included in the sample had significantly higher (at the 95% confidence level) groundfish landings than vessels not included in the sample, but that revenue from landings of crab and salmon were not significantly different. While the difference in revenue from groundfish landings for vessels in the survey sample and vessels excluded from the survey sample was statistically significant, it was only $1,250. Vessels included in the survey sample averaged $5,557 from groundfish landings during 2005 while vessels excluded from the survey sample averaged $4,307 from groundfish landings.

Each of the 532 vessels in the survey sample was assigned to either the in-person survey sample or the telephone survey sample. Vessels with more than $25,000 of combined groundfish and salmon landings during 2005 and 2006 were assigned to the in-person survey population. Vessels with less than $25,000 of combined groundfish and salmon landings during 2005 and 2006 were sorted in order of total groundfish and salmon landings during 2005 and 2006. Every third vessel was assigned to the in-person survey, while the remaining two-thirds were assigned to the telephone survey.

The in-person survey sample included 349 vessels owners; the telephone survey sample included 132 vessel owners. By using both in-person interviews and telephone interviews to collect data, an attempt was made to balance the higher response rate expected from in-person interviews and the lower cost of telephone interviews. Since the previous limited entry survey had achieved satisfactory response rates with in-person interviews and this was the first survey to attempt collecting cost earnings data via telephone interviews, the size of the telephone interview sample was limited in order to increase the likelihood of a satisfactory response rate.[1]

2.2. Questionnaire Development

The final questionnaire used for this survey is very similar in format and content to the questionnaire used for the previously conducted limited entry trawl and fixed gear survey. Because some vessel types which operate in the limited entry fishery (such as sablefish fixed gear and crabbers) also operate in the open access groundfish and salmon troller survey population, it is often necessary to use data from both surveys to perform analytical studies. In order to combine data from multiple surveys for analytical studies, it is important to keep the questionnaire as similar as possible across surveys. Some small changes were made to account for known differences in the survey populations. For example, it is known that among the open access groundfish and salmon troller survey population (in contrast to the limited entry survey population) there will be no vessels targeting groundfish with trawl gear and there will be many vessels that do not target groundfish at all.

[1] For a discussion of survey methodology and response rates in the limited entry survey see Lian (2010).

Two versions of the questionnaire were used for this survey. The versions differed in whether they asked about the crew compensation method used when the vessel was operating in the groundfish or the salmon fishery. Vessels with more revenue during 2005 and 2006 from groundfish than salmon landings received a version of the questionnaire asking about crew compensation when the vessel operated in the groundfish fishery. This version of the questionnaire is presented in Appendix A. Vessels with more revenue during 2005 and 2006 from salmon than groundfish landings received a version of the questionnaire asking about crew compensation when the vessel operated in the salmon fishery. This version of the questionnaire is presented in Appendix B.

3. Survey Fielding Protocol

This section describes the protocol used to field the survey and collect data from respondents. Particular emphasis was placed on implementing protocol that would maximize response rates. Steps taken to maximize response rates are discussed in subsection 3.2.

3.1. Fielding Schedule

Fielding began with each member of the survey sample receiving a package by mail containing an introductory letter describing the survey, a one-page description of reasons for conducting the survey, and a copy of the questionnaire (Appendix A). For members of the in-person sample, enclosing the questionnaire gave recipients an opportunity to see firsthand the data being collected by the survey and collect it prior to the in-person interview. Members of the in-person and telephone samples were told that they could call a provided phone number to schedule an interview, or that they would be contacted to schedule the interview.

About 2 weeks after the letter and questionnaire mailing, attempts began to contact each survey recipient by telephone to schedule an in-person or telephone interview. During the following 3 weeks, up to 6 additional attempts were made to contact each member of the survey population until an interview date was scheduled. Interviews moved across geographic areas over time, so as to reduce travel costs involved in conducting in-person interviews. Interviews were conducted at a location chosen by the respondent; the most frequent interview locations were the respondent's residence, vessel, or a restaurant.

Interviewers used the questionnaire during the in-person interviews, asking some additional follow-up questions when appropriate. For example, interviewers were prompted to ask questions about the nature of repair and maintenance expenses when survey respondents reported large repair and maintenance expenditures.

The survey was fielded by PSMFC and its subcontractors, ORC Macro and Gilmore Research. Survey fielding began in October 2007 and was completed in December 2007. Data were collected through both in-person interviews and telephone interviews. Gilmore Research provided the two interviewers who conducted all in-person interviews and assisted with day-to-day management of field activities by the in-person interviewers. ORC Macro conducted telephone interviews, developed the computer assisted telephone interview document used during the telephone interviews, provided software and hardware for data entry during survey fielding, and constructed the SAS database in which survey data were delivered to PSMFC and NMFS.

3.2. Maximizing Response Rates

A number of methods were used to maximize survey response rates. First, the survey was short, consisting of only four pages in written form. Data collection through the in-person

and telephone interview usually took less than 1 hour. Second, respondents were asked only to provide information about major cost and earnings categories, thus avoiding what may seem to survey respondents like unnecessary detail. Third, most of the data were collected through in-person interviews, which typically have higher response rates than mail or telephone surveys. Fourth, there were extensive follow-up telephone calls and mailings after the initial letter/questionnaire mailing in order to schedule in-person interviews and obtain responses. These follow-up telephone calls were distributed among weekend/weekday and day/evening time periods to maximize the likelihood of reaching the contact person.

4. Survey Response Rates

Table 2 presents a summary of survey response rates. Survey responses were received from 135 of the 349 vessel owners in the in-person survey sample (a 39% response rate) and 33 of the 133 vessel owners in the telephone survey sample (a 25% response rate). In total 168 responses were received from the 532 vessel owners in the survey sample (a 32% response rate). Since the survey population consisted of 1,152 vessels, survey responses were received from 15% of the survey population.

Table 2 also presents response rates by vessel type, geographic location, and revenue from 2005 West Coast landings. The vessel type definitions follow those of Radtke and Davis.[2] Vessels were assigned to categories based on 2005 landings data and 2006 landings data from the Pacific Fisheries Information Network (PacFIN). Because of the 2006 salmon disaster,[3] many vessels classified as salmon trollers in 2005 were classified as crabbers, other less than $15,000, or highly migratory species vessels in 2006 as they moved out of the salmon fishery.

Response rates show some variation across vessel types. Among the vessel types with at least 50 vessels in the survey population, survey response rates ranged between 25% for other less than $15,000 and 41% for salmon trollers. Salmon trollers exhibit the highest response rates among vessel types, with a response rate of 41% in 2005 and 39% in 2006.

Response rates rise as revenue from 2005 West Coast landings rises. The higher response rate observed in Washington relative to Oregon and California also reflects higher average 2005 West Coast landings of Washington vessels in the survey sample. Response rates rose from 27% for vessels with less than $25,000 of revenue from 2005 West Coast landings to 43% for vessels with more than $100,000 from 2005 West Coast landings. The positive correlation between West Coast landings revenue and response rates is much weaker during 2006.[4]

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[2] See Radtke and Davis (2000), p.55. Within the population of vessels covered by this survey, the primary vessel types are crabbers, groundfish fixed gear, other less than $15,000, sablefish, and salmon trollers. All vessels landing less than $15,000 of fish on the West Coast during a calendar year are classified as other less than $15,000 vessels, regardless of the species composition of their landings.

[3] Salmon harvesting off the Oregon and northern California coast was severely restricted during 2006 due to poor returns of spawning Klamath River salmon. Because salmon fishermen could not harvest salmon from the more plentiful Columbia River and Sacramento River stocks without also harvesting some of the Klamath River stocks in this area, ocean salmon harvesting with troll gear was much lower in 2006 than 2005. For vessels in the survey population, salmon landings decreased from $18.8 million in 2005 to $8.2 million in 2006. This reduction in 2006 landings of troll caught salmon is referred to as the 2006 salmon disaster.

[4] Two events had a major effect on revenue from West Coast landings for many vessels. First, salmon troll landings decreased sharply during 2006 due to the salmon disaster. Second, 2006 was a year of unusually high revenue from crab landings on the West Coast. As a result, many vessels in the $25,000 to $100,000 West Coast landings revenue category during 2005 moved into either the less than $25,000 revenue category during 2006 (due to the reduction in salmon troll landings) or into the more than $100,000 category (due to the increase in crab landings).

5. Comparing Respondents and Nonrespondents

A considerable amount of information about vessel characteristics and landings for each member of the survey population is available from federal and state vessel registration records and PacFIN landings data. This information can be used to compare respondents and nonrespondents and perform tests to determine whether differences between them are statistically significant. This section compares vessel physical characteristics and revenue from landings for respondents and nonrespondents.

5.1. Data Used to Test for Nonresponse Bias

Data on vessel physical characteristics, West Coast landings (by species, gear type, and port), and revenue from West Coast landings (also by species, gear type, and port) are available for all survey population members. Available information on vessel characteristics includes vessel length and horsepower. PacFIN provides vessel-level information on West Coast (Washington, Oregon, and California) landings by date, species, gear type, and port for all vessels in the survey population. As a result, it is possible to compare respondents and nonrespondents with regard to seasonal patterns, species landed, and location of landings.

5.2. Comparison Results

Vessel physical characteristics and landings revenue for survey respondents and nonrespondents are compared in Table 3 through Table 16. In these tables, survey nonrespondents include both those vessels included in the survey sample that did not respond to the survey and those vessels that were omitted from the survey sample due to lack of a phone number. The survey respondents and survey nonrespondents contain every vessel in the survey population, whether or not the vessel was in the survey sample. As a result, these tables compare those vessels that did respond to the survey with all vessels that did not respond to the survey. Table 3 through Table 9 compare survey respondents and nonrespondents during 2005. Table 10 through Table 16 compare survey respondents and nonrespondents during 2006.

Because many vessels changed vessel classification between 2005 and 2006, results for the 2 years are discussed separately. While Table 3 through Table 16 provide a comparison of respondents during 2005 and 2006, they do not provide tests of the statistical significance of differences between respondents and nonrespondents. Such tests are provided in Table 17 and Table 18 and discussed in subsection 5.3.

Table 3 provides a comparison of respondents and nonrespondents for the entire survey population during 2005. Respondents had higher levels of groundfish, crab, and salmon landings than nonrespondents. As a result, the mean value of West Coast landings of all species was $42,151 for survey respondents and $36,623 for nonrespondents during 2005. Survey respondents had slightly larger engines (189 horsepower vs. 184 horsepower) than nonrespondents. Table 10 shows that respondents had lower levels of groundfish and crab landings than nonrespondents during 2006, and as a result the value of all West Coast landings

was lower for survey respondents than nonrespondents during 2006 ($41,074 for respondents vs. $43,885 for nonrespondents).

For certain vessel types, survey respondents had higher revenue from West Coast landings than nonrespondents. This was true for crabbers ($116,479 for respondents vs. $102,703 for nonrespondents), other groundfish fixed gear ($49,694 vs. $39,079), and other vessels with less than $15,000 ($7,958 vs. $6,598) during 2005. Respondents had lower revenue from all West Coast landings than nonrespondents for sablefish fixed gear ($38,850 vs. $39,382, respectively) and salmon trollers ($43,903 vs. $50,558, respectively) during 2005.

During 2006 respondents exhibited lower revenue from West Coast landings than nonrespondents for crabbers ($112,931 vs. $128,604, respectively), other less than $15,000 vessels ($6,452 vs. $6,549), and salmon trollers ($35,262 vs. $37,726). Groundfish fixed gear ($54,489 for respondents vs. $40,241 for nonrespondents), other greater than $15,000 ($83,464 vs. $79,431, respectively), and sablefish fixed gear ($40,462 vs. $31,704) exhibited higher revenue from West Coast landings among respondents than nonrespondents during 2006 as well as 2005.

When comparing survey respondents and nonrespondents during 2005 and 2006, it is important to remember that there were two major changes in the fisheries in which the survey population vessels participate. First, West Coast salmon troll landings declined by more than 50% between 2005 and 2006 due to a decline in Klamath River salmon returns. Second, the quantity and market value of West Coast crab landings were at unusually high levels during 2006. Many vessels that earned a substantial share of their revenue from salmon troll landings during 2005 either experienced a substantial reduction in landings revenue during 2006 or shifted their operations into the crab fishery.

5.3. Statistical Tests for Nonresponse Bias

A two sample t-test was used to determine whether the differences observed between survey respondents and nonrespondents were statistically significant. The two sample t-test is based on a null hypothesis that the mean value of the variable being tested is the same for respondents and nonrespondents.[5]

Two sample t-tests based on 2005 data are reported in Table 17 and two sample t-tests based on 2006 data are reported in Table 18. Test results are reported for the entire survey population as well as the major vessel types within the survey population (crabber, groundfish fixed gear, other < $15,000, other > $15,000, sablefish fixed gear, and salmon troller). Two sample t-tests for each vessel type are performed using data on vessel length, vessel engine horsepower, value of West Coast crab landings, value of West Coast groundfish landings, value of West Coast salmon landings, and value of all West Coast landings. For each year, a total of 6

[5] In addition to testing for statistically significant differences between survey respondents and nonrespondents using a two sample t-test, survey respondents and nonrespondents were compared using permutation tests, which do not require any assumption about the distribution of the variable being used to compare respondents and nonrespondents. Since the outcome of the permutation tests was similar to the outcome of the t-tests and the intent of this document is to summarize survey responses, results from the permutation tests are not provided. For an outline of the permutation testing methodology see Goode (2006).

two sample t-tests were performed for the entire survey population and 36 two sample t-tests were performed at the vessel type level. In some cases, a limited number of observations prevents reporting results due to confidentiality considerations.[6]

Table 17 shows that for all vessels in the survey population during 2005, none of the 6 two sample t-tests based on physical characteristics of vessels and West Coast landings revenue demonstrated a statistically significant difference between survey respondents and nonrespondents at the 95% confidence level. At the 90% confidence level, survey respondents had revenue from salmon landings that was significantly greater than nonrespondents. While this difference was statistically significant at the 90% confidence level, the magnitude of the difference was relatively small (Table 3 shows that the mean revenue from salmon landings was $18,747 for respondents and $15,923 for nonrespondents). Table 18 shows that for the entire survey population during 2006, the two sample t-tests did not show statistically significant differences between survey respondents and nonrespondents for vessel physical characteristics and revenue from West Coast landings.

When the two sample t-tests are examined by vessel type, there are 36 tests for a given year (6 tests for each of the 6 vessel types). The tests for 2005 in Table 17 reveal that 6 indicated a statistically significant difference between respondents and nonrespondents at the 95% confidence level, and an additional 3 showed a statistically significant difference at the 90% confidence level (but failed to show a statistically significant difference at the 95% level). Table 17 shows that the difference in revenue from all 2005 West Coast landings for respondents and nonrespondents was statistically significant at the 95% level for other less than $15,000 vessels (due to differences in revenue from salmon landings). However, the difference in revenue from West Coast landings for respondents and nonrespondents was only $1,360 during 2005. At the 90% confidence level, respondent salmon trollers had revenue from all West Coast landings which was significantly less than nonrespondent salmon trollers (due to differences in revenue from both crab and salmon landings). Respondent salmon troller revenue fell below nonrespondent salmon troller revenue during 2005 by $3,667 for crab and $3,390 for salmon. For all species, respondent salmon troller landings revenue fell short of nonrespondent salmon troller landings revenue by $6,655 in 2005.

The individual vessel type two sample t-tests for 2006 in Table 18 indicate that 2 out of 36 tests showed a statistically significant difference between respondents and nonrespondents at the 95% level and 3 tests showed a difference which was significant at the 90% confidence level (but not the 95% confidence level). The difference in revenue from all landings by other less than $15,000 vessel respondents and nonrespondents was significant at the 95% level but only $903 in magnitude.

5.4. Correcting for Nonresponse Bias

The comparison of survey respondents and nonrespondents in subsection 5.2 and the corresponding two sample t-tests in subsection 5.3 do not show a consistent pattern of differences between respondents and nonrespondents that are statistically significant and of large

[6] In order to protect the confidentiality of survey respondents, responses from at least three separate business entities were required in order to report values for survey means and standard deviations.

magnitude. As a result, the data collected in this survey are not weighted to adjust for nonresponse bias. The survey results presented in the following sections are unweighted, with no adjustment for any differences between survey respondents and nonrespondents.

6. Empirical Results

Before examining cost and earnings data from 2005 and 2006, it is worthwhile to consider the health of the West Coast groundfish, salmon, and crab fisheries during 2005 and 2006.[7] Total commercial non-whiting groundfish landings for all gear types on the West Coast were 27,091 metric tons (mt) during 2005 and 24,615 mt during 2006.[8] The average ex vessel price of non-whiting groundfish rose from $0.73 per pound in 2005 to $0.83 per pound in 2006. As a result of the increase in ex vessel prices, revenue from non-whiting groundfish landings on the West Coast increased from $43.3 million in 2005 to $45.2 million in 2006. These groundfish landings figures are for not only the open access fleet covered in this survey, but also the limited entry (trawl and fixed gear) fleet. Overall, 2005 and 2006 represent fairly typical years in the non-whiting groundfish fishery during the 2001–2010 period.

Total commercial crab landings for all gear types on the West Coast were 28,089 mt during 2005 and 38,761.4 mt during 2006. Despite the increased harvest during 2006, the average ex vessel price paid for crab increased from $1.57 per pound in 2005 to $1.69 per pound in 2006. With both landed weight and price increasing between 2005 and 2006, revenue from West Coast crab landings increased from $97,092,991 during 2005 to $144,047,576 during 2006. Commercial crab landings during 2006 reached their highest level of landed weight and revenue during the 2001–2010 year period.

In contrast to groundfish and crab landings, the salmon fishery experienced a sharp downturn during 2006. Landings of troll caught salmon decreased from 4,276 mt in 2005 to 1,184 mt in 2006.[9] Since the average price for troll caught salmon rose from $2.55 a pound in 2005 to $3.88 a pound in 2006, the revenue from troll caught salmon showed a smaller percentage decrease (from $24,054,315 to $10,139,813) than the round weight of salmon troll landings. Since 2007 annual West Coast landings of troll caught salmon have ranged between 250 mt and 1,435 mt.

In summary, 2005 represents a year in which West Coast landings and revenue from landings of groundfish, salmon, and crab were typical of those observed over the 2001 to 2010 period. In contrast, 2006 was a year in which West Coast salmon troll landings and revenue showed a steep decline from the previous year and crab landings and revenue were at their highest levels during the 2001 to 2010 period.

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[7] All figures in this section are taken from the commercial landed catch tables available on the PacFIN Web site at http://pacfin.psmfc.org/pacfin_pub/all_species_pub/woc_r307.php.

[8] Because whiting are targeted only with trawl gear and a limited entry permit is required in order to target groundfish with trawl gear, the open access groundfish fishery does not land whiting. As a result, conditions in the non-whiting component of the groundfish fishery are most relevant to the activity of the open access groundfish fleet.

[9] Since the survey population included salmon trollers but not salmon netters, the figures in this paragraph only cover troll caught salmon.

6.1. Costs and Earnings during 2005

Table 19 provides average expenditures and revenues for all survey respondents. Some respondents did not answer all questions, so the number of observations varies across variables. Cost categories covered by the survey include payments to captain, payments to crew, fuel, food, ice, bait, RMI (repair, maintenance, and improvements), insurance, interest, permit purchases, and permit leases. Sources of earnings covered by the survey include landings in Alaska, landings in Hawaii, other landings (such as landings in British Columbia), at sea deliveries, sales and leasing of permits, and other. Table 20 through Table 25 provide the same information for the primary individual vessel types (crabbers, fixed gear groundfish, other < $15,000, other > $15,000, sablefish fixed gear, and salmon trollers) during 2005.

When the survey respondents are examined across all vessel types, the mean survey respondent earned $42,151 from West Coast landings during 2005. The largest sources of revenue were salmon ($18,757), crab ($12,532), groundfish ($5,639), and highly migratory species ($3,121). Mean revenues from sources other than West Coast landings included $8,496 from other sources (positive values were reported by 30 out of 168 survey respondents), $3,980 from at sea deliveries (positive values were reported by 6 out of 168 survey respondents), and $2,024 from Alaska landings (positive values were reported by 3 out of 168 survey respondents.

The largest cost categories reported by survey respondents were captain expenses ($12,802), RMI ($8,874), crew ($7,471), and fuel ($6,081). As discussed in subsection 6.3, Table 19 (as well as Table 20 through Table 32) reports not only the cost data as collected on the survey, but two cost figures calculated from the survey data. The adjusted cost of captain is calculated by imposing a minimum captain cost of 15% of revenue for each vessel. This adjustment is designed to adjust for vessel owners who do not pay themselves an explicit salary for captain services. The imputed cost of capital is a measure of the opportunity cost of using the capital tied in the fishing vessel, and is calculated as 5% of the estimated market value of the vessel reported on the survey. More detailed explanations of the calculation of adjusted captain cost and imputed capital cost are provided in subsection 6.3.

In an effort to keep the questionnaire length short and boost response rates for this voluntary survey, data were collected on all expenditures for RMI. No distinction is made in Table 19 through Table 25 between purchases that are expensed and purchases that are capitalized and depreciated in future years. As a result, costs at the individual vessel level show considerable variation due to changes in purchases of capital goods that provide services over many years.

A more theoretically desirable way to have collected data on purchases of capital goods would have been to collect information on 1) purchases expensed during 2005 and 2006, 2) purchases capitalized during 2005 and 2006, and 3) depreciation taken during 2005 and 2006 for capital goods purchased in previous years. However, this approach increases questionnaire length and complexity, and was rejected for use in this voluntary survey.

Table 20 through Table 25 provide data on costs and earnings for each of the primary vessel types in the survey population (crabbers, groundfish fixed gear, other > $15,000, other < $15,000, sablefish fixed gear, and salmon trollers). Because only 2 vessels in the other greater

than $15,000 vessel type during 2005 responded to the survey, confidentiality considerations prevent disclosure of the response means and standard deviations.

6.2. Costs and Earnings during 2006

Table 26 provides average expenditures and revenues for all survey respondents. Some respondents did not respond to all questions, so the number of observations varies across variables. When survey respondents are examined across all vessel types, the mean survey respondent earned $41,074 from West Coast landings during 2006. This slight decrease from the mean West Coast landings revenue of $42,151 during 2005 reflects the combined effect of a sharp decline in salmon revenue and an increase in crab revenue.

The largest sources of revenue were crab ($19,682), salmon ($8,159), groundfish ($5,140), and highly migratory species ($4,909). Per vessel revenue from salmon landings declined from $18,747 in 2005 to $8,159 in 2006. At the same time, per vessel revenue from crab landings increased from $12,532 in 2005 to $19,582 in 2006. Per vessel revenues from HMS landings increased from $3,121 in 2005 to $4,909 in 2006. Per vessel revenue from groundfish landings declined from $5,639 in 2005 to $5,140 in 2006. Mean revenues from sources other than West Coast landings included $8,496 from other sources (positive values were reported by 30 out of 168 survey respondents), $3,974 from at sea deliveries (positive values were reported by 5 out of 168 survey respondents), and $1,726 from Alaska landings (positive values were reported by 2 out of 168 survey respondents).

As during 2005, the largest cost categories reported by survey respondents in Table 26 were captain expenses ($11,896), RMI ($9,134), crew expenses ($6,858), and fuel expenses ($5,831). Because some vessel owners serve as captain and do not pay themselves a wage, the reported expenses for captain do not always provide a measure of the opportunity cost of captain services. Imposing a minimum captain cost of 15% of revenue for each vessel raises captain expenses to $15,303.[10] The cost of capital was not reported directly by survey respondents, but rather is calculated as 5% of the value of the fishing vessel reported by survey respondents.

Table 27 through Table 32 provide data on costs and earnings for each of the primary vessel types in the survey population (crabbers, groundfish fixed gear, other > $15,000, other < $15,000, sablefish fixed gear, and salmon netters). While confidentiality considerations prevent reporting the costs and earnings for the 2 greater than $15,000 vessels responding to the survey in 2005, there were 6 respondents in the greater than $15,000 vessel type during 2006 (due to the movement of vessels from the salmon netter vessel type to the other > $15,000 vessel type), and costs and earnings for other greater than $15,000 vessels are reported for 2006.

[10] Because examination of survey responses indicated that some vessel owners who served as captain were not paying themselves a salary, the reported payments to captain do not always reflect the opportunity cost to the vessel owner of obtaining captain services. In the case of a vessel owner who serves as the captain of the vessel but does not pay himself a market salary, the opportunity cost of providing captain services is the forgone earnings from the labor he could have provided had he not been serving as the vessel captain. Examination of survey responses from vessel owners who did not serve as captain indicated that vessel captains are typically paid at least 15% of landings revenue for vessels with the scale of operation encountered in this survey population.

6.3. Calculating Economic Net Revenue and Quasi-rents from Survey Data

Prior to discussing estimates of profitability, it is important to clearly define the measure of profit being calculated. Accounting profit measures the difference in a given time period between revenue and cost, where cost includes items that are being expensed in the current period as well as depreciation from capital goods purchased in previous time periods. Because the survey data 1) did not collect information on depreciation taken during 2005 and 2006 on capital goods purchased during previous years and 2) did not collect information on which expenditures during 2005 and 2006 were expensed and which were capitalized, it is not possible to calculate accounting profit from the survey data. Obtaining the information required to calculate accounting profit would require a considerably longer and more detailed questionnaire than was deemed feasible for use with a voluntary economic cost earnings survey.

The data collected by this survey do support the calculation of accounting net revenue and economic net revenue. Accounting net revenue equals revenues minus costs reported on the survey plus landings taxes and buyback fees. Because the survey did not collect information on some minor cost categories, accounting net revenue overstates accounting profit. Economic net revenue is equal to the difference between the total revenue earned by operating a commercial fishing vessel and the opportunity cost of operating that vessel. In order to calculate economic net revenue from the data collected by the survey, three calculations are necessary. First, the survey does not cover all costs incurred by vessel owners. In an effort to limit survey length and boost response rates, the questionnaires (Appendix A and Appendix B) did not collect data on costs such as moorage, unloading fish, and transporting fish to the buyer. Conversations with industry participants suggest these costs are in the range of 5% to 10% of total costs. For purposes of calculating economic net revenue and quasi-rents, a 5% adjustment to costs is used to account for those minor cost categories that are not covered by the questionnaire.[11] That is, estimates of adjusted total cost and adjusted variable cost include a 5% upward adjustment relative to the costs reported on the questionnaire.

Second, calculating economic net revenue requires adjustment for the vessel owners who serve as captain and do not always pay themselves a salary as captain. Even though these vessel owners do not receive a wage, they are forgoing other employment opportunities to serve as captain. These vessel owners derive their compensation for service as captain through their earnings as the recipient of vessel profits. Since actual expenditures differ greatly from opportunity costs in such cases, it is necessary to estimate the opportunity cost of serving as the vessel captain based on the earnings of captains on vessels where the captain is hired on all trips. Examination of survey responses from this survey and the limited entry survey indicated that for vessels of the scale of operation in this survey population, captains are typically paid at least 15% of landings revenue as compensation on vessels where the captain is hired by the owner.

The third issue that must be addressed when using these survey data to derive a measure of economic net revenue is the opportunity cost of the money tied up in marketable capital goods such as the fishing vessel and equipment. The fishing vessel and onboard equipment represent

[11] Quasi-rent equals total revenue from all sources minus variable operating costs (payments for captain, crew, fuel, food, ice, and bait).

an opportunity cost for the vessel owner. Were the vessel and equipment to be sold, the money received for the vessel could be placed into an interest bearing account. The implicit cost of capital is the rate of return that capital could be expected to earn in an alternative investment of equivalent risk multiplied by the market value of the capital. Calculations of the implicit cost of capital assume that the forgone interest rate is 5%, and as a result the implicit cost of capital is equal to 5% of the market value of the fishing vessel reported on the survey. The survey did not collect information on the value of permits held by each vessel (only the cost of permits purchased during 2005 and 2006), so no attempt was made to incorporate the value of permits into the estimate of capital cost.

Table 33 and Table 34 report the total costs, variable costs, quasi-rents, and net revenue by vessel type for 2005 and 2006. The first three columns in each table show total revenue, total reported cost, and accounting net revenue. Quasi-rent is calculated as total revenue (the sum of landings revenues reported in PacFIN and other revenue sources reported on the survey) minus variable costs (captain, crew, fuel, food, ice, and bait expenditures as reported on the survey). The last three columns of each table provide economic cost (reported costs adjusted for unpaid captain services, the opportunity cost of capital, and unreported costs), quasi-rent (total revenue minus variable economic costs), and economic net revenue.

6.4. Costs, Earnings, Quasi-rents, and Economic Net Revenue

Table 33 reports the revenues, costs, net revenue, and quasi-rents for both the entire survey population and primary vessel types during 2005. For all survey respondents, the mean revenue earned by a vessel was $57,157 and the mean reported cost was $40,378. When the three adjustments described in subsection 6.3 are made to the cost data, the mean economic cost equals $48,273. Crabbers have much higher revenues and costs than members of other vessel types. Results are not shown for the other greater than $15,000 vessel type because of confidentiality issues with only two observations. The average per vessel quasi-rent is $24,334 and the average per vessel economic net revenue is $8,884. Results differ considerably across vessel types. Crabbers have much higher revenues and economic net revenues than any other vessel type. Groundfish fixed gear and salmon trollers are the least profitable vessel types, barely earning a positive economic net revenue.

Table 35 provides revenues and costs for the survey population and primary vessel types during 2006. Table 36 provides quasi-rents and net revenue earned by the survey population and primary vessel types during 2006. For the 168 survey respondents, average revenue declined from $57,157 in 2005 to $46,810 in 2006. While per vessel revenue declined by 10,347 from 2005 to 2006, the average cost per vessel in the survey population declined by only $2,212 before any adjustments were made to costs. Adjusted costs declined by $1,712 from 2005 to 2006. As a result, quasi-rents and net revenue were much lower in 2006 than 2005. Both other less than $15,000 and other greater than $15,000 vessels earned negative profit before any adjustments to calculate economic net revenue. Groundfish fixed gear and salmon troller vessels, which earned a small positive adjusted economic profit during 2005, earned negative adjusted economic profit in 2006. Despite a sizable increase in total West Coast crab landings and revenue during 2006, crabbers on a per vessel basis earned less revenue and lower economic profits during 2006 than 2005. Many vessels which operated in the salmon troll fishery during

2005 moved into the crab fishery during 2006 as the amount of salmon available for harvest declined.

6.5. Crew Size, Fuel Use, and Speed

Table 37 provides fuel use in gallons per hour, vessel speed in knots per hour, and crew size for the survey respondents and major vessel types. Crew size (which does not include the captain) exhibits some variation by activity, with the largest crew size reported for crabbing (1.6) and the smallest crew size reported for salmon trolling (0.6). Crew size exhibited little variation across fisheries. Except for a few cases where the number of observations is low, crew size does not vary greatly across vessel types—fishing activity is a greater determinant of crew size than vessel type.

Fuel use (in gallons per hour) for all respondents is greater when crabbing (3.3) than when longlining (2.1) or trolling (2.0). Like crew size, fuel use appears more dependent on the activity a vessel is engaged in than the vessel type. Part of the reason for similarity in fuel use for a particular activity across different vessel types is that the different vessel types do not have vastly different physical characteristics. The average length by vessel type for survey respondents varies from 27 to 40 feet, and the average engine horsepower by vessel type varies from 151 to 254.

Vessel speed is reported in knots per hour. For all survey respondents, average vessel speed ranged between 4.0 knots per hour when crabbing to 3.1 knots per hour when longlining or trolling.

6.6. Owner as Captain

Table 38 reports the percentage of trips on which the owner served as captain during 2005. While the questionnaire did not ask for separate information on the percentage of trips on which the owner served as captain during 2005 and 2006, some vessels changed vessel types between 2005 and 2006 so the numbers change at the individual vessel type level. For all vessel types, the owner served as captain on 89.9% of trips. This figure was lowest for sablefish fixed gear vessels in 2005 (76.3%) and other groundfish fixed gear vessels in 2006 (64.4%). Salmon trollers had a very high percentage of trips with the owner serving as captain (92.3% in 2005 and 97.2% in 2006).

7. Concluding Comments

NWFSC and PSMFC thank all of the vessel owners who participated in this voluntary survey. The quality of data and summary statistics provided in this report depend on the willingness of commercial fishermen to provide their time and confidential data.

While this report provides a considerable amount of information taken from the survey responses, it does not provide all possible summary statistics that could be derived from the survey responses. Individuals interested in further information about the survey should contact either NWFSC or PSMFC.

NWFSC and PSMFC intend to conduct cost earnings surveys of the open access groundfish and salmon troll fleets on a regular basis. In addition, NWFSC and PSMFC intend to begin surveying the salmon netter fleet in the future. This will allow for development of a time series that will support evaluation of the economic performance of the open access groundfish and salmon fleets.

Tables 1–38

Table 1. Survey population and survey sample vessel physical characteristics and revenue from landings in Washington, Oregon, and California.

	N[a]	Length (feet)	Net tonnage	Horse-power	Groundfish	Crab	Salmon	Total[b]
Survey population								
Mean	1,152	34.3	12.2	184.5	$4,884	$12,009	$16,863	$39,777
SD		12.7	11.9	113.9	$10,271	$30,847	$20,722	$46,673
Survey sample								
Mean	532	33.2	11.2	182.1	$5,557	$11,064	$16,696	$38,913
SD		14.9	11.1	109.6	$11,434	$29,725	$20,612	$46,720
Not in sample								
Mean	620	35.4	13.0	186.7	$4,307	$12,820	$17,007	$40,518
SD		10.5	12.5	117.5	$9,126	$31,779	$20,832	$46,658
T statistic		–2.79	–2.51	–0.69	2.03	–0.97	–0.25	–0.58
Degrees of freedom		936	1,149	1,142	1,011	1,141	1,127	1,123
95% critical value		1.96	1.96	1.96	1.96	1.96	1.96	1.96
Test statistics		0.01	0.01	0.49	0.04	0.33	0.80	0.56

[a] N = number of observations.
[b] Total = revenue from landings of all species in Washington, Oregon, and California.

Table 2. Survey response by vessel type, state, and revenue.

	Survey population	Survey sample	Complete responses	Response rate (%)
Open access groundfish and salmon				
Total survey	1,152	532	168	32
In-person interview sample		349	135	39
Telephone interview sample		133	33	25
By vessel type, 2005				
Crabber	122	53	18	34
Groundfish fixed gear	86	49	13	27
Highly migratory species	27	12	3	25
Other less than $15,000	436	206	51	25
Other greater than $15,000	15	8	2	25
Pelagic netter	1	1	0	0
Sablefish	56	22	6	27
Salmon	409	181	75	41
By vessel type, 2006				
Crabber	242	95	32	34
Groundfish fixed gear	80	48	10	21
Highly migratory species	49	20	11	55
Other less than $15,000	543	269	77	29
Other greater than $15,000	15	11	5	46
Pelagic netter	1	1	0	0
Sablefish	48	16	6	37
Salmon	170	70	27	39
Shrimper	4	2	0	0
By state				
California	602	297	70	24
Oregon	398	170	66	39
Washington	152	65	32	50
By annual WOC revenue, 2005				
Less than $25,000	596	275	74	27
$25,000 to $100,000	445	205	74	36
Greater than $100,000	111	52	20	43
By annual WOC revenue, 2006				
Less than $25,000	674	322	97	30
$25,000 to $100,000	317	140	47	34
Greater than $100,000	161	70	24	34

Table 3. Comparison of vessel physical characteristics and revenue sources for open access groundfish and salmon troller 2005 survey (all vessel types) respondents and nonrespondents.

Variable	Response status	Number of observations	Mean	Standard error
Engine horsepower	All	1,117	185	3
	Respondents	167	189	7
	Nonrespondents	950	184	4
Vessel length (feet)	All	1,152	34	0
	Respondents	167	34	1
	Nonrespondents	985	34	0
Revenue from crab (US$)	All	1,152	11,855	904
	Respondents	168	12,532	2,563
	Nonrespondents	985	11,740	964
Revenue from groundfish (US$)	All	1,152	4,880	302
	Respondents	168	5,639	950
	Nonrespondents	985	4,750	315
Revenue from salmon (US$)	All	1,152	16,335	584
	Respondents	168	18,747	1,374
	Nonrespondents	985	15,923	642
Revenue from all species (US$)	All	1,152	39,052	1,359
	Respondents	168	42,151	3,420
	Nonrespondents	985	38,523	1,480

Table 4. Comparison of vessel physical characteristics and revenue sources for the 2005 survey crabber respondents and nonrespondents.

Variable	Response status	Number of observations	Mean	Standard error
Engine horsepower	All	122	233	11
	Respondents	18	231	20
	Nonrespondents	104	233	12
Vessel length (feet)	All	122	40	1
	Respondents	18	39	1
	Nonrespondents	104	40	1
Revenue from crab (US$)	All	122	76,834	4,890
	Respondents	18	83,092	14,860
	Nonrespondents	104	75,751	5,154
Revenue from groundfish (US$)	All	122	5,485	805
	Respondents	18	7,136	2,426
	Nonrespondents	104	5,200	848
Revenue from salmon (US$)	All	122	13,736	1,327
	Respondents	18	16,344	2,450
	Nonrespondents	104	13,284	1,497
Revenue from all species (US$)	All	122	104,736	6,566
	Respondents	18	116,479	16,917
	Nonrespondents	104	102,703	7,139

Table 5. Comparison of vessel physical characteristics and revenue sources for the 2005 survey groundfish fixed gear respondents and nonrespondents.

Variable	Response status	Number of observations	Mean	Standard error
Engine horsepower	All	79	185	13
	Respondents	13	254	29
	Nonrespondents	66	172	14
Vessel length (feet)	All	86	27	1
	Respondents	13	26	1
	Nonrespondents	73	27	1
Revenue from crab (US$)	All	86	4,478	1,460
	Respondents	13	10,601	4,318
	Nonrespondents	73	3,388	1,517
Revenue from groundfish (US$)	All	86	22,795	1,748
	Respondents	13	33,633	5,274
	Nonrespondents	73	20,865	1,756
Revenue from salmon (US$)	All	86	1,939	635
	Respondents	13	2,188	1,313
	Nonrespondents	73	1,895	714
Revenue from all species (US$)	All	86	40,684	3,499
	Respondents	13	49,694	8,368
	Nonrespondents	73	39,079	3,836

Table 6. Comparison of vessel physical characteristics and revenue sources for the 2005 survey "other greater than $15,000" respondents and nonrespondents.

Variable	Response status	Number of observations	Mean	Standard error
Engine horsepower	All	11	265	23
	Respondents	2	*	*
	Nonrespondents	9	254	28
Vessel length (feet)	All	11	37	4
	Respondents	2	*	*
	Nonrespondents	9	38	5
Revenue from crab (US$)	All	11	4	2
	Respondents	2	*	*
	Nonrespondents	9	5	3
Revenue from groundfish (US$)	All	11	7,047	2,285
	Respondents	2	*	*
	Nonrespondents	9	5,615	2,097
Revenue from salmon (US$)	All	11	7,004	2,983
	Respondents	2	*	*
	Nonrespondents	9	8,561	3,454
Revenue from all species (US$)	All	11	99,672	22,236
	Respondents	2	*	*
	Nonrespondents	9	101,070	27,081

Table 7. Comparison of vessel physical characteristics and revenue sources for the 2005 survey "other less than $15,000" respondents and nonrespondents.

Variable	Response status	Number of observations	Mean	Standard error
Engine horsepower	All	411	162	5
	Respondents	51	162	12
	Nonrespondents	360	162	6
Vessel length (feet)	All	437	29	1
	Respondents	51	29	1
	Nonrespondents	386	29	1
Revenue from crab (US$)	All	437	225	55
	Respondents	51	205	189
	Nonrespondents	386	227	57
Revenue from groundfish (US$)	All	437	2,008	166
	Respondents	51	1,818	461
	Nonrespondents	386	2,034	178
Revenue from salmon (US$)	All	437	4,179	218
	Respondents	51	5,752	704
	Nonrespondents	386	3,971	227
Revenue from all species (US$)	All	437	6,756	203
	Respondents	51	7,958	611
	Nonrespondents	386	6,598	214

Table 8. Comparison of vessel physical characteristics and revenue sources for the 2005 survey sablefish fixed gear respondents and nonrespondents.

Variable	Response status	Number of observations	Mean	Standard error
Engine horsepower	All	54	226	21
	Respondents	4	151	39
	Nonrespondents	50	232	23
Vessel length (feet)	All	56	37	1
	Respondents	5	33	3
	Nonrespondents	51	38	1
Revenue from crab (US$)	All	56	4,395	1,397
	Respondents	5	1,798	1,505
	Nonrespondents	51	4,650	1,525
Revenue from groundfish (US$)	All	56	29,151	1,693
	Respondents	5	34,481	6,991
	Nonrespondents	51	28,629	1,738
Revenue from salmon (US$)	All	56	3,659	1,015
	Respondents	5	2,558	1,351
	Nonrespondents	51	3,767	1,108
Revenue from all species (US$)	All	56	38,334	3,058
	Respondents	5	38,850	6,551
	Nonrespondents	51	39,382	3,310

Table 9. Comparison of vessel physical characteristics and revenue sources for the 2005 survey salmon troller respondents and nonrespondents.

Variable	Response status	Number of observations	Mean	Standard error
Engine horsepower	All	408	178	5
	Respondents	76	184	11
	Nonrespondents	332	177	5
Vessel length (feet)	All	408	39	0
	Respondents	75	37	1
	Nonrespondents	333	39	0
Revenue from crab (US$)	All	409	8,637	839
	Respondents	76	5,651	1,414
	Nonrespondents	333	9,318	976
Revenue from groundfish (US$)	All	409	813	134
	Respondents	76	1,179	337
	Nonrespondents	333	729	146
Revenue from salmon (US$)	All	409	35,359	994
	Respondents	76	32,599	1,899
	Nonrespondents	333	35,989	1,140
Revenue from all species (US$)	All	409	49,321	1,663
	Respondents	76	43,903	3,199
	Nonrespondents	333	50,558	1,904

Table 10. Comparison of vessel physical characteristics and revenue sources for open access groundfish and salmon troller 2006 survey (all vessel types) respondents and nonrespondents.

Variable	Response status	Number of observations	Mean	Standard error
Engine horsepower	All	1,117	185	3
	Respondents	167	189	7
	Nonrespondents	950	184	4
Vessel length (feet)	All	1,152	34	0
	Respondents	167	34	1
	Nonrespondents	985	34	0
Revenue from crab (US$)	All	1,152	24,326	1,780
	Respondents	168	19,682	3,279
	Nonrespondents	985	25,119	2,006
Revenue from groundfish (US$)	All	1,152	4,497	267
	Respondents	168	5,140	855
	Nonrespondents	985	4,388	277
Revenue from salmon (US$)	All	1,152	7,144	312
	Respondents	168	8,159	825
	Nonrespondents	985	6,971	337
Revenue from all species (US$)	All	1,152	43,476	1,982
	Respondents	168	41,074	3,898
	Nonrespondents	985	43,885	2,224

Table 11. Comparison of vessel physical characteristics and revenue sources for the 2006 survey crabber respondents and nonrespondents.

Variable	Response status	Number of observations	Mean	Standard error
Engine horsepower	All	240	223	8
	Respondents	32	221	14
	Nonrespondents	208	224	9
Vessel length (feet)	All	242	41	1
	Respondents	32	40	1
	Nonrespondents	210	41	1
Revenue from crab (US$)	All	242	107,386	5,878
	Respondents	32	89,726	9,383
	Nonrespondents	210	110,077	6,608
Revenue from groundfish (US$)	All	242	3,602	444
	Respondents	32	5,423	1,332
	Nonrespondents	210	3,324	468
Revenue from salmon (US$)	All	242	6,856	578
	Respondents	32	7,474	1,614
	Nonrespondents	210	6,762	620
Revenue from all species (US$)	All	242	126,531	6,325
	Respondents	32	112,931	10,125
	Nonrespondents	210	128,604	7,120

Table 12. Comparison of vessel physical characteristics and revenue sources for the 2006 survey groundfish fixed gear respondents and nonrespondents.

Variable	Response status	Number of observations	Mean	Standard error
Engine horsepower	All	73	205	18
	Respondents	10	247	30
	Nonrespondents	63	198	20
Vessel length (feet)	All	81	27	1
	Respondents	10	26	2
	Nonrespondents	71	28	1
Revenue from crab (US$)	All	81	5,777	1,704
	Respondents	10	19,073	7,789
	Nonrespondents	71	3,904	1,511
Revenue from groundfish (US$)	All	81	23,201	1,645
	Respondents	10	34,399	4,862
	Nonrespondents	71	21,624	1,677
Revenue from salmon (US$)	All	81	2,560	891
	Respondents	10	779	779
	Nonrespondents	71	2,811	1,008
Revenue from all species (US$)	All	81	42,000	3,414
	Respondents	10	54,489	12,359
	Nonrespondents	71	40,241	3,475

Table 13. Comparison of vessel physical characteristics and revenue sources for the 2006 survey "other greater than $15,000" respondents and nonrespondents.

Variable	Response status	Number of observations	Mean	Standard error
Engine horsepower	All	14	268	18
	Respondents	5	261	28
	Nonrespondents	9	272	24
Vessel length (feet)	All	14	36	3
	Respondents	5	35	5
	Nonrespondents	9	36	4
Revenue from crab (US$)	All	14	1,106	914
	Respondents	5	2,653	2,544
	Nonrespondents	9	246	238
Revenue from groundfish (US$)	All	14	4,301	1,383
	Respondents	5	4,272	1,715
	Nonrespondents	9	4,317	2,004
Revenue from salmon (US$)	All	14	319	228
	Respondents	5	581	581
	Nonrespondents	9	174	174
Revenue from all species (US$)	All	14	80,871	12,474
	Respondents	5	83,464	11,900
	Nonrespondents	9	79,431	18,796

Table 14. Comparison of vessel physical characteristics and revenue sources for the 2006 survey "other less than $15,000" respondents and nonrespondents.

Variable	Response status	Number of observations	Mean	Standard error
Engine horsepower	All	520	165	5
	Respondents	77	172	11
	Nonrespondents	443	163	5
Vessel length (feet)	All	542	30	1
	Respondents	77	30	1
	Nonrespondents	465	30	1
Revenue from crab (US$)	All	542	338	66
	Respondents	77	332	181
	Nonrespondents	465	339	71
Revenue from groundfish (US$)	All	542	1,766	144
	Respondents	77	1,229	303
	Nonrespondents	465	1,855	160
Revenue from salmon (US$)	All	542	2,958	164
	Respondents	77	4,524	503
	Nonrespondents	465	2,699	169
Revenue from all species (US$)	All	542	5,678	186
	Respondents	77	6,452	454
	Nonrespondents	465	5,549	203

Table 15. Comparison of vessel physical characteristics and revenue sources for the 2006 survey sablefish fixed gear $15,000 respondents and nonrespondents.

Variable	Response status	Number of observations	Mean	Standard error
Engine horsepower	All	48	196	15
	Respondents	5	162	33
	Nonrespondents	43	200	16
Vessel length (feet)	All	49	39	2
	Respondents	6	40	6
	Nonrespondents	43	39	2
Revenue from crab (US$)	All	49	2,507	1,205
	Respondents	6	901	901
	Nonrespondents	43	2,731	1,367
Revenue from groundfish (US$)	All	49	22,442	1,656
	Respondents	6	29,862	7,543
	Nonrespondents	43	21,407	1,555
Revenue from salmon (US$)	All	49	4,305	1,152
	Respondents	6	9,101	4,132
	Nonrespondents	43	3,635	1,165
Revenue from all species (US$)	All	49	32,776	2,624
	Respondents	6	40,462	8,373
	Nonrespondents	43	31,704	2,753

Table 16. Comparison of vessel physical characteristics and revenue sources for the 2006 survey salmon troller respondents and nonrespondents.

Variable	Response status	Number of observations	Mean	Standard error
Engine horsepower	All	167	159	6
	Respondents	27	183	22
	Nonrespondents	140	155	6
Vessel length (feet)	All	169	38	1
	Respondents	26	37	1
	Nonrespondents	143	39	1
Revenue from crab (US$)	All	170	6,953	1,268
	Respondents	27	5,807	3,839
	Nonrespondents	143	7,169	1,328
Revenue from groundfish (US$)	All	170	892	182
	Respondents	27	895	428
	Nonrespondents	143	892	201
Revenue from salmon (US$)	All	170	24,779	940
	Respondents	27	23,329	2,900
	Nonrespondents	143	25,053	978
Revenue from all species (US$)	All	170	37,334	1,958
	Respondents	27	35,262	6,127
	Nonrespondents	143	37,726	2,030

Table 17. Two sample t-tests of statistical significance for differences between respondents and nonrespondents in the 2005 survey.

Fleet	Variable	T statistic	Degrees of freedom	Probability > T if H0 true
All	Vessel length	–0.68	306	0.50
	Engine horsepower	0.57	261	0.57
	Revenue from groundfish	0.89	205	0.38
	Revenue from crab	0.29	217	0.77
	Revenue from salmon	1.86	246	0.06
	Revenue from all species	0.97	234	0.33
Crabber	Vessel length	–0.60	29	0.55
	Engine horsepower	–0.11	30	0.91
	Revenue from groundfish	0.75	21	0.46
	Revenue from crab	0.47	21	0.65
	Revenue from salmon	1.07	31	0.29
	Revenue from all species	0.75	23	0.46
Groundfish fixed	Vessel length	–0.74	39	0.47
	Engine horsepower	2.57	18	0.02
	Revenue from groundfish	2.30	15	0.04
	Revenue from crab	1.58	15	0.14
	Revenue from salmon	0.20	20	0.85
	Revenue from all species	1.15	17	0.26
Other < $15,000	Vessel length	0.03	126	0.97
	Engine horsepower	0.05	73	0.96
	Revenue from groundfish	–0.44	66	0.66
	Revenue from crab	–0.11	59	0.91
	Revenue from salmon	2.41	61	0.02
	Revenue from all species	2.10	63	0.04
Other > $15,000	Vessel length	–1.77	9	0.11
	Engine horsepower	1.89	9	0.09
	Revenue from groundfish	0.87	1	0.53
	Revenue from crab	–1.73	8	0.12
	Revenue from salmon	–2.48	8	0.04
	Revenue from all species	–0.20	4	0.85
Sablefish fixed	Vessel length	–1.43	7	0.20
	Engine horsepower	–1.80	5	0.13
	Revenue from groundfish	0.81	5	0.46
	Revenue from crab	–1.33	15	0.20
	Revenue from salmon	–0.69	11	0.50
	Revenue from all species	–0.07	6	0.94
Salmon troller	Vessel length	–1.85	100	0.07
	Engine horsepower	0.61	113	0.54
	Revenue from groundfish	1.22	105	0.22
	Revenue from crab	–2.14	155	0.03
	Revenue from salmon	–1.53	135	0.13
	Revenue from all species	–1.79	134	0.08

Table 18. Two sample t-tests of statistical significance for differences between respondents and nonrespondents in the 2006 survey.

Fleet	Variable	T statistic	Degrees of freedom	Probability > T if H0 true
All	Vessel length	–0.68	306	0.50
	Engine horsepower	0.57	261	0.57
	Revenue from groundfish	0.84	204	0.40
	Revenue from crab	–1.41	308	0.16
	Revenue from salmon	1.33	226	0.18
	Revenue from all species	–0.63	288	0.53
Crabber	Vessel length	–1.05	45	0.30
	Engine horsepower	–0.16	57	0.87
	Revenue from groundfish	1.49	39	0.15
	Revenue from crab	–1.77	67	0.08
	Revenue from salmon	0.41	41	0.68
	Revenue from all species	–1.27	67	0.21
Groundfish fixed	Vessel length	–0.84	28	0.41
	Engine horsepower	1.35	19	0.19
	Revenue from groundfish	2.48	11	0.03
	Revenue from crab	1.91	10	0.09
	Revenue from salmon	–1.60	47	0.12
	Revenue from all species	1.11	10	0.29
Other < $15,000	Vessel length	0.12	186	0.90
	Engine horsepower	0.74	113	0.46
	Revenue from groundfish	–1.83	123	0.07
	Revenue from crab	–0.03	101	0.97
	Revenue from salmon	3.44	94	0.00
	Revenue from all species	1.82	109	0.07
Other > $15,000	Vessel length	–0.17	9	0.87
	Engine horsepower	–0.29	9	0.78
	Revenue from groundfish	–0.02	12	0.99
	Revenue from crab	0.94	4	0.40
	Revenue from salmon	0.67	5	0.53
	Revenue from all species	0.18	12	0.86
Sablefish fixed	Vessel length	0.10	6	0.93
	Engine horsepower	–1.03	6	0.34
	Revenue from groundfish	1.10	5	0.32
	Revenue from crab	–1.12	33	0.27
	Revenue from salmon	1.27	6	0.25
	Revenue from all species	0.99	6	0.36
Salmon troller	Vessel length	–1.33	36	0.19
	Engine horsepower	1.24	30	0.22
	Revenue from groundfish	0.01	38	0.99
	Revenue from crab	–0.34	33	0.74
	Revenue from salmon	–0.56	32	0.58
	Revenue from all species	–0.38	32	0.71

Table 19. Cost and earnings by category for all vessel types in the 2005 survey, based on 168 observations.

Variable	Mean (US$)	Standard error (US$)
Cost of:		
Captain	12,802	1,095
Captain (adjusted)	15,303	1,243
Crew	7,571	950
Food and crew provisions	1,719	203
Fuel	6,081	741
Bait	1,303	194
Ice	586	74
Insurance	1,537	238
Interest payments	582	172
Leasing permits	19	15
Purchasing permits	608	202
RMI[a]	8,874	885
Capital (imputed)	3,095	298
Revenue from:		
Alaska	2,024	1,262
Hawaii	0	0
Other sources	8,496	3,749
At sea deliveries	3,980	3,668
Permit sale and leasing	506	370
All species	42,151	3,420
Groundfish	5,639	950
Crab	12,532	2,563
Shrimp	0	0
Salmon	18,747	1,374
Pelagic	0	0
HMS[b]	3,121	802
Halibut	358	101

[a] RMI = repair, maintenance, and improvements.
[b] HMS = highly migratory species.

Table 20. Cost and earnings by category for crabber in the 2005 survey, based on 18 observations.

Variable	Mean (US$)	Standard error (US$)
Cost of:		
Captain	25,578	4,783
Captain (adjusted)	31,397	4,484
Crew	30,113	4,521
Food and crew provisions	2,413	462
Fuel	8,742	1,437
Bait	5,415	829
Ice	792	237
Insurance	6,869	1,242
Interest payments	1,258	487
Leasing permits	122	122
Purchasing permits	844	777
RMI[a]	14,240	2,591
Capital (imputed)	4,750	636
Revenue from:		
Alaska	0	0
Hawaii	0	0
Other sources	23,611	20,356
At sea deliveries	0	0
Permit sale and leasing	0	0
All species	116,479	16,917
Groundfish	7,136	2,426
Crab	83,092	14,860
Shrimp	0	0
Salmon	16,344	2,450
Pelagic	0	0
HMS[b]	8,773	3,359
Halibut	1,130	677

Table 21. Cost and earnings by category for groundfish fixed gear in the 2005 survey, based on 13 observations.

Variable	Mean (US$)	Standard error (US$)
Cost of:		
Captain	14,308	4,350
Captain(adjusted)	14,559	4,323
Crew	9,246	2,735
Food and crew provisions	1,146	405
Fuel	9,138	2,103
Bait	2,304	612
Ice	212	81
Insurance	208	142
Interest payments	821	766
Leasing permits	0	0
Purchasing permits	38	38
RMI[a]	9,592	3,268
Capital (imputed)	1,775	353
Revenue from:		
Alaska	0	0
Hawaii	0	0
Other sources	885	768
At sea deliveries	0	0
Permit sale and leasing	0	0
All species	49,694	8,368
Groundfish	33,633	5,274
Crab	10,601	4,318
Shrimp	0	0
Salmon	2,188	1,313
Pelagic	0	0
HMS[b]	30	30
Halibut	0	0

Table 22. Cost and earnings by category for "other greater than $15,000" in the 2005 survey, based on two observations.

Variable	Mean (US$)	Standard error (US$)
Cost of:		
Captain	*[c]	*
Captain (adjusted)	*	*
Crew	*	*
Food and crew provisions	*	*
Fuel	*	*
Bait	*	*
Ice	500	500
Insurance	*	*
Interest payments	*	*
Leasing permits	0	0
Purchasing permits	7,000	5,000
RMI[a]	43,825	36,175
Capital (imputed)	7,500	0
Revenue from:		
Alaska	0	0
Hawaii	0	0
Other sources	60,000	10,000
At sea deliveries	0	0
Permit sale and leasing	0	0
All species	93,382	27,292
Groundfish	13,492	8,828
Crab	0	0
Shrimp	0	0
Salmon	0	0
Pelagic	0	0
HMS[b]	0	0
Halibut	1,942	1,716

[a] RMI = repair, maintenance, and improvements.
[b] HMS = highly migratory species.
[c] The asterisk (*) indicates value not provided because of confidentiality restrictions when fewer than three respondents.

Table 23. Cost and earnings by category for "other less than $15,000" in the 2005 survey, based on 51 observations.

Variable	Mean (US$)	Standard error (US$)
Cost of:		
Captain	4,014	1,381
Captain (adjusted)	8,727	2,546
Crew	700	229
Food and crew provisions	766	189
Fuel	4,124	2,108
Bait	123	28
Ice	262	84
Insurance	448	97
Interest payments	187	81
Leasing permits	0	0
Purchasing permits	314	108
RMI[a]	3,548	646
Capital (imputed)	1,907	340
Revenue from:		
Alaska	980	980
Hawaii	0	0
Other sources	15,105	9,852
At sea deliveries	13,110	12,067
Permit sale and leasing	0	0
All species	7,958	611
Groundfish	1,818	461
Crab	205	189
Shrimp	0	0
Salmon	5,752	704
Pelagic	0	0
HMS[b]	56	41
Halibut	127	53

[a] RMI = repair, maintenance, and improvements.
[b] HMS = highly migratory species.

Table 24. Cost and earnings by category for sablefish fixed gear in the 2005 survey, based on five observations.

Variable	Mean (US$)	Standard error (US$)
Cost of:		
Captain	8,547	1,927
Captain (adjusted)	9,435	1,711
Crew	10,101	2,371
Food and crew provisions	784	229
Fuel	5,439	1,328
Bait	1,724	361
Ice	115	59
Insurance	0	0
Interest payments	200	200
Leasing permits	0	0
Purchasing permits	77	69
RMI[a]	2,560	905
Capital (imputed)	1,550	496
Revenue from:		
Alaska	0	0
Hawaii	0	0
Other sources	7,400	7,400
At sea deliveries	0	0
Permit sale and leasing	0	0
All species	38,850	6,551
Groundfish	34,481	6,991
Crab	1,798	1,505
Shrimp	0	0
Salmon	2,558	1,351
Pelagic	0	0
HMS[b]	0	0
Halibut	14	14

Table 25. Cost and earnings by category for salmon troller in the 2005 survey, based on 76 observations.

Variable	Mean (US$)	Standard error (US$)
Cost of:		
Captain	15,117	1,285
Captain (adjusted)	15,562	1,268
Crew	6,011	954
Food and crew provisions	2,009	249
Fuel	5,797	537
Bait	760	177
Ice	871	133
Insurance	1,366	287
Interest payments	695	333
Leasing permits	14	14
Purchasing permits	737	371
RMI[a]	10,116	1,275
Capital (imputed)	3,693	565
Revenue from:		
Alaska	3,816	2,706
Hawaii	0	0
Other sources	835	515
At sea deliveries	0	0
Permit sale and leasing	1,118	815
All species	43,903	3,199
Groundfish	1,179	337
Crab	5,651	1,414
Shrimp	0	0
Salmon	32,599	1,899
Pelagic	0	0
HMS[b]	2,826	1,067
Halibut	376	140

[a] RMI = repair, maintenance, and improvements.
[b] HMS = highly migratory species.

Table 26. Cost and earnings by category for all vessel types in the 2006 survey, based on 168 observations.

Variable	Mean (US$)	Standard error (US$)
Cost of:		
Captain	11,896	1,444
Captain (adjusted)	14,979	1,473
Crew	6,858	1,029
Food and crew provisions	1,547	206
Fuel	5,831	626
Bait	1,359	207
Ice	497	72
Insurance	1,385	228
Interest payments	572	171
Leasing permits	72	55
Purchasing permits	373	218
RMI[a]	9,134	1,262
Capital (imputed)	3,095	298
Revenue from:		
Alaska	1,726	1,229
Hawaii	0	0
Other sources	0	0
At sea deliveries	3,974	3,668
Permit sale and leasing	36	36
All species	41,074	3,898
Groundfish	5,140	855
Crab	19,682	3,279
Shrimp	0	0
Salmon	8,159	825
Pelagic	1	1
HMS[b]	4,909	895
Halibut	489	128

Table 27. Cost and earnings by category for crabber in the 2006 survey, based on 32 observations.

Variable	Mean (US$)	Standard error (US$)
Cost of:		
Captain	21,498	3,470
Captain(adjusted)	28,753	2,569
Crew	21,365	3,587
Food and crew provisions	2,738	580
Fuel	9,353	1,136
Bait	4,073	645
Ice	944	229
Insurance	4,743	870
Interest payments	688	264
Leasing permits	31	31
Purchasing permits	63	44
RMI[a]	12,225	1,618
Capital (imputed)	5,559	1,164
Revenue from:		
Alaska	3,906	3,906
Hawaii	0	0
Other sources	0	0
At sea deliveries	0	0
Permit sale and leasing	188	188
All species	112,931	10,125
Groundfish	5,423	1,332
Crab	89,726	9,383
Shrimp	0	0
Salmon	7,474	1,614
Pelagic	3	3
HMS[b]	7,973	2,126
Halibut	1,460	523

[a] RMI = repair, maintenance, and improvements.
[b] HMS = highly migratory species.

Table 28. Cost and earnings by category for groundfish fixed gear in the 2006 survey, based on 10 observations.

Variable	Mean (US$)	Standard error (US$)
Cost of:		
Captain	26,500	8,778
Captain (adjusted)	28,473	8,152
Crew	11,050	5,196
Food and crew provisions	940	501
Fuel	5,960	1,358
Bait	1,805	694
Ice	320	195
Insurance	80	80
Interest payments	300	300
Leasing permits	0	0
Purchasing permits	0	0
RMI[a]	6,250	2,048
Capital (imputed)	1,610	254
Revenue from:		
Alaska	0	0
Hawaii	0	0
Other sources	0	0
At sea deliveries	0	0
Permit sale and leasing	0	0
All species	54,489	12,359
Groundfish	34,399	4,862
Crab	19,073	7,789
Shrimp	0	0
Salmon	779	779
Pelagic	0	0
HMS[b]	189	127
Halibut	28	28

Table 29. Cost and earnings by category for "other greater than $15,000" in the 2006 survey, based on five observations.

Variable	Mean (US$)	Standard error (US$)
Cost of:		
Captain	22,600	15,025
Captain (adjusted)	29,318	12,569
Crew	9,784	4,658
Food and crew provisions	7,312	4,461
Fuel	19,857	6,463
Bait	4,652	2,715
Ice	500	316
Insurance	570	570
Interest payments	2,133	1,971
Leasing permits	0	0
Purchasing permits	440	440
RMI[a]	25,939	13,964
Capital (imputed)	7,100	1,592
Revenue from:		
Alaska	0	0
Hawaii	0	0
Other sources	0	0
At sea deliveries	0	0
Permit sale and leasing	0	0
All species	83,464	11,900
Groundfish	4,272	1,715
Crab	2,653	2,544
Shrimp	0	0
Salmon	581	581
Pelagic	0	0
HMS[b]	0	0
Halibut	259	170

[a] RMI = repair, maintenance, and improvements.
[b] HMS = highly migratory species.

Table 30. Cost and earnings by category for "other less than $15,000" in the 2006 survey, based on 77 observations.

Variable	Mean (US$)	Standard error (US$)
Cost of:		
Captain	3,454	1,072
Captain (adjusted)	5,322	1,558
Crew	836	479
Food and crew provisions	713	116
Fuel	3,431	997
Bait	341	147
Ice	265	70
Insurance	510	166
Interest payments	202	73
Leasing permits	14	14
Purchasing permits	157	36
RMI[a]	5,851	2,015
Capital (imputed)	1,887	219
Revenue from:		
Alaska	0	0
Hawaii	0	0
Other sources	0	0
At sea deliveries	8,670	7,997
Permit sale and leasing	0	0
All species	6,452	454
Groundfish	1,229	303
Crab	332	181
Shrimp	0	0
Salmon	4,524	503
Pelagic	1	1
HMS[b]	213	75
Halibut	150	55

Table 31. Cost and earnings by category for sablefish fixed gear in the 2006 survey, based on six observations.

Variable	Mean (US$)	Standard error (US$)
Cost of:		
Captain	8,667	4,807
Captain (adjusted)	12,316	3,751
Crew	10,167	4,285
Food and crew provisions	853	278
Fuel	7,775	3,617
Bait	2,700	1,053
Ice	432	319
Insurance	0	0
Interest payments	167	167
Leasing permits	1,500	1,500
Purchasing permits	63	63
RMI[a]	8,783	5,427
Capital (imputed)	1,458	410
Revenue from:		
Alaska	0	0
Hawaii	0	0
Other sources	0	0
At sea deliveries	0	0
Permit sale and leasing	0	0
All species	40,462	8,373
Groundfish	29,862	7,543
Crab	901	901
Shrimp	0	0
Salmon	9,101	4,132
Pelagic	0	0
HMS[b]	597	597
Halibut	0	0

[a] RMI = repair, maintenance, and improvements.
[b] HMS = highly migratory species.

Table 32. Cost and earnings by category for salmon troller in the 2006 survey, based on 27 observations.

Variable	Mean (US$)	Standard error (US$)
Cost of:		
Captain	18,002	4,524
Captain (adjusted)	19,155	4,354
Crew	3,835	1,446
Food and crew provisions	1,417	255
Fuel	4,228	629
Bait	242	116
Ice	699	244
Insurance	973	287
Interest payments	535	243
Leasing permits	39	39
Purchasing permits	407	407
RMI[a]	8,112	942
Capital (imputed)	3,287	623
Revenue from:		
Alaska	6,111	6,111
Hawaii	0	0
Other sources	0	0
At sea deliveries	0	0
Permit sale and leasing	0	0
All species	35,262	6,127
Groundfish	895	428
Crab	5,807	3,839
Shrimp	0	0
Salmon	23,329	2,900
Pelagic	0	0
HMS[b]	4,462	1,225
Halibut	765	417

Table 33. Revenue, costs, quasi-rents, and net revenue (in US$) per vessel in the 2005 survey.*

Fleet	Revenue all sources	Reported cost	Accounting net revenue	Economic cost	Quasi-rent	Economic net revenue
All	57,157	40,378	16,779	47,315	25,293	9,842
Crabber	140,090	90,972	49,118	106,619	62,960	33,471
Groundfish fixed	50,579	44,710	5,869	49,073	14,562	1,506
Other < $15,000	37,153	14,363	22,790	22,032	21,846	15,121
Other > $15,000	153,382	111,480	41,902	138,370	77,886	15,012
Sablefish fixed	46,250	27,824	18,427	31,774	19,083	14,476
Salmon troller	49,673	42,734	6,939	49,216	17,910	457

Table 34. Revenue, costs, quasi-rents, and net revenue (in US$) per vessel in the 2006 survey.*

Fleet	Revenue all sources	Reported cost	Accounting net revenue	Economic cost	Quasi-rent	Economic net revenue
All	46,810	38,166	8,645	46,561	15,612	249
Crabber	117,024	73,648	43,377	90,784	50,713	26,240
Groundfish fixed	54,489	51,400	3,089	57,732	5,409	–3,243
Other < $15,000	15,123	15,434	–311	20,149	4,027	–5,026
Other > $15,000	83,464	89,135	–5,671	108,100	13,355	–24,636
Sablefish fixed	40,462	38,397	2,065	45,679	7,352	–5,217
Salmon troller	41,373	38,247	3,126	44,822	10,572	–3,449

* In Table 33 and Table 34, values are rounded to the nearest dollar. Revenue all sources includes landings, at sea deliveries, sale and leasing of permits, salmon disaster payments, and any other sources. Reported cost provides the total of all cost categories as collected by the survey. Accounting net revenue is the difference between Revenue all sources and Reported cost. Economic cost makes three adjustments to the Reported cost figure to get closer to a measure of economic opportunity cost: 1) a minimum captain payment equal to 15% of revenue from landings and at sea deliveries is imposed to compensate for some vessels not making an explicit salary payment to the owner-captain for his or her provision of captains services, 2) capital costs are estimated to equal 5% of the reported market value of the vessel, and 3) costs are increased by 5% to account for those costs that were not included in the cost categories collected by the survey instrument. Quasi-rent equals Revenue all sources minus adjusted variable costs. Economic net revenue equals Revenue all sources minus Economic cost.

Table 35. Crew size, fuel use (gallons per hour), and speed (knots per hour) in the 2005 survey. The asterisk (*) indicates value not provided because of confidentiality restrictions when fewer than three respondents.

Fleet	Variable	Number of observations	Mean	Standard error
All	Crew size for crabbing	50	1.6	0.1
	Crew size for groundfish longlining	33	1.3	0.1
	Crew size for salmon trolling	121	0.6	0.1
	Fuel use for groundfish longlining	51	2.1	0.2
	Fuel use for crabbing	53	3.3	0.3
	Fuel use for salmon trolling	148	2.0	0.1
	Speed when groundfish longlining	51	3.1	0.4
	Speed when crabbing	53	4.0	0.3
	Speed when salmon trolling	147	3.1	0.1
Crabber	Crew size for crabbing	18	1.8	0.1
	Crew size for groundfish longlining	4	1.5	0.3
	Crew size for salmon trolling	17	0.8	0.1
	Fuel use for crabbing	18	3.3	0.8
	Fuel use for groundfish longlining	9	2.9	0.7
	Fuel use for salmon trolling	18	2.3	0.7
	Speed when crabbing	18	3.9	0.4
	Speed when groundfish longlining	9	3.6	1.1
	Speed when salmon trolling	18	3.3	0.3
Groundfish fixed	Crew size for crabbing	7	1.4	0.2
	Crew size for groundfish longlining	10	1.5	0.2
	Crew size for salmon trolling	5	1.2	0.2
	Fuel use for crabbing	7	3.4	0.8
	Fuel use for groundfish longlining	11	2.0	0.3
	Fuel use for salmon trolling	6	2.0	0.4
	Speed when crabbing	7	5.4	1.1
	Speed when groundfish longlining	11	3.8	0.9
	Speed when salmon trolling	6	2.8	0.2
Other < $15,000	Crew size for crabbing	2	*	*
	Crew size for groundfish longlining	7	1.3	0.2
	Crew size for salmon trolling	31	0.5	0.1
	Fuel use for crabbing	4	3.3	0.6
	Fuel use for groundfish longlining	7	2.1	0.3
	Fuel use for salmon trolling	42	1.6	0.1
	Speed when crabbing	4	3.0	0.4
	Speed when groundfish longlining	7	2.0	0.3
	Speed when salmon trolling	42	2.8	0.2
Other > $15,000	Crew size for crabbing	0	—	—
	Crew size for groundfish longlining	0	—	—
	Crew size for salmon trolling	0	—	—
	Fuel use for crabbing	0	—	—
	Fuel use for groundfish longlining	1	*	—
	Fuel use for salmon trolling	1	*	—
	Speed when crabbing	0	—	—
	Speed when groundfish longlining	1	*	—
	Speed when salmon trolling	1	*	—

Table 35 continued. Crew size, fuel use (gallons per hour), and speed (knots per hour) in the 2005 survey. The asterisk (*) indicates value not provided because of confidentiality restrictions when fewer than three respondents.

Fleet	Variable	Number of observations	Mean	Standard error
Sablefish fixed	Crew size for crabbing	2	*	*
	Crew size for groundfish longlining	5	1.2	0.2
	Crew size for salmon trolling	3	1.3	0.3
	Fuel use for crabbing	2	*	*
	Fuel use for groundfish longlining	4	2.4	0.4
	Fuel use for salmon trolling	3	2.0	0.0
	Speed when crabbing	2	*	*
	Speed when groundfish longlining	4	4.8	1.9
	Speed when salmon trolling	2	*	*
Salmon troller	Crew size for crabbing	20	1.6	0.2
	Crew size for groundfish longlining	7	0.9	0.3
	Crew size for salmon trolling	62	0.5	0.1
	Fuel use for crabbing	21	3.0	0.2
	Fuel use for groundfish longlining	18	1.8	0.2
	Fuel use for salmon trolling	75	2.0	0.1
	Speed when crabbing	21	3.6	0.4
	Speed when groundfish longlining	18	2.6	0.5
	Speed when salmon trolling	75	3.2	0.2

Table 36. Crew size, fuel use (gallons per hour), and speed (knots per hour) in the 2006 survey. The asterisk (*) indicates value not provided because of confidentiality restrictions when fewer than three respondents.

Fleet	Variable	Number of observations	Mean	Standard error
All	Crew size for crabbing	50	1.6	0.1
	Crew size for groundfish longlining	33	1.3	0.1
	Crew size for salmon trolling	121	0.6	0.1
	Fuel use for groundfish longlining	51	2.1	0.2
	Fuel use for crabbing	53	3.3	0.3
	Fuel use for salmon trolling	148	2.0	0.1
	Speed when groundfish longlining	51	3.1	0.4
	Speed when crabbing	53	4.0	0.3
	Speed when salmon trolling	147	3.1	0.1
Crabber	Crew size for crabbing	31	1.7	0.1
	Crew size for groundfish longlining	7	1.4	0.2
	Crew size for salmon trolling	28	0.8	0.1
	Fuel use for crabbing	32	3.2	0.5
	Fuel use for groundfish longlining	16	2.6	0.4
	Fuel use for salmon trolling	31	2.2	0.4
	Speed when crabbing	32	3.9	0.3
	Speed when groundfish longlining	16	3.1	0.6
	Speed when salmon trolling	31	3.3	0.3
Groundfish fixed	Crew size for crabbing	5	1.4	0.2
	Crew size for groundfish longlining	9	1.6	0.2
	Crew size for salmon trolling	5	1.2	0.2
	Fuel use for crabbing	5	2.8	0.5
	Fuel use for groundfish longlining	9	1.7	0.3
	Fuel use for salmon trolling	5	1.3	0.2
	Speed when crabbing	5	3.9	0.8
	Speed when groundfish longlining	9	3.9	1.1
	Speed when salmon trolling	5	2.2	0.4
Other < $15,000	Crew size for crabbing	5	1.6	0.2
	Crew size for groundfish longlining	9	1.1	0.1
	Crew size for salmon trolling	49	0.4	0.1
	Fuel use for crabbing	7	2.9	0.5
	Fuel use for groundfish longlining	12	2.1	0.3
	Fuel use for salmon trolling	67	1.8	0.1
	Speed when crabbing	7	4.0	0.6
	Speed when groundfish longlining	12	2.3	0.5
	Speed when salmon trolling	66	3.1	0.2
Other > $15,000	Crew size for crabbing	1	*	—
	Crew size for groundfish longlining	0	—	—
	Crew size for salmon trolling	1	*	—
	Fuel use for crabbing	1	*	—
	Fuel use for groundfish longlining	1	*	—
	Fuel use for salmon trolling	3	2.0	0.6
	Speed when crabbing	1	*	—
	Speed when groundfish longlining	1	*	—
	Speed when salmon trolling	3	2.6	0.3

Table 36 continued. Crew size, fuel use (gallons per hour), and speed (knots per hour) in the 2006 survey. The asterisk (*) indicates value not provided because of confidentiality restrictions when fewer than three respondents.

Fleet	Variable	Number of observations	Mean	Standard error
Sablefish fixed	Crew size for crabbing	1	*	—
	Crew size for groundfish longlining	5	1.4	0.2
	Crew size for salmon trolling	4	1.3	0.3
	Fuel use for crabbing	1	*	—
	Fuel use for groundfish longlining	5	1.9	0.3
	Fuel use for salmon trolling	4	1.8	0.4
	Speed when crabbing	1	*	—
	Speed when groundfish longlining	5	4.7	1.4
	Speed when salmon trolling	4	4.1	1.3
Salmon troller	Crew size for crabbing	4	1.0	0.4
	Crew size for groundfish longlining	2	*	*
	Crew size for salmon trolling	24	0.4	0.1
	Fuel use for crabbing	4	3.0	0.7
	Fuel use for groundfish longlining	5	1.8	0.4
	Fuel use for salmon trolling	27	1.8	0.2
	Speed when crabbing	4	3.8	1.1
	Speed when groundfish longlining	5	3.1	1.3
	Speed when salmon trolling	27	2.9	0.1

Table 37. Share for captain, crew, and vessel for the percent of trips where owner serves as captain in the 2005 survey. The asterisk (*) indicates value not provided because of confidentiality restrictions when fewer than three respondents.

Fleet	Number of observations	Mean	Standard error
All	119	89.7	2.5
Crabber	16	83.1	7.9
Groundfish fixed	12	84.6	8.8
Other < $15,000	35	93.9	4.0
Other > $15,000	2	*	*
Sablefish fixed	4	76.3	23.8
Salmon troller	47	92.3	3.5

Table 38. Share for captain, crew, and vessel for the percent of trips where owner serves as captain in the 2006 survey.

Fleet	Number of observations	Mean	Standard error
All	119	89.7	2.5
Crabber	27	87.0	5.6
Groundfish fixed	8	64.4	15.2
Other < $15,000	51	94.2	3.1
Other > $15,000	5	90.0	10.0
Sablefish fixed	6	84.2	15.8
Salmon troller	18	97.2	2.8

References

Lian, C. E. 2010. West Coast limited entry groundfish trawl cost earnings survey protocols and results for 2004. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-107.

Good, P. 2006. Resampling methods: A practical guide to data analysis. Birkhauser, Boston, MA.

Radtke, H. D., and S. W. Davis. 2000. Description of the U.S. West Coast commercial fishing fleet and seafood processors. Pacific States Marine Fisheries Commission, Portland, OR.

Appendix A: Open Access Groundfish Survey Questionnaire

OMB No. 0648-0369 Expiration date: 7/31/09

CONTACT INFORMATION FOR SURVEY RESPONDENT

1. Name: _____ 2. E-mail: _____

3. Date (month/day/year): _____ 4. Telephone: (____)_____

5. Mailing address (street, city, state, and zip code):

_____

VESSEL OWNERSHIP AND CHARACTERISTICS

6. Please verify the following information on record about your vessel's characteristics. If the information on record is correct, please place a check mark in the Corrections column. If the information on record is incorrect or there is no information on record, please provide the correct information in the Corrections column.

Item	Information on record	Corrections
a. Owner's name	*Charles Smith*	
b. Owner's address	*333 1st Street, Waldport, OR 97005*	
c. Vessel name	*Sea Breeze*	
d. USCG vessel ID	*33221843*	
e. State vessel ID	*OR33214*	
f. Home port	*Newport, OR*	
g. Length (feet)	*75*	
h. Fuel capacity	*300*	
i. Engine make and model	*No information on record*	

7. What is the approximate market value of your vessel (not including associated permits) in dollars?

$_____

8. Please provide your vessel's fuel consumption, speed, and crew size (not including captain) when engaged in each of the following activities. If this vessel does not engage in an activity, please write "NA" in the appropriate columns.

Activity	Fuel consumption (gallons per hour)	Speed (knots per hour)	Crew size (not including captain)
a. Longlining			
b. Trolling			
c. Crabbing			
d. Shrimping (while towing)			
e. Steaming (fully loaded)			Not applicable
f. Steaming (empty)			Not applicable

COSTS AND EARNINGS

Questions 9 through 12 collect information about this vessel's costs and earnings **while operating in all fisheries** (groundfish, crab, shrimp, salmon, etc.). This survey's primary objective is to collect data on costs and earnings for 2006. However, we recognize that conditions in the fishery change from year to year and that two years of data can provide a more complete picture than a one-year snapshot. If possible, we would appreciate receiving your cost and earnings data for both 2005 and 2006.

9. In what month does your vessel's fiscal year begin? _____

10. For each of the earnings (income) sources listed below, please indicate the income earned during your fiscal year 2005 and fiscal year 2006. If no income was earned from a particular source during a particular year, please write NA in the appropriate box.

Earnings (income) source	2005 ($)	2006 ($)
a. Landings in Alaska		
b. Landings in Hawaii		
c. Landings outside of the United States		
d. West Coast at sea deliveries		
e. Sale and leasing of permits associated with this vessel		
f. Other (please specify)_____		

11. Approximately what percentage of your annual household income comes from earnings associated with this vessel?

a. less than 20% b. 20% to 40% c. 40% to 60% d. 60% to 80% e. greater than 80%

12. For each cost category below, please provide total annual expenditures during your fiscal year 2005 and fiscal year 2006. If you do not have separate data on expenditures for captain (part a) and crew (part b), please write combined expenditures in part a and write NA in part b. If no expenditures were incurred in a particular category during a particular year, please write NA in the appropriate box.

For location of expenditures, please indicate the location of expenditures in either dollars or percentages in the following location categories: hp = home port, hs = home state but not home port city, wc = West Coast (WA, OR, or CA) state but not home state, ak = Alaska, us = United States outside of West Coast and Alaska, ot = outside the United States. For crew expenditures, please indicate the percent of crew that reside in each location category.

Cost (expenditure) category	**2005 ($)**	**2006 ($)**	**Location of expenditures**	
a. Captain (including share payments, bonuses, other forms of compensation, and payroll taxes)			hp: hs: wc:	ak: us: ot:
b. Crew (including share payments, bonuses, other forms of compensation, and payroll taxes)			hp: hs: wc:	ak: us: ot:
c. Fuel and lube			hp: hs: wc:	ak: us: ot:
d. Food and crew provisions			hp: hs: wc:	ak: us: ot:
e. Ice			hp: hs: wc:	ak: us: ot:
f. Bait			hp: hs: wc:	ak: us: ot:
g. Repair, maintenance, and improvements for vessel, gear, and equipment			hp: hs: wc:	ak: us: ot:
h. Insurance			hp: hs: wc:	ak: us: ot:
i. Interest			hp: hs: wc:	ak: us: ot:
j. Purchase of permits used with this vessel			NA	NA
k. Leasing of permits used with this vessel			NA	NA

CREW COMPENSATION

Questions 13 through 17 collect information about crew payments when this vessel is participating in the West Coast (Washington, Oregon, and California) **groundfish fisheries**.

13. Does this vessel use a crew share system to pay its crew when operating in the **groundfish fisheries**?
    a. Yes (proceed to question 14).
    b. No (proceed to Survey Conclusion).

14. Which of the following expenses were deducted from total revenue before calculating the crew share when this vessel operated in the **groundfish fisheries**?

		Deducted before calculating crew share?	
a.	Fuel and lube	Yes	No
b.	Food and other crew provisions.	Yes	No
c.	Landing taxes	Yes	No
d.	Unloading expenses	Yes	No
e.	Other. Please specify _____	Yes	No

15. On what percentage of fishing trips does the vessel owner serve as captain? _____%

16. On trips when the vessel owner serves as captain, please indicate the share of net revenue (revenue minus the deductions listed in question 14) going to the vessel, captain, and crew. If the vessel owner does not serve as captain on any trips, please circle NA.

Vessel share _____% Captain share _____% Crew share _____% NA

17. On trips when the vessel owner does not serve as captain, please indicate the share of net revenue (revenue minus the deductions listed in question 14) going to the vessel, captain, and crew. If the vessel owner always serves as captain, please circle NA.

Vessel share _____% Captain share _____% Crew share _____% NA

Survey Conclusion and Paperwork Reduction Act Statement

Thank you for participating in this voluntary survey that requests information on costs and earnings from vessel owners participating in the West Coast groundfish fishery. This information will be used to assess the economic effects of fishery management regulations, such as the effect of regulations on harvesting costs and regional economies. Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

The information you provide will remain strictly confidential. We will combine your responses with information provided by other participants and report it in summary form so that responses for any individual vessel cannot be identified. The public reporting burden for this information collection, including time for gathering data needed and completing the survey, is estimated to average one hour per respondent. Please provide comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to:

Carl Lian
2725 Montlake Boulevard East, Seattle, WA, 98112
Telephone (206) 302-2414 and e-mail Carl.Lian@noaa.gov

Appendix B: Salmon Troller Survey Questionnaire

OMB No. 0648-0369 Expiration date: 7/31/09

CONTACT INFORMATION FOR SURVEY RESPONDENT

1. Name: _____ 2. E-mail: _____

3. Date (month/day/year): _____ 4. Telephone: (____)_____

5. Mailing address (street, city, state, and zip code):

_____

VESSEL OWNERSHIP AND CHARACTERISTICS

6. Please verify the following information on record about your vessel's characteristics. If the information on record is correct, please place a check mark in the Corrections column. If the information on record is incorrect or there is no information on record, please provide the correct information in the Corrections column.

Item	Information on record	Corrections
a. Owner's name	*Charles Smith*	
b. Owner's address	*333 1st Street, Waldport, OR 97005*	
c. Vessel name	*Sea Breeze*	
d. USCG vessel ID	*33221843*	
e. State vessel ID	*OR33214*	
f. Home port	*Newport, OR*	
g. Length (feet)	*75*	
h. Fuel capacity	*300*	
i. Engine make and model	*No information on record*	

7. What is the approximate market value of your vessel (not including associated permits) in dollars?

$_____

8. Please provide your vessel's fuel consumption, speed, and crew size (not including captain) when engaged in each of the following activities. If this vessel does not engage in an activity, please write "NA" in the appropriate columns.

Activity	Fuel consumption (gallons per hour)	Speed (knots per hour)	Crew size (not including captain)
a. Longlining			
b. Trolling			
c. Crabbing			
d. Shrimping (while towing)			
e. Steaming (fully loaded)			Not applicable
f. Steaming (empty)			Not applicable

COSTS AND EARNINGS

Questions 9 through 12 collect information about this vessel's costs and earnings **while operating in all fisheries** (groundfish, crab, shrimp, salmon, etc.). This survey's primary objective is to collect data on costs and earnings for 2006. However, we recognize that conditions in the fishery change from year to year and that two years of data can provide a more complete picture than a one-year snapshot. If possible, we would appreciate receiving your cost and earnings data for both 2005 and 2006.

9. In what month does your vessel's fiscal year begin? _____

10. For each of the earnings (income) sources listed below, please indicate the income earned during your fiscal year 2005 and fiscal year 2006. If no income was earned from a particular source during a particular year, please write NA in the appropriate box.

Earnings (income) source	2005 ($)	2006 ($)
a. Landings in Alaska		
b. Landings in Hawaii		
c. Landings outside of the United States		
d. West Coast at sea deliveries		
e. Sale and leasing of permits associated with this vessel		
f. Other (please specify)_____		

11. Approximately what percentage of your annual household income comes from earnings associated with this vessel?

a. less than 20% b. 20% to 40% c. 40% to 60% d. 60% to 80% e. greater than 80%

12. For each cost category below, please provide total annual expenditures during your fiscal year 2005 and fiscal year 2006. If you do not have separate data on expenditures for captain (part a) and crew (part b), please write combined expenditures in part a and write NA in part b. If no expenditures were incurred in a particular category during a particular year, please write NA in the appropriate box.

For location of expenditures, please indicate the location of expenditures in either dollars or percentages in the following location categories: hp = home port, hs = home state but not home port city, wc = West Coast (WA, OR, or CA) state but not home state, ak = Alaska, us = United States outside of West Coast and Alaska, ot = outside the United States. For crew expenditures, please indicate the percent of crew that reside in each location category.

Cost (expenditure) category	**2005 ($)**	**2006 ($)**	**Location of expenditures**	
a. Captain (including share payments, bonuses, other forms of compensation, and payroll taxes)			hp: hs: wc:	ak: us: ot:
b. Crew (including share payments, bonuses, other forms of compensation, and payroll taxes)			hp: hs: wc:	ak: us: ot:
c. Fuel and lube			hp: hs: wc:	ak: us: ot:
d. Food and crew provisions			hp: hs: wc:	ak: us: ot:
e. Ice			hp: hs: wc:	ak: us: ot:
f. Bait			hp: hs: wc:	ak: us: ot:
g. Repair, maintenance, and improvements for vessel, gear, and equipment			hp: hs: wc:	ak: us: ot:
h. Insurance			hp: hs: wc:	ak: us: ot:
i. Interest			hp: hs: wc:	ak: us: ot:
j. Purchase of permits used with this vessel			NA	NA
k. Leasing of permits used with this vessel			NA	NA

CREW COMPENSATION

Questions 13 through 17 collect information about crew payments when this vessel is participating in the West Coast (Washington, Oregon, and California) **salmon fishery**.

13. Does this vessel use a crew share system to pay its crew when operating in the **salmon fishery**?
    a. Yes (proceed to question 14).
    b. No (proceed to Survey Conclusion).

14. Which of the following expenses were deducted from total revenue before calculating the crew share when this vessel operated in the **salmon fishery**?

		Deducted before calculating crew share?	
a.	Fuel and lube	Yes	No
b.	Food and other crew provisions.	Yes	No
c.	Landing taxes	Yes	No
d.	Unloading expenses	Yes	No
e.	Other. Please specify _____	Yes	No

15. On what percentage of fishing trips does the vessel owner serve as captain? _____%

16. On trips when the vessel owner serves as captain, please indicate the share of net revenue (revenue minus the deductions listed in question 14) going to the vessel, captain, and crew. If the vessel owner does not serve as captain on any trips, please circle NA.

Vessel share _____% Captain share _____% Crew share _____% NA

17. On trips when the vessel owner does not serve as captain, please indicate the share of net revenue (revenue minus the deductions listed in question 14) going to the vessel, captain, and crew. If the vessel owner always serves as captain, please circle NA.

Vessel share _____% Captain share _____% Crew share _____% NA

Survey Conclusion and Paperwork Reduction Act Statement

Thank you for participating in this voluntary survey that requests information on costs and earnings from vessel owners participating in the West Coast groundfish fishery. This information will be used to assess the economic effects of fishery management regulations, such as the effect of regulations on harvesting costs and regional economies. Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

The information you provide will remain strictly confidential. We will combine your responses with information provided by other participants and report it in summary form so that responses for any individual vessel cannot be identified. The public reporting burden for this information collection, including time for gathering data needed and completing the survey, is estimated to average one hour per respondent. Please provide comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to:

Carl Lian
2725 Montlake Boulevard East, Seattle, WA, 98112
Telephone (206) 302-2414 and e-mail Carl.Lian@noaa.gov

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115 **Plummer, M.L., W. Morrison, and E. Steiner. 2012.** Allocation of fishery harvests under the Magnuson-Stevens Fishery Conservation and Management Act: Principles and practice. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-115, 84 p. NTIS number pending.

114 **Bradburn, M.J., A.A. Keller, and B.H. Horness. 2011.** The 2003 to 2008 U.S. West Coast bottom trawl surveys of groundfish resources off Washington, Oregon, and California: Estimates of distribution, abundance, length, and age composition. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-114, 323 p. NTIS number PB2012-105507.

113 **Ford, M.J. (ed.). 2011.** Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Pacific Northwest. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-113, 281 p. NTIS number PB2012-104687.

112 **Skidmore, P.B., C.R. Thorne, B.L. Cluer, G.R. Pess, J.M. Castro, T.J. Beechie, and C.C. Shea. 2011.** Science base and tools for evaluating stream engineering, management, and restoration proposals. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-112, 255 p. NTIS number PB2012-104660.

111 **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. NTIS number PB2011-113405.

110 **Ainsworth, C.H., I.C. Kaplan, P.S. Levin, R. Cudney-Bueno, E.A. Fulton, M. Mangel, P. Turk-Boyer, J. Torre, A. Pares-Sierra, and H.N. Morzaria Luna. 2011.** Atlantis model development for the northern Gulf of California. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-110, 293 p. NTIS number PB2011-113404.

109 **Levin, P.S., and F.B. Schwing (eds.). 2011.** Technical background for an integrated ecosystem assessment of the California Current: Groundfish, salmon, green sturgeon, and ecosystem health. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-109, 330 p. NTIS number PB2011-112724.

108 **Drake, J.S., E.A. Berntson, J.M. Cope, R.G. Gustafson, E.E. Holmes, P.S. Levin, N. Tolimieri, R.S. Waples, S.M. Sogard, and G.D. Williams. 2010.** Status review of five rockfish species in Puget Sound, Washington: Bocaccio (*Sebastes paucispinis*), canary rockfish (*S. pinniger*), yelloweye rockfish (*S. ruberrimus*), greenstriped rockfish (*S. elongatus*), and redstripe rockfish (*S. proriger*). U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-108, 234 p. NTIS number PB2011-107576.

Most NOAA Technical Memorandums NMFS-NWFSC are available at the Northwest Fisheries Science Center Web site, http://www.nwfsc.noaa.gov