

BSAI CRAB RATIONALIZATION EDR AUDITS

**REPORT PREPARED FOR PACIFIC STATES MARINE
FISHERIES COMMISSION**

2011 Calendar Year Data

December 2012



AKT

CPAs *and* Business Consultants

TABLE OF CONTENTS

Introduction.....	1
Methodology	3
Support Classes	5
Catcher Vessel Audit Code Analysis	6
Processor Audit Code Analysis	8
Outlier Audit Code Analysis	9
Audit Variable Analysis	10
Burden Hour Estimate.....	11
Commendation.....	13
Conclusion	14
Appendix A	15
Appendix B	17

Background

The Bering Sea and Aleutian Islands (BSAI) Crab Rationalization Program was developed to create a quota system that grants exclusive harvesting and processing rights to crab harvesters, processors, and communities. The rationalized fishery began in fall 2005, with quota allocated to harvesters and processors based on historical participation in the fishery. Because of the expected impact on the industry, an economic data collection program was developed to better understand the economic impacts on the industry.

Economic data reports (EDRs) were developed to obtain information about the crab operations of harvesters and processors to help monitor how costs and economic returns of various stakeholders in BSAI crab fisheries are affected by rationalization. In order to ensure that the data submitted by respondents in the EDRs is accurate, Congress and the North Pacific Fishery Management Council specified that EDR data be subject to mandatory audits conducted by the third party collection agent, Pacific States Marine Fisheries Commission (PSMFC). PSMFC contracted AKT to develop and implement an EDR review and verification system, which involves reviewing the data contained within submitted EDRs, conducting verification audits for those EDRs containing data values outside of the expected range, and conducting random audits for a certain percentage of submitted EDRs.

The EDRs were developed to help determine the effects of the rationalization program, including changes to the costs of production and the effect of consolidation. National Marine Fisheries Service (NMFS) sought to understand the general trends over the years and the effects of rationalization to translate to other fisheries that are beginning similar programs.

This validation process is a continuation of similar work done in years 2006 to 2010. Prior years' data is audited in the current year; for example the 2010 data was audited in 2011.

In summary, the purpose of the economic data report and data validation is to:

- 1) Aid the Council and NMFS in assessing the success of the Program;
- 2) Understand the economic performance of crab fisherman;
- 3) Understand how the economic performance has changed after rationalization;
- 4) Isolate the effects attributable to the crab rationalization program;
- 5) Assess the validity of data reported in submitted EDRs; and
- 6) Provide guidance on improvements in the EDR process to improve the validity of future data reporting.

Key Participants and Roles

The key participants in the project include:

- **National Marine Fisheries Service (NMFS)** – initiator of the audit process and end-user of the information contained in the EDRs.
- **Pacific States Marine Fisheries Commission (PSMFC)** – collector and manager of the data collected through the EDRs.

- **AKT LLP** – independent accountants and consultants selected to audit and validate the information collected in the EDRs.
- Participants in the crab rationalization program.

Scope of Work

The following procedures were requested to be performed in the scope of work for this project:

- 1) **Random Audits** – Review and verification of a subset of data values reported in a randomly selected sample of EDRs.
- 2) **Outlier Audits** – Review and verification of data values reported in EDRs that contained multiple outlier variables. These outliers were identified through an analysis performed by NMFS. Analysis is conducted as needed, based on prior year audit results and statistical analysis.
- 3) **For Cause Audits** – Review and verification of data values reported in EDRs that were non-compliant or that failed the audit process in the previous EDR calendar year.

The methodology to address the procedures above is outlined later in this report.

Based upon our conversations with NMFS and PSMFC, the key objectives of the audit were outlined as follows:

- Validate key data.
- Identify problems with the data or EDR instructions and make suggestions for future reporting.
- Promote compliance with timely and accurate data reporting requirements.
- Identify appropriate changes to data when missing or incorrect.
- Characterize, and in some cases quantify, the level of accuracy associated with particular data elements.

Key Information

The current analysis is based on the data collected from participants of the BSAI crab rationalization program for the year 2011. A statistical sample was determined based upon a total submitted population of 111, which was comprised of all unique submitters of information. The sample was determined based upon achieving a 95% confidence level with a precision level of 15% in terms of assessing the accuracy of the submitted data (see Appendix A for detailed discussion of the statistical basis of the sample). The following table summarizes the number of EDRs submitted by type and the resulting sample size.

Type	# of EDRs Submitted 2011	Sample Size 2011
Catcher Vessel	76	21
Catcher Processor	3	1
Shoreside/Floating Processor	32	9

AKT, PSMFC, and NMFS worked together to determine the best process to analyze data submitted through the EDR process and to determine the methodology to sample and audit the data submitted in the EDRs. The process was based on prior year experience with improvements made to benefit the participants. The following is a summary of the steps taken throughout the audit process.

- 1) ***Determine appropriate variables to validate.*** The significance of the data for random audits and available audit evidence is considered when determining the appropriate variables to validate. This is a collaborative process between PSMFC, NMFS, and AKT.
- 2) ***Determine population subject to random audit.*** The sample size is determined using a statistical model with a 95% confidence level and a 15% precision level. See Appendix A for a discussion of the statistical basis used for selection.
- 3) ***Determine outlier audit population.*** Based upon its analysis of the EDR data without vessel identity, NMFS identifies the population that it desires to validate through an outlier audit. These audits focus on EDRs that have a significant number of outliers identified through analytical review. Once a vessel is identified has an outlier, it is subject to validation for only those variables for which an outlier status was identified. Nine vessels and six processors were identified as having outlier variables for the 2011 EDR data year.
- 4) ***Determining for-cause audits.*** Vessels selected for for-cause audits are those that did not comply with an audit request in the previous year. Four vessels were selected for audit in the 2011 EDR data year as a result of a failed audit in the prior year.
- 5) ***Gather and crosscheck EDR data to be audited.*** EDR data pertaining to the variables selected for auditing are transferred to AKT from PSMFC. AKT uses a standard auditing analysis spreadsheet and imports data from PSMFC into this format. EDR data is verified against the selected vessels' original EDR submissions for accuracy.
- 6) ***Request information subject to audit for random, outlier and for-cause audits.*** Selected vessels and processors are asked to provide supporting information for the variables selected for validation. They are given one month to comply with the request, though extensions are granted on an as-needed basis. If the selected vessels and processors do not comply within one month, they are individually contacted, and additional contact efforts are made as needed to ensure that each selected vessel and processor has an opportunity to respond in a timely manner.
- 7) ***Validate information by comparing with supporting documentation.*** This process involves a review of the supporting documentation submitted against the original EDR data submission for each vessel and variable selected. Detailed notes related to the basis and quality of information are maintained in order to evaluate the validity of selected data. The vessels or processors are contacted as need for further clarifications and additional supporting documents.
- 8) ***Summarize the results of the audit verification process.*** Each audited variable is classified within a support category, which classify and summarize the validity of the audit evidence received, allowing AKT to better perform overall analysis.

- 9) **Compile a burden hour estimate.** Selected vessels and processors are asked to estimate the amount of time dedicated to compiling their EDR submissions. The resulting responses are summarized into estimated burden hours by respondent type.

Audit Methodology

AKT selects vessels or processors for random audit based upon the statistical sample outlined in Appendix A. AKT works with NMFS and PSMFC to determine the appropriate variables to validate.

For each data variable requested, AKT critically evaluates the support provided by the selected vessel or processor. Information is evaluated against third party support, such as invoices or fish tickets; internally-generated information, such as crew settlement sheets, general ledger details, invoices, detailed internal reports, or financial statements; and estimates made, including an assessment of the reasonableness of assumptions. Supporting documentation for internally-generated spreadsheets is requested on a judgmental basis. AKT also notes when no support is available to evaluate the information.

Many of the records provided to AKT are unique, specifically for the vessels. The processor reporting tends to be more formal and standardized, reflecting the large company nature of those operations. Because the material provided is so unique, the audit process begins with a detailed review of each information packet received while comparing totals for each variable to the original EDR entry. Each supporting document is assessed for accuracy and depth of support. Estimates are accepted as long as a reasonable explanation and/or calculation are also provided. Handwritten statements are also considered adequate, but only after discussion with the EDR preparer and requests for additional support.

AKT places phone calls to all submitters with estimates and hand written statements. AKT also validates all variables that are reported with no value (blank) or a zero value. If discrepancies are found between the original EDR submission and the supporting documentation, AKT contacts the vessel owner and/or preparer to validate the correct reported value. Many times this leads to receiving further documentation from the vessel and/or further explanation as to the methodology used to report EDR values.

If the initially provided documentation is determined to be insufficient support, or if support is missing for a certain variable, AKT contacts vessels to ask for further documentation. Once documentation is received, it is assessed and validated via the process described above.

AKT worked jointly with PSMFC and NMFS to develop the following classifications to describe audit evaluations and summarize the results of the audited values.

Validation Code - Original Value	Is original value substantiated?	Is audited value substantiated?	Nature of Reporting Error	Correction	Validation Code - Audit Value
1	Yes	Yes (same)	No error; reported value is clearly substantiated by complete records	No	1
1T	Yes	yes (same)	Original value is blank, or N/A	No	1
2	Yes	Yes (same)	Calculation error	Yes	1
2T	Yes	Yes(same)	Typographical Error	Yes	1
3	Yes	Yes (same)	Misinterpretation of question	Yes	1
4	Yes	Yes (same)	Estimate is based on original documentation but flawed assumption/logic	Yes	4
5	Yes	Yes (same)	Data cannot be reported precisely as specified in EDR form and must be estimated; estimate is based on appropriate documentation and sound assumptions/logic and is considered validated	No	5
6	Yes	Yes (updated)	Original value was reported correctly based on original documentation, but corrected based on updated documentation	Yes	1
7	No	No	Reported value is "best guess"; value is not derived from records	No	7
8	No	Yes (new)	Original value is unsubstantiated; correction based on new documentation	Yes	1
9	No	No	No data reported	Yes - "Corrected Value is -9"	9
10	No	No	Item "Not Applicable" to vessel	Yes - "Corrected Value is -7"	10

CATCHER VESSEL - AUDIT CODE ANALYSIS



The records of 21 catcher vessels were requested, and 19 were received. Two catcher vessels were granted a reprieve due to the medical hardship of the EDR preparer. In the current year, four vessels selected for random audit did not require follow-up information requests. All other catcher vessels complied with AKT's requests for additional support.

AKT analyzed the audit codes assigned to each of the vessels in order to document consistent errors for each variable, along with the reasoning behind the error.

The total number of audit codes possible was determined by the number of EDR variables requested from selected vessels. 19 catcher vessels submitted information for 8 items, totaling 152 audit codes. The distribution of those audit codes is summarized below. Where appropriate, examples of situations causing the reporting errors are included.

Code - Original Value	Code - Audit Value	Nature of Reporting Error	Number of Occurrences	Percentage
1	1	No error; reported value is clearly substantiated by complete records	91	59.87%
1T	1	Original value is blank, or N/A	13	8.55%
2	1	Calculation error	1	0.65%
2T	1	Typographical Error	2	1.32%
3	1	Misinterpretation of question	14	9.21%
		<i>Did not report crew payments net of food and other shared expenses (Table 4.1)</i>	4	
		<i>Did not report crew payments net of food and other shared expenses (Table 6.o)</i>	2	
		<i>Reported only BSAI labor cost in annual labor total (Table 6.o)</i>	2	
		<i>Did not include BSAI labor cost in annual labor total (Table 6.o)</i>	1	
		<i>Other misinterpretation</i>	5	
4	4	Estimate is based on original documentation but flawed assumption/logic	0	0.00%
5	5	Data cannot be reported precisely as specified in EDR form and must be estimated; estimate is based on appropriate documentation and sound assumptions/logic and is considered validated	6	3.95%
		<i>Estimated fuel quantity/cost (Table 5.1)</i>	5	
		<i>Estimated annual labor costs (Table 6.o)</i>	1	
6	1	Original value was reported correctly based on original documentation, but corrected based on updated documentation	1	0.65%
7	7	Reported value is "best guess"; value is not derived from records	1	0.65%
8	1	Original value is unsubstantiated; correction based on new documentation	23	15.13%
9	9	No data reported	0	0.00%
10	10	Item "Not Applicable" to vessel	0	0.00%

Non-Error Audit Codes

Of the twelve possible audit codes, four do not represent actual errors. These codes are:

- 1-1
- 1T-1
- 5-5
- 10-10

The four non-error audit codes comprise 72.4% of all catcher vessel audit codes used, with 1-1, 1T-1 and 5-5 claiming 59.87%, 8.55%, and 3.95% respectively.

Audit code 1T-1 was used most frequently in EDR *Section 5.1 – Cost for BSAI Crab Fishing Only* when vessels did not purchase any line and other gear, bait, or pay crab harvest cooperative fees throughout the year.

Audit code 5-5 was used most commonly in reference to fuel purchases reported in *Section 5.1 – Cost for BSAI Crab Fishing Only*. These vessels typically track either fuel cost or fuel gallons, and arrive at the other measure using an average fuel cost per gallon.

Audit code 10-10 was not used.

Error Audit Codes

AKT analyzed the following results for the remaining audit codes, which are used to categorize errors:

- 2-1
- 2T-1
- 3-1
- 4-4
- 6-1
- 7-7
- 8-1
- 9-9

Audit code 3-1 was documented 9.21% of the time. The most common sources of misunderstanding the question related to:

- *Section 4.1 – Crab Harvesting Labor Costs*. Vessels reported earnings before crew-related expenses, rather than net of food and other shared expenses as instructed in the EDR.
- *Section 6.0 – Labor Costs*. Vessels were unclear on what figure should be reported here, resulting in the reporting of only BSAI labor or all labor other than BSAI labor. Additionally, vessels were unsure of whether to deduct food and other crew-related expenses from the amount reported (see note on *Section 4.1 – Crab Harvesting Labor Costs* above).

Audit code 8-1 was the error code used most frequently at 15.13%. This audit code was documented across all variables and indicates that the vessel's original submission was incorrect, but that adequate documentation was provided to support the revised value. In some instances the vessels acknowledged the original error, and in others AKT determined the existence of the error based upon the audit information provided and conversations with the vessels. Anecdotal evidence suggests that vessels do not always thoroughly review their records to report an accurate EDR number initially, and only revise the figures when forced to look more closely at their own data to produce auditable support for AKT.

Four additional audit codes appeared in a fraction of the catcher vessels: calculation errors (**2-1**) at 0.66%, typographical errors (**2T-1**) at 1.32%, values updated for new information (**6-1**) at 0.66%, and "best guesses" not derived from records (**7-7**) at 0.66%.

Audit codes 4-4 and 9-9 were not used.

PROCESSOR AUDIT CODE ANALYSIS



The records of ten processors were requested, and ten packets were received. In the current year, two processors selected for random audit did not require follow-up information requests. All other processors complied with AKT’s requests for additional support.

AKT analyzed the audit codes it assigned to each of the processors in order to document consistent errors for each variable, along with the reasoning behind the error.

The total number of audit codes possible was determined by the number of EDR variables requested from selected processors. Nine shoreside/floating processors submitted information for 3 items and one catcher processor submitted information for 8 items, totaling 35 audit codes. The distribution of those audit codes is summarized below.

Code - Original Value	Code - Audit Value	Nature of Reporting Error	Number of Occurrences	Percentage
1	1	No error; reported value is clearly substantiated by complete records	28	80.00%
1T	1	Original value is blank, or N/A	2	5.71%
2	1	Calculation error	0	0.00%
2T	1	Typographical Error	0	0.00%
3	1	Misinterpretation of question	1	2.86%
4	4	Estimate is based on original documentation but flawed assumption/logic	0	0.00%
		Data cannot be reported precisely as specified in EDR form and must be estimated; estimate is based on appropriate documentation and sound assumptions/logic and is considered validated		
5	5		3	8.57%
6	1	Original value was reported correctly based on original documentation, but	0	0.00%
7	7	Reported value is "best guess"; value is not derived from records	1	2.86%
8	1	Original value is unsubstantiated; correction based on new documentation	0	0.00%
9	9	No data reported	0	0.00%
10	10	Item "Not Applicable" to vessel	0	0.00%

Audit code 1-1 was used most extensively, accounting for 80.00% of variables tested. This high rate attests to the quality of data submitted by the processors and is an indication of the larger operations and more sophisticated record-keeping practices of processors as compared to catcher vessels.

Audit code 5-5 appeared 8.57% of the time, most often in relation to the *Total Processing Labor Payment* variable in *Section 3.1 – Crab Processing Labor Costs*. Because the same staff perform processing activities for many types of products, these processors use allocation bases, such as days processing or percent of pounds processed, to estimate labor costs for each fishery.

Audit codes 1T-1, 3-1, and 7-7 also appeared, accounting for 5.71%, 2.86%, and 2.86% respectively.

In total, non-error audit codes (1-1, 1T-1, 5-5, and 10-10) comprised 94.3% of processor audit codes used.

OUTLIER AUDIT CODE ANALYSIS



Nine vessels and six processors were selected for outlier audits through the NMFS analysis process described in the Methodology section of the report. AKT received support for the unique variables identified by NMFS for each of the 15 vessels/processors selected. In the current year, nine vessels and/or processors selected for outlier audit did not require additional requests. All other outliers complied with AKT’s requests for additional support.

AKT analyzed the audit codes it assigned to each of the outliers in order to document consistent errors for each variable, along with the reasoning behind the error.

The total number of audit codes possible was determined by the number of EDR variables requested from the outliers, totaling 23. The distribution of those audit codes is summarized below.

Code - Original Value	Code - Audit Value	Nature of Reporting Error	Number of Occurrences	Percentage
1	1	No error; reported value is clearly substantiated by complete records	12	52.17%
1T	1	Original value is blank, or N/A	0	0.00%
2	1	Calculation error	1	4.35%
2T	1	Typographical Error	5	21.74%
3	1	Misinterpretation of question	1	4.35%
4	4	Estimate is based on original documentation but flawed assumption/logic	0	0.00%
5	5	Data cannot be reported precisely as specified in EDR form and must be estimated; estimate is based on appropriate documentation and sound assumptions/logic and is considered validated	1	4.35%
6	1	corrected based on updated documentation	0	0.00%
7	7	Reported value is "best guess"; value is not derived from records	0	0.00%
8	1	Original value is unsubstantiated; correction based on new documentation	3	13.04%
9	9	No data reported	0	0.00%
10	10	Item "Not Applicable" to vessel	0	0.00%

Audit code 1-1 was used slightly more than half of the time, at 52.17%, with overall non-error codes (1-1, 1T-1, 5-5, and 10-10) totaling 56.5%. This well-supported rate is significantly less than that of vessels and processors, at 73.0% and 94.3% respectively. Given that outlier selections are based upon submissions identified as being anomalous, the decreased rate of support is reasonable.

Audit code 2T-1, accounted for 21.74% of codes used, and was used most frequently in EDR *Section 5.1 – Cost for BSAI Crab Fishing Only*. Most of these errors arose from three vessels owned by the same company, all of which mistakenly recorded *Crab Landing Taxes and Fees* in the field for *Crab Harvest Cooperative Fees*.

Audit code 8-1 was used 13.04% of the time, and spans a variety of variables. The audit code indicates that the vessel’s original submission was incorrect, but that adequate documentation was provided to support the revised value. In many instances this audit code is indicative of carelessness by the submitters when preparing the initial EDR.

Audit codes 2-1, 3-1, and 5-5 appeared in a fraction of outliers, at 4.35% each.

In addition to assessing the distribution and use of the various audit codes, AKT analyzed the EDR variables which were most frequently not supported by direct documentary evidence. This lack of support includes both errors and the necessary use of estimates.

Catcher Vessels

AKT identified three variables which received unsupported audit codes in greater than 30% of instances. Vessels were unable to substantiate these variables resulting in either errors or the use of estimates. A summary of those variables is provided below.

EDR Section (Year)	EDR Item Description/Year	# of Vessels		% of Vessels unable to substantiate
		5 - 5	Error	
4.1 Crab Harvesting Labor Costs (2011)	Total Labor Payment to Harvest Crew (exclude the captain)	0	6	32%
5.1 Costs for BSAI Crab Fishing Only (2011)	Fuel, Lubrication, and Fluids Used in BSAI Crab Fishery	5	4	47%
6.0 Annual Totals for All Fisheries (2011)	Total Labor Costs	1	10	58%

Nearly one-third of vessels received an unsupported audit code for *Total Labor Payment to Harvest Crew* (Section 4.1). This rate of unsubstantiation owes primarily to a misunderstanding of the question; namely, that vessels are not reporting crew labor payments net of food and other shared crew expenses. Placing additional emphasis on this point in the EDR instructions may be valuable in the reduction of future errors for this variable.

The variable for *Fuel, Lubrication, and Fluids Used in BSAI Crab Fishery* (Section 5.1) elicited unsupported audit codes for 47% of vessels. Five of these unsupported codes relate to reasonable estimates. The estimates used took a couple of different forms; two vessels had to estimate the number of gallons used in the fishery, usually by dividing the total fuel cost as recorded in their accounting system by the market price per gallon. This practice suggests that vessels are failing to retain applicable fuel invoices, and are thus forced to rely exclusively on their accounting records, which do not always include detail regarding gallons purchased. Two other vessels estimated the cost of fuel used in the fishery by multiplying the amount of fuel used, as measured by the crew, by the market price of fuel. The fifth vessel relying on estimates for this variable estimated the amount of fuel used in non-crab activities and subtracted that amount from the annual fuel cost to arrive at the reported amount. Overall, vessels had difficulty determining exactly how much fuel was consumed in each fishery, leading to the extensive use of estimates and numerous errors.

Finally, the *Total Labor Costs* (Section 6.0) variable was unsupported in 58% of instances. In many cases, these errors were the result of vessels misunderstanding what labor costs should be reported under this variable. Some vessels reported only BSAI crab fishing labor costs, while others reported all labor costs other than those for BSAI fishing. Whether or not to include shared crew expenses like food, which are excluded in Section 4.1, was also identified as a source of confusion. Further clarification of the data needed for this variable might prove beneficial. Additionally, anecdotal evidence derived from conversations with vessels indicates that the annual totals required in this section are difficult to compile, thus contributing to the high error rate.

Catcher/Shoreside/Floating Processors

As noted in the Processor Audit Code Analysis section, the quality of submissions was very high, with 80.0% of variables receiving a 1-1 audit code. Accordingly, analysis of frequent errors is not material to the processors.

As a result of its analysis and contact with the vessels and processors selected for audit, AKT asked all vessels and processors to provide information regarding the time commitment (burden hours) to prepare original EDR submissions for PSMFC and to prepare submissions for AKT.

Catcher Vessels

A summary of the burden hours estimated by the responsive vessels is included below. Note that 17 vessels provided estimates as to the amount of time taken to prepare the initial EDR, while 13 provided estimates for the time spent preparing supporting materials for validation.

Original EDR Submission to PSMFC			EDR Validation to AKT		
Burden Hour Estimate Range	Number of Vessels	Percentage	Burden Hour Estimate Range	Number of Vessels	Percentage
< 11 hours	5	29.4%	< 6 hours	8	61.5%
11 - 20 hours	4	23.5%	6 - 10 hours	3	23.1%
21 - 30 hours	1	5.9%	11 - 15 hours	1	7.7%
31 - 40 hours	2	11.8%	16 - 20 hours	0	0.0%
> 40 hours	5	29.4%	> 20 hours	1	7.7%

Estimates regarding the time required for catcher vessels to complete the original EDR submission ranged from two hours to one month, with 53.3% placing the burden at or below 20 hours and 46.7% at greater than 20 hours.

Estimates regarding the amount of time needed to compile documentation for AKT after being selected for audit ranged from one hour to a week and a half, with 84.6% of vessels spending less than ten hours on the process and 15.4% spending more.

Additional comments provided by vessels expressed general dissatisfaction with the workload and level of detail required by the EDR. Specifically, vessels expressed that the annual totals required by *Table 6 – Annual Totals for All Fisheries* are the most time-consuming and difficult figures to compile. Furthermore, they believe the questions in this table are unduly invasive in that they are not directly related to crab activity.

Catcher/Shoreside/Floating Processors

A summary of the burden hours estimated by the responsive processors is included below. Note that nine processors provided estimates as to the amount of time taken to prepare the initial EDR, while eight provided estimates for the time spent preparing supporting materials for validation.

Original EDR Submission to PSMFC			EDR Validation to AKT		
Burden Hour Estimate Range	Number of Processors	Percentage	Burden Hour Estimate Range	Number of Processors	Percentage
< 11 hours	4	44.4%	< 6 hours	6	75.0%
11 - 20 hours	1	11.1%	6 - 10 hours	2	25.0%
21 - 30 hours	1	11.1%	11 - 15 hours	0	0.0%
31 - 40 hours	3	33.3%	16 - 20 hours	0	0.0%
> 40 hours	0	0.0%	> 20 hours	0	0.0%

Estimates regarding the time required for processors to complete the original EDR submission ranged from six hours to 40 hours, with the distribution of processors taking less than and more than 20 hours resembling that of vessels, at 55.6% and 44.4% respectively.

Estimates regarding the amount of time needed to compile documentation for AKT after being selected for audit ranged from a half-hour to eight hours, with 75.0% of processors spending five hours or less.

The processors also included comments emphasizing that in addition to the time directly spent preparing the EDR, 50 to 60 hours are required throughout the year to maintain systems and files solely for EDR reporting purposes.

See Appendix B for detailed results of burden hour inquiries.

COMMENDATION



AKT worked collaboratively with members of the PSMFC and NMFS staff and would like to thank them for their commitment and time.

<i>Name</i>	<i>Organization</i>
Dave Colpo	Pacific States Marine Fisheries Commission
Geana Tyler	Pacific States Marine Fisheries Commission
Brian Garber-Yonts	National Marine Fisheries Service
Audit participants	Individual vessels and/or processors

The 2011 EDR yielded a high response rate from all catcher vessels and catcher, floating, and shoreside processors. The vessels that contained errors on their submissions were corrected easily by contact with the vessel or by the addition of new information to substantiate the data reported.

AKT appreciates the opportunity to work with PSMFC and NMFS staff. This collaborative relationship is critical to AKT's success in completing this yearly audit.

Statistical Sample

In order to determine an appropriate sample size as the basis of selection for the random audits, the main criteria to consider are the level of precision desired, the level of confidence or risk, and the degree of variability in the attributes being measured. These elements are defined as follows:

- **Level of Precision** – Also referred to as the margin of error, this is the range in which the true point value of the population is estimated to be. This is expressed as a percentage \pm the true value (e.g., $\pm 5\%$). Thus, if it is found from the sample that on average 15% of the fisherman did not submit data then it could be concluded, that for the total population, between 10% and 20% of the fisherman have not submitted data.
- **Confidence Level** – The degree to which we are certain that a result, or estimate, obtained from the study includes the true population percentage, when the precision is taken into account. In a normal distribution 95% of the sample values are within two standard deviations of the true population value. If 100 vessels were sampled 95 would have the true population values within the range specified.
- **Degree of Variability** – This measures the variability within the population (e.g. Catcher Vessels, Catcher/Processor Vessels, Shore/Floating Processors, Large Vessels, Small Vessels). The more heterogeneous a population, the larger the sample size required to obtain a given level of precision. The more homogenous a population the smaller the sample size required. A variability of 50% signifies the greatest variability.

Due to the variability within the industry and the variability of the data being analyzed, there is not one specific variable that can be used to create a statistical model that would enable AKT to calculate a standard deviation and regression analysis for the project. This fact places the project in a similar category as a questionnaire, political poll, surveys, and extension program impacts.

While there are no statistical analyses that can be applied directly, there are similar projects that derive statistical sampling methods relating to extension program impact. In these projects the samples are used to evaluate a change made to the extension programs.

The sampling formulas derived for such projects and to ensure a statistical basis for the samples chosen are the following:

$$n_0 = \frac{Z^2(p)(q)}{(e)^2} \qquad n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

n_0 = Sample size

n = Sample size with finite population correction for proportions

Z = The number of standard deviations a point x is from the mean; is a scaled value

p = Population variability

$q = 1 - p$

e = The desired level of precision

N = Total population

For this project p (variability) equals .5 to account for maximum variability in the population.

This type of sampling methodology takes into account errors and missing information in the data. The precision level quantifies the tolerable level of error based on the sample size. This error level is then projected to the total population.

The samples were stratified based on the proportion of the group versus the total population. The reasoning behind this is that by sampling each individual population there would be no statistical basis for both the Catcher/Processor and Stationary/Floater Processors. The only way to have a statistical basis for this population would be to census the population. Because this is not a reasonable approach, AKT suggested that the population include all groups and then additional random audits be performed for the Catcher/Processor and Stationary/Floater Processor populations.

The sample population was ultimately chosen based upon a 95% confidence level with 15% precision and variability of 50% (due to the variability of the information requested). This method ensures the data are correct (outlier audits) and provides a process to measure the quality of data (random audits). This sampling method provides a statistical basis for future studies and gives the agencies a basis to measure the accuracy of the population data.

Time Burden Estimates

Time burden estimates for each respondent are summarized below:

Type	Original EDR	
	Submission to PSMFC	EDR Validation to AKT
Catcher Vessel	2 - 4 hours	3 hours
Catcher Vessel	6 - 10 hours	4 - 5 hours
Catcher Vessel	7 - 8 hours	Not reported
Catcher Vessel	8 hours	1 - 2 hours
Catcher Vessel	8 - 10 hours	2 - 3 hours
Catcher Vessel	10 - 15 hours	2 hours
Catcher Vessel	13 hours	Not reported
Catcher Vessel	16 hours	1 - 2 hours
Catcher Vessel	20 hours	8 hours
Catcher Vessel	25 hours	Not reported
Catcher Vessel	30 hours	2 - 3 hours
Catcher Vessel	40 hours	Not reported
Catcher Vessel	48 hours	6 hours
Catcher Vessel	50 hours	15 hours
Catcher Vessel	55 - 60 hours	4.5 hours
Catcher Vessel	80 hours	6-7 hours
Catcher Vessel	1 month	1 - 1.5 weeks
Floating Processor	8 - 10 hours	2 - 3 hours
Floating Processor	8 - 10 hours	2 - 3 hours
Shoreside Processor	6 - 8 hours	1/2 - 1 hour
Shoreside Processor	8 hours	8 hours
Shoreside Processor	20 - 25 hours	1/2 hour
Shoreside Processor	20 hours	3 - 4 hours
Shoreside Processor	> 30 hours	1/2 hour
Shoreside Processor	40 hours	8 hours
Shoreside Processor	40 hours	Not reported