Amendment 91
AFA Chinook Salmon EDR Validation

Report Prepared for Pacific States Marine Fisheries Commission

2013 Calendar Year Data

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AKT
CPAs AND BUSINESS CONSULTANTS

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Background

The Amendment 91 Chinook Salmon Economic Data Report (A91 EDR) program was implemented by NMFS in 2013 as part of a suite of management measures designed by the North Pacific Fishery Management Council (Council) to minimize bycatch of Chinook salmon in the Bering Sea pollock fishery while mitigating the potential costs of bycatch restrictions on the catcher/processor, mothership, inshore cooperative sectors and the six Community Development Quota (CDQ) Program groups participating in the Bering Sea pollock fishery. Amendment 91 limits the amount of Chinook salmon that may be caught by the pollock fishery and allows NMFS to allocate transferrable Chinook salmon prohibited species catch (PSC) to entities representing the distinct sectors and CDQ groups. In addition, Amendment 91 includes sector-based Incentive Plan Agreements (IPA's), which specify terms for allocation and transfer of annual pollock harvest and Chinook bycatch quotas within the sectors, as well as a variety of industry-designed incentives such as penalties for vessels that exceed a sector-established Chinook salmon PSC limit, and banking of a percentage of quota holder's unused annual Chinook bycatch quota for use in future years. These industry-enforced contractual incentives are intended to promote minimizing Chinook salmon bycatch to the extent practicable in all years, and to prevent bycatch from reaching the established limit in most years.

In developing Amendment 91, the Council determined that additional economic data were needed to supplement existing data collections, including catch accounting, observer program and vessel monitoring system data, to support evaluation of longer-term effects of bycatch limits and industry incentives for reducing Chinook salmon prohibited species catch in the pollock fishery. To obtain the needed data, the Council developed the annual A91 EDR program, which includes three annual data report forms: (1) The Chinook Salmon PSC Compensated Transfer Report (CTR); (2) the Vessel Fuel Survey; and (3) the Vessel Master Survey.

The A91 EDR data collection represents an annual census of all entities that own and/or operate American Fisheries Act (AFA) vessels, and all non-vessel entities that participate in the AFA fishery, i.e., AFA sectors, AFA inshore cooperatives, CDQ groups, and IPAs; vessel entities are required to submit all three of the EDR forms, whereas non-vessel entities are required to submit only the CTR form. In contrast to the broader range of economic data collected in EDR programs currently in place for the BSAI crab fishery and Amendment 80 groundfish catcher/processor fleet, the A91 EDR is a more narrowly targeted data collection; the CTR and Vessel Fuel survey forms are limited to a small number of quantitative variables intended to support estimation of the incremental cost of Chinook bycatch avoidance as incurred by active vessels under different fishing conditions. Qualitative information collected from vessel captains in the Vessel Master Survey is intended to provide narrative descriptions of the operational context of the fishery to support interpretation of results drawn from quantitative variables; third party validation will focus on assessing the accuracy of quantitative data reported by EDR submitters in the Vessel Fuel Survey and CTR forms.

Data collected in the CTR form represents the transferred quantity of Chinook salmon bycatch quota units and monetary value of individual lease-transfers of Chinook salmon between the subject EDR submitter and other AFA participants, reported at the transaction level, with the date of transfer and five additional categorical/qualitative variables describing characteristics of each transfer (see attached CTR form).

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 longer-term effects of bycatch limits and industry incentives;
3) Understand the incremental cost of Chinook bycatch avoidance; and
4) Assess the validity of data reported in submitted EDRs.

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 Amendment 91 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 analysis performed by NMFS.

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

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

- Validate date reported by vessel operators in the Annual Vessel Fuel Survey (VFS) form, and data reported by Amendment 91 participants (pollock and chinook PSC quota holders) in the Compensated Transfer Report (CTR) form.
- 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 Amendment 91 program for the year 2013. A statistical sample was determined for VFS and CTR records based upon the submitted populations of 100 and 122, respectively. These populations were comprised of all unique submitters of the respective EDR forms. The samples were determined based upon achieving 95% confidence levels with precision levels 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 2013	Sample Size 2013
Fuel	100	16
Transfer	122	20

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 similar audits. 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 for which significant reporting anomalies were identified through analytical review. Ten vessels were identified as having outlier variables for the 2013 EDR data year.

4) ***Gather and crosscheck EDR data to be audited.*** EDR data pertaining to the entities selected for auditing are transferred to AKT from PSMFC. AKT uses a standard auditing analysis spreadsheet and imports data from PSMFC into this format.

5) ***Request information subject to audit for random and outlier audits.*** Selected entities 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 entities do not comply within one month, they are individually contacted and additional contact efforts are made as needed to ensure that each selected entity has an opportunity to respond in a timely manner.

6) ***Validate information by comparing with supporting documentation.*** AKT reviews the supporting documentation submitted by the entities and compares the supported values to those submitted on the original EDR. Detailed notes regarding the basis and quality of information are maintained in order to evaluate the validity of selected data. The entities are contacted as needed for further clarifications and additional supporting documents.

7) ***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 for effective and meaningful overall analysis.

8) ***Compile a burden hour estimate.*** Selected entities 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 entities 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 entity. Information is evaluated against third party support, such as invoices; internally-generated information, such as general ledger details, 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 vessels owned by larger companies tend to have more sophisticated operations and support. 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 reasonable explanations and/or calculations are also provided. Handwritten statements are also considered adequate, but only after discussion with the EDR preparer and requests for additional support.

If discrepancies are found between the original EDR submission and the supporting documentation provided, AKT contacts the vessel owner and/or preparer to validate the corrected value. Many times this discussion leads to the receipt of additional documentation and/or further explanation as to the methodology used to report EDR values.

If the initially provided documentation is determined to be incomplete or insufficient, then AKT contacts the vessel to request further documentation. Once this additional 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

The records of 20 Compensated Transfer Report (CTR) form submitters were requested and 14 were received. AKT was able to use the 2013 Inshore IPA spreadsheet, provided by NMFS to validate the variables for those vessels that did not provide documentation. In the current year, 17 vessels selected for random audit did not require follow-up information requests.

AKT analyzed the audit codes assigned to each of the CTR records 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 CTR records. 20 CTR form submitters submitted information for 2 items, totaling 40 audit codes. The distribution of those audit codes is summarized below. Where significant, a breakdown of the variables receiving the reporting errors is 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**	**0**	**0.00%**
1T	1	**Original value is blank, or N/A** *Table 1 - Amount Transferred* *Table 1 - Payment Amount*	**40** *20* *20*	**100.00%**
2T	1	**Typographical Error**	**0**	**0.00%**
3	1	**Misinterpretation of question**	**0**	**0.00%**
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**	**0**	**0.00%**
6	1	**Original value was reported correctly based on original documentation, but 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**	**0**	**0.00%**
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

Audit code 1T-1 was used in EDR *Table 1 – Chinook PSC Allocation Transfer Information: Amount of Chinook Salmon Transferred* when the submitter did not have any compensated transfers of chinook salmon. Of the four non-error audit codes, code 1T-1 was used 100% of the time.

Audit code 1-1, 5-5, and 10-10 were not used.

The records of 16 Vessel Fuel Survey (VFS) submitters were requested, and 16 packets were received. In the current year, one fuel vessel submitter selected for random audit did not require follow-up information requests. The majority of the fuel vessels selected were able to comply with AKT's requests for additional support. Any additional information that was not received by the agreed upon deadline was notated.

AKT analyzed the audit codes assigned to each of the fuel 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 fuel vessels. 16 fuel vessels submitted information for four items, totaling 64 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** *Table 2 - Fuel Loaded* *Table 2 - Fuel Cost*	**16** *10* *6*	**25.00%**
1T	1	**Original value is blank, or N/A**	**0**	**0.00%**
2	1	**Calculation error**	**5**	**7.81%**
2T	1	**Typographical Error**	**7**	**10.94%**
3	1	**Misinterpretation of question**	**4**	**6.25%**
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** *Table 2 - Average Fuel Consumption - Fishing* *Table 2 - Average Fuel Consumption - Transitioning*	**12** *6* *6*	**18.75%**
6	1	**Original value was reported correctly based on original documentation, but corrected based on updated documentation**	**0**	**0.00%**
7	7	**Reported value is "best guess"; value is not derived from records** *Table 2 - Average Fuel Consumption - Fishing* *Table 2 - Average Fuel Consumption - Transitioning*	**16** *8* *8*	**25.00%**
8	1	**Original value is unsubstantiated; correction based on new documentation**	**4**	**6.25%**
9	9	**No data reported**	**0**	**0.00%**
10	10	**Item "Not Applicable" to vessel**	**0**	**0.00%**

Non-Error Audit Codes

Audit code 1-1 was prevalent, appearing in 25% of variables, most often for *Table 2 – Vessel Fuel Consumption and Costs, Fuel Purchased During Calendar Year.*

Audit code 5-5 appeared 18.75% of the time. This audit code indicates that the audit data was an estimate that we determined to be reasonable. This code was used in relation to *Table 2 – Vessel Fuel Consumption and Costs, Average Rate of Fuel: Fishing and Transitioning.*

In total, non-error audit codes (1-1, 1T-1, 5-5, and 10-10) comprised 43.8% of fuel vessel audit codes 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 7-7 was the error code used most frequently at 25%. This audit code indicates that the value is a "best guess" and is not derived from records. This was used in relation to *Table 2 – Vessel Fuel Consumption and Costs, Average Rate of Fuel Consumption: Fishing and Transitioning*. Many of the vessels were unable to provide more than a best guess based on years of experience due to the limitations of their vessels. Through multiple conversations with the vessels, it was noted that many of the vessels are not equipped with the machinery to track this information.

Audit code 2T-1 was documented 10.94% of the time. This audit code was documented across all variables and indicates that the vessel's original submission included a typographical error. This was determined through additional conversations with the vessels and examination of the audit documentation provided.

Three additional audit codes appeared in a fraction of the fuel vessels: calculation error (**2-1**) at 7.81%, Misinterpretation of the question (**3-1**) at 6.25%, and original value unsubstantiated (**8-1**) at 6.25%.

Audit codes 6-1 and 9-9 were not used.

Ten VFS records were selected for outlier audits through the NMFS analysis process described in the Methodology section of this report. AKT received support for the unique variables identified by NMFS for each of the ten vessels. In the current year, one vessel 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 36. 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	3	15.79%
1T	1	Original value is blank, or N/A	0	0.00%
2	1	Calculation error	4	21.05%
2T	1	Typographical Error	6	31.58%
3	1	Misinterpretation of question	4	21.05%
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	0	0.00%
6	1	Original value was reported correctly based on original documentation, but corrected based on updated documentation	0	0.00%
7	7	Reported value is "best guess"; value is not derived from records	2	10.53%
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 15.79%. This was the only non-error audit code used for the outliers.

Audit code 2-1 was used 21.05% of the time. This audit code was for *Table 2 – Vessel Fuel Consumption and Costs, Fuel Purchased During Calendar Year* and indicates a calculation error. Through discussions with the vessels it was noted that these errors were caused by missed amounts and oversights.

Audit code 2T-1 was used 31.58% of the time, and spans a variety of variables. The audit code indicates that the vessel's original submission had a typographical error that was corrected by the documentation provided. In many instances this audit code is indicative of carelessness by the submitters when preparing the initial EDR.

Audit code 3-1 was used 21.05% of the time. This audit code was documented across all variables and indicates a misunderstanding of the question. One vessel provided the cost and gallons of fuel consumed rather than purchased, while another used the average fuel consumed per day rather than per hour.

Audit codes 7-7 appeared in a fraction of outliers, at 10.53%.

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.

Random Audit – Vessel Fuel Survey Records

AKT identified four 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 Error	% of Vessels unable to substantiate
2.0 Vessel Fuel Consumption and Costs	Average Fuel Consumption (Fishing)	10	63%
	Average Fuel Consumption (Transitioning)	10	63%
	Fuel Purchased (gallons)	6	38%
	Fuel Purchased (dollars)	10	63%

Over 60 percent of fuel vessels received an unsupported audit code for the transitioning and fishing section of *Table 2 – Vessel Fuel Consumption and Costs, Average Rate of Fuel Consumption*. Through discussions with the submitters and examination of the audit documentation provided, it was noted that many of the submitters do not have the machinery to produce this type of evidence for average fuel consumption. Often they rely on the experience of the captain and crew to determine the values for these variables.

The variables for fuel purchased in gallons and dollars in *Table 2 – Vessel Fuel Consumption and Costs* elicited unsupported audit codes for 38% and 63% of submitters, respectively. Through discussion with the submitters, several factors were noted that caused the high rate of errors. Some of the submitters reported the cost of fuel purchased net of taxes in the original EDR, but included this amount in the audit documentation provided. In other instances, non-fuel items were included in the total fuel purchased. One of the submitters reported the total fuel burned rather than what was purchased for the calendar year. Overall, it appeared that the errors were caused by the submitters overlooking the instructions on the original EDR when they submitted their values.

Random Audit – CTR Records

As noted in the CTR Analysis section, all of the submissions resulted in a non-error audit code. All of the submitters that were selected reported zero values that were substantiated through the audit.

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

CTR Form

A summary of the burden hours estimated by the responsive vessels is included below. Note that 8 vessels provided estimates as to the amount of time taken to prepare the initial EDR and the supporting materials for validation.

Original EDR Submission to PSMFC			EDR Validation to AKT		
Burden Hour Estimate Range	Number of Transfer Vessels	Percentage	Burden Hour Estimate Range	Number of Transfer Vessels	Percentage
< 5 hours	6	75.0%	< 3 hours	7	87.5%
6 - 10 hours	0	0.0%	4 - 6 hours	1	12.5%
11 - 15 hours	2	25.0%	7 - 9 hours	0	0.0%
16 - 20 hours	0	0.0%	10 - 12 hours	0	0.0%
> 20 hours	0	0.0%	> 13 hours	0	0.0%

Estimates regarding the time required for transfer vessels to complete the original EDR submission ranged from 15 minutes to 12 hours, with 75% placing the burden at or below 10 hours and 25% at greater than 10 hours.

Estimates regarding the amount of time needed to compile documentation for AKT after being selected for audit ranged from less than 1 hour to 4 hours. Of all those that provided their burden estimates, 87.5% placed the burden at less than 3 hours.

VFS Form

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

Original EDR Submission to PSMFC			EDR Validation to AKT		
Burden Hour Estimate Range	Number of Fuel Vessels	Percentage	Burden Hour Estimate Range	Number of Fuel Vessels	Percentage
< 5 hours	3	33.3%	< 3 hours	8	88.9%
6 - 10 hours	4	44.4%	4 - 6 hours	1	11.1%
11 - 15 hours	2	22.2%	7 - 9 hours	0	0.0%
16 - 20 hours	0	0.0%	10 - 12 hours	0	0.0%
> 20 hours	0	0.0%	> 13 hours	0	0.0%

Estimates regarding the time required for the random fuel vessels to complete the original EDR submission ranged from 2 hours to 12 hours, with the distribution of vessels taking less than and more than 10 hours at 77.7% and 22.2% respectively.

Estimates regarding the amount of time needed to compile documentation for AKT after being selected for audit ranged from 2 hours to 4 hours.

Outlier Audit – VFS Records

A summary of the burden hours estimated by the responsive outliers is included below. Note that four vessels provided estimates as to the amount of time taken to prepare the initial EDR, while five 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 Fuel Vessels	Percentage	Burden Hour Estimate Range	Number of Fuel Vessels	Percentage
< 5 hours	2	50.0%	< 3 hours	3	60.0%
6 - 10 hours	1	25.0%	4 - 6 hours	2	40.0%
11 - 15 hours	1	25.0%	7 - 9 hours	0	0.0%
16 - 20 hours	0	0.0%	10 - 12 hours	0	0.0%
> 20 hours	0	0.0%	> 13 hours	0	0.0%

Estimates regarding the time required for the vessels to complete the original EDR submission ranged from 5 hours to 12 hours, with 75% placing the burden at or below 10 hours and 25% at greater than 10 hours.

Estimates regarding the amount of time needed to compile documentation for AKT after being selected for audit ranged from less than 2 hours to 4 hours. Of all those that provided their burden estimates, 60% placed the burden at less than 3 hours.

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.

Name	Organization
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

CONCLUSION

The 2013 EDR yielded a high response rate from all CTR and VSF form submitters. The records that contained errors on their submissions were corrected easily by contact with the submitter 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 ± the true value (e.g., ± 5%). Thus, if it is found from the sample that on average 15% of the fisherman did not submit data then is 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. 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 following sampling formulas were used to ensure a statistical basis for the samples chosen:

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

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 sample size for each population of the vessel types was determined based on the number of EDR records submitted for transfer vessels and fuel vessels, individually. Once the appropriate number of vessels to include in the sample was determined, selections were made randomly. Due to each list of EDR records being considered separately, there was a possibility that some vessels may be selected for both the fuel and transfer audit if they submitted an EDR to PSMFC for each.

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
Transfer Vessel	<1 hour	<1 hour
Transfer Vessel	2 hours	<1 hour
Transfer Vessel	2 hours	2 hours
Transfer Vessel	2 hours	1 hour
Transfer Vessel	4.5 hours	<1 hour
Transfer Vessel	5 hours	4 hours
Transfer Vessel	12 hours	2 hours
Transfer Vessel	12 hours	2 hours
Fuel Vessel	2 hours	2 hours
Fuel Vessel	2 hours	2 hours
Fuel Vessel	4 hours	4 hours
Fuel Vessel	5.5 hours	2 hours
Fuel Vessel	5.5 hours	2 hours
Fuel Vessel	7.5 hours	2.75 hours
Fuel Vessel	7.5 hours	2.75 hours
Fuel Vessel	12 hours	2 hours
Fuel Vessel	12 hours	2 hours
Fuel Vessel	None given	2 hours
Fuel Vessel	5 hours	4 hours
Fuel Vessel	5 hours	4 hours
Fuel Vessel	7.5 hours	2.75 hours
Fuel Vessel	12 hours	2 hours