

Independent External Peer Review Report

on
Literature Review of
Fish Consumption Rate Research
Conducted in the State of Alaska

DRAFT

July 24, 2015

By

Department of Environmental Conservation
Division of Water



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1. Executive Summary

The federal Clean Water Act provides for state development of water quality standards. The role of the standards and associated numeric criteria is to protect aquatic and human health from excessive risk due to contamination from various natural and anthropogenic sources. States have a responsibility to ensure that standards apply contemporary science and policy to the regulatory process. Human health criteria (HHC) are numeric values designed to be protective of individuals who drink untreated surface waters and/or consume aquatic life over the course of a lifetime (~70 years). The amount or “rate” of fish a person may consume on average (a.k.a. fish consumption rates (FCRs)) are part of the formula for deriving HHC.

Alaska’s current HHC are based on EPA recommended human health criteria documents published in 1980, and were last revised in 2003 and approved by EPA in 2004. HHC for carcinogenic substances were promulgated by the U.S. Environmental Protection Agency (EPA) in 1992 as part of the National Toxics Rule. An FCR value of 6.5 g/day was used to derive Alaska’s current HHC.

EPA’s *Methodology for the Deriving Ambient Water quality Criteria for the Protection of Human Health* was published in 2000 and the national default value for FCR was increased to 22 g/day in 2015. The methodology indicates that local or regional fish consumption rate information should be used in preference to national FCRs, since national values may not reflect actual fish consumption in Alaska today.

In an effort to help direct Alaska’s efforts to revise its HHC, the Alaska Department of Environmental Conservation (DEC) commissioned a literature review titled *Fish Consumption Rate Research in the State of Alaska* (hereinafter known as “Report”), by The Cadmus Group Inc. The report identifies dietary survey information, subsistence harvest data, and similar types of research conducted by public and private agents that could be used by DEC to inform the decision making process. The report does not represent final scientific or policy decisions on this issue but rather acts as a tool to identify legitimate sources of dietary data, potential data gaps, areas for further study, and potential options for DEC to consider as it works to revise the HHC to reflect contemporary fish consumption rates.

An independent expert review panel (Panel) was conveyed by DEC in 2015 to provide a professional peer review on the report.

The Panel was charged with the following:

1. Provide comment on the comprehensiveness of the literature viewed;
2. Provide comment on the conclusions drawn from the contractor’s analysis; and
3. Provide general comments on the report.

The panel provided a total of 35 individual comments to DEC and recommended several additional sources of information for DEC to consider. A summary of the additional sources of information was completed by DEC and included in the report as an Appendix.

2. Introduction

DEC determined that evaluating HHC in water quality standards to be a high priority issue for the 2015-2017 Triennial Review cycle. The FCR is used in deriving HHC for the purpose of determining exposure risk to toxic contaminants from the consumption of aquatic life. EPA published FCR values in the *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health* (2000) and established a hierarchy for states to consider when evaluating data sources:

1. Local data sources
2. Use of data reflecting similar geography/population groups (Regional)
3. National survey data
4. EPA default intake rates

Data on FCR for the general and subsistence-dependent populations in Alaska appears to be limited and existing studies identified by DEC staff appear to be inconsistent regarding the methods used, types of data derived, and applicability for the establishment of a regional or statewide FCR. In an effort to help direct Alaska's efforts to revise HHC in state water quality standards, the DEC commissioned *Fish Consumption Rate Research in the State of Alaska*, a literature review by The Cadmus Group Inc. to inform DEC and interested stakeholders.

Clean water and the benefits it provides is an important topic for Alaskans. Salmon and other fish are iconic symbols of Alaska's culture. Both the commercial and sport fishing industries are major economic drivers for the state; protecting subsistence fishing has been identified as a local, regional and national issue for water quality; and environmental justice for marginalized communities are serious concerns to decision makers. Alaska expects its efforts will solicit a great deal of attention from the public based on the experiences of Washington and Idaho to complete their respective HHC updates.

3. Purpose of Panel

The purpose of the peer review process is to convene a group of experts to evaluate the scientific basis and appropriateness of the document(s) and related conclusions. Peer review is a critical review of a work product by qualified individuals who are independent of those who performed the work, but are collectively equivalent in technical expertise (i.e., peers) to those who performed the work. The peer review involves an in-depth assessment of the assumptions, calculations, alternate interpretations, methodology, and conclusions of the material under review.

4. Methods

This section describes the method followed in selecting the members for the Panel and in planning and conducting the IEPR. DEC considered U.S. EPA Peer Review guidance and *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003) when designing and facilitating the peer review process.

4.1 Planning and Schedule

DEC invited Panel participants on January 9, 2015. **Table 1** describes the various tasks, actions, and associated dates of interest.

Table 1. Panel schedule

Task	Date
Technical review period	1/21 –4/1
Email check in with Panel	Week of 2/23
Summary teleconference with Panel	Week of 2/30
Final Panel comments provided to DEC	4/19
DEC internal review	4/19 to 5/19
Public Notification of Literature Review	To Be Determined

4.2. Identification and Selection of Panel Participants

The Panel participants are recognized technical experts who have been selected for their relevant technical knowledge and independence. Collectively, the panel has expertise in toxicology, risk assessment, survey methodology and analysis, and qualitative metrics.

The panel included:

Lon Kissinger, Ph.D. U.S. Environmental Protection Agency

Dr. Kissinger is a Risk Analyst with the U.S. Environmental Protection Agency-Region 10. He is a lead staff member for the review of water quality standards proposals that address HHC. He is currently involved in both national and regional efforts to update HHC values and methodologies.

Elizabeth Nobmann, Ph.D. EDN Nutrition Consulting

Dr. Nobmann is a professional nutritionist and the owner of EDN Nutrition Consulting. She is the lead or contributing author on numerous works associated with Alaska Native diet and nutrition.

Angela Matz, Ph.D. U.S. Fish and Wildlife Service

Dr. Matz is a toxicologist with the U.S. Fish and Wildlife Service-Alaska Station and member of Alaska Fish Consumption Rate Technical Committee.

Philip Loring, Ph.D. University of Saskatchewan

Dr. Loring is a faculty member at the University of Saskatchewan, affiliate faculty at the University of Alaska-Fairbanks and author of numerous academic publications associated with Alaskan Native diets.

Candidates for the Panel were identified by the DEC based on participation with the DEC Fish Consumption Technical Review Committee, contributions to the scientific literature in the Alaska, or referral by knowledgeable parties.

Panel members participated on a voluntary basis and were not financially compensated in any way. Participants were identified by DEC based on familiarity with the subject matter, experience with the collection and interpretation of dietary survey information, and access to additional sources of information that may not have been previously identified in the draft document. Personal conversations with participants and peer-recommendations led to DEC's final decisions regarding the Panel composition. All participants were asked to complete a Conflict of Interest statement to ensure transparency and neutrality in the review process.

5. Panel Findings

A comment summary was generated as a way of tabulating the panel's comments. Three of the four reviewers chose to submit formal comments as part of this process. The panel was able to identify several key issues of concern for both the document as well as the general state process of establishing FCRs. The panel was also able to provide several new sources of information for DEC's consideration during the HHC development process.

5.1 Summary of comments.

The Panel produced 35 individual comments in response to the report. DEC reviewed the comments to identify overall recurring themes, areas of potential conflict, and other overall impressions. Comments are summarized by DEC and presented in section 5.3.

5.2 Panel Teleconference

A Panel teleconference was held on March 12, 2015 to discuss the document. The Panel noted that there were several points of concern but overall the document was comprehensive in nature and accurately depicted the majority of applicable literature. A common theme amongst the Panel were questions regarding how this document would inform the decision making process and whether there was sufficient information currently available to make scientifically-informed decisions. Several substantive points/comments raised by the Panel during the teleconference include:

- Need to add an additional section that provides general information about human health in water quality criteria and the context of this document in the human health criteria revision process
- Need to add a list of definitions
- Need to consider the role of sea mammals and corresponding literature
- Need to address the challenge of differentiating between the surveys that were specific to coastal communities versus those that address interior fish consumption rates
- Need to consider federal sources of dietary information
- Need to include additional information regarding bioaccumulation versus bioconcentration versus biomagnification of toxic substances in aquatic life

DEC is considering how to incorporate these comments into the final document.

5.3 Summary of Final Panel Comments

The following table presents an overview of comments provided by the Panel. Comments that are summarized rather than provided in full are noted as such. The determination regarding the significance of the comment was completed by DEC based on the following:

- Availability of information to address the comment
- Ease of incorporating the information into the document
- Importance of information to the FCR/HHC process

DEC is using the following terms to provide additional context on how individual comments on the Report will be considered and addressed. DEC reserves the right to adjust their significance findings as new information becomes available.

Table 2: Summary of Final Panel Comments

No.	Commenter	Issue	Comment	Significance
1	Nobmann	Comprehensiveness of Lit Review	The information was good. Other references should be considered (see Appendix A)	N/A
2		Comprehensiveness of Lit Review	Did the authors of the Draft Report consider the federal Household Food Consumption Survey to ascertain if data were available by state? It is possible that the WIC Program (Special Supplemental Food Program for Women, Infants and Children administered through ADHSS) could have some dietary intake information on women and children.	The authors did not explore this source. No response intended at this time
3		Conclusion	I concur that the findings can inform preliminary efforts to develop FCRs for Alaska. Further, the findings support the conclusion that FCR in Alaska exceeds the current EPA default rate of 22 g/day. However, the problem of incorporating data on portion size with frequency of consumption needs to be addressed.	Issues with portion size is a Key Issue to be raised as part of HHC process
4		Modeling/Use of ADF&G data	Further investigation of the National Cancer Institute two-part model should be considered further. The approach of conducting dietary surveys does not address the logistical and fiscal challenges that dietary surveys in Alaska present. Therefore, the recommendation of considering some model based on harvest data, to which Alaska devotes considerable effort and resources, seems worthy of further exploration. Likewise, assessing what methods are used in other states and Indian tribes seems appropriate and resource-efficient. However, other states/tribes may differ in their general access to fish and cultural reliance and mix of subsistence and store-bought fish.	Key Issue to be raised as part of HHC process

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No.	Commenter	Issue	Comment	Significance	
5	Nobmann	Scope of application	The authors of the Draft Report recognize different consumption patterns in the state. I feel that it is very important to recognize the regional variations. Establishing one FCR for the entire state may be problematic. The existing data would support this.	Key Issue to be raised as part of HHC process	
6		General Comments	Inc. marine fish (i.e., salmon and halibut)	Key Issue to be raised as part of HHC process	
7		General Comments	Important to consider consumption of marine mammals-esp. Northern and Coastal regions	Key Issue to be raised as part of HHC process	
8		General Comments	Inc. of seaweeds	No response intended at this time	
9				It may be unrealistic to develop one standardized dietary questionnaire and survey methodology for the state, unless the questionnaire is limited to only fish for example. I believe that the burden to the survey participant begins to degrade the quality of the data in a truly comprehensive food questionnaire.	Key Issue to be raised as part of HHC process
10				ADEC might also consider determining intake and/or harvest data using moving averages if sufficient data are available. Three year or up to 10 year averages might be considered	No response intended at this time
11		General Comments	Another option for determining fish consumption is to aggregate data collected in the various studies in some manner to define intake, as a meta-analysis.	Key Issue to be raised as part of HHC process	
12				Dietary projects start with identifying foods that people eat. These results are translated into nutrient intakes most often in the Alaska surveys and the results are published in that format. There are data sets with information about food intakes that were generated by the various projects (GOCADAN, EARTH, WATCH, CANHR, ASP, ANDSFAP, ATDP, etc.). Whether the raw data from these studies is available may be worth pursuing.	No response intended at this time-Quick Fix: See Appendix A

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13	Nobmann	Typos	<p>While not tasked with proof reading, I feel it might be helpful to have feedback. There were some typographical errors, etc. such as Nanwalke (sic) in Table 1 which should be Nanwalek although the original document misspelled it in the title.</p> <p>P 8 andromous should be anadromous.</p> <p>P 8 last line: I didn't find the reference "Ecology, 2013 listed in the Resources.</p> <p>P 9 Please reference DEQ, 2011.</p> <p>P 12 Paragraph 2 Please give complete title of Methodology for Deriving Ambient <u>Water Quality...</u></p> <p>Table 1 The Final Report... is Authored by The Alaska Native Epidemiology Center <u>of the</u> Alaska Native Health Board.</p> <p>P 15 line 2 lists Institute for Polar Studies. It should read Institute for Circumpolar Health Studies.</p> <p>P 16 The preferred spelling is dietitian rather than dietician.</p> <p>P 17 the maximum intake of some foods is exceptionally high. This may be accounted for by interpretation and/or confusion on the part of interviewees and/or interviewers.</p> <p>P 23 In the article by Nobmann, et al, there is a misinterpretation concerning interviewers. The interviewers were either local individuals who were bilingual, <u>or</u> nutritionists with registered dietitian credentials who were trained...</p> <p>P 34 Para 1 costal should be <u>coastal</u>. Do the authors intend "<u>would</u> be speculative" not "were be speculative"?</p> <p>P 37 References to Department of Health and Human Services is confusing. If these are references to the Alaska Department of Health and Social Services (ADHSS), they should be referenced as such to avoid confusion with the US Department of Health and Human Services.</p>	Edits have been completed
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No.	Commenter	Issue	Comment	Significance
14	Matz	Typos	Need to correct for final version	Edits have been completed
15		Modeling	Part of the introduction should describe regions based on how marine/freshwater fish consumption rates vary, which could serve as a potential framework for discussion of more than one statewide consumption rate.	Key Issue to be raised as part of HHC process
16		Methodology	Report should discuss how EPA methodology accounts for trophic status	Quick Fix- to be addressed before Report is finalized
17		Methodology	Include a review of methodologies used to develop FCR in different states. Include EPA data as well as QA/QC requirements for FCR data. Use discussion to describe how different approaches could be used in AK	Quick Fix- to be addressed before Report is finalized
18		Modeling	Look to federal agencies that have subsistence divisions that collect harvest data as well as ADF&G sources	Key Issue to be raised as part of HHC process
19	Kissinger	Statistics	Statistic for development of national tribal FCR was consistent with average tribal consumption rates	No response intended at this time
20		Comprehensiveness	Should consider citing other fish consumption rates established in WA	The purpose of this report is to address Alaska-specific rather than Northwest sources of data. No response intended at this time
21		Implementation	Should discuss how aspects of implementation do or do not protect women of a child bearing age (p.9)	Quick Fix- to be addressed before Report is finalized
22		Comprehensiveness	Would have been helpful to consult EPA staff at the regional and national levels as the use of FCRs in a regulatory context presents unique issues	No response intended at this time
23		Dietary Surveys- Issues of concern	FFQ often result in under reporting of intake. This was documented in the OPEN study. The advantage of 24 hour recall surveys is that recall is better. However, modeling is needed to convert short term dietary recall data into usual and accustomed fish consumption rates.	No response intended at this time

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No.	Commenter	Issue	Comment	Significance
24	Kissinger	Comprehensiveness	Need to cite community harvest surveys	DEC recognizes that community harvest data is extremely relevant to this process. However, the number of community surveys and their format does not readily convert to individual consumption rates. This is a KEY ISSUE that DEC plans to address in the course of this process. .
25		Survey Specific: Alaska Traditional Diet Survey	Summary: Numerous questions regarding how the survey was developed, implemented, and QA/QC of data were raised by panel member. Key Points: <u>Representativeness</u> may be questioned due to sex ratio, when FFQ's were administered, how "seafood" was interpreted-parts/cooked v. uncooked/portion size and weights, and interviewer performance/peer review. <u>Statistics</u> were lacking-panel member notes that average and upper percentile FCRs were not available nor was distribution of FCRs.	DEC acknowledges the reviewers concerns and will take them under consideration when considering this source of data. No additional response is expected at this time.
26		U.S. Agency for Toxic Substances (2009)	Summary: Numerous questions regarding representativeness including: accurate account of population of concern, analysis of sample size, how FFQ was developed, how it was administered, consideration of seasonal differences, portion size and weights, and QA/QC details	DEC acknowledges the reviewers concerns and will take them under consideration when considering this source of data. No additional response is expected at this time.
27		DHSS (2013)	Summary: Numerous questions regarding representativeness including: accurate account of population of concern, timing of the survey, surveyor training, use of FFQ to accompany interviews (including specific species, parts, and preparation methods), and QA/QC methodology	DEC acknowledges the reviewers concerns and will take them under consideration when considering this source of data. No additional response is expected at this time.
28		Johnson (2009)	Summary: Numerous questions regarding representativeness including: accurate account of population of concern, use of a FFQ to accompany interviews (including specific species, parts, and preparation methods). Lack of definition of multi-pass method for recording all food stuffs consumed. Statistics: Need to identify upper percentile long-term consumption rates	DEC acknowledges the reviewers concerns and will take them under consideration when considering this source of data. No additional response is expected at this time.

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No.	Commenter	Issue	Comment	Significance
29	Kissinger	Nobmann (1992)	Summary: Numerous questions regarding representativeness including: bias from sampling of members with and without addresses, use of a FFQ to accompany interviews (including specific species, parts and weights, and preparation methods). Lack of species specific information excludes use in development of FCR.	DEC acknowledges the reviewers concerns and will take them under consideration when considering this source of data. No additional response is expected at this time.
30		Loring (2013)	Summary: Numerous questions regarding representativeness including: bias from mailed survey/literacy issues, use of a FFQ to accompany interviews (including specific species, parts and weights, and preparation methods). Statistics: Data is not amenable for use in development of FCR	DEC acknowledges the reviewers concerns and will take them under consideration when considering this source of data. No additional response is expected at this time.
31		Seldovia (2013)	Summary: Numerous questions regarding representativeness including: models for other forms of seafood besides fillets, lack of species specific info during high/low seafood consumption periods. QA/QC: How were interviewers evaluated? Statistics: Need to present upper percentile FCR stats.	Key Issue: Most recent and comprehensive survey on FCR to date. DEC intends to engage with the authors of this Report in the course of this rule making.
32		U.S. Dept. of Energy (2013)	Summary: Numerous questions regarding representativeness including: selection of participants, sample size, weighting, use of a FFQ to accompany interviews (including specific species, parts and weights, and preparation methods). Statistics: questions raised about reported average rates per species; did not report according to village, did not include upper percentile and avg. rate information. Did not include information on weighting if used	DEC acknowledges the reviewers concerns and will take them under consideration when considering this source of data. No additional response is expected at this time.
33		ADF&G Harvest Data	Need more review of Technical Paper No. 261 (Wolfe and Utermohle)	Key Issue and source(s) of data to be explored in the course of this project.

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No.	Commenter	Issue	Comment	Significance
34	Kissinger	Comprehensiveness	Additional information on limitations of the studies for use in developing methodology for calculation of FCR: <ol style="list-style-type: none"> 1. Inadequate coverage of all of the different high fish consuming groups in Alaska. 2. Uncertain that samples are representative of populations. 3. Unclear that consumption of all fish species and preparations was addressed. 4. Inadequate documentation of how portion size was characterized and associated with raw and cooked fish tissue mass. 5. Seasonal aspects of consumption not addressed. 6. Inadequate documentation of data analysis approaches 7. FCR statistics of interest (e.g. average and upper percentiles)not presented 8. FCR categories available to support policy discussions (e.g. near coastal/estuarine/fresh vs. marine and migratory vs. resident) not available. 	Quick Fix: DEC plans to add an additional section that discusses the limits of dietary studies.
35		Methodology	Should be a review of high fish consuming populations in AK and which one (?) should receive surveys	Key Issue for DEC to address over the course of this project.

Appendix A. Additional Sources of Dietary Information

Based on the recommendations provided by IERP, DEC reviewed the following documents for relevance to the HHC project as a whole and relevance to the Literature Review. The information in this section is recorded in the same format that was used in the Report. The text is that of DEC and has not been reviewed by the IERP. However, because the following documents were suggested by the Panel, DEC considers them valid sources of information and should be considered accordingly.

Table 1. Additional Sources of Dietary Survey Information

Title	Author	Year	Data Collection Method	Study Location	Average Fish Intake	Other Findings
Establishing Alaska Subsistence Exposure Scenarios (ASPS #97-0165)	IDM Consulting	1997	Statistical comparison of several state and federal databases	Statewide	N/A	Potential to serve as a foundation for regional patterns.
Nutrient Intakes Are Associated with Adherence to a Traditional Diet Among Yup'ik Eskimos Living in Remote Alaska Native Communities: The CANHR Study	Andrea Bersamin, S. Zidenberg-Cherr, J. Stern, and B. Luick	2007	Food Frequency Survey and Interview	Yukon-Kuskokwim Delta	N/A	Demographic information from CANHR study may be useful for establishing regional differences
Compendium of Alaskan Traditional and Subsistence Dietary Files	The Lifeline Group	2007	Exposure and Risk Assessment Software	Statewide	N/A	N/A
Traditional Foods and Physical Activity Patterns and Associations with Cultural Factors in a Diverse Alaska Native Population	Diana G. Redwood <i>et al.</i>	2008	Computer-assisted self-administered questionnaire	Southwest, Southcentral, and Southeast	N/A	N/A

Summary of Supplemental Studies

DEC conducted a review of the five additional articles that were recommended by the Panel. The review applied the same general metrics as the draft report but placed additional emphasis on such issues as representativeness, source differentiation (fresh/estuarine/marine), seasonality, and quality assurance procedures.

Title: Establishing Alaska Subsistence Exposure Scenarios (ASPS #97-0165).

IDM Consulting. 1997. Submitted to the Alaska Department of Environmental Conservation.

General Information

This study was commissioned by DEC and tasked with reviewing three issues:

1. Evaluate existing subsistence information in an effort to define subsistence regions and consumption pattern distributions for use in human health risk assessment;
2. Conduct sensitivity analysis on subsistence risk calculations to determine which variables contribute most to the overall risk assessment; and
3. Prepare point estimates and probability density functions for all input parameters for variables identified in Task #2 for those resource areas identified in Task #1.

Study Population

Question #1 considered three subsistence region classifications available on the Community Profile Database: ADFG subsistence region boundaries (n=6); Federal subsistence region boundaries (n=10); and Ecological-Cultural region boundaries (n=5). The Community Profile Database contains harvest information on all significant harvest resources. Major harvest categories include salmon and non-salmon fish, large land mammals, small land mammals, feral animals, marine mammals, migratory birds, non-migratory birds, bird eggs, marine invertebrates, and vegetation (i.e., plants and berries).

Data Collection Methods

To further evaluate subsistence dietary patterns in Alaska, IDM compared the Alaska Department of Fish and Game Community Profile Database (CPDB) harvest survey results and Indian Health Service consumption survey results where data existed in both databases. Because the CPDB harvest data are available for many more communities than the consumption data, it was preferable to use the harvest data in developing probability distributions to represent dietary subsistence intake. However, it has not been generally established that harvest data provide a good representation of subsistence consumption patterns in Alaska. IDM evaluated both the harvest data and limited consumption data in order to better understand the relationship of these two data sources. Our analysis of 7 Alaska communities for which both harvest and consumption data were available indicates that harvest and consumption are well correlated, although harvest data significantly overestimates consumption for some resources.

Description of Data

The data provides a statistical basis for geographical differentiation when considering risk, an estimate of how harvest data differs by both type of food (e.g., salmon, non-salmon, marine mammal, vegetation)

Per IDM: The ecological cultural zones divide the state into five regions (Figure 2) defined by the ADFG Division of Subsistence. The ecological-cultural zones reflect the predominant

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Alaska Native culture associated with major ecological regions: Aleutian Pacific (Aleut-Alutiiq), Arctic-Subarctic Coast (Inupiat-Yupik), Southeast Alaska Coast (Tlingit-Haida), Subarctic Interior (Athabaskan) and Urban-Urban Periphery (recent major population centers). This system was selected for further analyses for several reasons. First, it may reflect coastal, interior and urban harvest patterns better than other systems. Second, ecological regions may be more justifiable from a scientific perspective than are administrative jurisdictions. Third, it was suggested by Charles J. Utermohle, Ph.D. who is an ADFG Research Analyst knowledgeable about the CPDB, and suggests that ecological cultural zones might best differentiate regions in terms of subsistence harvest.

Ecological-Cultural Regions	Region Codes
Arctic-Subarctic Coast/Yupik-Inupiaq	1
Aleutian Pacific/Aleut-Alutiiq	2
Subarctic Interior/Athabaskan	3
Southeast Alaska Coast/Tlingit-Haida	4
Urban-Urban Periphery	5

The report was able to access consumption rate values for seven communities through the Indian Health Service consumption survey results. The analysis indicated that harvest and consumption were well coordinated although harvest may over-estimate for certain resources.

Quality Assurance/Quality Control (QA/QC) Procedures

QA/QC practices were not mentioned in detail as the majority of data was assessed via statistical software.

Findings on Fish Consumption

The report was able to provide harvest and limited consumption information according to salmon, non-salmon, and marine mammals according to all three geographical schemas. Dietary information for those communities included in the consumption survey do not represent all areas of the state, nor can they be reasonably assumed to represent regional dietary trends because of their limited number. To describe intake of indigenous foods for this investigation, 24 hour dietary recall data from eleven communities within five Alaska Native Health Corporations were obtained from a separate study (Nobmann et al., 1992) and analyzed using Microsoft Access 97. Seven of the eleven communities are located in ecological-cultural zone 1, one in zone 3, two in zone 4, and one in zone 5. Of the eleven communities where consumption data were available, only seven had comparable harvest data available on the CPDB.

Title: Nutrient Intakes Are Associated With Adherence to a Traditional Diet among Yup'ik Eskimos Living in Remote Alaska Native Communities: The CANHR Study

Andrea Bersamin, S. Zidenberg-Chert, J. Stern, and B. Luick

General Information

This study was conducted in 2007 under the auspices of the Center for Alaska Native Health and Research. The objective of the study was to:

- 1) Determine the leading sources of traditional foods;
- 2) Determine the degree of dependence on traditional subsistence foods by population subgroups; and
- 3) Examine the contribution of traditional foods to nutrient intake.

Study Population

The study population for the current study included 241 men and 307 women living in seven remote communities in the Yukon-Kuskokwim Delta; ages ranged from 14 - 94 years. Participants were recruited via word of mouth, flyers, and radio advertisements. Individuals under 14 years of age or pregnant were not invited to participate.

Data Collection Methods

Dietary data were collected from each participant by certified interviewers using a computer assisted 24 -hour recall (Nutrition Data System for Research (NDS-R) software version 4 .06) (10). Participants were asked to recall all food and beverages consumed over a 24 -hour period using a multiple pass approach¹ to minimize recall bias. Although the majority of participants were bilingual, a native Yup'ik speaker also trained in the use of NDS-R software assisted non-English speakers. Western and common Alaskan Native foods were included in the database, substituted with similar items, or added to the database by request. It appears that certain foods were aggregated (i.e. different salmonids as “fish”) and that mixed foods were disaggregated so only traditional ingredients were used for study purposes.

Description of Data

A total of 566 participants completed the 24-hour recall. Forty-one percent of the sample resided in coastal communities, 47.8% in inland communities, and the remaining 10.6% lived in Bethel, Alaska. There is no evidence that the study population can be considered to be a representative sample of the Yukon-Kuskokwim Delta total population, age distribution, gender, income, or similar demographical information that may introduce biases.

¹ Multiple pass approach is a 5-step dietary interview that includes multiple passes through the 24 hour of the previous day, during which respondents receive cues to help with remember and describe foods consumed. This approach may be conducted in person or be computer-based.

Traditional foods (fish and fish roe, animal fat, game meat, and game fowl comprised 22% of participants' total diet. The study considers the 22% value to be generally consistent amongst different Alaska Native populations based on the findings of four referenced documents

Quality Assurance/Quality Control (QA/QC) Procedures

QA/QC procedures were not noted in this study beyond a practice of excluding answers that were greater than three standard deviations above the mean (n=18). An individual was considered unreliable if they were unable to recall details about one or more meals or did not appear to understand the protocol for other reasons. Analyses were conducted on 548 individuals.

Findings on Fish Consumption

Certain demographical information found in this study may be useful when considering statewide differences. Residents of coastal or riverine communities were determined to be more dependent on traditional foods (including fish) than those living in Bethel. This same relationship may be evident in other parts of Alaska.

Applicability of the Data for use in Determining FCRs

There is little specific information in this study that can be used to develop a FCR on any level. However, information in this study may be useful for determining whether weighted averages will be necessary when surveying populations in urban v. rural settings, considering what percentage of overall diet could be attributed to fish, and whether gender should be considered when surveying individuals on fish consumption habits.

Title: The Tribal Lifeline Project: The Compendium of Alaska Traditional and Subsistence Dietary Files

The Lifeline Group. Chaisson, A.M., and C.F. Chaisson

General Information

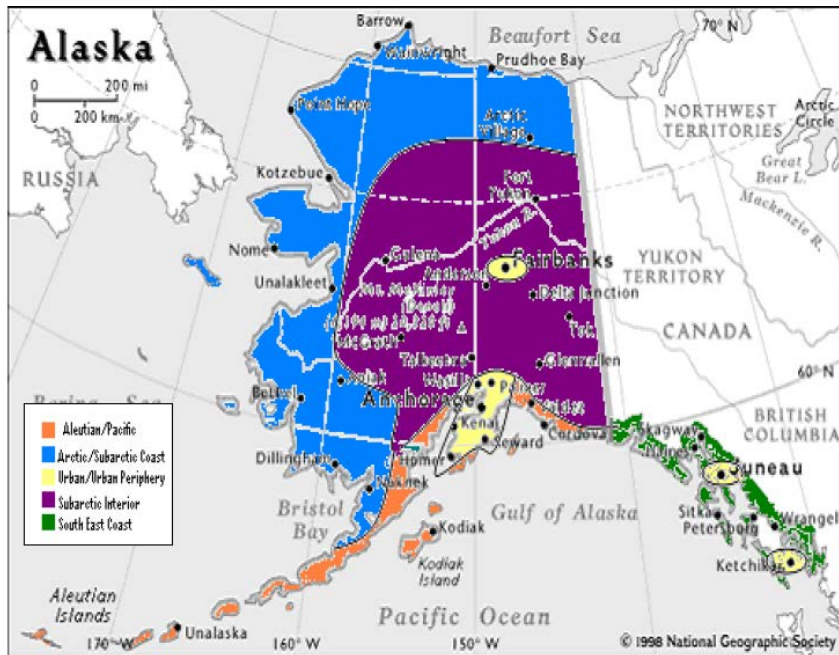
This 2007 project is considered to be a new approach for updating dietary surveys, incorporating data for unique populations, and conducting dietary exposure estimation and dietary risk assessment for blended diets using new LifeLine™ software tools. The purpose of this software is to allow the user to develop a more accurate understanding of how diet and degree of risk to certain population groups can be established.

Study Population

The population of concern consists of Alaska Natives and represents five major ecological and cultural zones seen in Alaska. Note that the regional framework is the same as previously identified by IDM Consulting for ADEC (1997).

Data Collection Methods

Various public sources of data were used in this compendium. They include the Community Subsistence Information System (CSIS) and data from the Alaska Traditional Diet Project. These are supplemented with data from the Subsistence Technical Paper Series published by ADF&G.



Eco-cultural Regional Schema proposed by The Lifeline Group

Description of Data

The compendium identifies a universal food list, caloric reference for each food, portion size and probability/frequency of consumption estimates. The assumptions and limitations for each of the categories is addressed in detail in the document and appendices. What is notable is that the “users” of resources addressed in this database are not necessarily only Alaska Natives but rather are residents of Alaska that harvest under subsistence regulations. This means that much of the results can be attributed to the “general” rural population rather than only a subset of the total Alaskan population. However, differences in use may in fact occur between Alaska Native and non-native users as well as urban and rural Alaska Native users. Seasonal and age differences within this group may also occur.

Quality Assurance/Quality Control (QA/QC) Procedures

QA/QC procedures are not listed in the general project description documents.

Findings on Fish Consumption

The database provides information on seasonal consumption by percentage (E.g., Summer/Fall (40%); Winter/Spring (10%)). Consumption data is provided by the different regional health consortium/corporation.

A review of the database did not provide any distinct information that would inform this process

Applicability of the Data for use in Determining FCRs

Due to the format and nature of the database, it was determined that the reports used to derive the database values may have significant utility beyond identification of sources of data.

Title: Traditional foods and physical activity patterns and associations with cultural factors in a diverse Alaska Native population

Diana G Redwood, Elizabeth D Ferucci, Mary C Schumacher, Jennifer S Johnson, Anne P Lanier, Laurie J Helzer, Lillian Tom-Orme, Maureen A Murtaugh, Martha L Slattery

General Information

The object was to determine traditional food intake and activity in relation to certain socio-demographic characteristics amongst 3,830 Alaska Native and American Indian people enrolled in the Education and Research towards Health (EARTH) Study in three regions in Alaska.

Study Population

This report examines data collected from 3,830 participants enrolled in the Alaska EARTH Study from March 2004 through August 2006. Alaska participants came from 26 communities in 3 regions (Southcentral, Southwest, and Southeast) in both urban and rural settings. Recruitment took place through community engagement, public service announcements, and personal invitations. Participants must be 18 years of age, not currently pregnant, and not currently subject to chemotherapy.

It does not appear that this study should be considered representative of the Alaska Native population at large as participation was not evenly distributed on a regional basis nor representative of the total population within specific region.

Data Collection Methods

Participants completed the diet and physical activity questionnaires by using computer-assisted self-interviews on touchscreen panels while listening to an audio version of the questionnaire by headphones in English or Yup'ik. Tribal leaders and local community members as well as experts in the field of Alaskan physical activity and wild foods were consulted in order to ensure that the questions included the major sources of traditional foods.

Description of Data

The diet history questionnaire measured frequency as well as variety of traditional foods (27) consumed and limited information on preparation practices. The study also describes general patterns of behavior such as subsistence gathering practices.

Quality Assurance/Quality Control (QA/QC) Procedures

Limited information was available regarding QA/QC practices.

Findings on Fish Consumption

Independent External Peer Review Report on Literature Review of Fish Consumption Rate
Research Conducted in the State of Alaska
Alaska Department of Environmental Conservation

Fish were the most frequently reported consumed traditional food (80.2%) and fish and shellfish comprised 29.6% of the total foods consumed. Older participants (55+) were more likely to eat fish than other traditional foods (e.g., moose, marine mammals, caribou). A significant limitation is that the data does not include quantification of traditional foods eaten.

Applicability of the Data for use in Determining FCRs

The majority of information available in this report will be useful for making broad comparisons of more accurate consumption data from one community to another. This report also supports the hypothesis that gender may be less important when determining a fish consumption rate for a population. Furthermore, the data suggests that certain regions do in fact consume more fish than other regions.

Data were not collected in communities of the North Slope, Interior, or Aleutian Island Chain. Because of the limited number of communities selected, it may be anticipated that had different communities been invited to participate in providing consumption information, different results would have been obtained. For these reasons we did not attempt to extrapolate community consumption to the appropriate Ecological-Cultural region.

In order to compare consumption rates with harvest rates it was necessary to convert the consumption data to match the harvest data, which was defined in the CPDB as the wet weight of a food as it might enter the kitchen. Yield ratios were not always available, especially for dried foods and sea mammals. Furthermore, this report did not consider the consumption of specific parts, storage or preparation methods, or individual preferences for fish or marine mammals.