



CORPORATE HEADQUARTERS

November 7, 2013

SENT VIA EMAIL TO: paula.wilson@deq.idaho.gov

Ms. Paula Wilson
Idaho Department of Environmental Quality
1410 North Hilton
Boise, ID 83706

Dear Ms. Wilson:

Attached are comments from the J.R. Simplot Company prepared by Arcadis, Inc. regarding DEQ's Idaho Fish Consumption Survey.

We appreciate the opportunity to provide these comments.

Sincerely,

Alan L. Prouty
Vice President, Sustainability & Regulatory Affairs

Attachment

Cc: Don Essig, Idaho Department of Environmental Quality

J.R. Simplot Company

**Comments on the Proposed IDEQ
Fish Consumption Survey:
October 15, 2013 Negotiated
Rulemaking Presentation Materials**

November 7, 2013



Ellen Ebert
Technical Specialist

Paul Anderson, Ph.D.
Vice President/Principal Scientist

Nancy Bonnevie
Principal Scientist

**Comments on the Proposed
IDEQ Fish Consumption
Survey: October 15, 2013
Negotiated Rulemaking
Presentation Materials**

Prepared for:
J.R. Simplot Company

Prepared by:
ARCADIS U.S., Inc.
482 Congress Street
Suite 501
Chelmsford, Massachusetts 01824
Tel 978 937 9999
Fax 207 828 0062

Our Ref.:
ME000168.0000

Date:
November 7, 2013

This document is intended only for the use of the individual or entity for which it was prepared and may contain information that is privileged, confidential and exempt from disclosure under applicable law. Any dissemination, distribution or copying of this document is strictly prohibited.



1. Introduction	1
2. Revised Survey Instrument	1
3. Discussion Paper #1 entitled “Idaho Fish Consumption Rate and Human Health Water Quality Criteria – Discussion paper #1; Fish Consumers and Nonconsumers (prepared by IDEQ and dated October 2013)	8
4. Idaho Fish Consumption Rate and Recommended Sample and Questions (prepared by Boise State University and released October 10, 2013)	9
5. Idaho Department of Environmental Quality Request for Proposals (RFP); RfP #0922, Survey of Idaho Fish Consumption Rates (released October 15, 2013)	18
6. Tribal survey being developed by EPA and Idaho tribes	20
7. Summary	20

Acronyms and Abbreviations

BRFSS	Behavioral Risk Factor Surveillance System
BSU	Boise State University
g	gram
IDEQ	Idaho Department of Environmental Quality
kg	kilogram
MCMC	Markov Chain Monte Carlo
NCI	National Cancer Institute
RfP	Request for Proposal
USEPA	United States Environmental Protection Agency
WQC	water quality criteria

1. Introduction

ARCADIS staff participated by webinar in the October 15, 2013, Negotiated Rulemaking Meeting hosted by the Idaho Department of Environmental Quality (IDEQ) concerning the proposed statewide fish consumption survey to be conducted to identify and characterize the fish consumption habits of Idahoans. Since that time, ARCADIS has reviewed the documents that were presented and discussed during the October 15 Meeting as well as additional, related documents that have been published on IDEQ's website and briefly discussed during that meeting. These include: 1) the revised draft survey instrument; 2) Discussion Paper #1 concerning fish consumers and non-consumers; 3) the background document prepared by Boise State University (BSU) entitled "Idaho Fish Consumption Rate and Recommended Sample and Questions"; and 4) IDEQ's Request for Proposals (RFP #0922) for survey implementation.

We have undertaken a critical review of all of these documents. Based on our review, we offer both general and specific comments on each. Our goal is to maximize the efficacy of Idaho's fish consumption rate survey and help to ensure that the data collected will be adequately robust and scientifically-based for the regulatory process being undertaken by Idaho. In addition, while no detail was provided during the webinar concerning the selected approach and overall progress being made on the tribal survey under development by the United States Environmental Protection Agency (EPA) and tribal representatives, we want to ensure that this additional effort will yield similarly robust data to inform the rule-making process. Thus, we offer comments for their consideration in survey development.

2. Revised Survey Instrument

ARCADIS commends IDEQ and BSU for implementing many changes to the survey instrument that were recommended in comments submitted earlier by ARCADIS. We believe that these changes will greatly improve data collection, reduce ambiguity and the possibility for misunderstandings about the intent of questions, and streamline the approach.

There are, however, some additional changes that we would like to recommend, which we believe will further improve the survey instrument. General comments are presented first followed by specific comments.

General comments.

- General comment 1: The numbering of questions and the skip patterns need to be carefully evaluated in the final survey instrument. The current draft of the instrument has several redundant question numbers and also some incorrect skips. If this structure is not carefully checked, it can have a substantial effect on data collection.

- General Comment 2: It appears, based on the background document prepared by BSU, that nearly identical instruments will be used to capture the fish consumption rates of the general population and recreational anglers. While recreational anglers are discussed in the background document, it is not clear if they will be addressed in a separate survey effort, or as part of the effort for the general population. In addition, neither sample size nor specifically how the sample will be collected for recreational anglers is discussed. This information needs to be presented for review.
- General Comment 3: Throughout the draft instrument, there are extra boxes in many places that are not needed for the interviewer or for individuals who participate via the internet. It is likely that the extra boxes may lead the interviewer or participant to believe that there is additional information that needs to be filled in. We recommend that all unnecessary boxes be removed to avoid confusion and inconsistent data entry.
- General Comment 4. The numbering of questions is unnecessarily confusing. Most question numbers are followed by an “A” but there is no “B”. In some places, scripts are numbered when they don’t need to be. Finally, skips often refer to a number that is not actually there. For example, a “no” response to Question 4 skips to Question 9 but there is no Question 9. Instead, there are two areas designated as 9A and one designated as 9B. To keep things simpler and avoid confusion and mistakes in skip patterns, we recommend that all questions be numbered sequentially without an “A” or “B”, except where it is specifically needed, and that scripts not be numbered.

Specific comments.

- Introductory Section and Interviewer Summary Notes. This first section is rather confusing and may not be adequate. It appears that an attempt will be made to interview the same individual four times (i.e., there are boxes to be checked indicating first survey, second survey, third survey, fourth survey). In addition, it appears that there will be four attempts made during each survey effort (Try 1, Try 2, Try 3, Try 4) and that the date and time of day of each attempt will be recorded. However, there is only one place to record whether the interview was completed, whether there was no answer, or what “Other” is meant to signify. Assuming that a separate form will be used for each of the four survey attempts, we recommend that the reason that each “Try” failed be recorded as well as the interview date and time. We assume that the interviewer will know in advance how many times the individual has been surveyed previously and will check that box before beginning the interview.

This could be set up as follows:

Try 1 Date __/__/__ __am __pm __Complete __No answer __ Refused __Other __
Try 2 Date __/__/__ __am __pm __Complete __No answer __ Refused __Other __
Try 3, etc.

- Question 1A. This question description states “If female answers and a male is needed....”. This implies that the interviewer is going to make a determination as to whether he/she wants to interview a male or female. It is not clear how this need will be determined and, depending upon the goals for the survey, this may or may not be appropriate.

It appears, based on the background document, BSU is recommending that the same survey instrument be used for the general population and the recreational angler surveys. It is not clear whether this is a single survey effort (intended to capture the habits of a sufficient number of recreational anglers within this single effort) or whether these are two separate survey efforts. However, if Idaho is like most states, the number of fishing license-holders is likely to be strongly biased toward males. In many states, as many as 85% to 90% of anglers surveyed are males, with a much smaller fraction (10% to 15%) of female anglers. Thus, if the goal is to capture an adequate and representative sample of recreational anglers, the arbitrary selection of male or female participants, based on the composition of the general population, is not likely to yield a representative sample of the recreational angler population.

IDEQ may want to consider separating these two efforts, if this is not already planned. One effort could be directed to licensed Idaho anglers selected at random from license records. This random selection would be more representative of the gender composition of license holders. The second effort could be a gender-balanced general population survey that will likely capture some license holders but will not be constrained by the need to obtain a representative sample of recreational anglers.

- Question 1B. This question asks whether the participant would be willing to provide information about his or her fish consumption and provides options of “Yes”, “No”, “Other” and “No adult home”. It is not clear what would be indicated under “Other” and what the interviewer does if this is the appropriate response. It is also not clear what the interviewer is to do if the correct answer is “No Adult Home”. Wouldn’t the call already have been terminated as a result of 1A if no adult was home?
- Question 2A. It is not clear what “Other” is intended to indicate as a possible response to question 2A or why the call would be terminated. Either the respondent will indicate that he or she has or has not eaten fish in the last year and then the interviewer skips as indicated. If the respondent provides an ambiguous answer to the question, then the interviewer needs to have a script to help guide them to a “yes” or “no” answer. In addition it will be important to collect demographic information from all participants so the call should not be terminated at this point.

- Description prior to Question 2B. We recommend that “(including fast food)” be added as a parenthetical after “tuna or other fish sandwiches” in the description. We also recommend that fish sauce used in cooking be added to the list.
- Question 2B. There is no need to go through the list of specific types of fish that might have been consumed, as the collection of this information will take time but will not contribute to the fish consumption rate derivation. Instead, in order to save time and streamline the interview and data entry, we recommend that the description prior to Question 2B be read and the interviewer can simply ask whether the survey participant has had any of these things in the past year, with a simple “yes” or “no” response.
- Question 2B. If the respondent indicates that he or she has not eaten any of these items, the survey instrument directs the interviewer to Question 17. We recommend, however, that the skip go to Question 13 in order to determine why the respondent hasn’t eaten fish in the past year and then move forward to collect all demographic information about the individual.
- Question 3. This question asks how often the individual eats fish or seafood on average. We recommend that it be made clear what is included in the fish or seafood category, including fresh, frozen or prepared, freshwater and marine shellfish, such as clams, crustaceans, such as shrimp or crayfish, as well as fin fish. Also, depending on the individual, this “on average” rate may vary by season. Because it is possible that the interviewer will have only one opportunity to interview this person, as they may not be selected for, or may refuse to participate in, a second interview, we recommend that the following questions be added after this question:

Does this frequency of fish meals change at different times of the year? __yes __no
(If yes) What time of year do you eat the most fish? __spring __summer __fall __winter
What is your average frequency during this time? ___ times per ____
What is the time of year that you eat the least fish? __spring __summer __fall __winter
What is your average frequency during this time? ___ times per ____
- Question 3. If the respondent indicates only “yes or no or indefinite” as indicated at the bottom, the interviewer needs to have a script to get a more definitive answer from the respondent.
- Question 4A. If the respondent has not eaten fish or seafood in the last 24-hours, the question indicates that the interviewer should skip to Question 9. There is no Question 9. 9A addresses portion size, which is not an appropriate question for someone that has not consumed fish. The next question is also indicated as 9A and it asks about the remainder of the 7-day recall period. Therefore, individuals responding “No” to Question 4A should be directed to the second 9A. As previously noted, the entire survey instrument needs to be reviewed carefully with respect to numbering and all skips should be scrutinized carefully.

- Questions 5A and 5B. We recommend that the questions be revised slightly to include snacks so that minor consumption events are not overlooked. Question 5A can be revised to say "...did you have fish or seafood for more than one meal or snack?" Question 5B can be revised in a similar way.
- Questions 6A, 7A, 8A and 9A. Rather than having 3 separate questions that collect different information about the same meals, we recommend that these questions be combined into a single question and organized by meal. It is difficult for survey participants to jump back and forth between meals and remember details about them. Thus, we recommend that all information about a single meal or snack be collected before moving on to the next meal or snack. This can easily be done using a matrix like the one below, which captures all aspects of a specific fish meal before moving onto the next. An appropriate script will need to be developed to walk the interviewer and participant through each step of the matrix.

Meal/ Snack	Type of Fish	Source of fish	Portion Size	Parts Eaten	Cooking Method
1	Trout	<input type="checkbox"/> Market <input type="checkbox"/> Restaurant <input checked="" type="checkbox"/> Sport-caught <input type="checkbox"/> In Idaho <input checked="" type="checkbox"/> Outside Idaho <input type="checkbox"/> Gift	<input type="checkbox"/> Card Deck <input checked="" type="checkbox"/> Checkbook <input type="checkbox"/> Pieces <input type="checkbox"/> Ounces <input type="checkbox"/> Cups <input type="checkbox"/> Cans ___ oz	<input checked="" type="checkbox"/> Flesh <input checked="" type="checkbox"/> Skin <input type="checkbox"/> Guts <input type="checkbox"/> Whole	<input checked="" type="checkbox"/> Fried <input type="checkbox"/> Baked <input type="checkbox"/> Broiled/Grilled <input type="checkbox"/> Poached <input type="checkbox"/> Microwaved <input type="checkbox"/> Raw <input type="checkbox"/> Dried, smoked, salted <input type="checkbox"/> Canned/pickled <input type="checkbox"/> Stew or soup
2	Shrimp	<input checked="" type="checkbox"/> Market <input type="checkbox"/> Restaurant <input type="checkbox"/> Sport-caught <input type="checkbox"/> In Idaho <input type="checkbox"/> Outside Idaho <input type="checkbox"/> Gift	<input type="checkbox"/> Card Deck <input type="checkbox"/> Checkbook <input checked="" type="checkbox"/> Pieces <input type="checkbox"/> Ounces <input type="checkbox"/> Cups <input type="checkbox"/> Cans ___ oz	<input checked="" type="checkbox"/> Flesh <input type="checkbox"/> Skin <input type="checkbox"/> Guts <input type="checkbox"/> Whole	<input type="checkbox"/> Fried <input type="checkbox"/> Baked <input checked="" type="checkbox"/> Broiled/Grilled <input type="checkbox"/> Poached <input type="checkbox"/> Microwaved <input type="checkbox"/> Raw <input type="checkbox"/> Dried, smoked, salted <input type="checkbox"/> Canned, pickled <input type="checkbox"/> Stew or soup
3	Fish Chowder	<input type="checkbox"/> Market <input checked="" type="checkbox"/> Restaurant <input type="checkbox"/> Sport-caught <input type="checkbox"/> In Idaho <input type="checkbox"/> Outside Idaho <input type="checkbox"/> Gift	<input type="checkbox"/> Card Deck <input type="checkbox"/> Checkbook <input type="checkbox"/> Pieces <input type="checkbox"/> Ounces <input checked="" type="checkbox"/> Cups <input type="checkbox"/> Cans ___ oz	<input checked="" type="checkbox"/> Flesh <input type="checkbox"/> Skin <input type="checkbox"/> Guts <input type="checkbox"/> Whole	<input type="checkbox"/> Fried <input type="checkbox"/> Baked <input type="checkbox"/> Broiled/Grilled <input type="checkbox"/> Poached <input type="checkbox"/> Microwaved <input type="checkbox"/> Raw <input type="checkbox"/> Dried, smoked, salted <input type="checkbox"/> Canned, pickled <input checked="" type="checkbox"/> Stew or soup

- Question 6A. We recommend that “acquire” be changed to “get” per EPA comments to simplify the language. Also, the third section of existing Question 6A concerning fish that are not caught in Idaho waters is likely to lead to confusion. Individuals may not know whether gift fish come from Idaho or not. At the same time, not all fish purchased in a market or at a restaurant are obtained from waters outside of Idaho. It appears, based on information provided by BSU, that all trout and crayfish consumed will be assumed to be from Idaho waters. Other fish species may or may not be from Idaho waters. It is likely that only the source of sport-caught fish may be reliably identified and that will be captured in the information included in the above recommended matrix.
- Question 7A. This question indicates that the interviewer should refer to the coding table. However, as indicated previously, a coding table and grouping of species is not necessary. To do so results in lost detail about specific species consumed. The species reported by the respondent can be recorded directly as indicated and will preserve information about individual species, which may be useful later. Grouping of species, if necessary, can be done during the analysis phase.

In addition, if the purpose of grouping species is to help identify the types and sizes of portions consumed, this can be addressed differently as discussed in the discussion about Question 9A below.

- Question 8A. We recommend that the specific cooking method used be identified individually, as indicated in the matrix provided above, rather than grouped. For some chemical constituents, cooking may alter the chemical concentration in the fish. Thus, it is important to preserve this information so that it may be used to develop a cooking loss factor for selected chemical constituents, if desired by IDEQ, when developing WQC. Similarly, information about the parts fish eaten has been removed. We recommend that this information be collected. Different chemicals accumulate in different portions of the fish, with some evenly distributed throughout the fish and others concentrated in the fatty tissues and viscera. Thus, when developing chemical-specific WQC, it may be important for IDEQ to understand what parts of the fish are being consumed enabling the Department to make appropriate decisions about allowable concentrations. This information can be collected as indicated in the matrix above.
- Question 8A. We also recommend that stew and soup be added as a potential category for preparation.
- Question 9A (first question labeled as such). In selecting portion sizes, the use of multiple descriptors may be challenging for survey participants. For example, there may be many people who no longer have checkbooks, making that comparison challenging. In addition, it may be difficult for people to determine how many cups of shellfish they have eaten when they are accustomed to visually identifying the number of pieces (i.e., 12 clams) without having any idea how many cups that represents without the shells. If the survey is going to be mailed to potential

participants, we recommend that visual representations of different portion sizes be provided to assist respondents in identifying their portion sizes. The script for this, if these are the metrics that will be used in identifying portion sizes, will need to be carefully developed and pre-tested to determine if these comparisons will work.

- Question 9B. Again we recommend that the question be reworded to include snacks as well as meals and that the word “acquire” be substituted with the word “get”, per EPA comments.
- Questions 9B, 10A, 11A and 11B can be combined in the same way as recommended for Questions 6A, 7A, 8A and 9A, above and all of the same modifications recommended for those individual questions can be adopted here as well.
- Question 12. Question 12 is not a question, it is a script. Recommend removing the question number.
- Question 12A. This question implies that the respondent may eat more fish than others, which may or may not be the case. We recommend that the script be modified as follows: “There are many reasons that people eat fish. What would you say are the primary reasons that you eat fish?” We then recommend that the question be asked as an open-ended question so as not to bias the response. Then the interviewer can check off the responses given or, if something different is given as a reason, can indicate that in “other”. We recommend that response “i” be removed as a possible response as it will not be necessary if the question is reworded.
- Question 13A. Similar to Question 12A, this implies that someone might be limiting their fish or seafood consumption. We recommend that the script be modified as follows: “There are many reasons that people limit their fish and seafood consumption. If this is true for you, what are the primary reasons that you limit your consumption?” Again, this can be asked as an open-ended question and the nearest response(s) checked.

If, however, the lists will be read, rather than using an open-ended question, we recommend that responses “h” and “i” be moved after response “f” to avoid biasing responses. Also concerns about sustainability are very different from concerns about pollution. Because current response option “h” addresses concerns about pollution, we recommend that response “g” be modified to say: “I have concerns about the sustainability of fish resources”. These will allow these very different concerns to be differentiated.

- Question 15. Question 15 is a script, not a question. Thus, we recommend that the question number be deleted. Also, this script should be placed after the following script as it does not appear that demographic information will be collected from individuals who have already provided it in previous interviews.

- Script following Question 15. It is assumed that this is meant to say “IF REPEAT SURVEY...”. Modify as appropriate.
- Question 15A. It is better to ask for a specific age, rather than binning the ages. Binning can be completed later.
- Question 16A. The skip leads to Question 23 but should lead to Question 18A.
- Question 17A. This question should only be asked of individuals who indicate that they have some Native American or Alaska Native heritage (positive response in Question 16A).
- Question 18A. Again, income should be asked specifically, not binned. Binning can be completed later. Also, individual income is not relevant. For example, a woman who is involved in raising her children at home may have no individual income, so that her income would be recorded as zero, but her household income may be very high. The important metric for comparisons among income groups and comparisons with other survey results is household income.
- Question 20A. As noted in prior comments, recording weight ranges is not helpful. It is not likely that individuals will respond honestly to questions about weight. In addition, because the metric to be used in developing WQC is g/day, not g/kg-day, this information is unlikely to be used. Thus, we recommend that this question be removed. However, if information about weight is ultimately determined to be needed, for example to compare with other surveys that have recorded consumption rates as g/kg-day, it would be far better to ask for a specific weight than to ask for ranges, as the use of ranges will require that unverifiable assumptions be made about the specific weight of the individual, thereby introducing bias into estimates.
- Question 23A. This question indicates that only those individuals who responded affirmatively to Question 4 and or Question 9 may be recontacted. However, discussions during the October 15 indicated that this would no longer be the case and that all participants who consume fish (not just those who consumed in a single one-week period) would have an equal likelihood of being included in the group that receives repeat interviews. Thus, this should refer back to Question 2B instead.

3. Discussion Paper #1 entitled “Idaho Fish Consumption Rate and Human Health Water Quality Criteria – Discussion paper #1; Fish Consumers and Nonconsumers (prepared by IDEQ and dated October 2013)”

This paper is well-written and discusses an important consideration for evaluating dietary data collected during survey efforts. It presents the information and analysis in a clear manner that is easily understood.

We suggest a couple of minor changes to clarify the paper further, as noted below.

- Page 3, 1st full paragraph. The Behavioral Risk Factor Surveillance System BRFSS survey asked about frequency of “fish meals” consumed. As a result, respondents may have overlooked fish consumed as snacks, toppings for pizza, soups, etc. We recommend that the first sentence be modified as follows: “The rates for any fish are likely even higher because question 1 excluded shellfish and crustaceans and it is likely that respondents may have also overlooked fish consumed as snacks, appetizers, and ingredients of casseroles, soups and stews.”
- Page 4, par 4. This paragraph discusses EPA’s basing its national recommended fish consumption rates on the whole population, not just consumers. It lays out a number of conjectural reasons why EPA has made this choice. The discussion would be strengthened and provide better support for IDEQ’s policy if EPA’s specific reasons for making this choice we presented...
- Page 4, Recommendations. This discussion is a bit confusing as it presents a number of ideas as recommendations even though it appears that this section is more of a summary of the issues presented earlier. Because it is currently identified as “Recommendations”, and the 1st and last paragraphs of this section appear to conflict with each other, it could be confusing to a reader. We recommend changing the section header to “Summary”, in which case the current text is appropriate, but that an additional section be added after this to outline IDEQ’s specific recommendations. It appears that IDEQ intends to base its fish consumption distribution on the entire population surveyed, rather than just those who consumed during the recall periods. ARCADIS agrees that this approach is appropriate. It is not clear, however, whether IDEQ has selected how it intends to represent the fish consumption rate (i.e., a statistic representing central tendency, the entire distribution, one or more percentiles of the distribution, etc.) when developing its WQC. If that decision has been made it would be helpful to provide that information in this section as well, particularly as this may be a factor to consider during final survey design.

4. Idaho Fish Consumption Rate and Recommended Sample and Questions (prepared by Boise State University and released October 10, 2013)

- General Comment 1: This background document needs to be substantially reorganized and edited. The objectives of the document and the survey itself are not clear and substantial extraneous information included that distracts from the purpose of the document. We recommend that the document be reorganized to provide a more definitive summary of the proposed approach including the following:
 - The goal for the survey;
 - The survey approach with only information on how the methodology was selected, why it was selected, and a discussion of each step in the process;

- The selection of the sample (who was selected, how they were selected and how many were selected) for both the general population and the recreational angler survey efforts;
- The script for interviewers to follow; and
- The specific analysis plan outlining how survey questions will be combined to derive fish consumption estimates and the way in which results will be presented.

Much of the additional information can be removed from the main text and included instead as appendices that can be referenced in the main text as appropriate and consulted for additional information as needed.

- General Comment 2: There are many inconsistencies among the survey instrument, this background document and the RfP, and as well as inconsistencies within the background document itself. Given these inconsistencies, it will be difficult for the survey implementation contractor to provide a detailed and accurate scope of work. For example, the survey instrument is set up to complete as many as four separate interviews with the survey respondents. This is consistent with text on Page 17, which indicates that the National Cancer Institute (NCI) method is not reliable with only two recalls per person but works well when there are four recalls per person. However, text on Page 37 discusses the recommendation to conduct the surveys on three occasions while page 16 mentions that the Markov Chain Monte Carlo (MCMC) approach for analysis is reliable with only two repeats. Finally, the RfP does not specify the number of repeat interviews and appears to leave this up to the winning bidder for survey implementation.

In addition, while the survey currently indicates that only those individuals who respond affirmatively to Questions 4 and/or 9 will be re-interviewed, discussions during the October 15 meeting and language in this support document indicates that a subset of all survey respondents may be re-interviewed. The RfP does not specifically discuss this. In addition, the RfP mentions the conduct of two surveys but only a single sample is discussed, making it unclear whether two separate samples need to be collected.

- General Comment 3. The process used to select the sample size is not well organized. There is a discussion regarding how many surveys are needed based on individual goals of the survey but that information does not lead to a specific recommendation until the end where a sample size of 7,000, which is not discussed previously, is recommended. The key to selecting sample size is to determine, based on the overall goals of the survey, the most confining data (smallest detail) about which statistical certainty is desired and then to work backward from that. For example, if the goal of the survey is to characterize fish consumption rates of different subpopulations, then the sample size needs to be selected, based on population statistics of Idaho, to ensure that adequate interviews are conducted to obtain a representative sample for each of those groups. This all needs to be established in advance to help inform survey design and sample selection. It is not clear from

the document that the critical goal for the survey has been adequately identified; therefore, it is impossible to determine if the proposed sample size will be adequate.

Specific Comments.

- Page 5, number 2. This goal seems to indicate that IDEQ is only interested in the median (50th percentile) and 95th percentile fish consumption rates for Idahoans. The first paragraph of the RfP, however, indicates that IDEQ would like to retain the flexibility to consider the full distribution (all percentiles) of fish consumption rates for the entire population surveyed. It will be important to calculate consumption rates for each individual so that the inter-individual variability can be preserved, and then calculate the summary statistics of choice at the end, rather than combining all of the data up-front and presenting summary statistics for the entire population, thereby losing the individual information.
- Page 5, Paragraph 2, item 4. It appears that the goal of the survey is to capture consumption by the population statewide and to also characterize consumption for recreational anglers as a subpopulation. While the RfP seems to indicate that two separate survey efforts will be conducted, this is not clear in the background document's discussion of sample selection. This needs to be clarified to inform sample selection and assist the bidders in estimating the costs and optimal approach for survey implementation.
- Page 6, Paragraph 3. This discusses the visual aids that will be available online for those "selected" to participate via internet. It is not clear how this selection process occurs. The text noted here seems to imply that individuals will be selected by the survey contractor for participation in this portion of the survey, but it has been our impression based on information provided previously that this will be a self-selection process and that individuals will choose whether they want to participate via telephone or internet. There is very little discussion about the internet sample and how there will be control over the identity, age and gender of internet participants. How will these individuals be re-interviewed? More specific information regarding the internet portion of the survey and how it will be implemented needs to be provided.
- Page 6, Paragraph 4. ARCADIS is concerned that the methodology for data analysis has not been verified; for example use of the NCI method. Because selection of sample and question design will depend on the analytical approach selected, it may be necessary to select a sample differently and/or to redesign questions if the NCI method cannot be applied. It is disconcerting that the survey is proceeding to the final design and implementation stage without having resolved some of these critical issues. We recommend that the methodology be selected and verified before the sample is selected and the final survey instrument is developed.

- Page 6, Paragraph 5. It is not clear why BSU is recommending that IDEQ evaluate consumption during three seasons of the year to test seasonal variations in consumption. While the Idaho Department of Fish and Game regulations describe specific seasons for certain species of fish, fishing is permitted in some waters of Idaho and for some species on a year-round basis. For example, harvesting of steelhead is not generally permitted during the months of May and June but other species are readily available during that period. If an angler fishes exclusively for steelhead, then consumption of steelhead may be zero during the time that their capture is illegal but may be high during other periods of the year. However, if that angler does not fish exclusively for steelhead, his or her consumption may not change during this period because other species can be harvested and consumed during this time. At the same time, some anglers may only fish during the warmer months of the year while other anglers may only participate in ice-fishing. To truly capture seasonal variations, it will be important to evaluate consumption habits during all four seasons of the year.
- Pages 7 through 9. The descriptions of the surveys are too limited to provide an accurate picture of their potential utility, making it unclear what lessons were learned from them and how they have informed the selected methodology for the IDEQ survey. We recommend that this text be extracted from the document, expanded as indicated below and included as an appendix that can be referenced in the text. Specifically, we recommend that the following information be provided in a more complete manner for each survey:
 - Name of survey and year of implementation;
 - Goal of survey, targeted population and survey method used;
 - Recall period and response rate;
 - Type of information provided by the survey, how analyzed, and how reported;
 - Strengths and limitations of the survey method in terms of achieving the stated goals;
 - Comparability with goals for the proposed IDEQ survey; and
 - Lessons learned in terms of forming the method for the IDEQ survey.
- Page 8, Paragraph 4. What is meant by “take rate”?
- Page 9, Paragraph 1. This paragraph states that because Idahoans seem to eat trout frequently, trout should have its own grouping in the fish category coding. As discussed previously, it is not necessary to group fish species during data entry and to do so results in lost detail that may be useful in the future. Species can be recorded individually during the data entry phase and can then be grouped as needed or desired during data analysis.
- Page 9, Paragraph 3. This paragraph states that the statistical approach to be used in analyzing the data is unresolved at this time. As indicated above, this is problematic because the survey design should depend on the approach to be used in analyzing the data and the data quality

objectives cannot be determined until the approach is clear. These issues need to be resolved before the survey instrument is completed because changes in the statistical approach to data analysis may require that changes be made to the survey design and methodology to ensure that appropriate and necessary data are collected.

- Pages 10-13, Definitions. This section interrupts the flow of the document and is distracting. We recommend it be extracted and presented in an appendix. Very brief descriptions of these terms should be incorporated into the main text as they arise. For example, the target population, survey respondents, definitions of Idaho residents, consumers, nonconsumers and anglers should all be discussed within the objectives of the survey, rather than in a separate section.
- Page 10, description of Survey Respondent. Different portions of this document and the RfP discuss using both households as the survey unit and individuals as the survey unit. The current survey design is focused on consumption by individuals, not households. Thus, this language needs to be made consistent throughout both documents.
- Page 11, Paragraph 3. ARCADIS agrees that a resident who holds a fishing license should be considered an Idaho angler. This does not necessarily mean, however, that the angler is a fish consumer. Many people fish for sport or practice catch and release for preservation of the resource. Thus, the two terms, angler and fish consumer, are not synonymous. In addition it is important to recognize that anglers who practice catch and release, and therefore do not eat any of their own catch, may still consume fish obtained from markets and restaurants.
- Page 11, Paragraph 6. As discussed previously, it is not clear how recreational anglers are going to be surveyed. While the survey instrument asks whether the respondent is an angler, it is not clear whether there will be a second survey effort that specifically targets holders of fishing licenses. If fishing license holders are to be included in the single survey effort, the sample size needs to be large enough to provide statistically robust results about their consumption. In addition, the sample populations are different. In most states, the vast majority of recreational anglers are male. Thus, if the goal is to obtain a statistically valid and representative sample of fishing license-holders we recommend that a secondary survey method be considered that focuses solely on a random sample of fishing license-holders in the state.
- Pages 14-17. The discussion of the Survey Technical Group also breaks the flow of the document. The pertinent information should be condensed into an introductory section at the beginning of the document that outlines the following:
 - Why the survey is being done;
 - Who is involved in its development;
 - What are the critical issues to be considered;

- How does the planned survey effort meet those objectives and address the critical issues identified; and
- What will be the outcome of the survey and how will the data be analyzed and used for regulatory purposes.

If more detail needs to be provided (and in most cases this does not seem necessary), it can be included in an appendix to the main document.

- Page 16, Paragraph 3. This discussion implies that unlicensed anglers are high consumers. There is no basis for this conclusion. In order to be a high rate consumer, an angler must fish with a high frequency in order to obtain enough fish to provide for that level of consumption. The vast majority of avid fishermen in most states hold fishing licenses. While unlicensed anglers may also fish frequently, it is often the case that individuals who don't anticipate fishing and only fish once or twice in a given year may not bother to purchase a license and may consume little to no sport-caught fish. Thus, the implied correlation between unlicensed anglers and high levels of consumption should be removed.
- Page 16, Paragraph 5. It is stated here that the information on respondents' weights is not necessary for the fish consumption survey. ARCADIS agrees with that statement. However, the survey still includes questions related to the respondent's weight. While it might be interesting to obtain this information for risk assessment purposes, it is unlikely that respondents will be truthful about their weights, adding substantial uncertainty to the responses and any rates calculated based on them. In addition, assigning weights to range bins, as the current design does, is not useful for risk assessment purposes. If information about weight is ultimately collected, then we recommend that people simply be asked to report their weights as a single number, rather than within a range. It will be important, however, to acknowledge the high level of uncertainty associated with the reported weights if they are used in subsequent analysis of fish consumption rates.
- Page 18, Paragraph 2. The fish targeted by anglers are not necessarily the fish that are eaten by the anglers. In most cases, anglers are quite opportunistic and will eat other species of fish harvested (assuming they are desirable species of adequate size) while they are fishing for target species. The important consideration for this survey is not what type of fish they are seeking for but rather what type of fish they are consuming.
- Page 19, Chart and subsequent text. Fish do not need to be categorized in advance. If the purpose of this is to assist the interviewer with portion size, this approach may be misleading as the size and shape of the portion will depend on the size of the fish and its density. It may be more helpful to ask the survey participant if their fish portion was chunky like a deck of cards or long and flat like a checkbook and then proceed from there. In addition, if an invitation to participate in the survey is mailed in advance, visual aids, such as photos of fish meals of different sizes on standard dinner plates, can be provided for survey participants.

- Page 20, Paragraph 4. This discussion indicates that the questionnaire will query Idahoans' perceptions of whether their current consumption differs from their past consumption or their desired consumption. As currently designed, this information is not captured but simply characterizes their reasons for eating or not eating fish.
- Page 21, Gender Proportionality. This paragraph discusses the importance of gender balance for the population surveyed. This may be a reasonable goal for the survey if the total population of Idaho is the key consideration. However, as discussed previously, it is important to note that the vast majority of recreational anglers captured in other survey efforts have been male. Thus, seeking gender balance is not likely to be the most appropriate basis for evaluating the consumption habits of recreational anglers. If the consumption habits of recreational anglers are an important objective of the survey a separate survey effort should be considered using a random sampling of license-holders statewide to ensure the sample is representative of that population.
- Page 21, Age Scale. The survey is not currently set up to collect information for individuals under the age of 18. This discussion needs to be modified.
- Pages 21 to 24. It is not clear why this detailed discussion is provided. The comparison between Idaho and US statistics is unnecessary. The only data of interest in designing this survey are Idaho statistics. In addition, these statistics are only of interest if the primary goal of the survey is to characterize consumption behaviors of specific income or ethnic groups. As indicated previously, it is important to determine the most constraining goal that the survey is intended to achieve and then calculate the sample size based on that. If the survey is not specifically targeting certain income or ethnic groups, then this discussion can be eliminated from this report and instead discussed in the final survey report.
- Page 26, Paragraph 2. It is incorrect that people are likely to consume the same portion of fish from meal to meal. Fish may be consumed in a variety of ways from large portions of fish fillet, to tuna sandwiches, to small pieces of fish in soups or stews. Thus, there may be considerable intra-individual variability within the general population. This is even more pronounced for individuals who consume self-caught fish as the portion sizes for a particular meal will depend greatly on the amount of fish successfully harvested on a given day of fishing and the number of individuals who share in that fish meal.
- Page 26, Paragraph. 3. We recommend that a greater variety of portion sizes be provided as visual cues. The proposed 6- and 12-ounce meal sizes are relatively large meals that may not be regularly consumed by the majority of people. In fact, the most common meal size for sport-caught fish is 8 ounces but the range is wide. We recommend that photos of 2-, 4-, 6-, 8- and 12-ounce meals be provided to assist in estimating portion sizes.

- Page 26, Preparation Method. We recommend that information about parts consumed be added back into the survey instrument. Certain chemical constituents tend to accumulate in different parts of the fish. Some are uniformly distributed while others may tend to accumulate in the belly fat, viscera and skin fat. Thus, when considering the development of WQC and the monitoring methods used to measure compliance, it may be important to understand whether people eat the skin or viscera of certain species.
- Pages 26-30. Survey Methods. This discussion interrupts the flow of the document and would be better placed in an appendix. In addition, it oversimplifies the strengths and weaknesses of all of these methods. If it is to be included, it should more thoroughly present information about the ways in which the data from these survey types can be collected and used, their strengths and their limitations.
- Page 27, Paragraph B1. While it may not be possible to collect a representative sample during a creel survey due to the tendency to over-sample more frequent anglers, methods have been developed to correct for avidity bias. These methods are discussed in EPA's 2011 *Exposure Factors Handbook*.
- Page 29, Mail or Internet Surveys. These methods are very different and should be discussed separately and in more detail.
- Page 29, B1. Response rates can be very high for a well-conducted mail survey that has appropriate follow-up.
- Page 29, Telephone-Mail/Internet-Telephone Approach. Generally when a combination telephone-mail survey is conducted, the survey instrument is mailed out to the survey participant and then follow-up calls are made to assist in helping people complete the survey. This can be a very effective means of collecting this information if the survey instrument itself is mailed to the potential participant. However, this does not appear to be the approach for the current survey, based on discussions during meetings, but rather that only an "invitation" to participate will be mailed. If this is not the case, it needs to be clarified in this background document. In addition, the survey instrument itself needs to be modified so that it can be deciphered unambiguously if participants are completing it themselves.
- Page 31, Sample Design. This entire section should appear early in the document, not on page 31, as it contains the essence of the document.
- Page 31, Sample Design. The discussion of sample sizes is confusing. An equation is presented on Page 32 with variables that are not explained and referenced again in the discussion. In

addition, a wide range of sample sizes are discussed. For example, for a lognormal distribution the report states that 2,000 surveys are necessary for the total Idaho population. Under the discussion of the NCI approach it states that there will need to be 50 to 60 completed double 24-hour recall surveys. When discussing the Idaho Population Sample, it concludes that the sample size may need to be 5,000 or more to achieve the desired goal. Later the document states that if a seven-day recall is used, a sample of 500 may be used but this is followed by a statement that it may be necessary to have a sample size of 3,000. Subsequently for the Idaho Fish Sample section, the document discusses a sample size of as much as 10,000 if based on consumption of Idaho fish by recreational anglers. Boise State recommends that IDEQ be prepared to sample as many as 7,000 Idahoans. Finally, the RfP then discusses potential sample sizes of 5,000 and 7,500. This is very confusing for the reader.

In part, the recommended sample size appears to be based on the assumption that the only successful double 24-hour recall survey is one in which a respondent indicates that he or she consumed fish during both 24-hour recall periods. However, it overlooks that a respondent answering positively during one 24-hour event but negatively during the second 24-hour event is an equally valid response in terms of capturing variability in consumption habits. Consideration of this fact may substantially reduce the required sample size. In other words, if 60 completed double 24-hour recall periods are required to use the NCI method, and 15 percent will have answered in the affirmative on at least one of those occasions, then a sample size of only 400 is necessary to achieve this goal. If, however, the NCI method is not able to accommodate a positive response during one recall event and a negative response on the second recall event, then it may be necessary to consider using a different methodology to capture the necessary information about variability for and among fish consumers.

Regardless, as previously noted, the most important consideration in determining the sample size is an understanding of the survey goals and any related confining data.

- Page 37, Paragraph 1. This paragraph discusses two survey efforts: 1) one for all adult Idahoans statewide and 2) one for licensed adult anglers in the state. However, all of the discussion about sample selection, gender balance, sample size, etc. seems to be geared toward the population survey rather than the angler survey. If two efforts are to be undertaken, then the background document also needs to provide separate discussion and justification concerning the planned sample selection, gender balance, etc. for the recreational survey effort.
- Page 37, Paragraph 1. This paragraph recommends that each survey be conducted on three occasions to address seasonality but it is not clear why they would not be conducted during all four seasons because fishing and consumption are possible all four seasons and ice fishing may present a different demographic than open water fishing. We recommend that the survey be conducted all four seasons of the year.

- Appendix B, Page 49. The table presented is not consistent with the survey instrument and should be deleted.
- Appendix E, Page 69. This states that there will be two 24-hour recall interviews with the same individual within a few days of each other. To capture the variability by season as well as the variability from meal to meal, we recommend that more repeat interviews occur so that the data collection meets the needed four repeats for the NCI method, and that these re-interviews occur during different seasons of the year rather than a few days apart.

Also, there is discussion of dropping individuals from the database who do not provide a positive consumption response on both recall days. It is important to retain these individuals as the variation in consumption over two different days is an important component for understanding intra- and inter-individual variability in deriving consumption rates.

- Appendix F, Idaho Angler Target Population. This is the first time that specifics about the angler survey are provided but inadequate information is provided concerning sample size, types of licenses targeted (if not all), the way in which anglers will be selected, whether this is also telephone and/or internet survey, etc. This information is critical both for peer review of the methodology and also for the understanding of scope necessary for the consultant who is to implement the survey.

5. Idaho Department of Environmental Quality Request for Proposals (RFP); RfP #0922, Survey of Idaho Fish Consumption Rates (released October 15, 2013)

- Page 3, Paragraph 1. This discusses quantification of the consumption habits of the adult population in Idaho and the population of adult anglers in Idaho and indicates that the data should be analyzed and presented in a way that any percentile of the distribution can be quantified. This is an excellent and important goal for the data collection and analysis. However, the background document by BSU (discussed under number 4 above) appears to be somewhat at odds with this approach and, as that document is specifically cited as an important resource for bidders (see page 4, par 3 of the RfP), this may confuse potential bidders. It will be very important that IDEQ is clear with bidders about the specific goals for the survey and that the background document be revised to parallel that approach.
- Page 6, Paragraph 3. This specifically references the survey methods outlined in the background document prepared by BSU. However, as indicated in prior comments on that document, the document is not well organized and is internally inconsistent. This will pose challenges for potential bidders. It is critical that the goals and sampling approach for the survey be clearly defined so that bidders will have a common footing in submitting their bids.

- Pages 8-9, Task 5, Analyzing data. It is clear and appropriate that IDEQ is requesting that bidders finalize the survey approach, implement the survey and provide descriptive statistics and confidence intervals for the data sets. However, the RfP is requesting that the survey contractor also complete the analysis of fish consumption rates. Survey companies specialize in survey development and implementation but many are not experts in the end-use of the data for regulatory and/or risk assessment purposes. Thus, it is likely that they will not understand the intricacies and nuances required for data analysis for this purpose unless they have access internally, or through subcontracting, to an individual or firm that can assist them with this process. This is an important consideration because the data collected may be combined many different ways to derive consumption estimates and, based on the information provided by BSU, the exact method to be used to capture intra-individual, inter-individual, and seasonal variability in consumption rate is still undecided. This will make it difficult for survey companies to estimate the potential costs associated with data analysis and make it difficult for IDEQ to ensure that the results of the analysis will meet its needs.

As the survey is currently designed, there will be multiple pieces of data that can be used to derive long-term consumption rates. Question 3 will provide information on their average consumption rate over time. The multiple 24-hour recall surveys for individuals will provide snapshots of consumption over as many as four 24-hour periods throughout the year (if four interviews are conducted with a subset of survey respondents). During multiple survey attempts, answers to questions may differ, in terms of frequency of consumption, species consumed, meal sizes, cooking methods, etc. In addition, data for multiple meals will need to be combined.

For example a survey participant may report that he or she eats fish three times per month on average. However, if that individual is surveyed two times about the previous 24 hour periods, and reports that he or she ate ½ pound (227 g) of fish on one of those days and no fish on the other, one could conclude that his fish consumption rate is, on average, 113.5 g/day. However, if that individual consumes fish three times per month on average and eats 227 g during each of those meals, his or her total consumption during a 12 month period would be 8,172 grams, which equals approximately 22 g/day on an annualized daily basis (the rate that is used in developing WQC). This is a major difference in estimated consumption rates for individuals and highlight decisions that will need to be made as to how these differences are going to be resolved, particularly as there is no way to know what the actual rate may be. In addition, during the second 24-hour recall period interview, this individual could respond differently to this question and report that he or she consumes, on average, two meals per month. This may or may not be an actual disagreement. It may also reflect that his or her consumption may vary seasonally so that during the weeks or months leading up to first recall period, that individual may have been consuming fish more frequently than he or she was in the weeks and months leading up to the second 24-hour recall period.

The contractor who analyzes the data will need to have a strategy for reconciling differences among responses and combining data from multiple questions and multiple sampling events to derive long-term fish consumption rate(s). It will also be important that the individual consumption rates calculated for each individual be preserved so that the full distribution of consumption rates will be available to IDEQ for selection in establishing WQC.

As a result, we strongly recommend that IDEQ acquire bids for survey implementation, data entry and summarization of the data but that it not request bids on data analysis until a data analysis plan can be developed and finalized. We suggest that final decisions be made about the analytical approach to be used to capture variability and the way in which the responses to questions are going to be combined to derive consumption rates. This can be done as a separate analysis plan that can then be circulated as part of a separate RfP for future bids after these decisions have been made.

6. Tribal survey being developed by EPA and Idaho tribes

Very little is known about the planned tribal survey. While it appears, based on the very brief discussion during the October 15 meeting, that EPA is already putting forward an RfP for survey implementation, ARCADIS is not aware of the details of the survey design, the methodology, the plan for implementation, the sample size, or the comparability of the data to be collected (compared with the IDEQ survey that is planned). It is important that the tribal survey undergoes the same level of scrutiny and peer review as the IDEQ survey to ensure that it will collect robust and reliable data on the long-term average daily fish consumption rates of tribal members.

7. Summary

ARCADIS again commends the State of Idaho and IDEQ for recognizing the critical role of State-specific fish consumption rate information in developing protective yet practical WQC, and for deciding to conduct a survey of Idahoans to obtain Idaho-specific fish consumption rates. Because we have had extensive involvement in the development, implementation, and analysis of fish consumption surveys, we appreciate the complexity and level of effort required to develop representative and robust fish consumption rate data. These comments are offered in an attempt to ensure that the best survey approach and instrument be developed to attain the established objectives within the budgetary constraints that exist.

We believe that the survey instrument has been substantially improved since the draft provided in September. We still have some minor recommended changes to maximize data collection in the shortest time possible and with the least amount of ambiguity or confusion on the part of interviewers and participants.

We do not believe, however, that the support document prepared by BSU provides a clear and concise overview of the objectives of the survey, recommendations for survey design, or data quality objectives. It contains extraneous information that is not necessary for this purpose and the language used and recommendations provided are not adequately concise or justified. In addition, substantial uncertainties remain concerning how the data will be analyzed to provide long-term estimates of consumption based on short-term recall data. As a result, data could be misinterpreted and the support document does not provide a strong technical basis for bidders who are responding to the RfP developed by IDEQ.

Although the RfP is well-written and focused, it is premature to request that bidders submit bids for final analysis for fish consumption rates until some critical decisions are made about how the data are to be combined and analyzed. Thus, ARCADIS recommends that bids be limited to finalization of survey design, sample selection, implementation, data entry, data verification, and summary statistics for individual questions. We further recommend that a data analysis plan be developed and circulated to bidders in a separate RfP before bids are accepted on the data analysis portion of the study.

Finally, ARCADIS requests that more information about the design and goals of the tribal survey be submitted for peer review and public comment prior to implementation. This will help ensure that the data collected are robust and adequately representative to allow the calculation of long-term fish consumption rates for these populations.