

Idaho Fish Consumption Survey

SUBMITTED TO:

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SUBMITTED BY:

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SUMMARY

Introduction and Purpose

In May 2012, Region 10 of the EPA disapproved Idaho’s Human Health Criteria (HHC) update because it could not conclude that the fish consumption rate of 17.5 g/day used by Idaho was protective of human health in Idaho. In order to characterize fish consumption rates for Idaho residents, Idaho undertook a survey of residents on their fish eating habits. Responses from the survey questions were analyzed to estimate rates of fish consumption, ultimately a daily rate for each respondent. The objective was to find the distribution of these rates for the population of Idaho, in addition to traditional point estimates, such as a 90th percentile.

Survey Methodology

A telephone survey using a dual-frame sample (landline and cell phone sample elements) was conducted to gather information regarding fish consumption rates for two groups in Idaho: (1) the general population, and (2) recreational anglers. The former is anyone living in Idaho; the latter are Idaho resident fishing license holders.

There were two main phases to the project.

- **Phase 1: Survey Design:** This phase entailed development of a draft survey instrument—a questionnaire about people’s fish, shellfish, and seafood consumption habits; a description of the population sample frames—who was sampled and they were identified; and estimates of the number of completed surveys needed. Initial survey design recommendations were developed by staff at Boise State University.¹ Northwest Research Group was then selected to develop and test the final survey design. Qualitative research and an extensive pretest were used to support the design of the questionnaire and to test and refine questionnaire language to ensure reliable responses, including how to verbally administer portion size visual aids.
- **Phase 2: Survey Implementation and Data Processing:** This phase included administering the survey to more than 4,500 Idaho residents 18 years of age and older, monitoring response rate and data quality, maintaining data security and confidentiality, entering the data into a database, and providing a summary of the results once all surveys were completed. The research was conducted by telephone using a dual frame sample. A key part of this research was a re-contact effort to accommodate use of the National Cancer Institute’s (NCI) method to estimate the variance in self-reported portion sizes. A total of 1,557 respondents from the main survey were re-contacted and provided additional fish consumption data.

All work for this project was carried out in compliance with ISO 20252: 2012 Market Research Quality Standards.

Results

Respondents were asked to indicate if they had personally consumed fish or seafood in the past 12 months. Consumption was defined as all meals during the day—that is breakfast, lunch, and dinner—as well as snacks that were eaten at home, in a restaurant, or at someone else’s house; includes fish or shellfish (fresh or frozen) eaten by itself or within a dish or food items such as anchovies on a pizza, or seafood in a soup, stew or pasta, or a sandwich that contains fish.

¹ Boise State University Public Policy Center, “Idaho Fish Consumption Rate Recommended Sample and Questions,” December 19, 2013.

- Eighty-eight percent (88%) of **all** adult Idahoans (included fish consumers and non-consumers) had consumed fish or seafood in the past year. Fish consumption varied by demographics; household income is the primary demographic characteristic distinguishing fish consumers from non-consumers.

Food frequency questions were used to obtain an estimate of the average number of consumption events over the course of a year and the average portion size consumed.

- Idaho adults consume an average of 60 meals or snacks per year that contain fish or seafood. This equates to 5.5 percent of all meals annually (assuming three meals a day). Anglers consume fish or seafood more often than do non-anglers—71 versus 54 consumption events per year, respectively.
- Respondents reported that the usual portion size consumed at a meal is between 5.8 and 6.3 ounces, depending on where the meal was consumed (home, restaurant, or somewhere else). Portion sizes for snacks are less than half the size of a meal portion size. Average portion size for all consumption events (meals and snacks) is 5.5 ounces or 156 grams.
- Total average fish consumption was computed by multiplying the total number of consumption events times the average estimated portion size consumed at the corresponding events. The average Idahoan consumes 9,790 grams or 345 ounces of fish annually.
- Average daily fish consumption was computed by dividing total annual fish consumption by 365 (number of days in a year). On average, Idaho adults who consume fish, consume 31 grams or just over 1 ounce of fish per day. This figure captures the average daily fish consumption rates for just over 70 percent of all Idaho adults. Median consumption rates are slightly less than half of the mean consumption rate—16 grams or .57 ounces.

Dietary recall questions were used to obtain a more valid portion size estimate than the usual portion size estimates provided in the food frequency questions and to allow use of the NCI method for estimating usual intake of nutrients and food. Respondents provided portion size estimates for fish or seafood consumed the day prior to being surveyed and during the seven days prior to “yesterday.” Use of both 24-hour and 7-day questions increased the likelihood of reaching respondents who had recently consumed fish during the initial contact and the re-contact surveys.

- Nearly half of all fish consumers reported consuming fish in the seven days prior to the initial contact; 13 percent reported consuming fish on the day prior to the initial contact.
- The portion size estimates given by a respondent in the recall series of questions were on average one-third higher than the average portion size estimates given by the same respondent in the food frequency questions—7.64 compared to 5.73 ounces, respectively.
- While the percentage of respondents reporting that they consumed fish on any given day in the eight days prior to being contacted decreased as the distance of the consumption event from the survey contact increased, portion size estimates are nearly the same regardless of the amount of time between the consumption event and the survey contact.

Four hundred twenty-seven (427) respondents had consumed fish one to eight days before the main survey and again one to eight days before the re-contact survey.

- There were no significant differences in the portion size estimates a respondent gave during the initial contact (196.45 grams) and during the re-contact (196.31 grams).

Discussion

While there are many concerns regarding continued use of telephone surveys due primarily to the increasing prevalence of cell phone only and cell phone primary households and decreasing response rates, significant efforts were undertaken in the design of this research to address these concerns so that the results represent reliable and valid estimates of key consumption measures for Idaho adults. Best practices in telephone research methods were used; all work is compliant with ISO 20252: 2012 Quality Standards. However, it is noted that these estimates may error on the high side due to over-representation of higher income individuals and anglers, both segments consume fish more often and consume larger portions of fish, as well as possible non-response bias—i.e., those who do not consume fish at all were less likely to participate in the research.

There are some clear differences in portion size estimates between the food frequency and dietary recall questions—notably portion size estimates from the food frequency questions are smaller than from the dietary recall question. Portion size estimates for dietary recall questions may be larger as respondents were recalling a specific and relatively recent meal. For the food frequency questions, respondents were providing an estimate covering typical meals and may be influenced by other factors such as nutritional guidelines. Therefore, the estimate for the dietary recall portion size estimates may represent more valid measures of actual portion sizes consumed.

While the dietary recall questions appear to provide more valid portion size estimates, the total number of consumption events estimated using the dietary recall questions is significantly lower than the total number of consumption events estimated using the food frequency questions. At the same time, the number of consumption events calculated using the food frequency questions is likely high. The per person number of consumption events is most likely to be somewhere between the self-reported number obtained through the food frequency questions and the estimate computed from the dietary recall questions.

BACKGROUND AND PURPOSE

Problem Statement

The Idaho Department of Environmental Quality (IDEQ) is responsible for management of surface water quality under the federal Clean Water Act (CWA) and the state Water Quality Act. This includes administering state water quality standards which specify the designated beneficial uses of state waters and the water quality criteria necessary to protect those uses.

Recreational use incorporates sport fishing and consumption of fish. Consumption of fish is the primary route by which people are exposed to toxins in the aquatic environment, especially toxins which are bio-accumulative. Domestic water supply use is applied to surface waters protected as a drinking water source. Drinking of water is also an important route of added exposure to toxins for surface waters which serve as a domestic water supply.

In 2005 Idaho undertook rulemaking to update its human health criteria (HHC) for toxics substances applied to waters protected for recreational use, where fish could be caught and then consumed, or applied to waters protected as domestic water supply, where exposure from drinking water as well as consumption of fish is likely. The update was in part based on increasing the fish consumption rate (FCR) used in criteria calculations from the 1992 National Toxics Rule value of 6.5 g/day to EPA's national default value of 17.5 g/day recommended in 2002.

The Environmental Protection Agency (EPA) has oversight over state water quality standards and must approve state standards before they can be used for CWA purposes. These purposes include permits allowing but limiting discharge of pollutants, total maximum daily load allocations to restore impaired waters, and the assessment and reporting on support of beneficial uses as required under sections 303(d) and 305(b) of the CWA.

In May 2012, Region 10 of the EPA disapproved Idaho's HHC update because it could not conclude that the fish consumption rate of 17.5 g/day used by Idaho was protective of human health in Idaho. EPA reached this conclusion because regional evidence, mainly regional fish consumption surveys conducted primarily in the states of Washington and Oregon, indicates that fish consumption rates for some segments of the Idaho population may be higher. In response to EPA's disapproval, Idaho decided it needs to obtain state-specific information on the usual intake rate of fish and shellfish by Idaho residents.

In order to characterize fish consumption rates for Idaho residents, Idaho undertook a survey of residents on their fish eating habits. Responses from the survey questions were analyzed to assess usual dietary intake of fish, expressed as the average amount (in grams) consumed daily. The objective was to find the distribution of these rates for the population of Idaho, in addition to traditional point estimates, such as a 90th percentile rate.

Usual intake rates are the fish consumption rates of interest for criteria calculation. Usual intake is defined as a person's long-term average rate of consumption, for instance over a year or lifetime. Because observations over a long period (e.g., a year) are impractical, usual intake is generally estimated statistically from the shorter term observations / self-reporting of consumption possible in a food frequency or dietary recall survey. It is also desirable to be able to break down the intake of fish by its source—for instance, Idaho waters or not, species and life history (are the fish consumed from Idaho waters resident or migratory) and the characteristics of people eating fish—for example, whether consumption patterns vary by demographics or other characteristics—for example anglers, Hispanics, gender, age, income, or geographic location.

Intended Use of the Data

Fish consumption data generated under this project will be used to support the calculation and then adoption of revised HHC that can be shown to be protective of human health in Idaho.

The data collected may also be used to describe and communicate the level of risk to the Idaho population from various rates of consuming fish and/or drinking water with contamination at the level of the criteria. Therefore it is desirable to know the distribution of fish consumptions rates within the population surveyed.

The EPA recommends that “an analysis of protectiveness of the criteria for the general population, recreational fishers and subsistence fishers should be included in the criteria documentation” (EPA 2000). IDEQ expects that ultimately it will be necessary to be able to compare expected risks for the general population to expected risks for recreational anglers, members of Indian tribes in Idaho, or others with higher consumption than the general population.

In addition, IDEQ also wants to be able to say what proportion of the overall fish consumption rate (i.e., from all sources) represents fish caught from Idaho waters, and within the latter what proportion of fish species is resident versus migratory. This breakdown of the overall consumption rate, while not essential to the calculation of HHC approvable by EPA under the CWA, is consistent with EPA national policy and desired by Idaho for purposes of informing public policy.

Approach to the Research

This project used a telephone survey to gather information regarding the distribution of fish consumption rates for two groups in Idaho: (1) the general adult population, and (2) recreational anglers. The former was defined as anyone 18 years of age and older, living in Idaho; the latter were defined as Idaho resident fishing license holders.

There were two main phases to the project as outlined below.

- **Phase 1: Survey Design:** This phase entailed development of a draft survey instrument—a questionnaire about people’s fish, shellfish, and seafood consumption habits; a description of the population sample frames—who will be sampled and how we will identify them; and estimates of the number of completed surveys needed. Initial survey design recommendations were developed by staff at Boise State University.² Northwest Research Group was then selected to develop and test the final survey design. Qualitative research and an extensive pretest were used to support the design of the questionnaire and to test and refine questionnaire language to ensure reliable responses, including how to verbally administer portion size visual aids.
- **Phase 2: Survey Implementation and Data Processing:** This phase included administering the survey to more than 4,500 Idaho residents 18 years of age and older, monitoring response rate and data quality, maintaining data security and confidentiality, entering the data into a database, and providing a summary of the results once all surveys were completed. The research was conducted by telephone using a dual frame sample. A key part of this research was a re-contact effort to accommodate use of the National Cancer Institute’s (NCI) method to estimate the variance in self-reported portion sizes. A total of 1,557 respondents from the main survey were re-contacted and provided additional fish consumption data.

All work for this project was carried out in compliance with ISO 20252: 2012 Market Research Quality Standards.

² Boise State University Public Policy Center, “Idaho Fish Consumption Rate Recommended Sample and Questions,” December 19, 2013.

SURVEY METHODOLOGY

Sampling

The original sample plan called for completing a total of 4,500 interviews; it was originally estimated that this would ensure a large enough sample to reach an adequate number ($n = 50$) of twice-consumers (originally defined as respondents who had consumed fish in the 24 hours immediately preceding the survey contact in the main and re-contact surveys) in the re-contact survey. A total of 4,570 interviews were completed.

Telephone Survey Methodology

Many food consumption surveys rely on in-person interviews. In-person interviews are frequently used due to the ability to use visual portion-size estimation aids (PSEAs) as references to help respondents cognitively judge and report how much they ate. However, in-person interviews are costly and intrusive.

The Idaho Department of Environmental Quality originally envisioned using an address-based sample that included making initial contact by telephone and then subsequently sending respondents a self-administered mail-in or Internet survey. This would be followed with telephone reminders that also give the respondents the ability to seek clarification or to complete the survey by phone.³ The primary advantages of this approach included the ability to provide a representative sample of the population for the purposes of statistical analysis, including the use of stratified sampling to “oversample” rare cases. However, a major disadvantage of this approach was that when matching phone numbers to an address-based sample, at the time this study was initiated, only landline numbers could be matched to addresses. This was of grave concern due to the significant number of Idaho households (52%) without associated landline phone numbers (i.e. wireless only households). Another concern was the higher costs due to printing and mailing to all those sampled without an associated landline number as well as those that were initially contacted by telephone who agreed to participate in the research. Additional costs would be incurred due to the need for potentially two telephone contacts. Other concerns included lower response rates due to refusals during the initial contacts as well as during the subsequent mailing and the possible introduction of measurement bias resulting from different survey modes—online or mail (visual) and telephone (aural).

As a result, NWRG recommended and IDEQ concurred with the use of a telephone survey. Support for this methodology is described in more detail.

List-assisted random digit dialed sampling has been the standard method for telephone surveys, one of the most cost efficient modes of collecting data, since the early 1990s.⁴ In the intervening years, there have been significant improvements in call center technologies such as computer-assisted telephone interviewing (CATI), call schedulers, and sample management systems. However, other personal and in-home technologies such as answering machines, caller ID, and notably the increasing prevalence of wireless only or wireless primary households and the advent of number portability have presented challenges. Despite concerns about coverage and response rates, well-executed telephone surveys continue to be one of the best research methodologies due to the ability to maintain quality control over the entire process of data collection, cost efficiencies, and speed of data collection.

³ Boise State University, loc.cit.

⁴ Casady, R. J., and Lepkowski, J. M. (1993). Stratified Telephone Survey Designs. *Survey Methodology*, 19, 103-113.

Telephone surveys are particularly effective for studies with complex survey instruments or sampling plans. Quality control can be managed all the way through the process, including questionnaire construction and administration. While piloting of questions and wording can be done for all surveys, the success of specific questions can be continuously monitored throughout the data-collection process of a telephone survey, especially with the use of CATI systems. CATI systems also allows for the management of the sample by removing much of the human error in call scheduling and providing an automated system that can be programmed to establish clear parameters for scheduling second and subsequent calls including length of time between call attempts, the type of first contact, and variation in the timing and schedule of contacts.⁵

There is a considerable body of other research available to support the use of telephone surveys as practical and valid data collection tools for food consumption and dietary research surveys.^{6,7,8,9,10,11,12} Specifically, the EPA discusses the strengths and weaknesses of different data collection methods, including telephone, for consumption surveys for fish and shellfish.¹³ Advantages include:

- Can assess region-specific consumption rates
- Can target and identify specific subpopulations of concern when these populations can be preselected on some basis or when specific limiting questions are included on the surveys
- Is generally less expensive (by approximately one-half) and less time-consuming than personal interviews (since less training of interviewers is required and travel costs are not necessary), so large numbers of respondents may be contacted
- A high rate of success for completing interviews is likely
- Sensitive information may be obtained more easily than with other approaches
- This approach provides immediate responses to questions, so analyses may be completed more quickly

Disadvantages include:

⁵ Weeks MF. 1988. "Call Scheduling with CATI: Current capabilities and Methods." *Telephone Survey Methodology*. New York: Wiley, pp. 25–49

⁶ Casey, P. H., Goolsby, S. L., Lensing, S. Y., Perloff, B. P., and Bogle, M. L. (1999). The Use of Telephone Interview Methodology to Obtain 24-Hour Dietary Recalls. *Journal of the American Dietetic Association* 99:1406–11.

⁷ Morgan, K. J., Johnson, S. R., Rizek, R. L., Reese, R., and Stampley, G. L. (1987). Collection of Food Intake Data: An Evaluation of Methods. *Journal of the American Dietetic Association* 87:888–96.

⁸ Leighton, J., Neugut, A. I., and Block, G. (1988). A Comparison of Face-to-Face Frequency Interviews and Self-administered Questionnaires. *American Journal of Epidemiology* 128:891 (Abstract).

⁹ Lyu, L. C., Hankin, J. H., Liu, L. Q., Wilkens, L. R., Lee, J. H., Goodman, M. T., and Kolonel, L. N. (1998). Telephone versus Face-to-Face Interviews for Quantitative Food Frequency Assessment. *Journal of the American Dietetic Association* 98:44–48.

¹⁰ Bogle, M., Stuff, J., Davis, L., Forrester, I., Strickland, E., Casey, P. H., Ryan, D., Champagne, C., McGee, B., Mellad, K., Neal, E., Zaghloul, S., Yadrick, K., and Horton, J. (2001). Validity of a Telephone-Administered 24-Hour Dietary Recall in Telephone and Non-telephone Households in the Rural Lower Mississippi Delta Region. *Journal of the American Dietetic Association* 101:216–22.

¹¹ Brustad, M., Skeie, G., Braaten, T., Slimani, N., and Lund, E. (2003). Comparison of Telephone versus Face-to-Face Interviews in the Assessment of Dietary Intake by the 24 h Recall EPIC SOFT Program: The Norwegian Calibration Study. *European Journal of Clinical Nutrition* 57:107–113.

¹² Szolnok, G., and Hoffmann, D. (2013, December). Online, Face-to-Face, and Telephone Surveys: Comparing Different Sampling Methods in Wine Consumer Research. *Wine Economics and Policy* 2(2):57–66.

¹³ Environmental Protection Agency. (1992, February). Consumption Surveys for Fish and Shellfish: A Review and Analysis of Survey Methods. 8–10.

- Interviewers cannot reach people who do not have phones or those with unlisted numbers
- Interviews may need to be limited in scope and length, so the number of questions must be carefully chosen
- It is difficult to verify information given

It should be noted that it is currently possible to reach people with unlisted numbers—both landline and cell phone. Therefore, the only segment of the population not reached by telephone are those with no phones at all—estimated to be less than 3 percent of Idaho households.¹⁴

Dual Frame Sample

Trends and characteristics of telephone coverage—traditionally discussed as the proportion of the population with a working landline telephone—have become the primary concern when conducting telephone surveys. Idaho has one of the highest percentages of wireless only households in the United States. At the time the original sample plan was developed, it was estimated that 46 percent of Idaho households were wireless only, and an additional 10 percent were wireless mostly.¹⁵ By the time the survey was completed, the percentage of wireless only households in Idaho had increased to 52 percent.¹⁶

Use of a dual-frame sample methodology is currently the industry standard to address the growing prevalence of cell phone only and cell phone primary households. Much has been written on best practices when planning and conducting random digit dialing (RDD) and other telephone surveys using a dual-frame sample.¹⁷

To ensure representation of wireless households, the original sample plan called for a dual-frame (RDD landline and RDD cell phone) sample and specified a minimum of 30 percent of all interviews statewide were completed from within the cell phone sample. As the goal was to ensure representation of all age groups and difficulty encountered in reaching certain population groups, after four months of data collection the decision was made to increase the percentage of interviews completed from within the cell phone sample.

The frame for the landline sample was created somewhat differently than that for the cell phone sample. The list-assisted method used in landline sampling uses 100-series banks (first eight digits) of telephone numbers and random samples are taken from those banks that are known to contain valid households. RDD landline samples contain working, non-working, unassigned, and some business telephone numbers, but they also ensure each household in the frame has an equal probability of selection. The cell phone sample was selected from the 1000-series blocks (first seven digits) dedicated to wireless services.

In general, telephone numbers are assigned separately for cell phones and landlines. Because of this, non-overlapping frames of landlines and cell phones could be constructed. However, in 1996, the U.S. Federal Communications Commission (FCC) mandated that all telephone service providers allow for local number portability (LNP). According to this mandate, customers can switch between service providers or service types,

¹⁴ “Wireless Substitution: State Level Estimates from the National Health Survey,” *National Health Statistics Report*, No. 70, December 18, 2013.

¹⁵ Marketing Systems Group, Wireless Only Household Estimates October 2013

¹⁶ Marketing Systems Group, Wireless Only Household Estimates October 2014

¹⁷ Lavrakas, P. J., “Dual-Frame Sampling,” *Encyclopedia of Survey Research Methods*, 2008, ISBN: 9781412963947 or AAPOR. 2008.

“Guidelines and considerations for survey researchers when planning and conducting RDD and other telephone surveys in the U.S. with respondents reached via cell phone numbers”; and Fahimi M, “Practical Guidelines for Dual-Frame (RDD) Survey Methodology (Now That the Dust Is Settling),” *Survey Practice*, Volume 7, no. 2, 2014
<http://www.surveypractice.org/index.php/SurveyPractice/article/viewFile/261/pdf>.

keeping their original telephone number. As a result, the sampling frames for cell phones and landlines are not necessarily cleanly divided. There may be telephone numbers in the landline frame that are actually cell phone numbers. The sampling company used for this study, Marketing Systems Group, identified these “ported” numbers by matching to a database of cell phone numbers, thus avoiding overlap, as well as ensuring that cell phone sample is manually dialed as required by the Telephone Consumer Protection Act (TCPA).

As detailed in Table 1, a total of 2,544 interviews or 56 percent of all interviews were completed from the cell phone sample. Not all of these respondents represent wireless only households. A total of 1,829 or 40 percent of all interviews were completed with respondents stating they were wireless only households. The proportionality of the sample for both landline and cellular telephone interviews was monitored statewide and at the health district level to ensure that there was no significant over- or under-representation of any part of the state by telephone type.

Table 1: Cell Phone Sampling Total and by Health District

		Idaho			Sample Plan		Achieved			
District		# of HHs	# of Wireless Only HHs	% Wireless Only HHs Within District	# from Cell Phone	% Within District	# of Surveys from Cell Phone Sample	% Within District	# of Surveys w/ Wireless Only HHS	% Within District
1	Panhandle	85,163	39,021	45.8%	200	31.3%	340	53.0%	212	36.1%
2	N. Central	43,100	16,242	37.7%	80	24.1%	198	52.0%	133	34.7%
3	Southwest	88,219	39,967	45.3%	205	29.2%	456	63.2%	264	42.4%
4	Central	165,952	79,690	48.0%	410	32.1%	725	57.5%	535	41.8%
5	S. Central	67,682	29,641	43.8%	150	28.8%	242	43.9%	183	31.9%
6	Southeast	59,962	25,852	43.1%	130	27.8%	282	59.2%	222	43.5%
7	East	69,330	33,778	48.7%	175	31.2%	301	56.1%	279	45.5%
Idaho Total		579,408	264,191	45.6%	1,350	30.0%	2,544	55.7%	1,829	40.0%

Respondent Selection

Eligible interviewees were required to be adult (18+ years old) residents of Idaho at the time of the survey. The second sampling stage is sampling one adult per household.

Landline phones are generally shared by all members of the household. Therefore, a procedure was used to randomly select the person to interview in households with more than one person over the age of 18. The last birthday method for selection was used in which an interview is attempted with the adult in the household who had the most recent birthday. While there is some amount of selection error associated with this approach, it is generally agreed that it represents the most non-intrusive method to randomly select the person in the household to interview,¹⁸ and no other approach has been developed that significantly reduces selection errors.

¹⁸ Lavrakas, P. J., Bauman, S. L., and Merkle, D. M., “The Last Birthday Selection Method & Within-Unit Coverage Problems,” *American Statistical Association 1993 Conference Proceedings*, 1107–1112; and Lavrakas, P. J., Bauman, S. L., and Stasny, E. A., “The Last Birthday Selection Method & Within-Unit Coverage Problems,” Paper presented at 55th annual conference (2000) of the American Association for Public Opinion Research.

The issue of respondent selection in telephone surveys reaching cell phone numbers has not been widely researched for there to be an accepted need to use a selection method or an acceptable method for doing so.¹⁹ In addition, current research suggests that a relatively small percentage (10–15%) cell phones are shared devices.²⁰ Cell phone sampling continues to cost more than landline and selection procedures can depress response rates which would further impact costs. Therefore, common industry practice is to consider cell phones to be personal devices, that is, not shared, and within-unit respondent selection is not needed.

Geographic Strata

The sample was stratified by geographic area; Idaho’s seven health districts were used to define these strata. The sample plan called for sampling in proportion (within plus or minus two percent) to the population within each of these health districts. This was achieved as illustrated in Table 2.

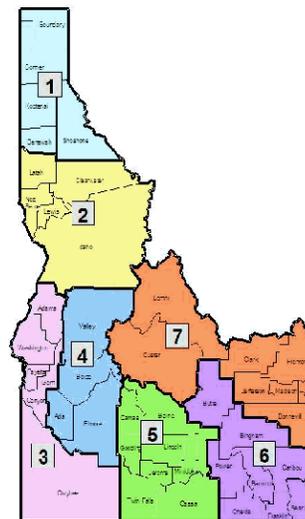


Table 2: Population Distribution and Interviews Total and by Health District

Idaho		Sample Plan		Achieved			
		Population 18+	% of Population	# of Completed Surveys	% of Sample	# of Completed Surveys	% of Sample
1	Panhandle	162,322	14.2%	640	14.2%	642	14.0%
2	N. Central	84,198	7.4%	332	7.4%	381	8.3%
3	Southwest	177,979	15.6%	701	15.6%	722	15.8%
4	Central	324,103	28.4%	1,277	28.4%	1,261	27.6%
5	S. Central	132,299	11.6%	521	11.6%	551	12.1%
6	Southeast	118,654	10.4%	468	10.4%	476	10.4%
7	East	142,429	12.5%	561	12.5%	537	11.8%
Idaho Total		1,141,984		4,500		4,570	

¹⁹ Brick, M. P., Edwards, W. S., and Lees, “Sampling Telephone Numbers and Adults, Interview Length, and Weighting in the California Health Interview Survey Cell Phone Pilot Study,” *Public Opinion Quarterly*, 71 (5), 2000, 793-813.

²⁰ Battaglia, M. P., “Reaching the U.S. Cell Phone Generation: Comparison of Cell Phone Survey Results with an Ongoing Landline Telephone Survey,” (2015)

http://www.researchgate.net/publication/31153130_Reaching_the_U.S._Cell_Phone_Generation_Comparison_of_Cell_Phone_Survey_Results_with_an_Ongoing_Landline_Telephone_Survey

Resident Anglers

Resident anglers—defined as adults, residing in Idaho, with a valid Idaho fishing license or a combined hunting and fishing license at any time during the 2013 or 2014 calendar years—represent an important segment of the total population for fish consumption as it was believed that anglers would be more likely to consume non-market Idaho fish. Idaho Department of Fish and Wildlife (IDFW) provided an initial estimate that there were 362,567 adults holding an Idaho fishing license; this equates to 32 percent of all Idaho adults. At a later date, IDFW provided a list of 297,865 current license holders; this included non-residents and some individuals under the age of 18. A review of this database indicated that out of a total of 1.14 million Idaho adults, 296,042 held a license. This was equivalent to 26 percent of all Idaho residents 18 years of age and older.

BSU originally recommended that 2,000 of the 7,000 completed surveys should be completed with anglers. This recommendation was driven by the assumption that anglers would be more likely to consume fish and that an over-sample of anglers would be needed to achieve the necessary number of twice consumers to use the NCI method. During the pretest and after the first six weeks of data collection, a review of the data indicated that approximately 33 percent of those contacted using the general population sample reported that they had a valid license. Therefore, a minimum number of interviews (n = 1,500 or 33 percent of all interviews) with the angler segment was established.

It was originally believed that use of the list of current license holders would be the most efficient means to reach anglers. The list contained both landline and cell phone numbers, although these were not distinguished. The pretest and first month of data collection used both the RDD sample frame and the IDFW list. High contact and response rates via the IDFW list plus a high incidence of anglers in the RDD sample frame resulted in a significant over-representation of anglers. The decision was made to not use the IDFW list and rely only on the RDD sample frame. In addition to reducing the potential for significantly over-representing anglers, sole use of the RDD sample frames eliminated any frame overlap between the RDD frames and the IDFW sample frame.

A total of 1,649 anglers were interviewed. Relying on the review of the IDFW database as the correct estimate of the percentage of resident anglers in the population, anglers are over-represented by a factor of 0.4 in the final sample. Over-representation is greatest in Eastern Idaho and, to a lesser extent, in South Central, North Central, and Southeast Idaho.

Table 3: Resident Anglers Total and by Health District

District		Idaho			Sample Plan		Achieved	
		Population 18+	# of Anglers 18+*	% Anglers Within District	# of Angler Surveys	% Within District	# of Angler Surveys	% Within District
1	Panhandle	162,322	44,313	27.3%	225	35.2%	225	38.3%
2	N. Central	84,198	24,717	29.4%	125	37.7%	170	44.4%
3	Southwest	177,979	48,657	27.3%	247	35.2%	221	35.5%
4	Central	324,103	74,052	22.8%	375	29.4%	379	29.6%
5	S. Central	132,299	35,672	27.0%	181	34.7%	232	40.4%
6	Southeast	118,654	31,802	26.8%	160	34.2%	193	37.8%
7	East	142,429	36,829	25.9%	187	33.3%	229	37.4%
Idaho Total		1,141,984	296,042	25.9%	1,500	33.3%	1,649	36.1%

* Source: IDFW database of licensed anglers as of 12/31/2013

Age and Gender Representation

To ensure representation of men and women and the three primary age groups (18–35, 35–54, and 55 plus) statewide, the age within gender distributions were monitored throughout data collection both statewide and at the health district level to ensure that there was no significant over- or under-representation of any part of the state and that statewide representation was within plus or minus 2 percent of actual. A maximum number of interviews within each age / gender segment was established for each month of interviewing. All sample elements in a replicate were dialed and screened; however, full interviews were not completed if the maximum number of interviews had been achieved.

Table 4 provides the age-within-gender distribution for the final achieved sample. The age-within-gender distribution for each health district is included in the Appendix.

Table 4: Statewide Population Distribution and Interviews by Age within Gender

Statewide						
	Idaho		Sample Plan		Achieved	
	# Population 18+	% of Population 18+	# of Completed Surveys	% of Sample	# of Completed Surveys	% of Sample
Men (All Ages)	567,187	49.7%	2,235	49.7%	2,136	46.7%
18–34	185,727	16.3%	730	16.2%	721	15.8%
35–54	200,453	17.6%	790	17.6%	745	16.3%
55 plus	181,007	15.9%	715	15.9%	670	14.7%
Women (All Ages)	574,797	50.3%	2,265	50.3%	2,434	53.3%
18–34	178,553	15.6%	700	15.6%	724	15.8%
35–54	199,225	17.4%	785	17.4%	869	19.0%
55 plus	197,019	17.3%	780	17.3%	841	18.4%
Total	1,141,984		4,500		4,570	

Other Demographics

In addition to age and gender, income and ethnicity were also monitored. Eighteen percent of Idahoans 18 years of age and older have annual household incomes of \$25,000 or less. Response rates can be lower among low-income households.²¹ In addition, low-income households are more likely to be accessed through cell phone samples.²² To ensure representation of low-income households, this demographic was monitored throughout data collection at the statewide level. As shown in Table 5, representation of low-income households statewide is nearly proportionate to the statewide population. While there are some differences at the health district level, these are not sufficient to be of significant concern.

²¹ Keeter, S., Miller, C., Kohut, A., Groves, R. M., and Presser, S. "Consequences of Reducing Nonresponse in a National Telephone Survey,"

²² Meekins, B., and Denton, S. "Cell Phones and Non-Sampling Error in the American Time Use Survey," October 2012, *Public Opinion Quarterly*, Volume 64, No. 2, pp. 125–148.

Table 5: Low Income Households and Interviews Total and by Health District

District		Idaho			Sample Plan		Achieved	
		# of Households	# HHs with Incomes <\$25K	% Low-Income Within District	# Low-Income	% Within District	# Low-Income	% Within District
1	Panhandle	162,322	21,740	25.0%	160	25.0%	150	28.4%
2	N. Central	84,198	12,912	30.0%	100	30.1%	93	26.3%
3	Southwest	177,979	24,401	28.0%	195	27.8%	173	30.9%
4	Central	324,103	33,146	20.0%	255	20.0%	234	19.8%
5	S. Central	132,299	16,720	25.0%	130	25.0%	148	27.4%
6	Southeast	118,654	14,921	25.2%	120	25.6%	126	26.4%
7	East	142,429	16,826	24.7%	140	25.0%	121	21.5%
Idaho Total		1,141,984	140,666	24.4%	1,100	24.4%	1045	24.9%

Hispanics represent approximately 12 percent of Idaho’s population but only 9 percent of Idaho adults. Like low-income households, Hispanics are more likely to be cell phone only households, and it was believed that increased cell phone sampling would increase the likelihood of reaching this segment.²³ While the original plan did not specifically address representation of Hispanics, it was noted after several months of data collection that Hispanics were somewhat under-represented in the sample. Therefore, additional efforts were made to increase representation of Hispanics including increased number of callbacks to known Hispanic households and use of targeted sample. These increased efforts resulted in representation of Hispanic adults proportionate to that in the general population.

Table 6: Hispanic Interviews Statewide

District	Idaho			Achieved	
	Population 18+*	# Hispanics	% Hispanic	# Hispanic	% Hispanic
Idaho Total	1,138,445	102,919	9.0%	401	8.9%

* Source: U.S. Census Bureau, 2010 Census.

Early analysis of the data indicated that there were no significant differences in consumption rates between Hispanic and non-Hispanic respondents. Therefore, it was determined that there would be limited benefit to incurring the additional data collection costs to translate the survey into Spanish and to have bi-lingual interviewers on standby. All interviews were completed in English. Of the 16,072 actual contacts 812 (or 5 percent of all contacts) were not completed due to a communications barrier which could include language. This is consistent with Census data that indicates that 4 percent of Idaho residents speak English less than very well.

²³ Link, M. W., Battaglia, M. P., Frankel, M. R., Osborn, L., and Mokdad, A. H., “Reaching The U.S. Cell Phone Generation Comparison of Cell Phone Survey Results with an Ongoing Landline Telephone Survey,” *Public Opinion Quarterly*, Vol. 71, No. 5, 2007, pp. 814–839.

Questionnaire Design and Testing

Due to the complexity of the research, the questionnaire design and testing process was extensive and consisted of four phases.

Phase 1: Literature Review

An extensive review of prior fish consumption surveys was undertaken by Boise State University and Northwest Research Group to develop the initial survey questionnaire. Northwest Research Group used the original questionnaire developed by Boise State University²⁴ and modified it to incorporate additional research and to format it so that it could be administered by telephone.

The draft questionnaire was comprised of two primary sections. The first section consisted of a set of food frequency questions (FFQs) asking respondents to report their usual frequency of consumption of a food item or items for a specific period of time. Standard food frequency questions were reviewed.²⁵ Particular focus was on questionnaires that had been developed and tested for consumption of a single item such as alcohol or groups of items such as fruits and vegetables as those were considered to be more similar to the current study than those measuring consumption of all foods consumed during a specific time period.²⁶ Food frequency questions have been widely used in part because research^{27,28,29, 30} has demonstrated that studies using FFQs are:

- Significantly less expensive to administer and process than food records or diet recalls
- Generally representative of usual intake
- A preferable method of measuring intake for nutrients with high day-to-day variability
- Easy for literate subjects to complete
- Suitable for very large studies

On the other hand, FFQs are not without corresponding weaknesses:

- They are a retrospective method that relies upon the respondent's memory.
- Cost may increase dramatically for questionnaires that must be interviewer-administered, such as for low-literacy populations.

²⁴ Boise State University, loc.cit.

²⁵ Dwyer, J. (1999). "Dietary Assessment." In *Modern Nutrition in Health and Disease*, eds. M. E. Shills, J. A. Olson, M. Shike, and A. C. Ross, 937–59. Baltimore, MA: Williams & Wilkins.

²⁶ Field, A. E., Colditz, G. A., Fox, M. K., Byers, T., Serdula, M., Bosch, R. J., and Peterson, K. E. (1998). Comparison of Four Questionnaires for Assessment of Fruit and Vegetable Intake. *American Journal of Public Health* 88:1216–18; or Serra-Majem, L., Santana-Armas, J. F., Ribas, L., Salmons, E., Ramon, J. M., Colom, J., and Salleras, L. (2002). A Comparison of Five Questionnaires to Assess Alcohol Consumption in a Mediterranean Population. *Public Health and Nutrition* 5:589–94.

²⁷ Block, G., Thompson, F. E., Hartman, A. M., Larkin, F. A., and Guire, K. E. (1992). Comparison of Two Dietary Questionnaires Validated against Multiple Dietary Records Collected during a 1-Year Period. *Journal of the American Dietetic Association* 92:686–93.

²⁸ Subar, A. F., Thompson, F. E., Kipnis, V., Midthune, D., Hurwitz, P., McNutt, S., McIntosh, A., and Rosenfeld, S. (2001). Comparative Validation of the Block, Willett, and National Cancer Institute Food Frequency Questionnaires: The Eating at America's Table Study. *American Journal of Epidemiology* 154:1089–99.

²⁹ Pritchard, J. M., Seechum, T., and Atkinson, S. A. (2012, August). A Food Frequency Questionnaire for the Assessment of Calcium, Vitamin D and Vitamin K: A Pilot Validation Study. *Nutrients*, 2(8):805–19.

³⁰ Riley, M., Rutishauser, I., and Web, K. (2001). Comparison of Short Questions with Weighed Dietary Records. Australian Food and Nutrition Monitoring Unity & Department of Health and Aged Care. National Food and Nutrition Monitoring and Surveillance Project.

- Foods differ in the extent to which they are over- and underreported (errors are not random).
- Arbitrary groupings of foods may not correspond to the respondent's perceptions.
- Social desirability or self-presentation biases may distort reports of "healthy" (e.g., fruits, vegetables) and "unhealthy" (e.g., salty snacks) food consumption.

It was also decided to include estimates of average portion sizes consumed in the food frequency questions. There has been considerable discussion about whether to include estimates of portion sizes in food frequency questionnaires driven in part by research indicating that most people cannot accurately estimate portion sizes of commonly consumed foods.³¹ However, there has been research that indicates some improvements in the performance of consumption estimates when asking respondents to report a typical portion size.³² In addition, there has been some research on the best ways to ask questions about portion sizes.³³ As a result, it was decided to include questions about the average fish portion size consumed, using best practices from this research.

The second major component of the questionnaire was a set of dietary recall questions. The most common approach to dietary recall is to use the previous 24 hours. Respondents are asked to remember and report foods and beverages consumed in the category of interest in the preceding 24 hours or in the preceding day.³⁴ The current state-of-the-art 24-hour dietary recall survey instrument is the United States Department of Agriculture's (USDA) automated multiple-pass method (AMPM). It is used in the U.S. National Health and Nutrition Examination Survey (NHANES).³⁵

As with food frequency questions, research indicates that there are both strengths and weaknesses inherent in this approach^{36, 37, 38}. Strengths include:

- With trained interviewers and a well-constructed questionnaire, it is relatively easy for a respondent to complete. Because of the relatively low respondent burden, studies are likely to be representative of the general population of interest.

³¹ Guthrie, H. (1984). Selection and Quantification of Typical Food Portions by Young Adults. *Journal of the American Dietetic Association* 84:1440–44; and Howat, P., Mohna, R., Champagne, C., Monlezun, C., Wozniak, P., and Gray, G. A. (1994). Validity and Reliability of Dietary Intake Data. *Journal of the American Dietetic Association* 94(2):169–73.

³² Cummings, S. R., Block, G., McHenry, K., and Baron, R. B. (1987). Evaluation of Two Food Frequency Methods of Measuring Dietary Calcium Intake. *American Journal of Epidemiology* 126:796–802.

³³ Subar, A. F., Thompson, F. E., Smith, A. F., Jobe, J. B., Ziegler, R. G., Potischman, N., Schatzkin, A., Hartman, A., Swanson, C., Kruse, L., Hayes, R. B., Riedel-Lewis, D., and Harlan, L. C. (1995). Improving Food Frequency Questionnaires: A Qualitative Approach Using Cognitive Interviewing. *Journal of the American Dietetic Association* 95:781–8; and Subar, A. F., Ziegler, R. G., Thompson, F. E., Johnson, C. C., Weissfeld, J. L., Reding, D., Kavounis, K. H., and Hayes, R. B. (2001). Is Shorter Always Better? Relative Importance of Dietary Questionnaire Length and Cognitive Ease on Response Rates and Data Quality for Two Dietary Questionnaires. *American Journal of Epidemiology* 153:404–409.

³⁴ Gibson, R. S. (1990). *Principles of Nutritional Assessment*. New York: Oxford University Press.

³⁵ Agricultural Research Service, U.S. Department of Agriculture. (2007). What We Eat in America, NHANES. , <http://www.ars.usda.gov/Services/docs.htm?docid=13793>.

³⁶ Cullen, K. W., Watson, K., Himes, J. H., Baranowski, T., Rochon, J., Waclawiw, M., Sun, W., Stevens, M., Slawson, D. L., Matheson, D., and Robinson, T. N. (2004). Evaluation of Quality Control Procedures for 24-h Dietary Recalls: Results from the Girls Health Enrichment Multisite Studies. *Preventive Medicine* 38(suppl):S14–S23.

³⁷ Probst, Y. C., and Tapsell, L. C. (2005). Overview of Computerized Dietary Assessment Programs for Research and Practice in Nutrition Education. *Journal of Nutrition Education and Behavior* 37:20–26.

³⁸ National Research Council. (1986). "Nutrient Adequacy: Assessment Using Food Consumption Surveys." Washington, D.C.: National Academy Press.

- It is suitable for large-scale surveys.
- It can be administered in person or by telephone and using either a computer-assisted or paper-and-pencil form.

On the other hand, dietary recall surveys have some of the same weaknesses as FFQs:

- They are memory dependent—that is, they are a retrospective method that relies on the respondents' ability to recall consumption. Depending on what is required—all food and beverage consumed versus consumption of a single item or group of items—long-term memory may be more or less reliable.
- There can be social desirability bias in recording good versus bad foods consumed.
- Estimates of portion sizes can be inaccurate.
- In addition, the single observation obtained in dietary recall surveys provides a poor measure of individual intake, notably for infrequently consumed items. Specifically, most individuals' diets vary greatly from day to day; therefore, it is not appropriate to use data from a single 24-hour recall to characterize an individual's usual diet without application of appropriate statistical techniques, such as the NCI method, to correct for the variability introduced by short duration of recall.

It was decided to also include 7-Day Dietary Recall questions. It was believed that as fish consumption is a periodic, rather than daily, event recall within the past week would be as accurate as recall within the past 24 hours. A longer recall period is supported by some research as it provides more information about the particular behavior or phenomenon being study and results in more stable estimates.³⁹ However, they are subject to bias—under-reporting—due to the increased likelihood of the respondent forgetting. Inclusion of both 24-Hour and 7-Day Dietary Recall questions increased the likelihood of reaching respondents who had consumed fish during both the main and re-contact studies and thus obtaining sufficient repeat recalls to support the NCI method.

Phase 2: Qualitative Research

Qualitative research was used to cognitively test the language in the questionnaire. The primary purpose of cognitive testing is to investigate how well questions perform when asked of survey respondents, that is, if respondents understand the question correctly and if they can provide accurate answers. Inaccurate answers also arise from memory error in retrieving information and sometimes bias that is introduced by the respondent's desire to provide a socially acceptable answer. Cognitive testing helps to ensure that a survey question successfully captures the scientific intent of the question and, at the same time, makes sense to respondents. This is increasingly becoming an essential part of the development process of any survey instrument.⁴⁰

Testing is performed by conducting in-depth, semi-structured interviews with a small number of respondents similar to those targeted in the survey. The interviewer asks the respondent(s) to think aloud as he or she answers each question, indicating how he or she arrived at the answer. Small group interviews were used for this phase of testing.

³⁹ Bingham, S., Gill, C., Welch, A., et al. Validation of dietary assessment methods in the UK arm of EPIC. *International Journal of Epidemiology* 1997, 26:S137–51; and Day, N. E., McKeown, N., Wong, M. Y., Welch, A., and Bingham, S. (2001). Epidemiological Assessment of Diet: A Comparison of a 7-Day Diary with a Food Frequency Questionnaire Using Urinary Markers of Nitrogen, Potassium and Sodium. *International Journal of Epidemiology* 30:309–17.

⁴⁰ Carbone, E. T., Campbell, M. K., and Honess-Morreale, L. (2002). Use of Cognitive Interview Techniques in the Development of Nutrition Surveys and Interactive Nutrition Messages for Low-Income Populations. *Journal of the American Dietetic Association*. 102(5):690-696; and Collins, D. (2003). Pretesting Survey Instruments: An Overview of Cognitive Methods. *Quality of Life Research* 12:229–238.

A total of six focus groups were held—two in each of the following markets: Northern Idaho (Coeur d’Alene), Central Idaho (Boise), and Eastern Idaho (Pocatello). One group per market was composed of anglers and one group per market was composed of non-anglers. Each group consisted of six to eight participants. All participants were 18 years of age or older, and all participants had consumed fish at least once in the past 30 days. Half of the participants in each group had consumed fish at least once in the past seven days. Groups consisted of a mix between men and women and different ages (18–34, 35–54, 55 plus).

Key discussion points, as well as brief notes as to the findings, are listed below. For a full report on the findings of this research see the written Qualitative Report.

- 1) Determine which time-references work best when asking participants about fish recall:
 - a. “Past year” versus “Past 12 months”—Decision was to use “Past 12 months.”
 - b. “Past Month” versus “Past 30 days”—Decision was to use “Past 30 days.”
 - c. “Past week” versus “Past 7 days”—Decision was to use “Past 7 days.”
 - d. “Yesterday” versus “Past 24 Hours”—Decision was to use “Yesterday.”
- 2) Understand how people define “Fish” and “Seafood”:
 - a. “Fish” is generally thought of as being from fresh water.
 - b. “Seafood” is generally thought of as being from the sea.
 - c. Shellfish and purchased/frozen goods were not initially thought of when asked about “fish and seafood.”
- 3) Recall—Place of consumption
 - a. Meal versus Snack—Participants primarily only thought about meals at home. Prompting was needed to get them to think about snacks and leftovers.
 - b. Home versus Restaurant—Participants usually considered meals eaten at home and at restaurants.
 - c. Somewhere else—Participants generally did not think about eating fish or seafood when not consumed at home or at a restaurant. Prompting was needed to get them to include places like work and friends’ houses.
- 4) Recall—Frequency of consumption
 - a. Recall was limited beyond 7 days.
 - b. “Average” number of consumptions was impacted by seasonality and ability to estimate beyond one month.
- 5) Portion Size
 - a. Conclusion is that questions must specifically ask for ounces and must allow for ranges.
 - i. Visual cues such as “deck of cards, tennis ball or palm of hand” were referenced by every group.
 - ii. Less than half of the participants provided portion size in ounces.
 - iii. Unless the participant prepared the fish, most could only give a range.
 - b. Most participants described the portion size in terms of the size of the portion “in front of them at the meal” that is cooked or prepared.
- 6) Recall of Recent Consumption
 - a. High consumers had a more difficult time recalling individual fish/seafood consumption events beyond a few days.
 - b. Moderate or low consumers were able to recall farther back, but specifics were lost after two to three events.

Major changes to the questionnaire based on the qualitative research included:

- The introduction was modified to be shorter and to clearly identify the purpose and sponsor of the research. Other information could be provided if requested by the respondent.
- Overall food frequency questions were decomposed to ask about frequency of fish consumption for different types of consumption events (e.g., at home versus in a restaurant) to increase the accuracy of the overall estimate. Estimates of portion sizes were then provided for each type of event.
- Respondents were asked to provide portion size estimates in ounces (unaided response). If they were unable to provide an absolute number, they were given an aided response by the interviewer reading a set of response categories ranging from less than 1 ounce to more than 16 ounces. Each response category represented a range [e.g., between one (1) and three (3) ounces or between four (4) and six (6) ounces]. Respondents were asked to indicate the response category representing their best estimate.
- When asking about 24-hour recall, the decision was made to use the term “yesterday” rather than “past 24 hours” to ensure that respondents were all using the same context.
- It was decided to retain a full seven-day recall as the goal was to maximize the potential number of fish meals and corresponding data. While the qualitative research indicated that recall would likely be lower among frequent fish consumers and distance from event grew, data from infrequent consumers would be limited if a shorter recall period was used.

Phase 3: Testing Use of Portion Size Estimation Aids

A separate study was conducted under a separate contract to further inform the design of IDEQ’s Fish Consumption Survey. The overall objective of the research was to determine the extent to which verbally (over the phone) administered portion size estimation aids (PSEAs) improve individual-level portion size estimates. It was anticipated that the research results would be used to identify the extent to which a verbal PSEA was needed to improve the accuracy of respondents’ recall of recent portion sizes consumed and, if needed, which PSEA was the best aid. It was also believed that the research results could be used to estimate the variance in portion size with and without a PSEA, and this variance estimate could potentially be used to calibrate portion size estimates from IDEQ’s phone survey.

This research used an experimental design to test the differences in portion size estimates under different conditions that would be similar to what might be used in research using different data-collection methodologies. Four conditions were tested, ranging from a respondent having full information—seeing a portion of fish or seafood along with a PSEA—to having no estimation aid at all. Study participants provided portion size estimates for two commonly consumed fish or seafood items—either a thick or thin piece of fish and a serving of shrimp. Five different PSEAs were tested.

A significant finding from this research was that there were no noticeable differences in the portion size estimates between the conditions where the PSEA was shown during the estimation (visual PSEA) or merely described (verbal PSEA). Based on this finding, the IDEQ survey questionnaire was structured to include the use of a verbal PSEA in those instances where a respondent was unable to provide an estimate of portion size without an estimation aid—that is, they responded “don’t know” to the question asking them to estimate the portion size of the fish for the meal(s) they consumed in the past 24 hours or past 7 days.

The research also explored what response format provided the most accurate estimate of portion size when respondents use a PSEA. Two response formats were tested—providing an estimate of portion size relative to the

size of the PSEA (e.g., 1.5 times as large, twice as large, etc.) or using the PSEA to compute an actual estimate in ounces. In the latter treatment, respondents were told that the PSEA was equivalent to 3 ounces of fish or seafood. Providing respondents with the equivalent weight of the PSEA and then asking them estimate the portion size in ounces provides a significantly more accurate estimate of portion size than asking them to indicate the size of the portion relative to the PSEA. The IDEQ Fish Consumption Survey used this more accurate response format.

The final finding was that, with the exception of a checkbook, there were no significant differences in the accuracy of portion size estimates for the remaining four PSEAs. Combined with the results of the qualitative research indicating that most participants thought about a deck of cards or the palm of their hand to help them estimate portion sizes, it was decided to use a deck of cards as the estimation aid in.

Results from this research are documented in a separate report—“Leading to a More Accurate Estimate of Fish Consumption Portion Sizes in Telephone Survey Research,” Final Report prepared for the U.S. Environmental Protection Agency by Northwest Research Group under SRA International, Inc. Contract EP-W-09-011, Task Order #125, August 2014.

Phase 4: Pilot Test

The questionnaire was revised based on these findings and programmed for administration via the CATI system used by Northwest Research Group’s data collection partner, Issues and Answers. Once programmed, a final pilot test was conducted. Due to the complexity of the questionnaire and the size of the final study, this pilot test was significant. The focus of the pilot test was to address the following questions.

- Respondent Comprehension, Burden, and Interest
 - Do respondents have difficulty understanding words, terms, or concepts?
 - Is the sentence structure too complex? Do respondents understand the question, the task required, and the answer format?
 - Do respondents interpret the question as intended?
 - Do respondents use different response categories or choices than those offered?
 - Are respondents willing and able to perform the tasks required to provide accurate and complete answers?
 - Are respondents attentive and interested in the questions?
- Interviewer Tasks
 - Do interviewers have difficulty pronouncing words or reading particular sentences?
 - Do interviewers leave out words or modify the question wording in other ways?
 - Do interviewers read the question and probe in a neutral manner?
 - Do interviewers follow instructions correctly?
 - Do interviewers record complete answers? Is adequate space provided?
 - Are there any other tasks interviewers have difficulty performing?
- Other Questionnaire Issues
 - Do the sections of the questionnaire and the questions within sections have a logical flow?
 - Are all skip and logic patterns programmed accurate?
 - Is there evidence of question order effects?
 - What is the survey length? Is it reasonable and within the budget?
- Sampling

- What is the response rate? Does the response rate indicate any potential problems?
- Are the eligibility rates as expected; do these rates indicate any unexpected problems?
- Are there any indications of problems with the completeness and accuracy of the sampling frame?
- Coding and Analysis
 - Does the output from the CATI system provide data in the format required for analysis?

A total of 130 interviews, or 2.8 percent of the total sample size, were conducted using the exact procedures that were to be used for the study. This size pilot test is consistent with industry standards which suggest that the pilot test should be no less than 30 interviews but for larger studies should be equal to approximately 2 to 3 percent of the total sample.⁴¹

The Northwest Research Group Project Director was on site for the initial interviewer training and the first night of the pilot test for live monitoring. In addition, pilot test interviewers were recorded and reviewed. Interviewers were debriefed following the pilot test to gain their insights into any problems or issues. No major issues were identified.

The results from the pilot test were subjected to extensive review to ensure that skip and logic programs were working correctly and the data file output was as expected. Errors identified were corrected and retested before the study was launched.

Once the main study questionnaire was finalized, the re-contact study was developed. The organization of the final questionnaire is shown in Table 7.

Table 7: Major Questionnaire Sections and Topics

Section	Questions	Included
Introduction	To introduce the purpose of the study and gain cooperation <ul style="list-style-type: none"> ● General introduction ● Cell phone safety / activity 	Main and re-contact surveys
Screening	To ensure respondents met key criteria for the study, respondent selection process, monitoring key demographics, and for respondents reached on landline, respondent selection question <ul style="list-style-type: none"> ● Age (those younger than 18 were not interviewed) ● Confirmation of state residence and home zip code to place in correspondent health district ● Determination if respondent had a valid Idaho fishing license or a combined hunting and fishing license ● Key demographics (gender, age [18-24, 25-34, 35-44, 45-54, 55-54, 65+, and broad income [above or below \$25,000) to monitor sample distributions 	Main survey only

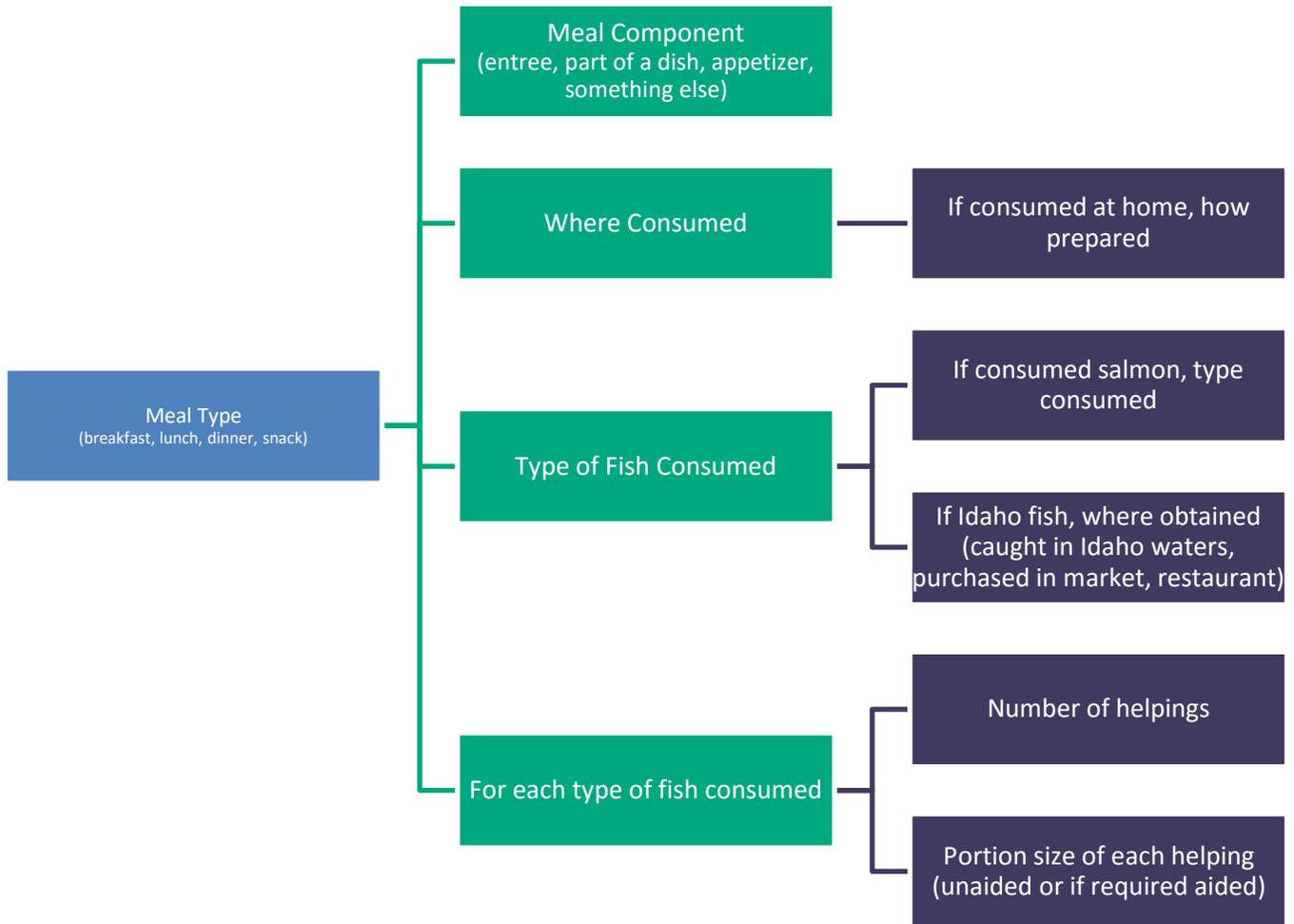
⁴¹ Courtenay, G. "Questionnaire Construction." In G. Hoinville and R. Jowell, Survey Research Practice. London: Heinemann Educational Books (1978), Chapter 3.

Section	Questions	Included
Overall Frequency of Fish Consumption and Average Portion Size	<p>General food (fish) frequency questions to assess overall consumption behavior and determine if qualified for re-contact study</p> <ul style="list-style-type: none"> Recency of fish consumption (past year, past month, past seven days) Number of meals at home, in restaurants, at other people’s homes or at work, or as a snack in in the most recent week, month, or full 12 months (depending on recency of fish consumption) Respondents provided an absolute average number of times and specified the denomination (e.g., per week or per month) Estimate (in ounces) of average portion size consumed for each meal type For anglers, the percentage of meals or snacks containing fish or seafood caught in Idaho 	Main survey only
Dietary Recall Yesterday and for Other Meals in Seven Days Prior to Yesterday	<ul style="list-style-type: none"> Confirmation that respondent consumed fish yesterday Meal or meals when fish was consumed For each meal when fish was consumed consumption details 	Main and re-contact surveys
Other Questions	<ul style="list-style-type: none"> Reasons for consuming / not consuming fish or seafood Additional demographics (education, race, ethnicity, body weight, detailed income) Willingness to be re-contacted 	Main survey only

Survey length varied widely—ranging from 3 to 37 minutes—based on the extent to which an individual consumes fish in general and specifically within the eight days prior to the interview. Average interview length was ten minutes, a reasonable length for a telephone survey.

For the dietary recall questions (yesterday and past seven days), respondents provided consumption details as illustrated below:

Figure 1: Dietary Recall Questions



Data Collection—Main Study

It was hypothesized that fish consumption might vary seasonally both in terms of frequency and potentially average portion size. Therefore, it was decided to conduct data collection over an entire year with an approximately equal number of interviews completed each month to ensure that the average annual consumption estimates would reflect this seasonality, if it exists. In addition, this was an opportunity to assess whether seasonality does exist. Data collection for the main study was conducted between April 24, 2014, and April 2, 2015. Fewer interviews were conducted during the first month to provide the opportunity for one additional check of the data file and programming.

Table 8: Main Study Data Collection

Month	Interviews Completed		
	Number	% of	Cumulative %
Apr-14	110	2.4%	2.4%
May-14	375	8.2%	10.6%
Jun-14	406	8.9%	19.5%
Jul-14	393	8.6%	28.1%
Aug-14	411	9.0%	37.1%
Sep-14	410	9.0%	46.1%
Oct-14	404	8.8%	54.9%
Nov-14	408	8.9%	63.8%
Dec-14	400	8.8%	72.6%
Jan-15	402	8.8%	81.4%
Feb-15	408	8.9%	90.3%
Mar-15	443	9.7%	100.0%
	4,570	100.0%	

Training and Supervision

Data collection was conducted by NWRG’s data collection partner, Issues and Answers. All interviewers were required to have completed a minimum of six hours of basic training which included interviewing skills and organizational requirements. A dedicated team of interviewers received study-specific training; study-specific retraining occurred over the course of the study as new interviewers were added or when monitoring identified issues or concerns. NWRG’s Project Director attended the initial training, and Issues and Answers maintained records to confirm that new or substitute interviewers received the required training.

A minimum of 10 percent of all interviewers were monitored by Issues & Answers supervisors and quality assurance staff. Monitoring consisted of listening to live interviews and simultaneously viewing data entry. A sample of interviews was recorded, and NWRG staff reviewed these recordings and as appropriate provided feedback to Issues & Answers. Most feedback focused on individual interviewer productivity and handling the survey introduction to gain cooperation.

Call Scheduling and Dialing Protocols

A minimum of five attempts were made to all landline sample elements before the number was abandoned. A minimum of three attempts were made to cell phone sample before being abandoned. The majority of calls were made during weekday evening hours (5:00 to 9:00 p.m.) which are the most productive contact hours. However,

at least one attempt was made during the day and at least one attempt on a weekend. There were no restrictions on calling times for appointments or scheduled callbacks.

A caller identification number (toll free 800 number) was displayed, and interviewers left messages when reaching voicemail, providing a toll-free number. Information was also maintained on IDEQ’s and NWRG’s website providing additional information about the study and upon request respondents or potential respondents were referred to these sites.

Response Rates—Main Study

Response rates represent an important quality control measure. They measure the extent to which dialing protocols are successful in contacting an eligible respondent and whether interviewers are successful in gaining respondent cooperation once a contact has been made.

Response rates were relatively consistent throughout data collection, ranging from 23 percent to 32 percent over any three-month period. Response rates were higher near the end of the survey as increased efforts were made to complete interviews with respondents contacted early in the study but were never reached, as well as with respondents contacted early in the study but who did not complete any portion of the survey.

The overall response rate was 25 percent. This was above the quality control measure (20%) established at the outset of the study. Contact rates were significantly higher than expected, 67 percent compared to 50 percent set as the quality control measure. Cooperation rates were on target—40 percent of eligible respondents agreed to complete the survey.

Table 9: Response Rates Main Study

Item	Details	Number / Calculation	Quality Measure
Total Numbers Used	Total sampled attempted at least once	112,538	
Total Working Numbers Available	Excludes numbers dialed but not eligible because they were non-working, business, or group quarters	50,575	
I = Completed		4,570	
P = Partial Interviews	Includes those who agreed to complete the survey but were not interviewed due to maximum number of interviews (age within gender) completed for the month	1,921	
R = Refusals and Breakoffs	Includes immediate refusals, partially completed interviews respondent terminates	9,611	
N = Non-Contacts	Selected respondent never available	1,094	
O = Other	Includes communication barrier	1,094	
UH = Unknown Household	Includes those contacted but eligibility not determined and households not contacted	32,285	
e = Estimate of Eligibility Unknown HHs	(interview + eligible not interview) / (eligible + not eligible)	22.8%	
Response Rate	AAPOR Response Rate 4 $(I+P)/((I+P)+(R+NC+O)+e(UH+UO))$	25.3%	20–22%
Contact Rate	AAPOR Contact Rate 2 $(I+P+R+O)/(I+P+R+O+NC+e(UH+UH))$	67.1%	50–60%
Cooperation Rate	AAPOR Coop Rate 4 $(I+P)/(I+P+R)$	40.3%	40–50%

There is limited data available to assess how these response rates compare to other studies. The most recent data available is from May 2012 from Pew Research Center and is shown below. Pew has found that response rates to telephone surveys have fallen dramatically, due in large part to the difficulty of persuading potential respondents. Response rates achieved for IDEQ’s fish consumption survey were significantly greater than response rates to Pew’s general polls. While contact rates were similar to those achieved by Pew, the cooperation rates achieved for IDEQ’s survey were equivalent to those achieved by Pew in 2000 and significantly better than rates in subsequent years

Table 10: Trends in Response Rates⁴²

	2000	2003	2006	2009	2012
Contact Rate	77%	79%	73%	72%	62%
Cooperation Rates	40%	34%	31%	21%	14%
Response Rates	28%	25%	21%	15%	9%

⁴² Pew Research Center, “Assessing the Representativeness of Public Opinion Surveys,” <http://www.people-press.org/2012/05/15/assessing-the-representativeness-of-public-opinion-surveys/5-15-12-1/>

Data Collection and Response Rates—Re-contact Survey

As part of the main study, respondents who had consumed fish at least four times in the past year were asked their willingness to participate in a follow-up study. Re-contact attempts commenced approximately 15 days after the first attempt and were completed within 30 days of the first attempt. Similar dialing protocols were used for the main and re-contact surveys; however, the total number of attempts was increased to eight for both landline and cell phone. Table 11 provides details as to the number of eligible re-contacts, the percentage eligible who agreed to be re-contacted, and the corresponding response rate.

It was originally assumed based on Idaho BRFSS data that 90 percent of those initially contacted would be eligible to be re-contacted—that is, they had consumed fish in the past year. The actual rate was somewhat lower due to stricter criteria requiring consumption rates of four or more meals or snacks in the past year. The percentage of qualified respondents who agreed to be re-contacted was consistent with original assumptions.

Response rates were lower than the quality goal. While cooperation rates were on target, contact rates were lower than anticipated.

Table 11: Response Rates Main Study

Item	Actual	Original Assumptions / Quality Goal
Total Number of Interviews Completed	4,570	
Number Qualified to Be Re-contacted	3,771	
% Qualified to Be Re-contacted	82.5%	90.0%
Number Agree to Be Re-contacted	2,781	
% Agree to Be Re-contacted	73.7%	75.0%
I = Completed Re-contacts	1,557	
P = Partial Re-contacts	0	
R = Refusals and Breakoffs	198	
N = Non-Contacts	968	
O = Other	58	
Response Rate	56.0%	57–63%
Contact Rate	65.2%	75.0%
Cooperation Rate	85.9%	76–84%
Number of Twice Consumers, Yesterday	40	50
Number of Twice Consumers, Yesterday plus seven days prior to yesterday	410	Not specified

Weighting—Main Study

Due to the complexity of the sample plan, weighting of the final respondent data file was required. A weight is a value assigned to each case in the data file. Weights are normally used to make statistics computed from the data more representative of the population. The value indicates how much each case will count in a statistical procedure—for example, a weight of 2 means that the case counts in the dataset as two identical cases; a weight of 1 means that the case only counts as one case in the dataset. Weights can be and often are fractions but are always positive and non-zero.

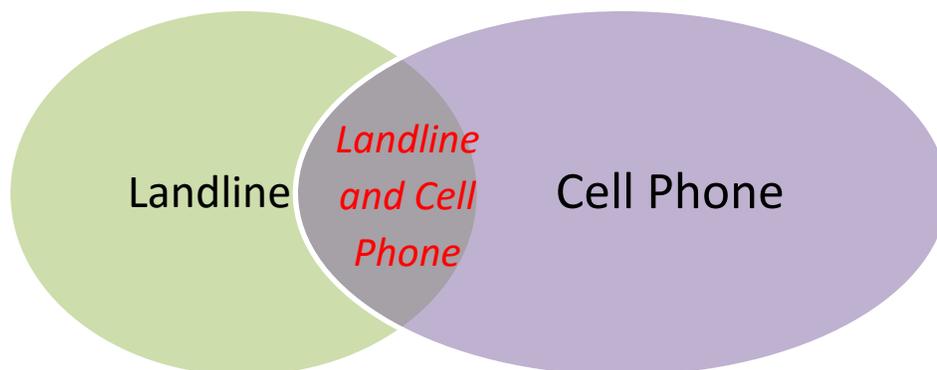
The two most common types of weights are:

- **Base Weight:** Used to reflect any differential selection probabilities, both at the primary sampling unit as well as subsequent selections that were employed.
- **Post-Stratification or Non-Response Weights:** Used to compensate for disproportionate sampling in a stratified sample or for the fact that persons with certain characteristics were not as likely to respond to the survey.

Both weights were required for this study.

Base Weight Computation

As previously discussed, a dual-frame sample was used to ensure maximum representation of all Idaho households. However, this results in some members of the study population having a non-zero probability of selection from more than one frame (as illustrated below).



The base weight was computed in two stages. The first stage of the base weight was to address the differential probabilities of selection between landline and cell phone sample frames. A literature review was conducted to identify the most efficient weighting approach in dual-frame phone samples. Traditional approaches have used a design weight to address the existence of multiple phone lines and multiple adults per household for landline sample. More recently, there has been strong support to couple this approach with a composite adjustment which allocates a proportion of the dual-phone weight to each frame via a compositing factor (λ). λ can be set to 50/50 (most common), chosen based on relative effective sample size, or optimized to a particular

outcome of interest.⁴³ While it was clear that a dual-frame adjustment was needed, it has been found that composite adjustments lead to higher unequal weighting that can lead to inflation of the error margins for survey estimates.⁴⁴

More recently there has been support for using a single-frame estimation (SFE) that treats the dual-frame as if it were a single frame,⁴⁵ which was the approach NWRG recommended for IDEQ’s Fish Consumption Survey.

There are four variables that determine the probability that an adult is selected from the landline sample frame. As cell phones were treated as individual rather than household devices, there were only three variables that determine the probability that someone was sampled by cell phone.

Landline		Cell Phone	
Label	Description	Label	Description
U _{LL}	Size of the landline sample frame	U _{CP}	Size of the cell phone sample frame
S _{LL}	Amount of landline sample released	S _{CP}	Amount of cell phone sample released
LL	Number of landline phones used to receive calls in the household	CP	Number of cell phones owned by the respondent
AD	Number of adults in the household		

The formula used was the single-frame (SF) basic probability (BP) method developed by Trent Buskirk and Jonathan Best (Nielsen Company and Princeton Survey Research Associates International).⁴⁶

$$BW_{-1} = ((S_{ll} \div U_{ll}) \times LL \div AD) + ((S_{cp} \div U_{cp}) \times CP - (((S_{ll} \div U_{ll}) \times (LL \div AD) \times (S_{cp} \div U_{cp}) \times CP)))^{-1}$$

Where: U_{LL} = 346,925

S_{LL} = 269,370

LL = 1 if respondent contacted on a landline; assumed to be 0 if contacted on cell phone and indicated they only have a cell phone or primarily use a cell phone

AD = 1 if single person household, 1.65 if two-person household, 2.65 if three-person household, and 3 if more than three-person household; decimal is based on percentage (35%) of Idaho households with children < 18

U_{CP} = 45,519 (from final disposition report)

⁴³ Xia, K., Pedlow, S., and Davern, M. (2010). “Dual-Frame Weights (Landline and Cell) for the 2009 Minnesota Health Access Survey, American Statistical Association, https://www.amstat.org/sections/srms/Proceedings/y2010/Files/308018_60874.pdf.

⁴⁴ Ridenhour, J., Berzofsky, M., Couzens, G. L., Blanton, C., Lu, B., Sahr, T. R., and Ferketich, A. (May 2013). “Most Efficient Weighting Approach in Dual-Frame Phone Survey with Multiple Domains of Interest,” AAPOR 68th Annual Conference <https://www.rti.org/pubs/aapor13-ridenhour-pres.pdf>

⁴⁵ Buskirk, T. D., and Best, J. (2012). “Venn Diagrams, Probability 101 and Sampling Weights Computed for Dual Frame Telephone RDD Designs,” American Statistical Association, https://www.amstat.org/sections/SRMS/Proceedings/y2012/Files/304351_72969.pdf.

⁴⁶ Ibid.

S_{CP} = 39,831 (from final disposition report)

CP = Assume 1 if contacted on cell phone or if contacted on landline and indicated they make some calls on a cell phone; assume 0 if contacted on landline and indicated all calls received on landline

While a significant percentage (56%) of the interviews were completed with the cell phone sample, only 40 percent were wireless only households, under-representing the estimated percentage (52%) of cell phone only households in Idaho⁴⁷. The second stage of the base weighting then was to reflect the higher rates of sampling landline and dual landline and cell phone households when compared to cell phone only households. This weighting is done at the health district level to ensure that cell phone only households are represented in proportion to their actual incidence in the general population in Idaho. This weight was computed by dividing the percentage of wireless only households in the population by the percentage in the sample.

$$BW_2 = \% \text{ of Wireless Only Households in Population} \div \% \text{ of Wireless Only Households in Sample}$$

Where: % of Wireless Only Households in Population was based on wireless only data provided at the county level and aggregated to corresponding health districts
% of Wireless Only Households in Sample was computed after BW₁ was applied

Table 12: Calculation of BW₂ for Wireless Only Households

District	Telephone Households	Landline Assignments	Wireless Counts	Telephone HH Type	% in Population	% in Sample*	BW ₂	% in Sample Weighted
1	95,632	46,753	48,879	Wireless Only	7.89%	5.1%	1.554671973	7.89%
				Not Wireless Only	7.55%	9.1%	0.829090090	7.55%
2	45,425	25,306	20,119	Wireless Only	3.25%	2.8%	1.167638609	3.25%
				Not Wireless Only	4.09%	6.2%	0.659404886	4.09%
3	89,181	43,890	45,291	Wireless Only	7.31%	6.9%	1.056904903	7.31%
				Not Wireless Only	7.09%	8.7%	0.812159310	7.09%
4	181,119	81,338	99,781	Wireless Only	16.11%	10.8%	1.486344152	16.11%
				Not Wireless Only	13.13%	16.3%	0.805953024	13.13%
5	71,552	35,859	35,693	Wireless Only	5.76%	3.5%	1.670215315	5.76%
				Not Wireless Only	5.79%	8.6%	0.671896799	5.79%
6	60,660	30,571	30,089	Wireless Only	4.86%	4.0%	1.227966210	4.86%
				Not Wireless Only	4.94%	6.4%	0.771843338	4.94%
7	75,834	35,037	40,797	Wireless Only	6.59%	4.7%	1.397045331	6.59%
				Not Wireless Only	5.66%	6.9%	0.815489673	5.66%
Total	619,403	298,754	320,649					
* % in Sample is computed after BW ₁ is applied								

The final base weight was computed by multiplying BW₁ times BW₂.

$$BW_{Final} = BW_1 \times BW_2$$

⁴⁷ Wireless Substitution: State-Level Estimates from the National Health Interview, National Health Statistics Report, No. 70, December 18, 2013.

Post-Stratification Weight

As previously discussed, the sampling and quality control took into account age-within-gender distributions at the statewide level. This ensured that age and gender representation was proportionate to the general population statewide and that health districts were sampled roughly in proportion to their population within the state. However, age within gender may not be completely representative within each health district. In addition, application of the calculated base weight (TEL_WGT) could affect this distribution.

A post-stratification weight was computed to ensure that age and gender representation was proportionate to the population within each health district and that each health district was represented proportionate to its population within the state. Three broad age categories were used: 18–34, 35–54, and 55 plus.

This weight was computed by dividing the percentage of each age within gender segment in the population by the percentage in the sample.

$$PST_WGT = \% \text{ of Age within Gender Segment in Population} \div \% \text{ of Age within Gender Segment in Sample}$$

Where: % of Age within Gender Segment in Population was based on data from the American Community Survey⁴⁸ provided at the county level and aggregated to corresponding health districts
% of Age within Gender Segment in Sample was computed after BW_Final is applied

The final weight was computed by multiplying BW_Final X PST_WGT.

$$Final_WFT_{MS} = BW_{Final} X PST_WGT$$

A similar process was used to create what is commonly referred to as an expansion weight. An expansion weight is used when there is a need to project the results to the general population 18 years of age and older. In this case the actual number of adults in the population or in the sample was used instead of the percentage of respondents.

$$PST_{WGT_EXP} = \# \text{ of Age within Gender Segment in Population} \div \# \text{ of Age within Gender Segment in Sample}$$

Where: # of Age within Gender Segment in Population was based on data from the American Community Survey⁴⁹ provided at the county level and aggregated to corresponding health districts
of Age within Gender Segment in Sample was computed after BW_Final is applied

⁴⁸ US Census Bureau, 2013 American Community Survey.

⁴⁹ Ibid.

Table 13: Calculation of Post-Stratification and Final Weight

District	Age within Gender Segment	% in Population	% in Sample (After BW_Final applied)	Weight*	% in Sample (after FINAL_WGT_MS applied)	District	Age within Gender Segment	% in Population	% in Sample (After BW_Final applied)	Weight*	% in Sample (after FINAL_WGT_MS applied)
1	Male 18–34	1.78%	2.8%	0.628647514	1.78%	4	Female 18–34	4.42%	5.3%	0.827334643	4.42%
	Male 35–54	2.41%	2.4%	0.994692287	2.41%		Female 35–54	5.24%	5.9%	0.882149663	5.24%
	Male 55+	2.78%	2.5%	1.100912184	2.78%		Female 55+	4.63%	3.9%	1.196709415	4.63%
	Female 18–34	1.76%	2.1%	0.856738267	1.76%	5	Male 18–34	1.80%	2.0%	0.924729701	1.80%
	Female 35–54	2.47%	2.8%	0.892105744	2.47%		Male 35–54	2.01%	1.9%	1.039073945	2.01%
	Female 55+	2.99%	2.9%	1.04628679	2.99%		Male 55+	1.97%	1.8%	1.099871597	1.97%
2	Male 18–34	1.30%	1.2%	1.058931552	1.30%	Female 18–34	1.69%	1.9%	0.906115622	1.69%	
	Male 35–54	1.08%	0.9%	1.221715646	1.08%	Female 35–54	1.96%	1.9%	1.012670843	1.96%	
	Male 55+	1.34%	1.0%	1.282454685	1.34%	Female 55+	2.13%	2.1%	1.026665849	2.13%	
	Female 18–34	1.11%	1.2%	0.963657288	1.11%	6	Male 18–34	1.75%	2.0%	0.896088219	1.75%
	Female 35–54	1.08%	1.5%	0.726837889	1.08%		Male 35–54	1.68%	1.7%	1.008990558	1.68%
	Female 55+	1.41%	1.5%	0.920885973	1.41%		Male 55+	1.69%	0.9%	1.866502414	1.69%
3	Male 18–34	2.42%	2.5%	0.96215016	2.42%	Female 18–34	1.69%	1.9%	0.872152639	1.69%	
	Male 35–54	2.74%	2.5%	1.075207379	2.74%	Female 35–54	1.71%	1.6%	1.099986328	1.71%	
	Male 55+	2.51%	1.5%	1.698232464	2.51%	Female 55+	1.81%	1.8%	1.009666648	1.81%	
	Female 18–34	2.43%	2.6%	0.948634654	2.43%	7	Male 18–34	2.38%	2.3%	1.047130549	2.38%
	Female 35–54	2.77%	3.0%	0.917357868	2.77%		Male 35–54	2.00%	2.0%	1.02745774	2.00%
	Female 55+	2.77%	2.3%	1.217307315	2.77%		Male 55+	1.78%	1.5%	1.184628526	1.78%
4	Male 18–34	4.69%	5.3%	0.882686785	4.69%	Female 18–34	2.40%	2.6%	0.91083775	2.40%	
	Male 35–54	5.40%	5.1%	1.052090189	5.40%	Female 35–54	1.97%	2.5%	0.775136869	1.97%	
	Male 55+	4.16%	3.7%	1.133850434	4.16%	Female 55+	1.91%	1.3%	1.452512685	1.91%	

Table 14: Calculation of Post-Stratification and Final Expansion Weight

District	Age within Gender Segment	Number 18+ in Population	# in Sample (After BW_Final applied)	Weight*	District	Age within Gender Segment	Number 18+ in Population	# in Sample (After BW_Final applied)	Weight*
1	Male 18–34	20612	156.960	131	4	Female 18–34	51143	295.778	173
	Male 35–54	27836	133.586	208		Female 35–54	60611	328.628	184
	Male 55+	32188	139.787	230		Female 55+	53483	214.048	250
	Female 18–34	20397	113.507	180	5	Male 18–34	20857	108.414	192
	Female 35–54	28505	153.478	186		Male 35–54	23219	106.673	218
	Female 55+	34524	157.827	219		Male 55+	22740	99.209	229
2	Male 18–34	15038	67.756	222		Female 18–34	19491	102.825	190
	Male 35–54	12502	49.448	253		Female 35–54	22629	106.708	212
	Male 55+	15534	57.940	268		Female 55+	24657	115.246	214
	Female 18–34	12880	63.809	202	6	Male 18–34	20211	108.246	187
	Female 35–54	12447	81.716	152		Male 35–54	19386	92.267	210
	Female 55+	16347	85.383	191		Male 55+	19490	50.195	388
3	Male 18–34	27930	139.173	201		Female 18–34	19489	107.377	182
	Male 35–54	31661	140.877	225		Female 35–54	19756	85.502	231
	Male 55+	29082	81.648	356		Female 55+	20875	98.699	212
	Female 18–34	28132	142.020	198	7	Male 18–34	27554	126.451	218
	Female 35–54	31994	167.075	191		Male 35–54	23174	108.232	214
	Female 55+	32032	126.061	254		Male 55+	20534	83.014	247
4	Male 18–34	54196	294.191	184		Female 18–34	27772	146.101	190
	Male 35–54	62400	283.677	220		Female 35–54	22825	140.716	162
	Male 55+	48069	202.519	237		Female 55+	22144	72.864	304
					TOTAL		1,156,346	5535.631	

Once the final weight was applied, an analysis was run to determine the extent to which the overall demographics of the study conformed to the population.

- Based on the sample plan, age within gender matches the population before and after weighting.
- Single person households are under-represented both before and after weighting. This should be considered to the extent to which fish consumption (frequency and portion size) is related to household composition.
- While low-income households are represented roughly in proportion to the population, both weighted and unweighted higher-income households, as well as better educated households, are over-represented relative to the population. To the extent to which fish consumption (frequency and portion size) is related to income and/or education (which are correlated), this was considered in the analysis and discussion.

Table 15: Demographic Characteristics of Unweighted and Weighted Sample Compared to Idaho Population

Demographic	Unweighted Sample	Weighted Sample	Idaho Population ⁵⁰
Age within Gender			
Male 18–34	16%	16%	16%
Male 35–54	16%	17%	17%
Male 55+	15%	16%	16%
Female 18–34	16%	16%	16%
Female 35–54	19%	17%	17%
Female 55+	18%	18%	18%
Race			
White Alone	95%	95%	92%
Native American	2%	3%	2%
Asian / Pacific Islander	1%	1%	2%
Black	.4%	.5%	.9%
Ethnicity			
Hispanic	9%	9%	9%
Household Composition			
Single Person	17%	17%	24%
Multi-Person	83%	83%	76%
Education			
High School Graduate or Less	28%	30%	39%
Some College	31%	31%	37%
Bachelor’s Degree	26%	25%	17%
Graduate School or Professional Degree	15%	14%	7%
Household Income			
Less than \$25,000	28%	29%	24%
Less than \$35,000	9%	9%	29%
Less than \$50,000	17%	17%	20%
Less than \$75,000	18%	18%	12%
\$75,000 or more	27%	26%	14%
Median	\$52,660	\$52,950	\$46,783

⁵⁰ Ibid.

Weighting—Re-contact Study

Those re-contacted were a subset of fish consumers—that is, they had consumed fish at least four times in the 12 months before being interviewed for the main study. As such, they were somewhat different demographically from the general Idaho population. In addition, while response rates to the re-contact were high, not all those qualified completed the re-contact, and thus it is possible that the re-contact data does not fully represent those qualified to be re-contacted.

Since the data from the initial interview were weighted to represent the general population of Idaho (age within gender), it is possible to assume that the characteristics of those who qualified as fish consumers in the main study (column B in table below) as the population data for weighting the re-contact data.

The re-contact weight is computed at the health district level by dividing the percentage of each age within gender segment in the population of qualified fish consumers (from main study) by the percentage in the re-contact sample:

$$\begin{aligned}
 &Recontact_{FinalWGT} \\
 &= \% \text{ of Age within Gender Segment in Population of Qualified Fish Consumers} \\
 &\div \% \text{ of Age within Gender Segment in RecontactSample}
 \end{aligned}$$

Table 16: Re-contact Sample Weighting

Age within Gender	Idaho Population ⁵¹ (A)	Qualified Fish Consumers Main Study (B)	Re-contact Completes Unweighted (C)	Re-contact Completes Weighted (D)
Male 18–34	16%	16%	15%	16%
Male 35–54	17%	18%	16%	18%
Male 55+	16%	17%	17%	17%
Female 18–34	16%	15%	15%	15%
Female 35–54	17%	17%	19%	17%
Female 55+	18%	18%	18%	18%

⁵¹ Ibid.

Analysis

Missing Values

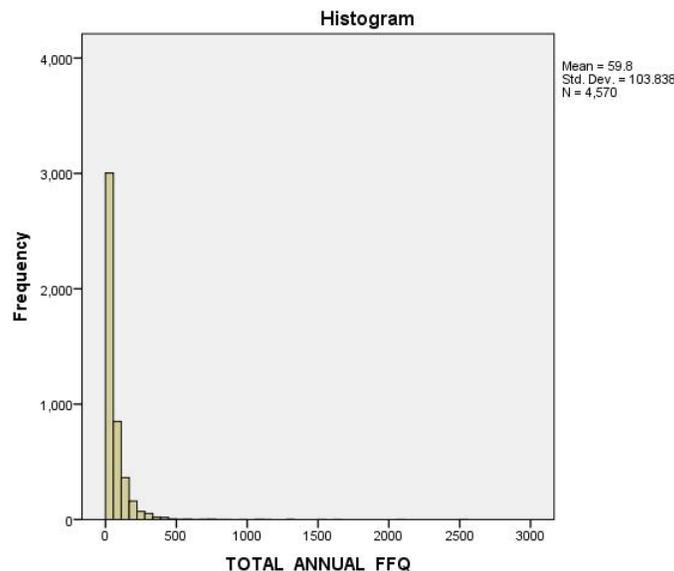
During the initial and re-contact surveys, interviewers made every effort to obtain complete responses from all respondents and to avoid any missing values. However, respondents had the option of indicating “don’t know” or “refused” in response to any specific question. For analytical purposes missing values were handled in the following ways:

- When possible, for some demographic characteristics where respondents did not provide information (e.g., age, household composition) the values were imputed based on characteristics of their neighbors. Imputation was only done when values were missing on key demographics, specifically age, used for weighting. Age was imputed for 46 respondents using education, income, health district, and gender.
- Don’t know responses and refusals were reviewed to determine if there were high percentages for any single question. This was not the case. Therefore, for analytical purposes these values are declared missing and are not included in frequency distributions or other analytics.

In addition, some variables have missing data based on responses to earlier questions. In these instances, the missing data were replaced based on the response to the earlier variable. For example, if a respondent indicated they did not consume fish or seafood meals in the past 30 days, they were not asked about their fish consumption in the past seven days or for the day prior to the survey contact. This system missing data was recoded as zero fish or seafood meals in the past seven days and zero fish or seafood meals yesterday.

Large Consumption Values

Histograms of the total number of fish or seafood consumption events in the past year were reviewed and identified a small number (3%) of respondents with noticeably higher values than other respondents (2 standard deviations above the mean).



These cases were individually reviewed, and the number of consumption events was determined to be plausible. Accordingly, the respondents were retained in the analysis without modification.

Data Processing and Calculations

The objective of the data processing was to create aggregate levels of fish or seafood consumption for the recall period in both the main and re-contact surveys. However, it was discovered during the qualitative phase that asking for an aggregate quantity of fish or seafood consumed was difficult for the respondents to do reliably. To ease respondent burden, the questionnaire was designed to gather data in a “conversational” way; that is, respondents were asked to describe each meal (breakfast, lunch, dinner, snack, and other times) where fish or seafood was consumed. For each meal, respondents were asked what type(s) of fish or seafood were consumed, then asked to describe the quantity of fish or seafood consumed. If a respondent had a meal containing multiple types of fish or seafood (e.g., shrimp and salmon), he or she was asked to estimate the quantity of shrimp consumed and then asked to estimate the quantity of salmon consumed.

The calculations performed during the data processing stage were used to aggregate the quantities of fish consumed. The discussion on the next few pages provides an overview of the calculations used. Additional details, including flowcharts, can be found in the appendix of this report.

Total Annual Fish Consumption (FFQ Series—FFQ1 through FFQ6)

Introduction: This series of questions was designed to get an overall estimate of the quantity of fish consumed annually by respondents. Respondents were asked to estimate the number of times they consumed fish or seafood at home, at a restaurant, someplace else, and as a snack. They were then asked to estimate the average portion size of fish or seafood consumed at each location (home, restaurant, someplace else, snack).

When asked to recall the number of consumption events, respondents were able to provide their answers in terms of number of times per week (e.g., “I eat fish or seafood on average once a week”), month (e.g., “I eat fish or seafood on average four times per month”), or year (e.g., “I eat fish or seafood on average 52 times per year”). This was done to ease the burden on the respondents. On the back end, the total number of annual consumption events was calculated mathematically.

The survey was designed to accept either absolute numbers (e.g., “6 ounces”) or ranges (e.g., “4 to 7 ounces”) when respondents were asked to estimate the average portion size for each consumption event. Furthermore, if a respondent was unable to estimate the average portion size for each consumption event, they were asked a follow-up question that provided a PSEA (e.g., “Using a deck of cards as a reference and assuming 3 ounces of cooked fish or seafood is the same size as a deck of cards,”) and then provided categories (e.g., “less than one ounce, between one and three ounces, etc.”) and asked to pick which category best described the average quantity of fish/seafood consumed per consumption event. The deck of cards was selected as the PSEA based on the test of different PSEA’s discussed on Page 25. In addition, categories were selected as in the original tests of different PSEA’s and in the pilot test, most respondents provided a range rather than an absolute number.

For the food frequency questions only 6 percent (672) of the total (10,524) requests for portion size required the use of the PSEA in order to provide a portion size. For the dietary recall questions, the PSEA was used more often. Looking at the dietary recall for fish consumed yesterday 41 out of 330 requests for portion size or 12 percent required the use of the PSEA. In most instances, respondents used the PSEA when providing portion sizes for shellfish. This is consistent to what we say in the qualitative research.

Calculations:

Total number of annual consumption events:

This was taken from the response to each of the FFQ4 series of questions and multiplying it by the time-frame provided in the response.

- If a respondent provided the frequency of consumption as a “number of times per week,” the result was multiplied by 52 to create the number of times per year (e.g., once per week = 52 consumption events annually).
- If a respondent provided the frequency of consumption as a “number of times per month,” the result was multiplied by 12 to create the number of times per year (e.g., once per month = 12 consumption events annually).
- If a respondent provided the frequency of consumption as a “number of times per year,” the result was multiplied by 1 to create the number of times per year (e.g., once per year = 1 consumption event annually).

This was calculated for each FFQ4 question (meals consumed at home, restaurant, or elsewhere, and snacks).

Portion Size:

This was taken from the responses to each of the FFQ5 series of questions to determine the average portion size per consumption event.

- If a respondent provided an absolute number for the portion size (e.g., “six ounces”), that number was used.
- If a respondent provided a range, the midpoint between the low and high number was used (e.g., “five to seven ounces” would translate to “six ounces”)
- If respondents indicated that they did not know the portion size, they were read a follow-up question providing a PSEA and then read a list of categories of portion sizes to choose from. In this situation the midpoint of the category selected was used (e.g., “between four (4) and six (6) ounces” would translate to “five ounces”)

This was calculated for each FFQ5 question to determine the average portion size per consumption event per place (home, work, elsewhere, and snack).

Total Annual and Computed Daily Portion Size:

These were calculated using a five-step methodology.

- The number of consumption events per place (home, work, elsewhere, and snack) was multiplied by the average number of ounces consumed per place. This created the total quantity of fish consumed per place (home, work, elsewhere, and snack).
- The total quantity of fish consumed per place were summed to create the Total Quantity of Fish/Seafood Consumed Annually (in ounces).
- The Total Quantity of Fish/Seafood Consumed Annually (in ounces) was multiplied by 28.349 to create the Total Quantity of Fish/Seafood Consumed Annually in Grams.
- The Total Quantity of Fish/Seafood Consumed Annually in Grams was divided by 365 to create the Average Daily Consumption in units of grams per day.

- Average Daily Consumption was multiplied by the percent of fish or seafood caught in Idaho (from FFQ6) to determine the Average Idaho Fish Daily Consumption in units of grams per day.

Recall Series—Grouping Fish / Seafood Species (Idaho vs. Non-Idaho & Market vs. “Everything Else”)

Introduction: A key goal of this study was to determine the quantity of Idaho fish consumed by residents of Idaho. To capture that information, the recall questions were designed to capture the type and quantity of fish consumed for each meal or snack. Moreover, the questionnaire was designed to record multiple types of fish consumed for each meal in the event that the respondent consumed multiple types of fish in one sitting such as a seafood medley or a party where multiple types of fish were being served.

For each meal (breakfast, lunch, dinner (or supper), snack, other) where fish or seafood was consumed, respondents were asked to indicate what type(s) of fish or seafood he or she ate.

If a respondent indicated they consumed a resident fish (i.e., lives and grows in Idaho waters, such as trout walleye, bass, perch, Kokanee or Sockeye Salmon, or Blueback Salmon), they were asked a follow-up question asking if the fish was purchased at the store, caught in an Idaho lake or stream, or caught in a lake or stream outside of Idaho. In the questionnaire and resulting data all resident fish are coded as a 100 series fish; see questionnaire in appendix for complete list.

These questions were the same for all recall consumption events (yesterday, each of the seven days prior to yesterday, initial contact plus re-contact phone call).

Calculations:

Resident Fish:

- All trout (including rainbow trout purchased in a market or restaurant) were considered a resident fish
- If a respondent indicated they consumed any 100 level fish or seafood or Kokanee or Sockeye Salmon (also known as Blueback Salmon), the respondent was asked where the fish was acquired.
 - If the fish or seafood consumed was caught by the respondent or someone else in an Idaho lake or stream it was considered an Idaho fish.

Non-Resident Fish:

- 200, 300, and 400 level fish as well as “other” fish, Coho Salmon, Chinook Salmon, and “Other” types of salmon were considered non-Idaho fish.
- If a respondent indicated they consumed any 100 level fish or seafood, Kokanee or Sockeye Salmon, or Blueback Salmon, the respondent was asked where the fish was acquired.
 - If the fish or seafood consumed was purchased at the market or grocery store, or caught by the respondent or someone else in a lake or stream somewhere other than Idaho, it was considered a non-Idaho fish.
 - If the respondent indicated that they did not know where the fish or seafood was consumed or refused the question, it was assumed to be a non-Idaho fish.
 - If the respondent indicated they acquired the fish at some “other” location, those responses were read and coded as Idaho/non-Idaho as appropriate.

Market Fish versus “Everything Else”:

The non-Idaho fish category was further broken down into two categories: “Market Fish” and “Everything Else.”

- A fish was considered a “Market Fish” under the following circumstances
 - All 200, 300, and 400 level fish as well as “other” fish and “other” types of salmon.
 - All 100 level fish and seafood, Kokanee or Sockeye Salmon, Blueback Salmon, Coho Salmon, or Chinook Salmon that were purchased at a store, obtained at some “other” location, or where the respondent does not know or refuses to answer where the fish or seafood was acquired.
- Fish fell into the “Everything Else” category under the following circumstances:
 - All 100 level fish or seafood, Kokanee or Sockeye Salmon, or Blueback Salmon that was caught by the respondent or someone else in a lake or stream that was not an Idaho lake or stream.
 - Coho or Chinook salmon that was caught by the respondent or someone else in an Idaho lake or stream.

Dietary Recall Series—Calculating the Portion Size

Introduction: This series of questions was designed to get an accurate estimate of the quantity of fish consumed by respondents during the dietary recall period. Respondents were initially asked if they consumed fish or seafood yesterday. If they consumed fish or seafood yesterday they were then asked to provide details of their consumption. This began by asking them for which meals they ate fish or seafood; then, for each meal, respondents were asked the type of fish or seafood consumed, the number of helpings consumed for each meal, and the size each helping (in ounces).

The recall series used a similar format to the food frequency questions for the portion size questions. The survey was designed to accept either absolute numbers (e.g., “6 ounces”) or ranges (e.g., “4 to 7 ounces”) when respondents were asked to estimate the portion size for each meal or snack consumed on the day in question. Furthermore, if a respondent was unable to estimate the portion size for a meal or snack, they were asked a follow-up question that provided a PSEA (e.g., “Using a deck of cards as a reference and assuming 3 ounces of cooked fish or seafood is the same size as a deck of cards,”) and then provided categories (e.g., “less than one ounce, between one and three ounces, etc.”) and asked to pick which category best described the quantity of fish or seafood consumed for that meal or snack.

Respondents were asked to provide the same information for each meal where fish or seafood was consumed (breakfast, lunch, dinner (or supper), snack). These questions were the same for each day during the recall period for both the initial contact and the re-contact call.

Calculations:

Species Level Calculating the Number Helping:

The following steps were used regarding the FCR24_7 / FCR7D_9 questions to determine the number of helpings of each species consumed during a specific meal.

- If a number was provided, that number becomes the number of helpings.
- If the respondent does not know or refuses to provide the number of helpings, it was assumed that he or she had one helping; a flag was set in the data to indicate these respondents.

Species Level Calculating Size of Helping:

The following steps were used regarding the **FCR24_7A / FCR7D_10A** questions to determine the size of each helping consumed of each species during a specific meal.

- If an absolute size was provided, use that as the portion size.
- If a respondent provided a range, the midpoint between the low and high number was used (e.g., “5 to 7 ounces” would translate to “six ounces”) as the portion size.
- If a respondent indicated that they did not know the portion size, they were read a follow-up question providing a PSEA and then read a list of categories of portion sizes to choose from. In this situation the midpoint of the category selected was used (e.g., “Between 4 and 6 ounces” would translate to “5 ounces”) as the portion size.
- If a respondent still indicated they did not know or refused to provide the size of the helping, the response was set to system missing.

Species Level Portion Size:

Once the size of each helping had been calculated, the following calculation was used to determine the portion size for each species for a specific meal.

- Multiply the number of helpings by the size of each helping as calculated above. To minimize over-demanding recall and respondent fatigue, those respondents who had more than a single helping of fish at a meal and who indicated that the helping sizes were different were prompted to provide an average portion size for each helping.

Meal Level Quantity of Fish or Seafood Consumed:

Once the species level portion size had been calculated, the following steps were taken to calculate the total quantity of fish or seafood consumed for a specific meal.

- Sum the species level portion sizes for each species consumed for the specific meal.

Daily Level Quantity of Fish or Seafood Consumed:

Once the meal level quantity had been calculated for each meal, the following steps were taken to calculate the total daily quantity of fish or seafood consumed.

- Sum the meal level quantity of fish or seafood consumed for each meal within a specific day (breakfast, lunch, dinner, snack, other).
- This was converted from ounces to grams by multiplying the daily level quantity of fish or seafood by 28.349.

Dietary Recall Series—Aggregating the Species Level Consumption Data

The data file contains variables indicating the total amount of fish or seafood consumed during the recall period for each species of fish or seafood in the questionnaire in both grams and ounces (“ounces” is designated by a _OZ at the end of the variable name). The recall period covers 8 days (yesterday plus 7 days back from there).

In order to create these variables, decisions had to be made on how to handle “zero consumption” versus “consumption unknown”.

Conditions where the species consumption=0.

- If the respondent did not eat any fish or seafood during the recall period.
- If the respondent did not eat any of a specific species during the recall period.

Conditions where the species consumption=system missing

- If the respondent did not report the quantity or type of fish or seafood for every day of the recall period.

Other considerations

- If consumption data was reported for some days, but not for other days, ignore the “do not know” when processing the total species level consumption and sum up the data for the known days. While this may underestimate the amount of fish or seafood consumed at the species level, it is better to do this than it is to lose all of the data.

The following rules were used to classify respondents as anglers

- All respondents were asked if they held an Idaho fishing license at any point during the 2013 or 2014 calendar years.
- Respondents who said “yes” were classified as anglers.
- Respondents who said “no” or “don’t know” were classified as non-anglers.
- Respondents who refused to answer the question were screened out and did not complete the survey.

Mean, Variance, and Percentile Methods

Estimates of means, variances, and percentiles were carried out using standard survey estimate methods available in SPSS.

Confidence Intervals

Confidence intervals express the uncertainty of the estimate population means and percentiles of fish consumption. The confidence intervals in this report were calculated using the 95 percent confidence level.

For most procedures, confidence intervals were obtained based on a parametric estimate of the standard error ($\sigma_{\bar{x}}$) for the statistics of interest (θ). Generally, the 95 percent confidence interval is computed by adding or subtracting the standard error multiplied by a critical value— $\theta \pm 1.96\sigma_{\bar{x}}$ where 1.96 is the critical value that corresponds to the 95 percent confidence interval. This computation assumes that the confidence is symmetric around θ and that the estimate of $\sigma_{\bar{x}}$ is correct.

There are many situations in which the parametric assumptions may be incorrect, notably in the presence of skewed data, and it is then useful in such situations to compute bootstrap confidence intervals that do not rely on those assumptions. The computations for average daily fish consumption rates was computed by multiplying the frequency of fish consumption times average portion size and dividing this result by 365. Since the distributions for frequency of fish consumption and/or portion size are non-normal, use of a parametric estimate of the standard error to compute a corresponding confidence interval would be inappropriate. Bootstrapping is a non-parametric method for deriving robust estimates of standard errors and confidence intervals such as the mean, median, etc. when distributional assumptions required for other methods cannot be met. The essential notion of the bootstrap lies in using the natural variation of the actual sample to obtain some approximation of the variation inherent in a parameter estimate. Confidence intervals surrounding the mean and percentiles for average daily fish consumption were computed using bootstrapping in SPSS; the following specifications were used:

- Sampling: Simple bootstrapping (case resampling with replacement from the original dataset) was used
- Number of Samples: 1,000
- Confidence Intervals: 95% percentile confidence interval which use the 2.5th and 97.5th percentiles of the bootstrap values as the lower and upper bounds of the interval

Report Conventions

The primary purpose of this report is to document the procedures used for conducting the research, data processing and analysis, and key findings. Conventions used for reporting key findings include:

- Tables and charts provide supporting data. In the charts and tables, unless otherwise noted, column percentages are used.
- Percentages are rounded to the nearest whole number. Columns generally sum to 100 percent except in cases of rounding. In some instances, columns sum to more than 100 percent due to multiple responses given to a single question; these cases are noted.
- On many questions in the survey, respondents may have answered “don’t know.” In addition, respondents have the option to refuse to answer any question. In general, “don’t know” and “refusals” are counted as missing values and are not included in the reported percentages except as noted.
- For every major topic, the specific question number or code and the actual text asked of the respondent is provided. The full questionnaire is included in the Appendix.
- The base for the question—that is, the characteristics and number of respondents asked the question—is also provided. The base for a question may vary depending on answers to previous questions or inclusion in specific analytical groups. Both unweighted (n) and weighted (n_w) sample sizes are shown.
- Z-tests (using the Bonferroni method for multiple comparisons) are used to test for statistically significant differences between proportions. Unless noted otherwise, statistical significance was tested at the 95 percent confidence levels.

Differences are noted in the tables using APA-style subscript notations. For example, in the table below, the percentage of males in Segment 1 (column a) is significantly higher than in Segment 2 (column b). Similarly, the percentage of females in Segment 2 (column b) is significant higher than in Segment 1 (column a).

	Segment 1 (a)	Segment 2 (b)
Gender		
Male	51% _b	42%
Female	49%	58% _a

KEY FINDINGS

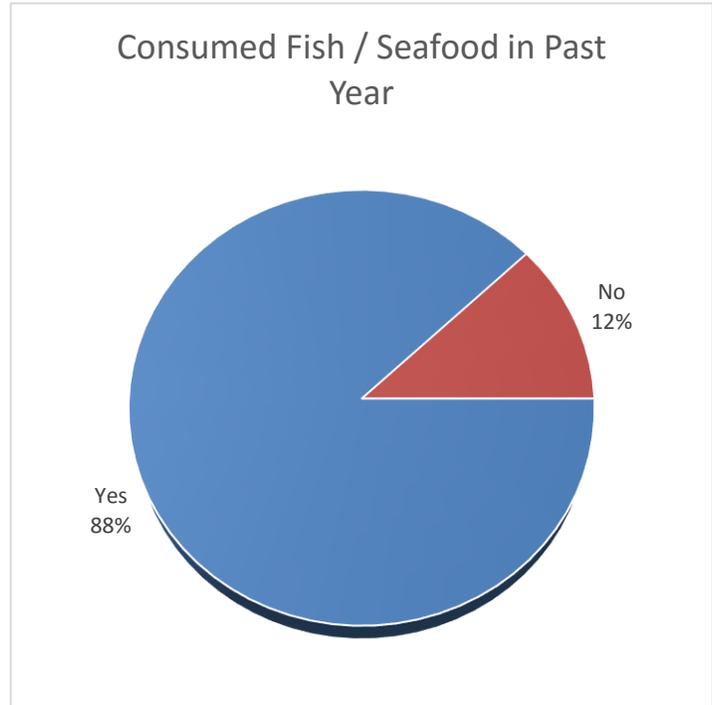
Fish Consumer and Non-Consumers (FFQ Series)

Respondents were asked to indicate if they had personally consumed fish or seafood in the past 12 months. Consumption was defined as all meals during the day—that is breakfast, lunch, and dinner—as well as snacks. Fish or seafood was defined as fish or seafood that is eaten at home, in a restaurant, or at someone else’s house. This includes fish, seafood, or shellfish eaten by itself or within a dish or food items—such as anchovies on pizza or seafood in a soup or stew or a sandwich that contains fish.

- Eighty-eight percent (88%) of all adult Idahoans have consumed fish or seafood in the past year.

This figure is consistent with Idaho Department of Health and Welfare 2012 BRFSS data which found that 91 percent of Idaho adults ate fish in the past year. Note that the 2012 BRFSS data was limited to any type of freshwater or saltwater fish (with fins) prepared in any style, cooked or uncooked. It did not include shellfish such as shrimp, oysters, clams or real crab.

Figure 2: Percent of Adult Idahoans Consuming Fish in Past Year



Question: FFQ1: Have you **personally** eaten fish or seafood in the **past 12 months**? (Please include all meals and snacks regardless of where purchased or eaten. Include fresh or frozen fish, seafood, or shellfish; and any dishes or food items that may contain fish or shellfish such as anchovies on a pizza or seafood in a soup, stew or pasta, or a sandwich that contains fish.)

FFQ1A: [ASKED IF RESPONSE TO FFQ1 = NO] When asked about fish or seafood, people sometimes overlook dishes or things that contain fish or seafood. In the past 12 months, have you eaten things such as Snacks that contain fish or seafood such as fish-sticks or popcorn shrimp . . . ?

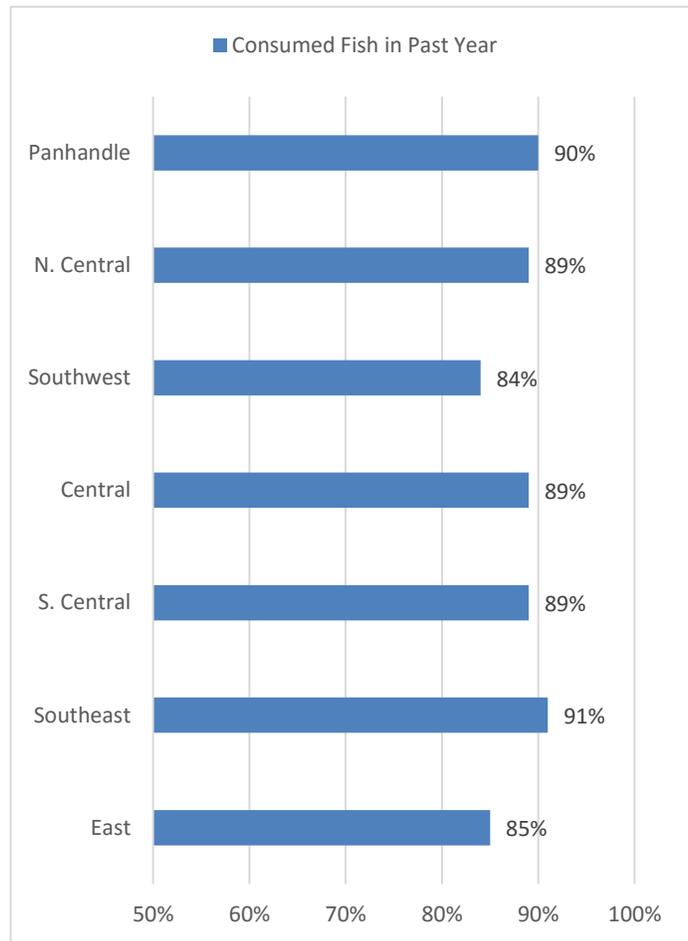
FFQ4: [ASKED IF CONSUMED FISH IN PAST YEAR] Thinking about the last 12 months, on average how often did you have a [meal at home, in a restaurant, at some other location such as other people’s homes or at work, or as a snack] that includes fish or seafood? Please provide your best estimate in terms of number of times per week, month, or year.

Consumed Fish in Last Year = Yes if response to FFQ1 = yes, response to any item in FFQ1A = yes, and responses to FFQ4 question series is greater than or equal to 1.

Base: All Respondents (n_w = 4,570)

The percentage of Idaho adults who consume fish is significantly lower in Southwest and Eastern Idaho.

Figure 3: Percent of Adult Idahoans Consuming Fish in Past Year by Health District



Fish consumers are equally likely to be male or female and are more likely than fish non-consumers to be:

- Distributed across all age groups, but highest among males 35 to 54 and 55 plus

Fish non-consumers are more likely to be:

- Women than men
- Younger, notably women 18 to 34
- Less educated (high school degree or less)
- Less affluent (household income below \$25,000)

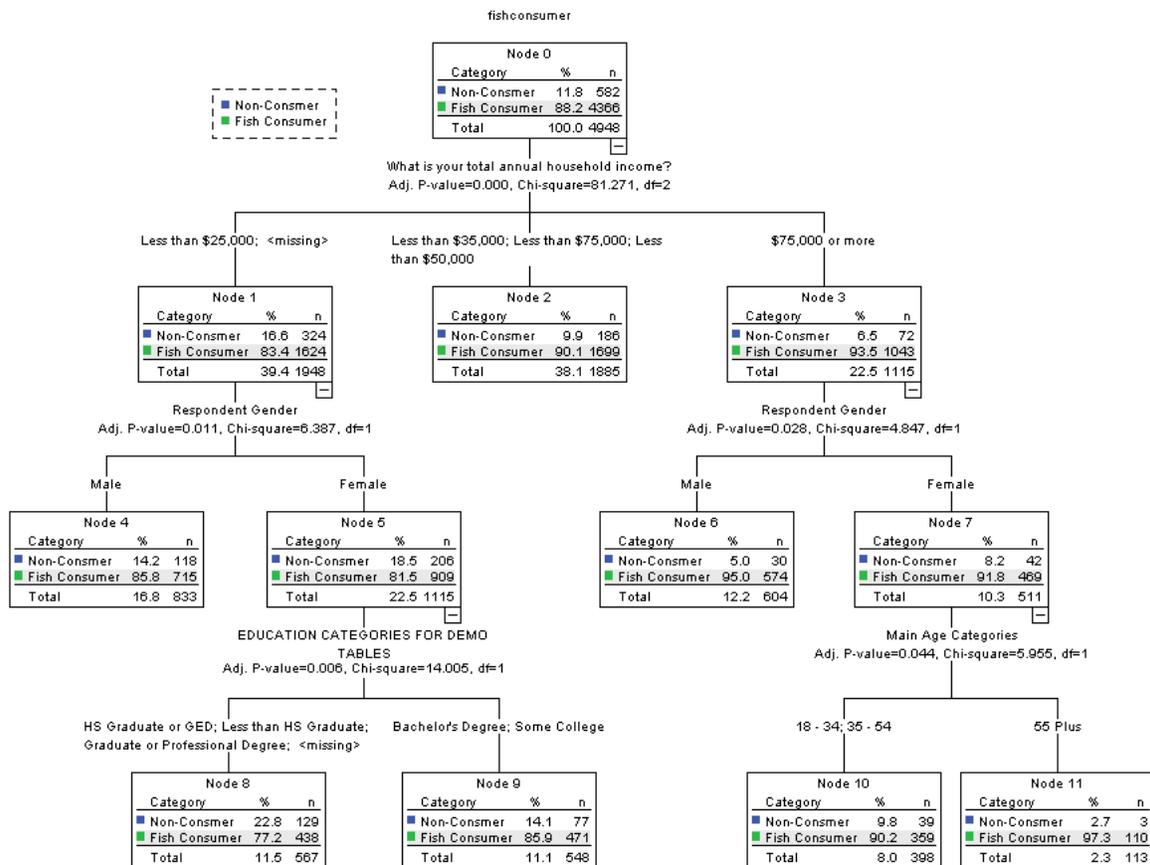
Table 17: Demographics of Fish Consumers and Non-Consumers

	Fish Consumer (n_w = 4,020) (a)	Fish Non-Consumer (n_w = 550) (b)
Gender		
Male	51% _b	42%
Female	49%	58% _a
Age		
18–34	31%	38% _a
35–54	35%	32%
55+	34% _b	30%
Mean	47.4 _b	44.9
Education		
Less than High School Graduate	5%	7% _a
High School Graduate or GED	24%	32% _a
Some College	31% _b	27%
Bachelor’s Degree	26%	23%
Graduate School or Professional Degree	14% _b	11%
Household Income		
Less than \$25,000	27%	45% _a
Less than \$35,000	9%	10%
Less than \$50,000	17%	15%
Less than \$75,000	19% _b	15%
\$75,000 or more	28% _b	15%
Median	\$53,495	\$34,477

A statistical technique called the chi-squared automatic interaction detector (CHAID) or tree analysis was used to determine which demographic or combination of demographics differentiated fish consumers from non-consumers. This analysis provides two different types of insights: (1) the demographic characteristic that most differentiates fish consumers from non-consumers and (2) the order in which other demographic characteristics distinguish these two groups. Only statistically significant differences are shown in the tree diagram.

- Household income is the primary demographic characteristic distinguishing fish consumers from non-consumers—17 percent of those with household incomes below \$25,000 are fish non-consumers, compared to 12 percent overall.
 - Within this income category, gender is the second distinguishing characteristics. A greater percentage of women are more likely to be fish-non-consumers. This is noteworthy for women with high school degrees or less, as well as those with a professional or graduate degree.
- Among those with household incomes of \$75,000 or greater, gender is also the second distinguishing characteristic.
 - Specifically, a greater percentage of men than women are fish consumers.
 - Among women, a high percentage of women 55 plus are fish consumers.

Figure 4: Distinguishing Demographic Characteristics of Fish Consumers and Non-Consumers



Resident Anglers

Anglers are considered a potentially at risk population as it was hypothesized that they consume a greater amount of fish and that they would be more likely to consume fish caught in Idaho waters. A total of 1,720 or 37% of all respondents (after weighting) were anglers.

Anglers surveyed are significantly different from non-anglers. Notably, they are:

- Nearly 2.5 times as likely to be men than women
- Younger than non-anglers
- More affluent than non-anglers

Table 18: Demographics of Fish Consumers and Non-Consumers

	Non-Anglers (n_w = 2,868) (a)	Anglers (n_w = 1,702) (b)
Gender		
Male	37%	71% _a
Female	63 _b	29%
Age		
18–34	29%	36% _a
35–54	33%	37% _a
55+	38% _b	27%
Mean	49.0 _b	43.3
Education		
Less than High School Graduate	5%	5%
High School Graduate or GED	24%	26%
Some College	30% _b	32%
Bachelor’s Degree	26%	24%
Graduate School or Professional Degree	15%	13%
Household Income		
Less than \$25,000	31% _b	25%
Less than \$35,000	10%	8%
Less than \$50,000	17%	17%
Less than \$75,000	17%	21% _a
\$75,000 or more	25%	29% _a
Median	\$52,210	\$54,177

Frequency of Consuming Meals or Snacks Containing Fish or Seafood (FFQ Series)

Number of Consumption Events

Respondents were asked to indicate the average number of fish meals or snacks they consumed. Meals were broken down by meals at home, meals in a restaurant, or meals at another location (e.g., someone else’s home or work). Respondents gave an absolute number of times and specified the denomination, per week, month, or year. Values were then converted to years. **Total number of consumption events** is the sum of the different types of meals AND snacks.

Idaho adults consume an average of 60 meals or snacks per year that contain fish or seafood. This equates to 5.5 percent of all meals annually (assuming three meals a day).

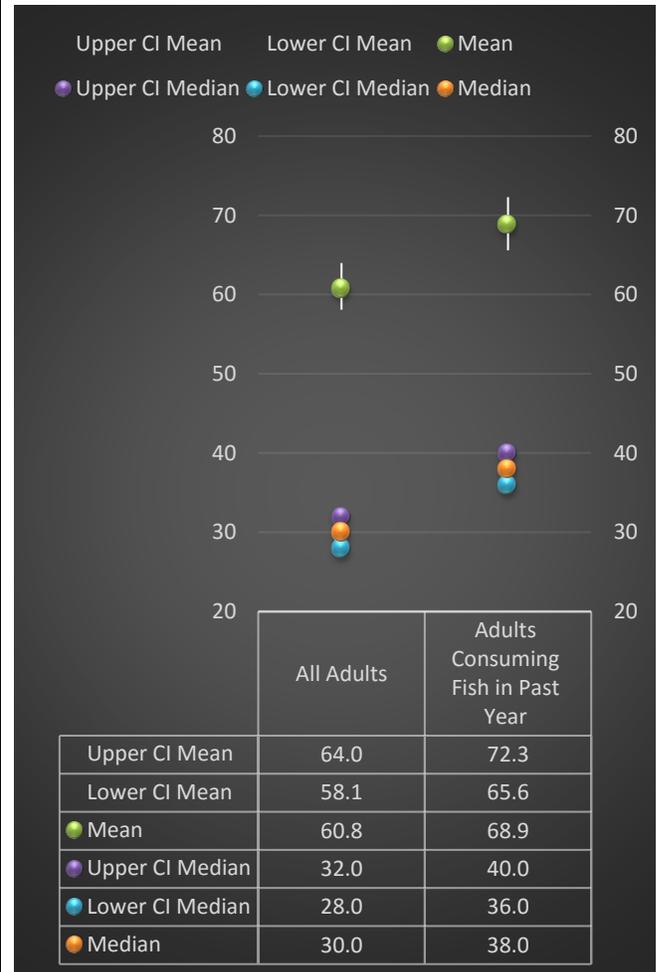
Among those who had consumed fish in the past year, the range was quite significant—from a single meal to more than 2,500 meals or snacks. Nearly 99 percent of all cases were below 365 meals—the equivalent of eating fish on a daily basis.

The median value of 30 for all adults or 38 for fish consumers is a potentially better measure of central tendency than the mean.

Table 19: Distribution of Total Annual Number of Consumption Events

	Total Annual Number of Consumption Events	
	All Adults (n _w = 4,570)	Adults Consuming Fish in Past Year (n _w = 4,020)
Minimum	0	1
Maximum	2,517	2,517
50th Percentile	30.0	38.0
60th Percentile	48.0	54.0
70th Percentile	64.0	70.0
80th Percentile	898.0	104.0
90th Percentile	144.0	156.0

Figure 5: Total Annual Number of Consumption Events



FFQ4: Thinking about the last 12 months, on average how often did you have a [meal at home, in a restaurant, at some other location such as other people’s homes or at work, or as a snack] that includes fish or seafood? Please provide your best estimate in terms of number of times per week, month, or year. Responses converted so base is times per year
 Base: All Adults (n_w = 4,570)
 Adults Consuming Fish in Past Year (n_w = 4,020)

Reflecting the higher percentage of fish non-consumers, the overall number of consumption events among adult Idahoans was lower in Southwest and East Idaho.

Table 20: Total Number of Consumption Events by Health District—All Adults

	n_w	Mean	Lower CI	Upper CI	Median	Lower CI	Upper CI
Panhandle	648	69.7	61.3	77.6	36.0	32.0	42.0
N. Central	335	57.2	47.7	67.8	28.5	26.0	36.0
Southwest	714	50.3	45.3	55.7	24.0	20.0	26.0
Central	1,304	64.5	59.9	69.1	38.0	36.0	41.0
S. Central	528	67.3	56.5	80.5	30.0	26.0	36.0
Southeast	471	59.1	48.1	72.1	28.0	25.0	36.0
East	569	52.0	44.4	61.0	24.0	20.0	26.0
Total	4,570	60.8	58.1	64.0	30.0	28.0	32.0
<i>Base: All Respondents</i>							

The overall annual number of consumption events was lower among fish consumers in Southwest and East Idaho.

Table 21: Total Number of Consumption Events by Health District— Fish Consumers

	n_w	Mean	Lower CI	Upper CI	Median	Lower CI	Upper CI
Panhandle	583	77.2	68.8	86.3	47.0	38.0	52.0
N. Central	299	64.2	53.1	77.0	36.0	30.0	44.0
Southwest	602	59.6	54.3	65.3	30.0	26.0	36.0
Central	1,158	72.6	67.8	78.1	48.0	42.0	52.0
S. Central	469	75.7	64.0	91.4	39.0	32.0	48.0
Southeast	429	65.3	53.0	80.2	36.0	28.0	42.0
East	482	60.3	51.9	70.3	28.0	26.0	36.0
Total	4,020	68.9	65.6	72.3	38.0	36.0	40.0
<i>Base: Consumed Fish in Past Year</i>							

As would be expected, anglers reported a greater number of consumption events than do non-anglers.

Table 22: Total Number of Consumption Events by Angler Status—All Adults

	n_w	Mean	Lower CI	Upper CI	Median	Lower CI	Upper CI
Non-Anglers	2,868	55.0	51.6	58.7	26.0	25.0	28.0
Anglers	1,702	71.0	65.9	77.0	37.0	36.0	41.0
Total	4,570	60.8	58.1	64.0	30.0	28.0	32.0
<i>Base: All Respondents</i>							

Table 23: Total Number of Consumption Events among Fish Consumers by Angler Status—Fish Consumers

	n_w	Mean	Lower CI	Upper CI	Median	Lower CI	Upper CI
Non-Anglers	2,440	64.3	60.3	68.5	36.0	35.0	38.0
Anglers	1,580	76.4	70.3	82.3	43.5	39.0	48.0
Total	4,020	68.9	65.6	72.3	38.0	36.0	40.0
<i>Base: Consumed Fish in Past Year</i>							

Seasonality

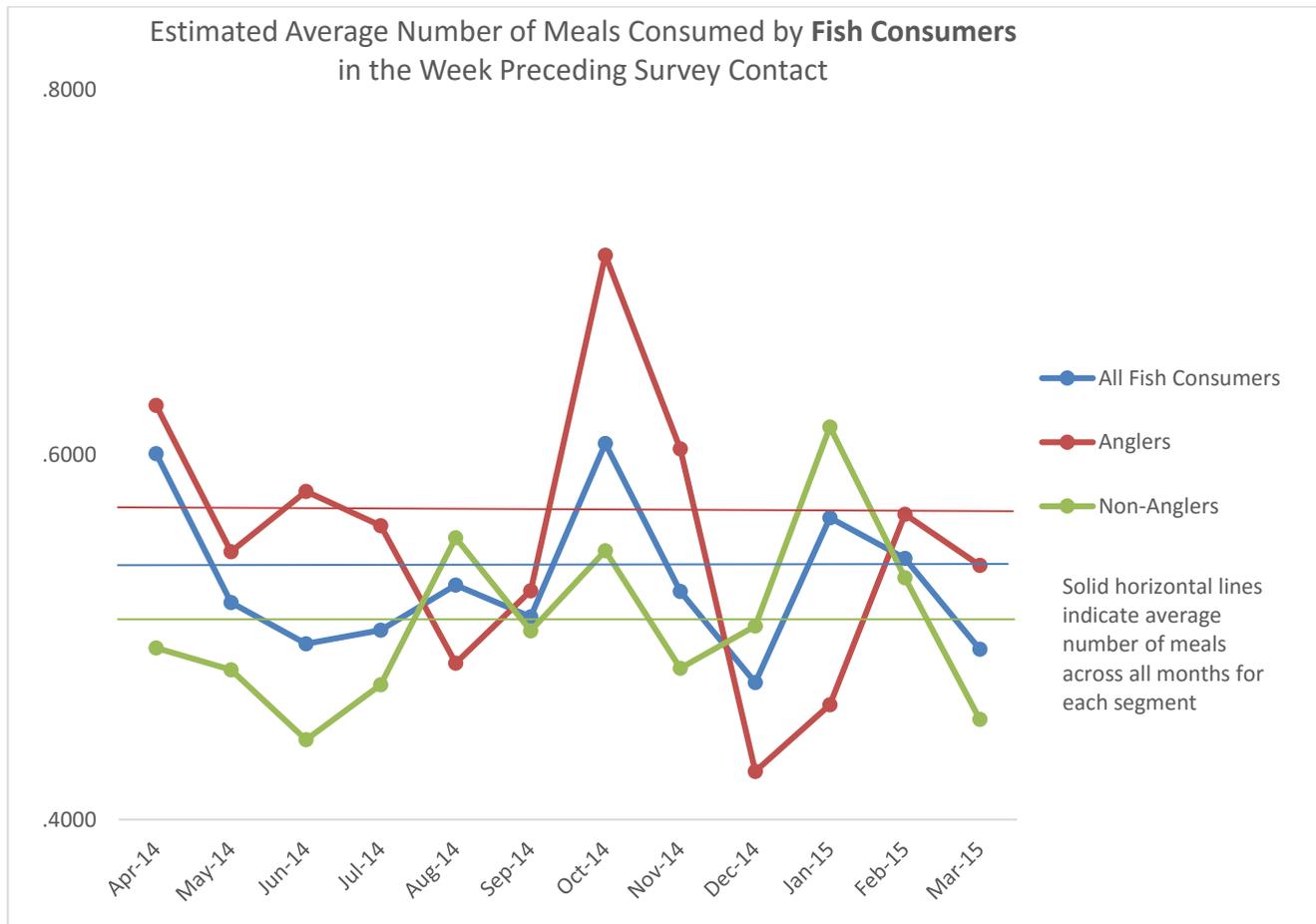
One interest in the design of the research was to test whether seasonality was a factor in fish consumption.

There is some evidence of seasonality although differences between months are in most instances not statistically significant.

Among all fish consumers, the number of meals per week ranged from .48 to .61 meals. The variation is somewhat greater for anglers—ranging from .43 to .63 meals per week—than for non-anglers—ranging from .44 to .55 meals per week.

- The number of fish or seafood meals consumed in the week before the survey contact was highest in October 2014 and lowest in June, July, and December 2014 and March 2015.
- Angler consumption of fish or seafood was significantly higher than average in October 2014 and significantly lower than average in December 2014.
- Among non-anglers, the number of fish or seafood meals consumed was significantly higher than average in January 2015 and lowest in June 2014.

Figure 6: Seasonality of Fish Consumption



Base: Respondents Consuming Fish in Past Year (n_w = 4,020)

Fish Consumption Segments (Based on Total Number of Consumption Events)

The surveyed population was divided into five fish consumption segments based on the number of consumption events:

- **Very Light:** Consumed between 1 and 3 fish meals or snacks in the past year.
- **Light:** Consumed between 4 and 14 (the 25th percentile) fish meals or snacks in past year. Four or more meals was set as the threshold for the re-contact survey.
- **Moderate:** Consumed between 15 and 50 fish meals or snacks in past year.
- **Heavy:** Consumed between 51 and 300 fish meals or snacks in past year.
- **Very Heavy:** Consumed more than 300 fish meals or snacks in past year (> the 95th percentile).

A fifth segment, non-consumers, was also created but is not shown here.

Figure 7: Fish Consumption Segments

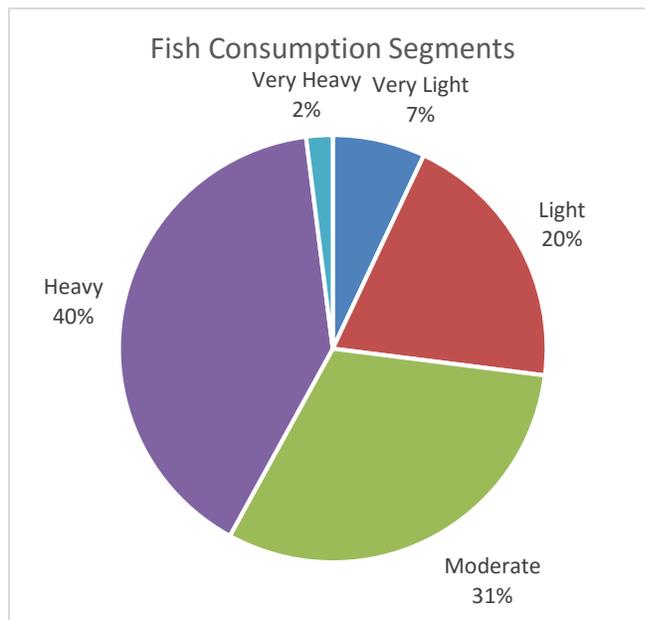


Table 24: Total Number of Consumption Events by Fish Consumption Segments

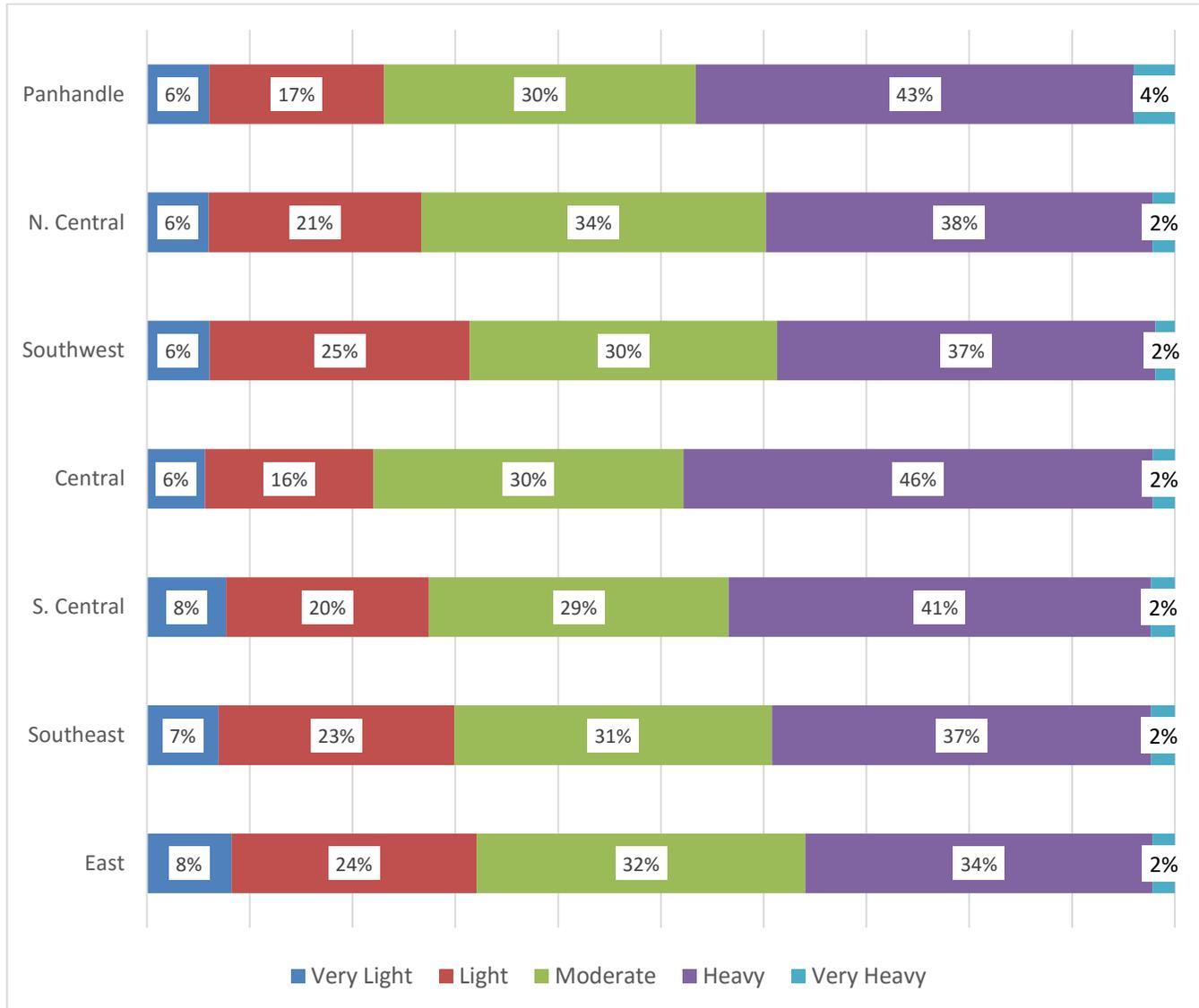
	n _w	Mean	Lower CI	Upper CI	Median	Lower CI	Upper CI
Very Light	261	2.1	2.0	2.2	2.0	2.0	2.0
Light	809	9.4	9.2	9.7	10.0	9.0	10.0
Moderate	1,229	30.3	29.8	30.8	28.0	28.0	29.0
Heavy	1,624	108.8	106.0	111.5	88.0	86.0	96.0
Very Heavy	97	544.8	477.5	623.3	392.0	364.0	418.0
Total	4,020	68.9	65.6	72.3	38.0	36.0	40.0

Base: Consumed Fish in Past Year

Consistent with lower consumption rates among fish consumers living in Southeast and East Idaho, these districts had the highest percentages of very light and light fish consumers. There was also a relatively high percentage of very light and light fish consumers in Southwest Idaho.

The Panhandle and Central Idaho had the highest percentage of heavy and very heavy fish consumers.

Figure 8: Distribution of Fish Consumption Segments by Health District



As noted in Table 17, fish consumers and non-consumers were clearly differentiated by demographics. The five fish consumption segments are further differentiated by their demographics.

- While gender clearly differentiates fish non-consumers from fish consumers, there are few gender differences between the different fish consumption segments; however, very heavy fish consumers are more likely to be men than women.
- Not only does age differentiate fish non-consumers from fish consumers, consumption increases with age.
- Income was also found to differentiate fish non-consumers from fish consumers. It further differentiates the five fish consumption segments. Specifically, fish consumption increases as income rises.
- Finally, anglers are more likely than non-anglers to be moderate to heavy / very heavy fish consumers.

Table 25: Demographic Characteristics of Fish Consumption Segments

	Very Light (n _w = 2618) (a)	Light (n _w = 809) (b)	Moderate (n _w = 1,229) (c)	Heavy (n _w = 1,624) (d)	Very Heavy (n _w = 978) (e)
Gender					
Male	50%	49%	52%	50%	60% _b
Female	50%	51% _e	48%	50%	40%
Age					
18–34	32%	36% _{cde}	32% _d	27%	26%
35–54	38%	35%	36%	33%	29%
55+	30%	29%	32% _a	40% _{abc}	45% _{abc}
Mean	45.9	45.2	46.1	49.6 _{abc}	49.1
Education					
Less than High School Graduate	7% _c	5%	4%	5%	4%
High School Graduate or GED	35% _{bcd}	26% _{cd}	22%	22%	26%
Some College	34%	30%	33%	31%	28%
Bachelor’s Degree	15%	26% _a	27% _a	26% _a	24% _a
Graduate School or Professional Degree	9%	13%	15% _a	16% _a	18% _a
Income					
Less than \$25,000	40% _{bcde}	31% _{cde}	25%	25%	20%
Less than \$35,000	12% _d	9%	11% _d	7%	10%
Less than \$50,000	15%	17%	18%	17%	19%
Less than \$75,000	14%	20%	20% _a	18%	14%
\$75,000 or more	19%	23%	27% _a	32% _{abc}	37% _{abc}
Median	\$49,563	\$52,474	\$74,191	\$75,033	\$75,413
Angler Status					
Anglers	32%	33%	41% _{ab}	41% _{ab}	55% _{abcd}
Non-Anglers	68% _{cde}	67% _{cde}	59% _e	59% _e	45%
<i>Base: Fish Consumers (n_w = 4,020)</i>					
<i>Letters following a number indicate statistically higher number than in the notated cells.</i>					

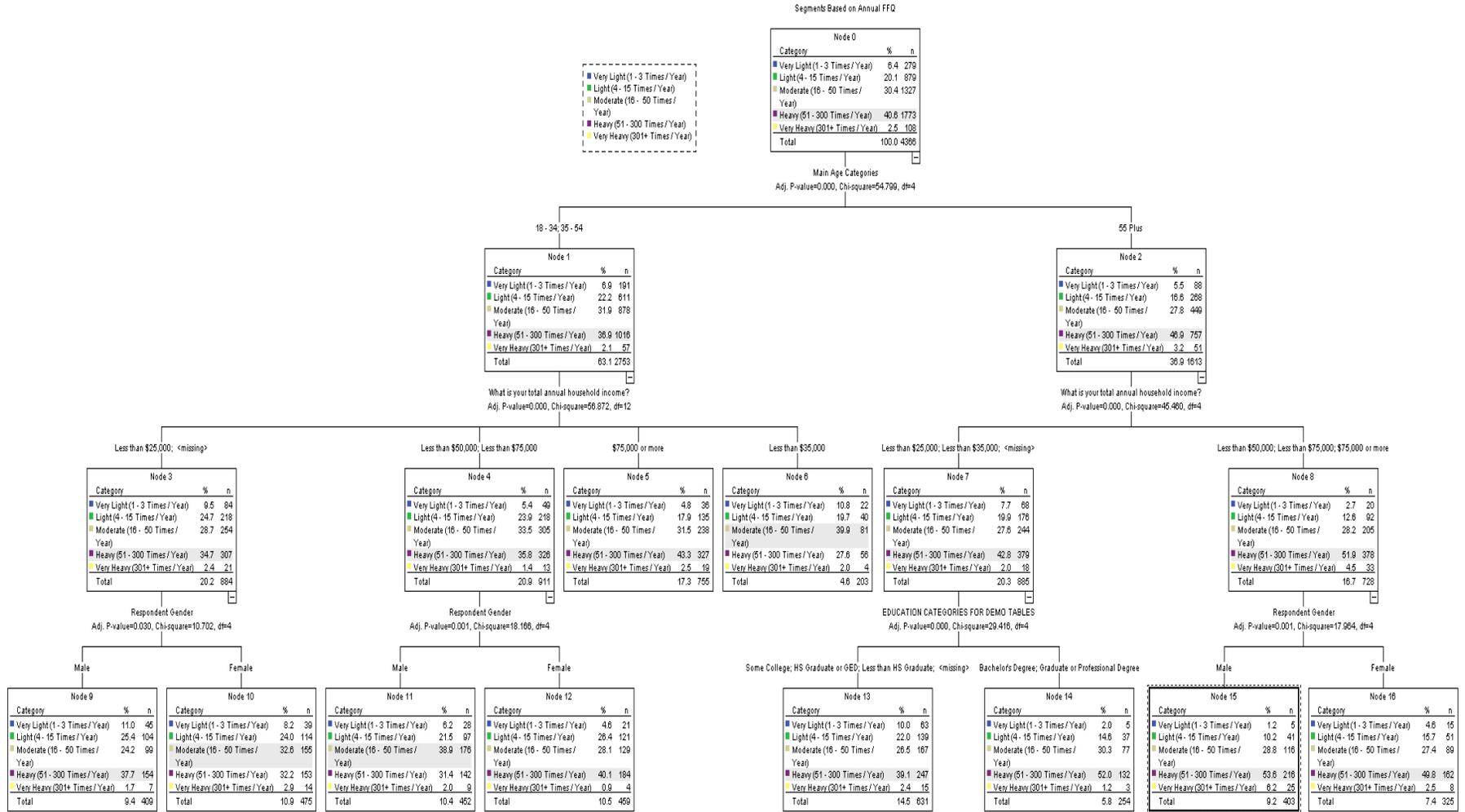
CHAID was used to identify which demographic or combination of demographics differentiated these five fish consumer segments. Looking specifically at the identifying characteristics of heavy fish consumers:

- Age is the variable that initially distinguishes these five segments.
 - Notably, a greater percentage of those 55 and older are heavy fish consumers.
- Income is then the second distinguishing variable.
 - Among those between the ages of 18 and 54, those with household incomes of \$75,000 or more are more likely to be heavy fish consumers while those with incomes between \$25,000 and \$34,999 are more likely to be moderate fish consumers.
 - Among those between the ages of 18 and 55 with household incomes below \$25,000, men are more likely to be heavy fish consumers while women are more likely to be moderate fish consumers. On the other hand, among those with household incomes between \$35,000 and \$74,999 women are more likely to be heavy fish consumers while men are more likely to be moderate fish consumers
 - Among those 55 and older, those with household incomes of \$50,000 or greater are most likely to be heavy fish consumers. This is noteworthy for men.

It is important to note that angler status is not a distinguishing characteristic. Thus higher consumption rates among anglers is more likely to be a result of the combination of age, income and gender than the fact that they are anglers.

- As noted on page 55, anglers are younger than non-anglers but are more affluent. In addition, they are significantly more likely to be men. As the CHAID analysis indicates below, those who are less than 55 years of age but have household incomes of \$75,000 or greater are more likely to be heavy fish consumers. Moreover, men 55 and older with household incomes of \$50,000 or greater are more likely to be heavy fish consumers.

Figure 9: Distinguishing Demographic Characteristics of Fish Consumption Segments



Perceived Accuracy of Reported Number of Fish Consumption Events

After responding to all of the food frequency questions, respondents were given the total number of annual fish or seafood meals they reported consuming and asked to rate the accuracy of this estimate, using a scale where “0” meant “not at all accurate” and “10” meant “completely accurate.”

Respondents were generally confident that the number of consumption events they reported was accurate.

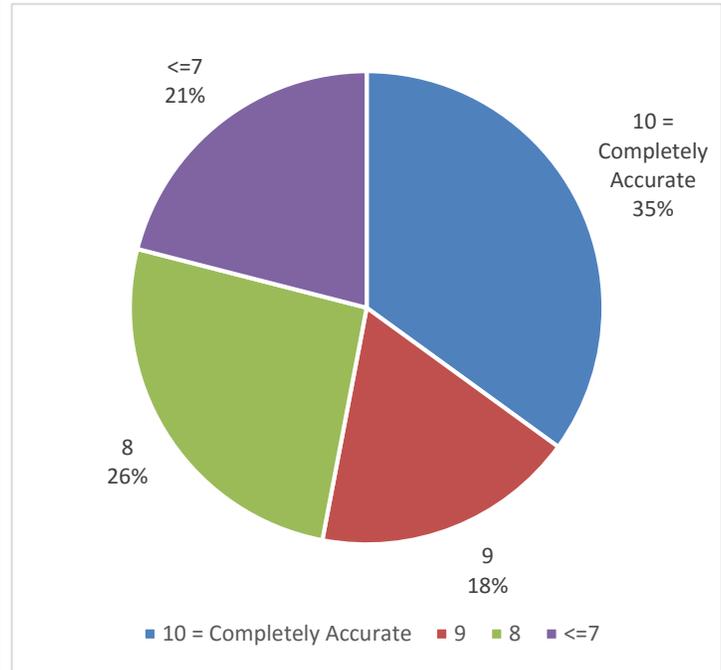
- More than one out of three respondents reported that the total number of consumptions events was completely accurate; four out of five rated the accuracy of their estimates as an eight.
- The mean rating was 8.40, suggesting that respondents are on average 85 percent confident in their estimates.

Perceived accuracy of the estimated number of fish consumption events decreases as the total number of events increases.

Table 26: Perceived Accuracy of Reported Number of Fish Consumption Events by Fish Consumption Segments

Fish Consumption Segment	% Completely Accurate	Mean
Very Light	73%	9.03
Light	42%	8.57
Moderate	29%	8.21
Heavy	32%	8.39
Very Heavy	30%	7.59

Figure 10: Perceived Accuracy of Reported Number of Fish Consumption Events



Question: FFQ4_5: Based on the responses you gave me, it appears that in the past 12 months, you had approximately [RESTORE TOTAL_ANNUAL_FFQ] meals or snacks that contained fish or seafood. Using a scale where “0” means “not at all accurate” and “10” means “completely accurate,” how accurate would you estimate this number is?

Base: Fish Consumers (n_w = 4,020)

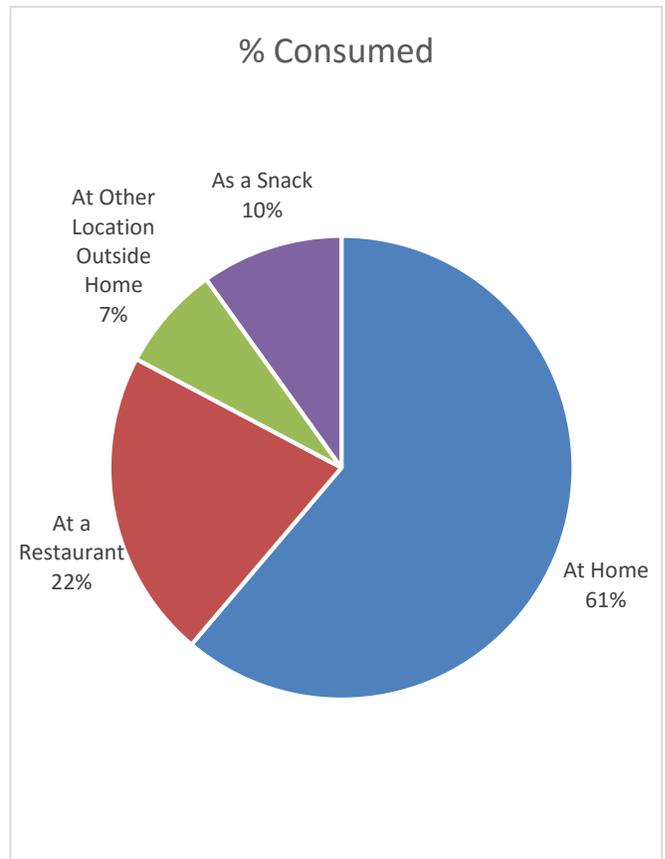
Type of Consumption Events

In addition to looking at the total annual number of consumption events, it was possible to examine what percentage of events were meals consumed at home, in a restaurant, some other location outside home, or as a snack.

The majority (61%) of consumption events containing fish or seafood were meals that were consumed at home.

Slightly less than one-fourth of all consumption events containing fish or seafood were restaurant meals.

Figure 11: Type of Consumption Events



Base: Fish Consumers (n_w = 4,020)

Portion Sizes (Estimated from FFQ Series)

Respondents were initially asked (in the food frequency questions) to provide separate responses for the typical portion size of fish they consumed at home, in a restaurant, other locations, and as snack. If they were unable to give an absolute portion size (in ounces), they were asked to indicate which range of portion sizes best represented their response; the mid-point of the range then served as their response.

- Respondents reported that the average portion size they consumed at a meal is between 5.7 and 6.3 ounces, depending on the type of meal (at home, restaurant, or somewhere else).
- Reported portion sizes for snacks were just over half the size of a meal portion size.
- Average portion size for all consumption events was 5.4 ounces or 154 grams.

Table 27: Average Portion Size Overall and by Consumption Event

Consumption Event	n _w		Mean	Lower CI	Upper CI	Median	Lower CI	Upper CI
All Events	3,965	Grams	154.0	151.3	156.6	142.3	141.7	146.2
		Ounces	5.4	5.3	5.5	5.0	5.0	5.2
All Meals	3,951	Grams	165.0	161.0	170.8	155.9	155.9	160.6
		Ounces	5.8	5.7	6.1	5.5	5.5	5.7
At Home	3,700	Grams	162.2	159.4	165.1	155.9	141.7	170.1
		Ounces	5.7	5.6	5.8	5.5	5.0	6.0
Restaurant	3,086	Grams	174.1	171.4	177.4	170.1	170.1	170.1
		Ounces	6.1	6.0	6.3	6.0	6.0	6.0
Other Places	1,835	Grams	179.1	161.4	208.7	6.3	5.7	7.4
		Ounces	6.3	5.7	7.4	6.0	6.0	6.0
Snacks	1,603	Grams	90.5	87.6	93.5	85.0	85.0	85.0
		Ounces	3.2	3.1	3.3	3.0	2.5	3.0

Base: Fish Consumers; excludes respondents (n = 55) who did not know or did not provide a portion size estimate for one or more meals or snacks

Portion sizes varied significantly by demographics.

- Not unexpectedly, portion sizes provided women were significantly lower than those provided by men.
- Older adults provided smaller portion sizes than do younger adults. Portion size were lowest for adults 55 plus.
- Lower income adults (household incomes below \$25,000) provided lower portion sizes than all other income segments. This is noteworthy as this segment also has fewer consumption events.

Table 28: Average Portion Size (in ounces) by Primary Demographic Segments

	Mean	Lower CI	Upper CI	Median	Lower CI	Upper CI
Gender						
Male	6.1	6.0	6.2	6.0	5.9	6.0
Female	4.8	4.7	4.9	4.5	4.4	4.7
Age						
18–34	5.7	5.6	6.0	5.4	5.2	5.6
35–54	5.5	5.4	5.6	5.3	5.1	5.5
55+	5.1	5.3	4.9	4.8	4.6	5.0
Income						
<\$25,000	5.1	4.9	5.3	4.8	4.6	5.0
<\$35,000	5.7	5.3	6.0	5.1	5.0	5.6
<\$50,000	5.6	5.3	6.0	5.1	5.0	5.5
<\$75,000	5.5	5.3	5.7	5.4	5.0	5.7
\$75,000+	5.8	5.6	6.0	5.4	5.2	5.6
<i>Base: Fish Consumers; excludes respondents (n = 55) who did not know or did not provide a portion size estimate for one or more meals or snacks</i>						

Portion sizes were correlated with weight—that is, portion sizes increased as body weight increased.

- This was noteworthy for men.

Table 29: Average Portion Size (in ounces) by Weight

	All Fish Consumers (n _w = 3,965)			Women (n _w = xxx)			Men (n _w = xxx)		
	Mean	Lower CI	Upper CI	Mean	Lower CI	Upper CI	Mean	Lower CI	Upper CI
< 125 lbs.	4.5	4.2	4.9	4.5	4.2	4.9	4.6*	3.5	5.5
125–149 lbs.	4.8	4.6	5.0	4.7	4.5	4.9	5.1	4.5	5.6
150–174 lbs.	5.3	5.1	5.5	4.8	4.6	5.1	5.9	5.6	6.2
175–199 lbs.	5.7	5.5	5.9	5.1	4.8	5.4	6.0	5.8	6.3
200+ lbs.	6.1	5.9	6.3	4.9	4.6	5.1	6.4	6.2	6.7

Fish Consumers; excludes respondents (n = 55) who did not know or did not provide a portion size estimate for one or more meals or snacks
* Caution small cell size for men < 125 lbs.

Portion sizes also varied somewhat by health district.

- Those living in Southwest and East Idaho provided smaller portion sizes, which is consistent with the lower number of consumption events provided.

Table 30: Average Portion Sizes (in ounces) by Health District

Health District	Mean	Lower CI	Upper CI	Median	Lower CI	Upper CI
Panhandle	5.5	5.3	5.8	5.2	5.0	5.5
N. Central	5.5	5.2	5.8	5.3	5.0	5.7
Southwest	5.2	5.0	5.4	5.0	4.7	5.2
Central	5.6	5.4	5.8	5.4	5.2	5.6
S. Central	5.4	5.1	5.7	5.0	4.7	5.0
Southeast	5.4	5.1	5.7	5.0	4.6	5.0
East	5.3	5.0	5.5	5.0	4.6	5.1
Total	5.4	5.3	5.5	5.0	5.0	5.2

Portion sizes were significantly higher among anglers than non-anglers.

- This was true for both men and women.

Table 31: Average Portion Sizes (in ounces) by Angler Status and Gender

Angler Status	Mean	Lower CI	Upper CI	Median	Lower CI	Upper CI
Non-Anglers	5.0	4.9	5.2	4.9	4.7	5.0
Anglers	6.1	5.9	3.6	6.0	6.0	6.0
Men						
Non-Anglers	5.7	5.5	5.9	5.6	5.3	5.9
Anglers	6.4	6.2	6.7	6.0	6.0	6.2
Women						
Non-Anglers	4.7	4.6	4.8	4.4	4.3	4.6
Anglers	5.2	5.0	5.5	5.0	4.7	5.0

Portion sizes also varied significantly across the different fish consumption segments.

- Portion sizes were significantly higher among moderate, heavy, and very heavy fish consumers than among those who consume fish less frequently.

Table 32: Average Portion Sizes (in ounces) by Fish Consumption Segment

Fish Consumption Segment	Mean	Lower CI	Upper CI	Median	Lower CI	Upper CI
Very Heavy (301+ Times / Year)	5.3	4.8	5.8	4.5	5.1	5.6
Heavy (51 - 300 Times / Year)	5.7	5.5	5.8	5.3	5.1	5.5
Moderate (15 - 50 Times / Year)	5.6	5.5	5.8	5.3	5.0	5.5
Light (4 - 15 Times / Year)	5.1	4.8	5.3	4.9	4.6	5.0
Very Light (1 - 3 Times / Year)	4.3	3.8	4.8	4.0	3.0	4.0
All Fish Consumers	5.4	5.3	5.5	5.0	5.0	5.2

Total Annual Fish Consumption (Estimated from FFQ)

Total average fish consumption estimated from the food frequency questions was computed by multiplying the total number of consumption events as determined by FFQ4 question series times the portion sizes consumed at the corresponding events.

- The average Idahoan consumes 9,790 grams or 345 ounces of fish annually.
- Fish Consumers (consumed fish in past year) consume an average of 11,050 grams or 390 ounces annually.

Table 33: Total Average Annual Fish Consumption (Estimated from FFQ) by Consumption Event and Overall—All Idaho Adults

Consumption Event	n _w		Mean	Lower CI	Upper CI	Median	Lower CI	Upper CI
At Home	4,430	Grams	6,096	6,453	5,738	2,722		
		Ounces	215	228	202	96		
Restaurant	4,430	Grams	1,890	2,064	1735	455		
		Ounces	67	73	61	16		
Somewhere Else	4,447	Grams	835	962	708	0		
		Ounces	30	34	5	0		
Snacks	4,429	Grams	1,057	1,340	775	0		
		Ounces	37	47	27	0.0		
Overall	4,474	Grams	9,790	10,366	9,215	4,422		
		Ounces	345	366	325	156		

Base: All Idaho Adults; portion size estimates for those with zero frequency consumption events is set at zero.

Table 34: Total Average Annual Fish Consumption (Estimated from FFQ) by Consumption Event and Overall—**Fish Consumers**

Consumption Event	n _w		Mean	Upper CI	Lower CI	Median
At Home	3,910	Grams	6,905	7,304	6,508	3,401
		Ounces	244	258	230	120
Restaurant	3,904	Grams	2,155	2,341	1,970	680
		Ounces	76	82.6	69.5	24
Other Meals	3,917	Grams	948	1,092	804	0
		Ounces	33	38.5	28	0
Snacks	3,898	Grams	1,201	1,522	880	0
		Ounces	42	54	31	0
Overall	3,965	Grams	11,050	11,690	10,411	5,613
		Ounces	390	412	367	198
<i>Base: Fish Consumers</i>						

Fish Consumption—Idaho Fish

As part of the food frequency questions, anglers were asked to indicate the percentage of fish or seafood meals containing fish or seafood that was caught in Idaho.

Anglers reported that slightly more than three out of ten (31%) of their annual fish meals contained fish caught in Idaho.

However, slightly less than 65 percent of Idaho anglers report that 31 percent of their fish meals contained fish caught in Idaho. Therefore, the median (18%) may represent a better measure of central tendency.

Table 35: Percentage of Fish / Seafood Meals Containing Fish Caught in Idaho—Anglers Only

	% of Fish / Seafood Meals Containing Fish Caught in Idaho
Minimum	0%
Maximum	100%
Mean	31%
Upper CI	33%
Lower CI	30%
50th Percentile	18%
60th Percentile	25%
65th Percentile	40%
70th Percentile	50%
80th Percentile	70%
90th Percentile	90%

FFQ6: You indicated that you eat fish or seafood as part of a meal or snack about [RESTORE TOTAL NUMBER OF MEALS / SNACKS CONTAINING FISH OR SEAFOOD] times per year. What percentage of these meals or snacks contained fish or seafood that was caught in Idaho?

Base: Anglers (n_w = 1,432)

Average Daily Fish Consumption (Estimated from FFQ Series)

Average daily fish consumption estimated from the food frequency questions was computed by dividing total annual fish consumption (from FFQ questions) by 365 (number of days in a year).

- On average, Idaho adults who consume fish, consume 31 grams or just over 1 ounce of fish per day. This figure captures the average daily fish consumption rates for just over 70 percent of all Idaho adults.
- Median consumption rates are just over half of the average (mean) consumption rate—16 grams or .6 ounces.

Table 36: Average Daily Fish Consumption (Grams / Day)—Fish Consumers

Species Group	Fish Consumers			Angler Population					
	All Fish			All Fish			Idaho Fish		
	Lower CI	Upper CI		Lower CI	Upper CI		Lower CI	Upper CI	
<i>n_w</i>									
Mean	31.0	29.3	32.8	37.0	33.9	40.2	17.2	17.06	17.34
Std. Dev.	56.3			63.4			37.15		
Min	0.04			0.16			0.00		
50th Percentile	16.2	15.2	16.8	19.9	18.0	21.4	5.28	5.28	5.31
55th Percentile	18.6	18.0	19.9	23.1	21.5	24.2	6.52	6.52	6.76
60th Percentile	22.4	21.1	23.1	26.9	24.5	29.2	8.22	8.21	8.23
65th Percentile	25.6	24.2	27.0	31.5	29.5	33.5	9.79	9.76	9.79
70th Percentile	30.8	29.8	32.2	35.4	33.6	38.1	12.55	12.35	12.68
75th Percentile	35.4	34.2	36.7	43.5	39.5	46.6	16.16	16.12	16.19
80th Percentile	43/4	41.0	45.4	52.8	49.9	57.7	20.66	20.23	20.74
85th Percentile	53.8	51.1	56.9	64.3	60.5	71.9	27.09	27.09	27.34
90th Percentile	70.7	65.9	73.6	85.5	78.2	96.9	43.90	43.00	44.18
95th Percentile	104.3	98.2	112.0	120.5	112.3	130.5	77.33	77.33	77.33
99th Percentile	230.1	186.9	247.3	250.3	229.7	357.3	156.58	156.58	156.58
Max	1,177.3			1,177.4			505.5		

Dietary Recall

Recent Fish Consumption

Nearly half of all fish consumers reported that they had consumed fish in the eight days prior to the initial contact; 13 percent reported that they had consumed fish on the day prior to the initial contact.

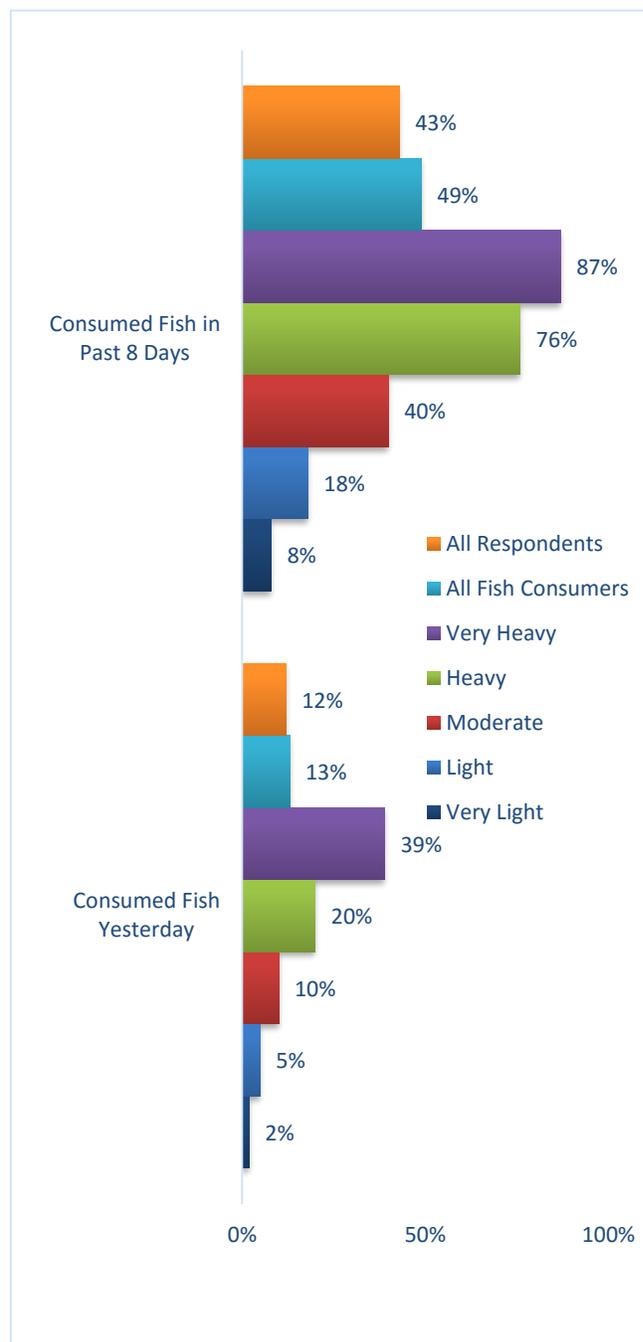
- As would be expected, the likelihood of recent consumption was related to overall frequency of consumption.
- In addition, the reported number of recent fish consumption events increased with frequency of fish consumption.

Table 37: Average Number of Consumption Events in Previous Eight Days by Fish Consumption Segments

Fish Consumption Segments	Average Number of Consumption Events Yesterday and Seven Days Prior to Yesterday	
	Mean	Median
All Fish Consumers	1.78	1.58
Very Heavy (301+ Times / Year)	3.12	2.89
Heavy (51 - 300 Times / Year)	1.91	1.70
Moderate (15 - 50 Times / Year)	1.39	1.34
Light (4 - 15 Times / Year)	1.22	1.17
Very Light (1 - 3 Times / Year)	1.06	1.06

Base: Consumed fish / seafood in previous eight days (yesterday and previous 7 days) n_w = 1,715

Figure 12: Percentage of Fish Consumers Consuming Fish Yesterday and Seven Days Prior to Yesterday



In general, those who had consumed fish in the previous eight days were similar demographically to all fish consumers. However, reflecting the finding that those consuming fish in the past seven days are more likely to be moderate to heavy fish consumers and the characteristics of these segments, recent fish consumers were:

- Somewhat older than non-recent fish consumers.
- Somewhat more affluent than non-recent fish consumers.

Table 38: Demographic Characteristics of Recent Fish Consumers

	All Fish Consumers (n_w = 4,020) (a)	Consumed Fish Past 8 Days (n_w = 550) (b)
Gender		
Male	51%	51%
Female	49%	49%
Age		
18–34	31%	27%
35–54	35%	35%
55+	34%	38%
Mean	47.4	48.9
Education		
Less than High School Graduate	5%	4%
High School Graduate or GED	24%	20%
Some College	31%	31%
Bachelor’s Degree	26%	29%
Graduate School or Professional Degree	14%	16%
Household Income		
Less than \$25,000	27%	22%
Less than \$35,000	9%	8%
Less than \$50,000	17%	18%
Less than \$75,000	19%	19%
\$75,000 or more	28%	32%
Median	\$53,495	\$54,825

Differences in Portion Size Estimates between Food Frequency and Dietary Recall Questions

Respondents also provided portion size estimates for each meal consumed in the eight days prior to being contacted. As with the food frequency questions, they were asked to provide an absolute number in ounces. If they were unable to give an absolute estimate of portion size (in ounces), they were asked to indicate which range of portion sizes best represented their estimate; the midpoint of the range then served as their estimate.

The portion size estimates given by a respondent in the recall series of questions were on average one-third higher than the average portion size estimates given by the same respondent in the food frequency questions.

- This was true for both men and women. However, the difference in portion size estimates was nearly twice as high for men as women—42 versus 22 percent higher, respectively.
- The difference in portion size estimates was greatest among respondents between the ages of 18 and 34 and lowest among those who are 55 years of age and older.
- The differences between portion size estimates decreased as income increased.

Table 39: Comparison of Portion Size Estimates Dietary Recall and Food Frequency Questions—Initial Call

		Portion Size Estimate Dietary Recall	Portion Size Estimate FFQ	Paired Difference*	Significant
All Respondents	Grams	216.5	162.6	54.0	*
	Ounces	7.6	5.7	1.9	
Male	Grams	261.3	184.4	76.9	*
	Ounces	9.2	6.5	2.7	
Female	Grams	171.3	140.5	30.8	*
	Ounces	6.0	5.0	1.1	
18–34	Grams	241.5	169.8	71.6	*
	Ounces	8.5	6.0	2.5	
35–54	Grams	222.8	166.3	56.5	*
	Ounces	7.9	5.9	2.0	
55 Plus	Grams	191.6	153.5	38.0	*
	Ounces	6.8	5.4	1.3	
<\$25,000	Grams	230.8	160.1	70.7	*
	Ounces	8.1	5.7	2.5	
\$25,000 - <\$35,000	Grams	234.2	162.8	71.4	*
	Ounces	8.3	5.8	2.5	
\$35,000 - <\$50,000	Grams	216.1	158.1	58.0	*
	Ounces	7.6	5.6	2.0	
\$50,000 - <\$75,000	Grams	208.3	160.8	47.4	*
	Ounces	7.3	5.7	1.7	
\$75,000 +	Grams	219.7	174.8	44.9	*
	Ounces	7.8	6.2	1.6	

Base: Respondents who had consumed fish or seafood in past seven days and provided portion size estimates for food frequency and dietary recall questions

** Difference is computed at the respondent level*

Consumption of Idaho Fish in the Previous Eight Days

The dietary recall questions asked what type of fish they consumed and where it was obtained. For the purposes of this research Idaho fish are defined as fish caught in Idaho waters by the respondent or someone else (see the discussion on grouping fish beginning on page 41 of this report):

The percentage of meals containing Idaho fish consumed in the eight days prior to the survey contact was computed by dividing the sum of all meals containing Idaho fish by the sum of all meals consumed.

On average, 7 percent of fish or seafood meals consumed in the eight days prior to the survey contact contained Idaho fish (as defined above).

- Anglers consumed more than three times as many meals containing Idaho fish than did non-anglers. Even among anglers, however, only one out of eight fish or seafood meals consumed in the past seven days contained Idaho fish.

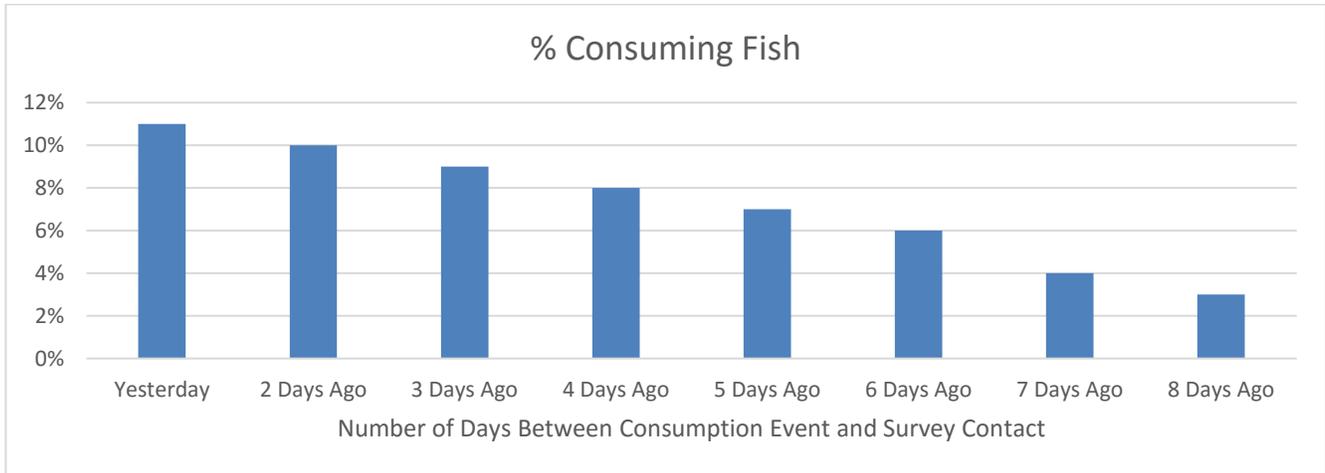
Table 40: Percentage of Fish / Seafood Meals Containing Idaho Fish Based on Dietary Recall Questions

	Initial Call		
	All Adults (n = 1,608)	Anglers (n = 650)	Non-Anglers (n = 959)
Minimum	0%	0%	0%
Maximum	100%	100%	100%
Mean	7.0%	11.9%	3.6%
Upper CI	8.1%	14.2%	4.7%
Lower CI	5.8%	9.6%	2.5%
Median	0.0%	0.0%	0.0%

Differences in Portion Size Estimates by Distance of Consumption Event from Survey Contact

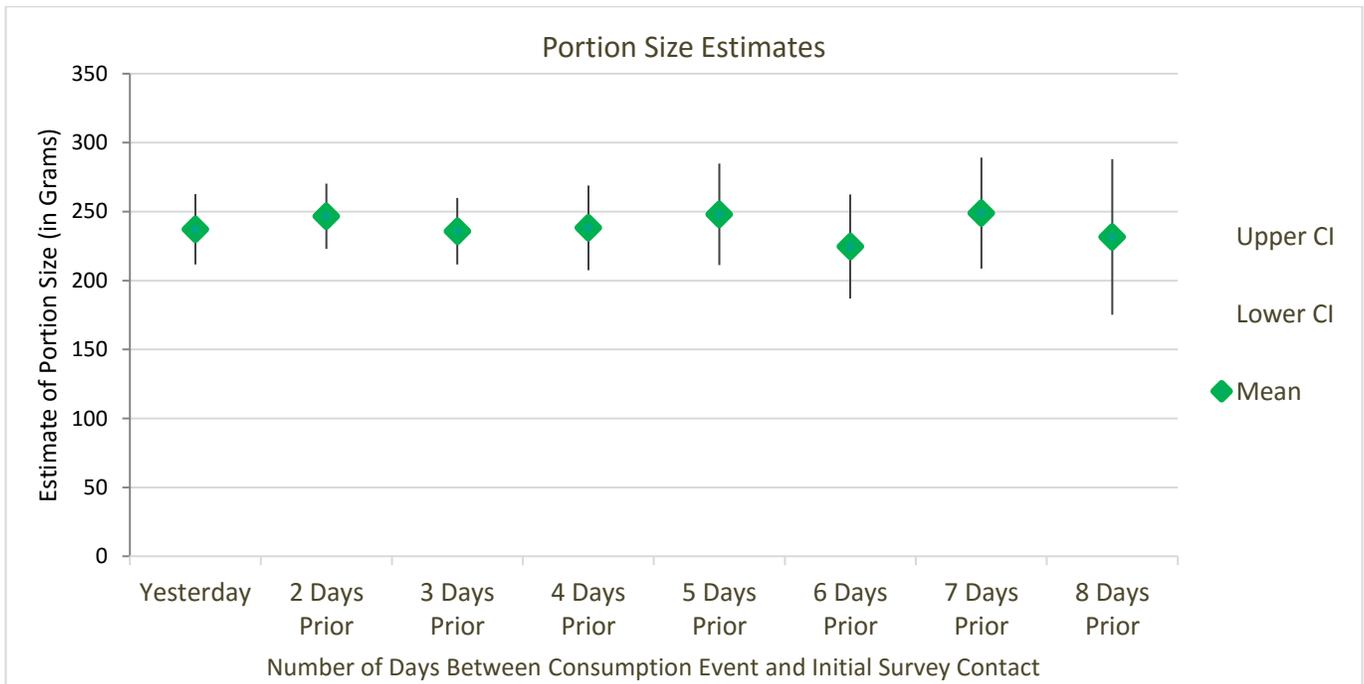
The percentage of respondents reporting that they consumed fish on any given day in the eight days prior to being contacted decreased as the distance of the consumption event from the survey contact increased.

Figure 13: % of Respondents Consuming Fish by Distance of Consumption Event from Survey Contact



Dietary recall portion size estimates are nearly the same regardless of the amount of time between the consumption event and the survey contact.

Figure 14: Dietary Recall Portion Size Estimates by Distance of Consumption Event from Survey Contact



* Initial contact only

Base: Consumed Fish in Previous Eight Days

Differences in Amount Consumed in Previous Eight Days between Main and Re-contact Surveys

One hundred fifty (150) respondents had consumed fish one to two days before the main survey and again one to two days before the re-contact survey. Two hundred seventy seven (277) respondents had consumed fish at least once three to eight days before the main survey and again during the three to eight days before the re-contact survey.

There were no significant differences in the portion size estimate a respondent gave during the initial contact and during the re-contact.

Table 41: Differences in Portion Size Estimates Main and Re-contact Surveys

	n_w*	Average Amount Consumed First Contact	Average Amount Consumed Re-contact	Difference	Upper CI of the Difference	Lower CI of the Difference	Sig. (2-tailed)
Consumed within Past 2 Days	150	200.5	196.3	4.2	-38.7	47.1	.85
Consumed 3 to 8 Days Ago	277	194.3	196.3	2.0	-34.9	30.9	.90

Reasons for Consuming / Not Consuming Fish

Fish consumers were asked their primary reason(s) for consuming fish or seafood.

- The primary reason given was a liking for or enjoyment of the taste. This was noteworthy among moderate and heavy fish consumers.
- The second major reason given was that it is considered to healthy and/or low in calories. The extent to which this is a reason for consuming fish increases as frequency of fish consumption increases
- Nearly one out of ten fish consumers indicated they consume fish as an alternative to meat or chicken. This is noteworthy among light fish consumers.

Table 42: Reasons for Consuming Fish or Seafood by Fish Consumption Segments

	All Fish Consumers (n _w = 3,958)	Very Light (n _w = 261)	Light (n _w = 809)	Moderate (n _w = 1,229)	Heavy (n _w = 1,624)	Very Heavy (n _w = 97)
Like It / Enjoy Taste	71%	40%	62%	76%	75%	74%
Healthy / Low in Calories	46%	17%	32%	43%	58%	62%
Alternative to / Something Different than Meat or Chicken	9%	19%	11%	9%	7%	8%

REA1: There are many reasons why people eat fish or seafood. What are the primary reasons why you eat fish or seafood? (Multiple responses allowed)
Base: Consumed fish in past year

As would be expected, a significant percentage of anglers cite that catching their own fish is a reason for consumption. However, this reason is secondary to the primary reasons of taste and health.

Table 43: Reasons for Consuming Fish or Seafood by Angler Status

	All Fish Consumers (n _w = 3,958)	Non-Anglers (n _w = 2,480)	Anglers (n _w = 1,588)
Like It / Enjoy Taste	71%	69%	73%
Healthy / Low in Calories	46%	47%	44%
Alternative to / Something Different than Meat or Chicken	9%	10%	8%
I Am an Angler / Catch My Own Fish	5%	1%	12%

Fish non-consumers and those consuming less than 12 times per year were asked to indicate why they don't consume fish or consume fish more often.

- More than half of those who do not eat fish at all or consume fish infrequently say that the primary reason they don't consume fish or do not consume fish more often is because they do not like the taste. This is noteworthy among fish non-consumers and very light fish consumers.
- Consistent with lower incomes noted earlier, nearly one out of four light fish consumers say that cost is a major reason for not consuming fish more often.
- Concerns about pollution or contamination were only mentioned by 3 percent of respondents.

There are no significant differences between anglers and non-anglers.

Table 44: Reasons for Not Consuming Fish or Seafood or Not Consuming More Often

	All (n _w = 1,428)	Non-Consumers (n _w = 549)	Very Light Consumers (n _w = 261)	Light (n _w = 618)
Don't Like Taste / Other Family Members Don't Like	50%	60%	58%	38%
Cost	15%	5%	15%	24%
Availability / Hard to Find	9%	5%	6%	12%
Allergies	7%	12%	4%	3%
Vegetarian	4%	9%	<1%	<1%
Concerns about Pollution / Contamination	3%	2%	4%	3%

	All (n _w = 1,428)	Non-Anglers (n _w = 1,026)	Anglers (n _w = 402)
Don't Like Taste / Other Family Members Don't Like	50%	52%	46%
Cost	15%	15%	15%
Availability / Hard to Find	9%	8%	11%
Allergies	7%	7%	7%
Vegetarian	4%	5%	2%
Concerns about Pollution / Contamination	3%	3%	3%

REA2 [Ask if TOTAL_ANNUAL_FFQ <12] There are many reasons why people do not eat fish very often. What are the primary reasons why you don't eat fish or seafood more often?
[Ask if FISH_NON-CONSUMER] There are many reasons why people do not eat fish. What are the primary reasons why you don't eat fish or seafood?

DISCUSSION

Sample Methodology

While there are many concerns regarding the use of telephone surveys due primarily to the increasing prevalence of cell phone only and cell phone primary households and decreasing response rates, best practices in survey research were used to address these concerns. The results represent reliable and valid estimates of key consumption measures.

The use of a dual-frame telephone sample ensured that all Idaho adults with access to a telephone—landline and/or wireless—had a known probability of being selected for the research. Cell phone sample was sampled at a higher rate than the landline sample, consistent with the high percentage of cell phone only households in Idaho’s population. Weighting further addressed this high percentage.

Efforts to ensure a representative sample included implementation of significant quality control measures to maximize response rates and monitoring data collection to ensure representation of key demographic segments (age within gender, low-income, and Hispanics). Up to ten attempts were made to each sample element. Two out of three sample elements resulted in an actual contact, minimizing potential bias that can be introduced by not being able to reach harder-to-contact respondents (typically younger individuals).

Of those contacted two out of five agreed to complete the survey. Those who immediately refused to complete the survey (i.e., hung up or said they were not interested) were re-contacted at a later date in an effort to convert a refusal into a response.

While there is no definitive source for current response rates, the final response rate (25%) achieved is comparable to the average response rates currently achieved for telephone research studies where significant effort is made to increase response rates.⁵² Therefore, while current concerns about non-response bias are legitimate, the efforts used in this survey to ensure overall high response rates across important demographic segments minimizes the extent to which non-response was systematic (i.e., lower response rates among demographic segments with significantly different consumption patterns).

A further strength of the methodology used was the ability to have a small staff of highly trained interviewers administer the highly complex survey instrument. The survey was programmed to be administered by a computer-assisted telephone interviewing system. Therefore, all of the complex logic patterns were handled automatically. Since the survey was administered continuously over a 12-month period, relatively few interviewers were required and efforts were made to use the same interviewers for the entire year.

The final strength of this methodology is the lower cost to achieve a significant sample size when compared to mail with telephone follow-up or face-to-face interviews.

A thorough review of the final sample (when compared to known population statistics) did identify two potential areas of bias: (1) over-representation of higher-income adults and (2) possible over-representation of anglers.

⁵² Pew Research Center, “Assessing the Representativeness of Public Opinion Surveys,” May 2012. <http://www.people-press.org/2012/05/15/section-1-survey-comparisons-and-benchmarks/>

Non-Response

Some analysis was undertaken to determine what possible effect non-response could have on the results. Number of contacts and whether a complete was a result of a refusal conversion attempt can be used as a proxy those not contacted or refusals. For example, those reached only after multiple contacts may be used as a proxy for those who were never reached. Similarly, those who completed the survey following a refusal conversion attempt may be used as a proxy for those who refused.

There were some differences in fish consumption habits between those contacted after multiple attempts or as a result of a refusal conversion.

- Those reached after multiple attempts (6 or more) were less likely to have consumed fish in the past year. In addition, those reached after multiple attempts (5 or more) reported somewhat fewer fish consumption events per year than did those who were reached with fewer attempts.
- Similarly, those who completed the survey following a refusal conversion attempt were less likely to have consumed fish in the past year and reported fewer fish consumption events per year.

	Number of Attempts						Refusal Conversion	
	1	2	3	4	5	6+	Yes	No
Consumed Fish in Past Year	88%	88%	89%	88%	92%	79%	85%	88%
Number of Fish Consumption Events (All Respondents)	63.3	57.3	55.3	63.4	42.4	46.5	47.3	61.2
Number of Fish Consumption Events (Fish Consumers)	72.1	65.0	62.2	72.2	57.0	59.0	55.8	69.4

This analysis would suggest that to the extent that there is a non-response bias and assuming that those contacted after multiple attempts or following a refusal conversion attempt, the estimates from this research are likely higher than would be the case if there was no non-response. It would be possible to develop and apply a non-response weight; however, this was not possible within the existing resources or time available for analysis.

Implications of Over-Sampling of Higher Income Adults

Significant efforts were undertaken to ensure a demographically representative sample statewide and within health districts. Overall, this goal was achieved. The final sample represented men and younger adults in proportion to their incidence in the general population. Similarly, low-income and Hispanic households were well-represented.

A final review of sample representation did find that Idaho’s highest income households were over-represented and those with household incomes between \$25,000 and \$35,000 were under-represented (Table 15). In addition, it was found that income was a key demographic characteristic differentiating fish consumers from non-consumers (Table 17) as well as the five fish consumption segments (Table 25).

This over-representation impacts calculations of overall fish consumption and average daily fish consumption as it was also found that high-income respondents consumed fish more often and consumed larger portions (Figure 8 and Table 24, respectively).

The effect of over-representation of higher income households results in a larger estimate of total fish consumption as well as average daily fish consumption than might occur in the general population. This effect could be corrected by application of a more complex weighting process than used in the current design. NWRG and IDEA discussed the implications of re-weighting the data. However, time and resources constraints precluded the ability to re-compute the weights. In addition, re-computing the weights could result in large weights within individual health districts, which raises other concerns. As the results indicated that re-weighting would most likely result in more conservative estimates of fish consumption, the decision was that IDEQ should factor this knowledge into their final rule-making processes rather than undertake further data processing efforts.

Implications of Over-Sampling of Anglers

Anglers may also be over-represented. The extent of this over-representation is unclear as there is no definitive estimate available as to what percentage of Idaho adults hold a valid fishing license beyond a comparison of the count provided by Idaho Department of Fish and Wildlife and the total number of Idaho adults. What is known from the analysis of the survey data is that anglers are generally more affluent than non-anglers and therefore the over-representation of anglers may be due in large part to the over-representation of higher income households. Higher representation may also be due to greater interest in the subject matter and greater cooperation rates.

As with the over-representation of higher-income residents, the effect of over-representation of anglers results in a larger estimate of total fish consumption as well as average daily fish consumption than might occur in the general population. Again, this effect could be corrected by application of a more complex weighting process than used in the current design. However, this could result in large weights within individual health districts, which raises other concerns. In addition, the exact percentage of adults with licenses in the general population is unknown; hence we could be weighting to an incorrect number.

As this over-representation results in more conservative estimates of fish consumption, it is recommended that IDEQ factor this knowledge into their final rule-making processes rather than undertake further data processing efforts.

Use of Food Frequency Questions versus Dietary Recall Portion Size Estimates

There are some clear differences in portion size estimates between the food frequency and dietary recall questions—notably portion size estimates from the food frequency questions are smaller than from the dietary recall questions.

The literature review conducted as part of this research supports that portion size estimates are just that—estimates. Due diligence was exercised in both the food frequency and dietary recall questions to provide response options and use of a portion size estimation aid to achieve a valid measure of portion size. There are several possible reasons behind these differences. First, portion size estimates in the food frequency questions were provided for four different types of meals (at home, in restaurants, at someone else's home or other location, and snacks). As shown in Table 27, the average portion size reported for snacks is smaller than for other meals. While a relatively small number of consumption events were snacks, inclusion of snacks would result in a lower average portion size estimate across all meals.

Portion size estimates for dietary recall questions may be larger as respondents were recalling a specific and relatively recent meal. For the food frequency questions, respondents were providing an estimate covering typical meals over time. As a result, the average for the food frequency is more likely to approximate a typical meal rather than a specific and very recent meal.

While different, the resulting estimates from both the food frequency and dietary recall questions are within a relatively small range. Moreover, estimates from the re-contact dietary recall questions are very similar to respondent estimates from the original food frequency questions.

While there are significant differences in portion size estimates between the food frequency and initial dietary recall questions, the differences in portion size estimates between the initial and re-contact dietary recall questions are insignificant. This would suggest the estimate for the dietary recall portion size estimates are more valid measures of actual portion sizes consumed.

Use of Food Frequency Questions versus Dietary Recall Calculations of Annual Number of Consumption Events

While the dietary recall questions appear to provide a more valid portion size estimates, the total number of consumption events estimated using the dietary recall questions is significantly lower than the total number of consumption events estimated using the food frequency questions. It is likely that the dietary recall questions underestimate the number of consumption events as many fish consumers may not have consumed fish during the week prior to being surveyed and hence the number of consumption events registers as zero.

At the same time, the number of consumption events calculated using the food frequency questions is likely high. This is supported by the extent to which respondents felt that their estimates were accurate (Figure 10).

The per person number of consumption events is most likely to be somewhere between the self-reported number obtained through the food frequency questions and the estimate computed from the dietary recall questions.

What is potentially more significant is the difference in average daily fish consumption rates obtained through the different methods. As noted earlier portion size estimates from the dietary recall questions are larger than from the food frequency questions. On the other hand, the number of consumption events using the food frequency questions is larger than the number of consumption events using the dietary recall questions.

Therefore, the impact of the larger portion size when computing average daily fish consumption rates using the dietary recall questions is offset by the lower number of consumption events.

Influence of Increasing Incomes or Aging Population on Future Fish Consumption Rates

The analysis shows that primarily income and secondarily age are significant demographic differentiators of fish consumption rates. If fish consumption does increase as income rises (i.e., a true cause-and-effect relationship) then as Idaho incomes increase it is possible that fish consumption rates may also increase, assuming an adequate supply of fish is available to support increased consumption.

Similarly, older adults consume more fish. If age is an actual driver of fish consumption, then as the young age cohort (18–35) ages, fish consumption rates could increase. On the other hand, this younger age cohort is more likely than older adults to say they do not consume fish because they dislike its taste. Therefore, if other factors such as preference for other foods or a dislike for the taste of fish are the primary determinant of consumption, future fish consumption rates could decrease.

APPENDIX

Questionnaire

NOTATIONS

Logic instructions use standard programming and mathematical notations. The logic instructions and notes for the CATI programmers are identified in the questionnaire as illustrated below:

ASK QUESTIONB IF QUESTIONA = 01

Each question is given a name that corresponds to the section—for example, screening questions are named SCR—followed by a sequential letter or number. Those questions that were asked in the re-contact survey are shaded as follows:

QNAME

Other notations in the questionnaire are used by the interviewers.

- **INTERVIEWER INSTRUCTIONS:** These are notes to the interviewer such as additional items that can be read to the respondent if needed or information on correct data entry procedures.
- **ALLCAPS:** Text in all uppercase fonts is not read to respondents
- **ALLCAPS SURROUNDED BY BRACKETS:** This text is interviewer and CATI programming instructions and not read to respondents
- **(Response options in parenthesis)** are read to respondents as necessary

INTRODUCTION

[BASE: ALL RESPONDENTS]

[PROGRAMMING: SECTION FOR TIMING]

INTROGP Hello. This is _____, calling on behalf of the **State of Idaho Department of Environmental Quality**.

We are conducting research for the State of Idaho on fish consumption to support update of Idaho's water quality standards to protect human health. The purpose of this research is to determine the types and quantities of fish and seafood Idahoans eat as this is an important factor used in setting these standards.

This call may be monitored and/or recorded for quality control purposes only.

[AS NECESSARY – IF RESPONDENT SAYS THEY DO NOT EAT A FISH: Even if you do not eat fish, we would like for you to participate as it is important that we talk to non-fish consumers as well as consumers. This survey is not very long and should only take a few minutes]

[AS NECESSARY – This study is being conducted by an independent research firm for the State of Idaho. If you have additional questions regarding this survey you can find answers, including contact information, on the Idaho Department of Environmental Quality website (www.deq.idaho.gov) or on the Northwest Research Group website (www.nwresearchgroup.com).]

INTERVIEWERS: PROVIDE THIS INFORMATION IF REQUESTED BY THE RESPONDENT

This study is being conducted for research purposes and results will be aggregated across all the people we interview. Your individual responses are kept strictly confidential.

The survey will take about 10 to 15 minutes.

Your participation is completely voluntary and you can skip any question or stop participation at any time.

If you would like additional information or would like contact information regarding this study, I am happy to provide that to you.

INROCELL Did I reach you on a cell phone or landline?

- 01 Cell
- 02 Landline

ASK INTROCELL IF INROCELL=01

INTROCELL Are you currently driving a car or doing any activity requiring your full attention?

- 01 YES [ASK : When is a more convenient time to call you back? **AND SCHEDULE CALLBACK APPOINTMENT**]
- 00 NO [CONTINUE]
- 998 DON'T KNOW
- 999 REFUSED

SCREENING

[BASE: ALL]

SCR1 Including yourself, how many people currently live in your household?

- _____ ENTER NUMBER OF INDIVIDUALS [RANGE 1 TO 10 / ENTER 10 IF 10 OR MORE]
- 998 DON'T KNOW

999 REFUSED / PREFER NOT TO ANSWER

ASK SCR1A IF SCR1 > 1 AND SAMPLETYPE = 01 (RDD LANDLINE)

- SCR1A To ensure that this study is representative of the general population, may I speak to the person in your household 18 years of age and older who had the most recent birthday?
- 01 YES PERSON CURRENTLY AVAILABLE – **CONTINUE**
 - 02 YES PERSON NOT CURRENTLY AVAILABLE – **SCHEDULE CALLBACK**
 - 03 NO PERSON NOT AVAILABLE OR UNWILLING TO COMPLETE STUDY – **CONTINUE WITH RESPONDENT ON THE PHONE**
- SCR2 Are you 18 years of age or older?
- 01 YES
 - 00 NO
 - 998 DON'T KNOW – **THANK AND TERMINATE CALL USE THANK2**
 - 999 REFUSED – **THANK AND TERMINATE CALL USE THANK2**

CONTINUE IF SCR2= 01

IF SCR2 = 00 AND SAMPLE_TYPE = 02 (CELL PHONE) OR 03 (ANGLER) THANK AND TERMINATE CALL USE THANK3

IF SCR2= 00 AND SAMPLE_TYPE = 01 (RDD LANDLINE) AND SCR1>1, ASK TO SPEAK TO PERSON IN HOUSEHOLD 18 YEARS OF AGE AND OLDER. IF NONE AVAILABLE THANK AND TERMINATE CALL AND USE THANK3.

IF NOT AVAILABLE BUT WILLING TO BE INTERVIEWED SCHEDULE CALLBACK.

- SCR3 Are you a resident of the state of Idaho?
- 01 YES – **CONTINUE**
 - 00 NO – **THANK AND TERMINATE CALL USE THANK4**
 - 998 DON'T KNOW – **THANK AND TERMINATE CALL USE THANK2**
 - 999 REFUSED – **THANK AND TERMINATE CALL USE THANK2**

ASK SCR3A IF SAMPLE_TYPE = 01 (LANDLINE) OR 03 (ANGLER)

- SCR3A To verify, is your home zip code [RECALL ZIP CODE FROM SAMPLE]?
- 01 YES
 - 00 NO
 - 998 DON'T KNOW
 - 999 REFUSED

ASK SCR3B IF SAMPLE_TYPE = (02) CELL PHONE OR SCR3A = 02

- SCR3B What is your home zip code?
- _____ ENTER CORRECT ZIPCODE [**Allow 5 digits**]
- 99998 DON'T KNOW
 - 99999 Refused

ASK SCR3C IF SAMPLE_TYPE = 01 (LANDLINE) OR 03 (ANGLER) (AND SCR3A=998 OR 999 OR SCR3B = 99998 OR 99999 OR SCR3B<83200 or SCR3B>83880)

- SCR3C Do you live in [RESTORE COUNTY FROM SAMPLE] County?
- 01 YES
 - 02 NO

998 DON'T KNOW – **THANK AND TERMINATE CALL USE THANK2**
 999 PREFER NOT TO ANSWER – **THANK AND TERMINATE CALL USE THANK2**

ASK SCR3D IF SAMPLE_TYPE = 02 (CELL PHONE) OR SCR3C=02 (AND SCR3A=998 OR 999 OR SCR3B = 99998 OR 99999)

SCR3D In which Idaho County do you live?

- | | | |
|----------------|---------------|----------------------|
| 1 ADA | 16 CASSIA | 31 LEWIS |
| 2 ADAMS | 17 CLARK | 32 LINCOLN |
| 3 BANNOCK | 18 CLEARWATER | 33 MADISON |
| 4 BEAR LAKE | 19 CUSTER | 34 MINIDOKA |
| 5 BENEWAH | 20 ELMORE | 35 NEZ PERCE |
| 6 BINGHAM | 21 FRANKLIN | 36 ONEIDA |
| 7 BLAINE | 22 FREMONT | 37 OWYHEE |
| 8 BOISE | 23 GEM | 38 PAYETTE |
| 9 BONNER | 24 GOODING | 39 POWER |
| 10 BONNEVILLE | 25 IDAHO | 40 SHOSHONE |
| 11 BOUNDARY | 26 JEFFERSON | 41 TETON |
| 12 BUTTE | 27 JEROME | 42 TWIN FALLS |
| 13 CAMAS | 28 KOOTENAI | 43 VALLEY |
| 14 CANYON | 29 LATAH | 44 WASHINGTON |
| 15 CARIBOU | 30 LEMHI | 95 NONE OF THE ABOVE |
| 998 DON'T KNOW | 999 REFUSED | |

IF ALL RESPONSES TO SCR3A TO SCR3D = DON'T KNOW OR REFUSED, THANK AND CONCLUDE [SCREENER REFUSAL] USE THANK2

ASK SCR4GP IF SAMPLE_TYPE = 01 (LANDLINE) OR 02 (CELL PHONE)

SCR4GP Did you have a valid Idaho fishing license or a combined hunting and fishing license at any time during the 2013 or 2014 calendar years?

- 01 YES
 00 NO
 998 DON'T KNOW
 999 REFUSED -- **THANK AND TERMINATE CALL USE THANK2**

IF SCR4GP = 01 OR SCR4ANG = 01, COUNT AS ANGLER –GROUP 2
IF SCR4GP = 00, 998 OR SCR4ANG = 00, 998, COUNT AS NON-ANGLER –GROUP 1

ASK DEMO1 IF SAMPLE_TYPE = 01 (LANDLINE) OR 02 (CELL PHONE)

DEMO1 To make sure that our study is representative of all Idahoans, may I please have your age?

- _____ ENTER AGE [RANGE 18 TO 120; IF RESPONDENT SAYS UNDER 18 THANK AND TERMINATE CALL USE THANK3]
- 998 DON'T KNOW
- 999 REFUSED / PREFER NOT TO ANSWER

ASK DEMO1A IF (DEMO1 = 998 OR 999)

DEMO1A Which of the following categories does your age fall into?

[READ OPTIONS]

- 01 18-24
- 02 25-34
- 04 35-44
- 05 45-54
- 06 55-64
- 07 65 OR OVER
- 998 [DO NOT READ] DON'T KNOW
- 999 [DO NOT READ] REFUSED / PREFER NOT TO ANSWER

ASK DEMO2 IF SAMPLE_TYPE = 01 (LANDLINE) OR 02 (CELL PHONE)

DEMO2 [ENTER RESPONDENT'S GENDER; IF UNCERTAIN ASK: "Are you. . ."]

- 01 [DO NOT READ] MALE
- 02 [DO NOT READ] FEMALE
- 998 [DO NOT READ] DON'T KNOW
- 999 [DO NOT READ] REFUSED / PREFER NOT TO ANSWER

INCQU Again just to make sure that our study is representative of all Idahoans, is your total annual household income. . .

- 01 \$25,000 per year or less
- 02 Greater than \$25,000 per year
- 998 [DO NOT READ] DON'T KNOW
- 999 [DO NOT READ] REFUSED / PREFER NOT TO ANSWER

FISH FREQUENCY QUESTIONS

[BASE: ALL]

FFQINT I would like to start by asking you some general questions about your **personal** consumption of fish and seafood. When we talk about your consumption, be sure to include all meals during the day—that is breakfast, lunch, and dinner—as well as snacks. In addition, include fish that is eaten at home, in a restaurant, or at someone else’s house. Include fish, seafood, or shellfish eaten by itself or within a dish or food items—such as anchovies on pizza or seafood in a soup or stew or a sandwich that contains fish.

FFQ1 Have you **personally** eaten fish or seafood in **the past 12 months**?
[AS NEEDED: Please include all meals and snacks regardless of where purchased or eaten. Include fresh or frozen fish, seafood, or shellfish; and any dishes or food items that may contain fish or shellfish such as anchovies on a pizza or seafood in a soup, stew or pasta, or a sandwich that contains fish.]

- 01 YES
- 00 NO
- 998 DON'T KNOW / CAN'T REMEMBER
- 999 REFUSED – **THANK AND TERMINATE CALL AND USE THANK2**

ASK FFQ1A IF FFQ1 = 00 (NO) OR 998 (CAN'T REMEMBER)

FFQ1A When asked about fish or seafood, people sometimes overlook dishes or things that contain fish or seafood. In the past 12 months, have you eaten things such as . . .
[READ LIST AND ENTER YES / NO FOR EACH ITEM MAY SKIP TO FFQ2 AS SOON AS RESPONDENT SAYS YES TO AN ITEM]

- FFQ1A_01 Snacks that contain fish or seafood such as fish-sticks or popcorn shrimp
- FFQ1A_02 Appetizers that contain fish or seafood such as crab dip
- FFQ1A_03 Leftovers that contain fish or seafood
- FFQ1A_04 Any type of canned fish or seafood such as tuna fish
- FFQ1A_05 Tuna or other type of seafood sandwich
- FFQ1A_06 Fish and chips
- FFQ1A_07 Clam or other type of seafood chowder or stew
- FFQ1A_08 Fast food fish sandwich
- FFQ1A_09 Seafood salad (includes shellfish such as crab or shrimp)
- FFQ1A_10 Smoked fish
- FFQ1A_11 Sushi or Sashimi
- FFQ1A_12 Pizza with anchovies
- FFQ1A_13 Bagels and lox
- FFQ1A_14 Paella or other seafood casserole
- FFQ1A_15 Pickled herring
- FFQ1A_16 Frozen fish or seafood purchased at a grocery store
- 01 YES
- 00 NO
- 998 DON'T KNOW / CAN'T REMEMBER
- 999 REFUSED

IF FFQ1 = 00 AND FFQ1A_1 TO FFQ1A_16 ALL = 00, CLASSIFY AS FISH NON-CONSUMER AND SKIP TO REA2
 IF FFQ1 = 01 OR ANY RESPONSE FFQ1A_1 TO FFQ1A_16 ANY = 01, CLASSIFY AS FISH CONSUMER AND CONTINUE
 IF FFQ1 = 00 OR 998 AND FFQ1A_1 TO FFQ1A_16 = 998,999 or 00 SKIP TO REA1

FFQ2 Have you **personally** eaten fish or seafood in the **past 30 days**?
 [AS NEEDED: Please include all meals and snacks regardless of where purchased or eaten. Include fresh or frozen fish, seafood, or shellfish; and any dishes or food items that may contain fish or shellfish such as anchovies on a pizza or seafood in a soup, stew or pasta, or a sandwich that contains fish.]

- 01 YES
- 00 NO
- 998 DON'T KNOW / CAN'T REMEMBER
- 999 REFUSED – **SKIP TO REA1**

ASK FFQ3 IF FFQ2 = 01, 998

FFQ3 Have you **personally** eaten fish or seafood in the **past seven (7) days**?
 [AS NEEDED: Please include all meals and snacks regardless of where purchased or eaten. Include fresh or frozen fish, seafood, or shellfish; and any dishes or food items that may contain fish or shellfish such as anchovies on a pizza or seafood in a soup, stew or pasta, or a sandwich that contains fish.]

- 01 YES
- 00 NO
- 998 DON'T KNOW / CAN'T REMEMBER
- 999 REFUSED – **SKIP TO REA1**

FFQ4_1 Thinking about the last 12 months, on average how often did you have a **meal at home** that **includes** fish or seafood? Please provide your best estimate in terms of number of times per week, month, or year.

[AS NEEDED: Think of all meals, breakfast, lunch or dinner. Include fresh or frozen fish, seafood, or shellfish; and any dishes or food items that may contain fish or shellfish such as seafood in omelets, seafood in a soup, stew or pasta, or a sandwich that contains fish.]

[If respondent selects a range please use the midpoint, i.e. "5 to 7 times per month" = "6 times per month" and "1 to 2 times per week" = "1.5 times per week"]

- ___ RECORD ABSOLUTE NUMBER OF TIMES [allow for one decimal place]
- 97 Varies
- 98 DON'T KNOW
- 99 REFUSED

[Skip to FFQ4_2 if FFQ4_1= 97, 98 or 99]

- FFQ4_1A
- ___ RECORD FREQUENCY
 - 01 PER WEEK
 - 02 PER MONTH
 - 03 PER YEAR

FFQ4_2 Thinking about the last 12 months, on average how often did you have a **meal in a restaurant** that included fish or seafood?

[AS NEEDED PROBE: Please provide your best estimate in terms of number of times per week, month, or year.]

[AS NEEDED: Think of all meals, at a restaurant, including appetizers. Include such items as fish

sticks, fish 'n' chips, popcorn shrimp, shrimp cocktail, oysters, and meals that may have fish or seafood in them such as seafood linguini or clam chowder]

[If respondent selects a range please use the midpoint, i.e. "5 to 7 times per month" = "6 times per month" and "1 to 2 times per week" = "1.5 times per week"]

___ RECORD ABSOLUTE NUMBER OF TIMES [allow for one decimal place]

97 Varies

98 DON'T KNOW

99 REFUSED

[Skip to FFQ4_3 if FFQ4_2=97, 98 or 99]

FFQ4_2A ___ RECORD FREQUENCY

01 PER WEEK

02 PER MONTH

03 PER YEAR

FFQ4_3 Thinking about the last 12 months, on average how often did you have a **meal somewhere else such as other people's homes or while at work** that included fish or seafood?

[AS NEEDED PROBE: Please provide your best estimate in terms of number of times per week, month, or year.]

[AS NEEDED: Think of events where fish or seafood may have been served such as parties or BBQ's. Include things such as smoked or grilled fish, shrimp cocktail or dishes that may have fish or seafood in them such as seafood salad. Also include leftovers brought to work and eaten for lunch.]

[If respondent selects a range please use the midpoint, i.e. "5 to 7 times per month" = 6 times per month" and "1 to 2 times per week" = "1.5 times per week"]

___ RECORD ABSOLUTE NUMBER OF TIMES [allow for one decimal place]

97 VARIES

98 DON'T KNOW

99 REFUSED

[Skip to FFQ4_4 if FFQ4_3=97, 98 or 99]

FFQ4_3A ___ RECORD FREQUENCY

01 PER WEEK

02 PER MONTH

03 PER YEAR

FFQ4_4 Thinking about the last 12 months, on average how often did you have a **snack** that included fish or seafood?

[AS NEEDED PROBE: Please provide your best estimate in terms of number of times per week, month, or year.]

[AS NEEDED: Think of common or uncommon snacks that you have at home, at work, or out and about. Include such things as smoked salmon, fish sticks, crab with butter, or soups and stews that may have fish or seafood in them.]

[If respondent selects a range please use the midpoint, i.e. "5 to 7 times per month" = "6 times per month" and "1 to 2 times per week" = "1.5 times per week"]

___ RECORD ABSOLUTE NUMBER OF TIMES [allow for one decimal place]

97 VARIES

98 DON'T KNOW

99 REFUSED

[Skip to FFQ4_5 if FFQ4_4=97, 98 or 99]

FFQ4_4A ___ RECORD FREQUENCY

- 01 PER WEEK
- 02 PER MONTH
- 03 PER YEAR

FFQ4_5 Based on the responses you gave me, it appears that in the past 12 months, you had approximately **[RESTORE TOTAL_ANNUAL_FFQ]** meals or snacks that contained fish or seafood. Using a scale where “0” means “not at all accurate” and “10” means “completely accurate,” how accurate would you estimate this number is?

Not at all accurate										Completely Accurate
00	01	02	03	04	05	06	07	08	09	10

- 998 DON'T KNOW
- 999 REFUSED

ASK FFQ5_1 IF FFQ4_1 > 0

FFQ5_1 When you eat fish or seafood as part of a **meal at home and it is the main part of the meal – that is, your entree**, what do you estimate is the average size of the portion of fish or seafood you eat? Please provide your best estimate in ounces.

- ___ RECORD ABSOLUTE NUMBER OF OUNCES
- ___ RECORD LOWER RANGE OF NUMBER OF OUNCES
- ___ RECORD UPPER RANGE OF NUMBER OF OUNCES
- 997 VARIES **[PROBE ONCE]**
- 998 DON'T KNOW
- 999 REFUSED

ASK FFQ5A_1 IF FFQ5_1 = 998, 999

FFQ5A_1 **[INSERT TREATMENT WORDING]**, would you say the average size of the portion of fish or seafood you eat as part of a **meal at home** is. . .

- 01 Less than one ounce
- 02 Between one (1) and three (3) ounces
- 03 Between four (4) and six (6) ounces
- 04 Between seven (7) and nine (9) ounces
- 05 Between 10 and 12 ounces
- 06 Between 13 and 16 ounces
- 06 More than 16 ounces or more than 1lb
- 997 VARIES
- 998 Don't Know
- 999 REFUSED

ASK FFQ5_2 IF FFQ4_2 > 0

FFQ5_2 When you eat fish or seafood as part of a **meal at a restaurant and it is the main part of the meal – that is, your entree**, what do you estimate is the average size of the portion of fish or seafood you eat?

[AS NEEDED: Please provide your best estimate in ounces.]

- ___ RECORD ABSOLUTE NUMBER OF OUNCES
- ___ RECORD LOWER RANGE OF NUMBER OF OUNCES

- ___ RECORD UPPER RANGE OF NUMBER OF OUNCES
- 997 VARIES [PROBE ONCE]
- 998 DON'T KNOW
- 999 REFUSED

ASK FFQ5A_2 IF FFQ5_2 = 998, 999

FFQ5A_2 [INSERT TREATMENT WORDING], would you say the average size of the portion of fish or seafood you eat as part of a **meal at a restaurant** is. . .

- 01 Less than one ounce
- 02 Between one (1) and three (3) ounces
- 03 Between four (4) and six (6) ounces
- 04 Between seven (7) and nine (9) ounces
- 05 Between 10 and 12 ounces
- 06 Between 13 and 16 ounces
- 06 More than 16 ounces or more than 1lb
- 997 VARIES
- 998 DON'T KNOW
- 999 REFUSED

ASK IF FFQ4_3>0

FFQ5_3 When you eat fish or seafood as part of a **meal at somewhere other than your home or a restaurant (e.g., someone else's home, your office) and it is the main part of the meal – that is, your entree**, what do you estimate is the average size of the portion of fish or seafood you eat?

[AS NEEDED: Please provide your best estimate in ounces.]

- ___ RECORD ABSOLUTE NUMBER OF OUNCES
- ___ RECORD LOWER RANGE OF NUMBER OF OUNCES
- ___ RECORD UPPER RANGE OF NUMBER OF OUNCES
- 997 VARIES [PROBE ONCE]
- 998 DON'T KNOW
- 999 REFUSED

ASK FFQ5A_3 IF FFQ5_3 = 998, 999

FFQ5A_3 [INSERT TREATMENT WORDING], would you say the average size of the portion of fish or seafood you eat as part of a meal at somewhere other than your home or a restaurant (e.g., someone else's home, your office) is. . .

- 01 Less than one ounce
- 02 Between one (1) and three (3) ounces
- 03 Between four (4) and six (6) ounces
- 04 Between seven (7) and nine (9) ounces
- 05 Between 10 and 12 ounces
- 06 Between 13 and 16 ounces
- 06 More than 16 ounces or more than 1lb
- 997 VARIES
- 998 DON'T KNOW
- 999 REFUSED

ASK IF FFQ4_4>0

FFQ5_4 When you eat fish or seafood as a **snack**, what do you estimate is the average size of the portion of fish or seafood you eat?

[AS NEEDED: Please provide your best estimate in ounces.]

- ___ RECORD ABSOLUTE NUMBER OF OUNCES
- ___ RECORD LOWER RANGE OF NUMBER OF OUNCES
- ___ RECORD UPPER RANGE OF NUMBER OF OUNCES
- 997 VARIES [PROBE ONCE]
- 998 DON'T KNOW
- 999 REFUSED

ASK FFQ5A_4 IF FFQ5_4 = 998, 999

FFQ5A_4 [INSERT TREATMENT WORDING], would you say the average size of the portion of fish or seafood you eat as part of a **snack** is. . .

- 01 Less than one ounce
- 02 Between one (1) and three (3) ounces
- 03 Between four (4) and six (6) ounces
- 04 Between seven (7) and nine (9) ounces
- 05 Between 10 and 12 ounces
- 06 Between 13 and 16 ounces
- 06 More than 16 ounces or more than 1lb
- 997 VARIES
- 998 DON'T KNOW
- 999 REFUSED

ASK FFQ6 IF RESPONDENT_TYPE = ANGLER

FFQ6 You indicated that you eat fish or seafood as part of a meal or snack about [RESTORE TOTAL_ANNUAL_FFQ] times per year. What percentage of these meals or snacks contained fish or seafood that was caught in Idaho?

- ___ RECORD PERCENTAGE [RANGE 0 – 100%]
- 998 DON'T KNOW
- 999 REFUSED

FISH CONSUMPTION RECALL – 24 HOUR

[BASE: ATE FISH IN PAST 7 DAYS FFQ3 = 01, ELSE SKIP TO FCR7D_1_A]

[PROGRAMMING: SECTION FOR TIMING]

ASK FCR24_1 IF FFQ3 = 01

FCR24_1 You indicated that you personally ate fish in the past seven (7) days. Did you eat any meal or snack that included fish, shellfish, or seafood **yesterday**?

BEFORE ACCEPTING A “NO” RESPONSE, PROMPT WITH: “Remember to include anything that you ate that included fish or seafood including a main entrée, a side dish, or as part of something else such as in a soup, on a salad, a sandwich, leftovers.”]

[AS NEEDED: That would be [RESTORE DAY OF WEEK FOR THE DAY PREVIOUS TO INTERVIEW DAY].

“Yesterday” is from the time you woke up to the time you went to bed.]

- 01 YES

- 00 NO
- 998 DON'T KNOW
- 999 REFUSED

IF FCR24_1 = 01 CONTINUE
IF FCR24_1 = 00, 998, 999 SKIP TO FCR7D_1_A

FCR24_2 For which of the following meal(s) did you eat fish or seafood yesterday?
[READ LIST AND ENTER YES / NO FOR EACH.]

- FCR24_2_1 Breakfast
 - FCR24_2_2 Lunch
 - FCR24_2_3 Dinner [OR SUPPER]
 - FCR24_2_4 Snack
 - FCR24_2_95 **[DO NOT READ]** Something else [SPECIFY]
- 01 YES
 - 00 NO
 - 998 DON'T KNOW
 - 999 REFUSED

CREATE VARIABLE: COUNT_MEALS = SUM OF YES (01) RESPONSES TO FCR_24_2_1 THROUGH FCR_24_2_95; NUMBER OF MEALS ATE FISH
RESPONDENT WILL BE ASKED FCR24_3 TO FCR24_8 FOR EACH MEAL WHERE FISH OR SEAFOOD WAS EATEN

FCR24_3_1 When you ate fish or seafood for **[RESTORE RESPONSE TO FCR24_2]** yesterday, was it. . .

- 01 The main part of your meal – that is, your entrée
- 02 Part of a dish – such as pasta, salad, soup, a sandwich
- 03 An appetizer
- 95 Something else
- 998 DON'T KNOW
- 999 REFUSED

FCR24_4_1 Did you eat the **[RESTORE RESPONSE TO FCR24_2]** where you consumed fish or seafood. . .

- 01 At home
- 02 In a restaurant
- 88 Somewhere Else (e.g. party, office, friend's house) [SPECIFY]
- 998 DON'T KNOW
- 999 REFUSED

ASK FCR24_4A_1 IF FCR24_4_1 = 01

FCR24_4A_1 Did you personally prepare this meal or did someone else?

- 01 PREPARER
- 02 SOMEONE ELSE
- 998 DON'T KNOW
- 999 REFUSED

FCR24_5_1 What type of fish or seafood did you eat for [RESTORE RESPONSE TO FCR24_2]?

[MULTIPLE RESPONSE QUESTION / CHECK ALL THAT APPLY]

[READ LIST IS NECESSARY TO PROMPT OR TO CLARIFY TYPE OF FISH]

- 000 SALMON [OF ANY TYPE]
- 101 TROUT [OF ANY TYPE INCLUDES: (RAINBOW, CUTTHROAT, LAKE, BROWN, BROOK)}
- 102 STEELHEAD TROUT
- 201 TUNA [FRESH OR CANNED]
- 202 POLLOCK
- 203 TILAPIA
- 204 HAILBUT
- 205 SWORDFISH
- 206 COD
- 301 SHRIMP
- 302 CRAB
- 304 CLAMS
- 305 OYSTERS
- 306 SCALLOPS
- 307 LOBSTER
- 401 SUSHI OR SASHIMI
- 402 FISH 'N' CHIPS (UNSURE OF SPECIFIC TYPE OF FISH)
- 403 FISH STICKS (FROZEN, PURCHASED FROM GROCERY STORE)
- 106 WHITEFISH **[INCLUDES MOUNTAIN OR LAKE WHITEFISH]**
- 107 YELLOW PERCH **[ACCEPT ANY "PERCH" HERE]**
- 108 WALLEYE
- 109 CATFISH [INCLUDES: BULLHEAD CATFISH OR JUST PLAIN CATFISH]
- 110 BASS
- 111 BLUEGILL
- 112 BLACK CRAPPIE
- 113 NORTHERN PIKE
- 114 WHITE STURGEON
- 115 CRAYFISH
- 888 OTHER [SPECIFY]
- 998 DON'T KNOW
- 999 REFUSED

ASK FCR24_6 IF FCR24_5 = 000

FCR24_6_1 Was the salmon you ate at [RESTORE RESPONSE TO FCR24_4_1] a . . .

- 01 Kokanee or Sockeye Salmon
- 02 Coho Salmon
- 03 Chinook Salmon
- 04 Blueback Salmon
- 95 Or some other type of salmon [INCLUDES: KING, SILVER, COPPER RIVER, CHUM, ATLANTIC, PINK, RED]
- 998 DON'T KNOW
- 999 REFUSED

ASK FCR24_6A_1 IF FCR24_6 = 01, 02, 03, 04 OR FCR24_5_1 EQ 101, 102, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115

FCR24_6A_1 Was the [RESTORE RESPONSE TO FCR24_5 OR FCR24_6] you ate . . .

- 01 Purchased at the market or grocery store
- 02 Caught by you or someone else in an Idaho lake or stream
- 03 Caught by you or someone else in a lake or stream somewhere other than Idaho
- 88 OTHER [SPECIFY]
- 998 DON'T KNOW
- 999 REFUSED

FCR24_7_1 How many helpings or pieces of [RESTORE RESPONSE TO FCR24_5] did you consume at [RESTORE RESPONSE TO FCR24_2]?

- ___ RECORD NUMBER [RANGE 1 – 4]
- 998 DON'T KNOW
- 999 REFUSED

FCR24_7A_1 What was the size of each helping or piece of [RESTORE RESPONSE TO FCR24_5]? If you can please provide your response in number of ounces.

[AS NEEDED: Use your best estimate]

[RECORD NUMBER AND DENOMINATION]

- ___ RECORD ABSOLUTE NUMBER OF OUNCES
- ___ RECORD LOWER RANGE OF NUMBER OF OUNCES
- ___ RECORD UPPER RANGE OF NUMBER OF OUNCES
- 888 OTHER [SPECIFY]
- 998 DON'T KNOW
- 999 REFUSED

ASK FCR24_7B_1 IF FCR24_7A_1 = 888, 998, 999 OR RESPONSE PROVIDED IN ANYTHING OTHER THAN OUNCES

FCR24_7B_1 [INSERT TREATMENT WORDING], would you say the amount of [insert fish mentioned in FCR24A_5 or FCR24_7] you ate at [RESTORE RESPONSE TO FCR24_2] was . . .

- 01 Less than one ounce
- 02 Between one (1) to three (3) ounces
- 03 Between four (4) to six (6) ounces
- 04 Between seven (7) to nine (9) ounces
- 05 Between 10 to 12 ounces
- 06 Between 13 to 16 ounces or 1lb
- 06 More than 16 ounces or more than 1lb

FCR24_8_1 How was the fish or seafood you consumed at [RESTORE RESPONSE TO FCR24_2] prepared?

- 01 BAKED
- 02 BROILED / GRILLED / BARBEQUED
- 03 CANNED / PICKLED
- 04 DRIED / SMOKED
- 05 FRIED
- 06 MICROWAVED
- 07 POACHED
- 08 RAW
- 09 SOUP / STEW / BOILED
- 10 SAUTEED

- 11 REHEATED / LEFTOVERS
- 888 OTHER [SPECIFY]
- 998 DON'T KNOW
- 999 REFUSED

FISH CONSUMPTION RECALL—7 DAYS

[BASE: RESPONDENTS WHO REPORTED CONSUMING FISH IN PAST 7 DAYS [FFQ3 = 01 ELSE SKIP TO REA1]

[PROGRAMMING: SECTION FOR TIMING]

ASK FCR7D_1_A THROUGH FCR7D_1_D IF FCR24_1 = 01 [ATE FISH PAST 24 HOURS]

FCR7D_1_A Excluding yesterday, how many meals did you eat at home that included fish or seafood in the past seven (7) days?

- ___ RECORD NUMBER [RANGE 0 TO 30]
- 998 DON'T KNOW
- 999 REFUSED

FCR7D_1_B Excluding yesterday, how many meals did you eat in a restaurant that included fish or seafood in the past seven (7) days?

- ___ RECORD NUMBER [RANGE 0 TO 30]
- 998 DON'T KNOW
- 999 REFUSED

FCR7D_1_C Excluding yesterday, how many meals did you eat somewhere else such as other people's homes or while at work that included fish or seafood in the past seven (7) days?

- ___ RECORD NUMBER [RANGE 0 TO 30]
- 998 DON'T KNOW
- 999 REFUSED

FCR7D_1_D Excluding yesterday, how many snacks did you eat that included fish or seafood in the past seven (7) days?

- ___ RECORD NUMBER [RANGE 0 TO 30]
- 998 DON'T KNOW
- 999 REFUSED

ASK FCR7D_2_A THROUGH FCR7D_2_D IF FCR24_1 = 00 [DID NOT EAT FISH YESTERDAY] AND FFQ3 = 01 [ATE FISH IN PAST 7 DAYS]

FCR7D_2_A You indicated that you personally ate fish or seafood in the past seven (7) days. How many meals did you eat at home that included fish or seafood?

- ___ RECORD NUMBER [RANGE 0 TO 30]
- 998 DON'T KNOW
- 999 REFUSED

FCR7D_2_B How many meals did you eat in a restaurant that included fish or seafood?

- ___ RECORD NUMBER [RANGE 0 TO 30]
- 998 DON'T KNOW
- 999 REFUSED

FCR7D_2_C How many **meals** did you eat **somewhere else** such as **other people's homes** or **while at work** that included fish or seafood?

- ___ **RECORD NUMBER [RANGE 0 TO 30]**
998 DON'T KNOW
999 REFUSED

FCR7D_2_D How many **snacks** did you eat that included fish or seafood?

- ___ **RECORD NUMBER [RANGE 0 TO 30]**
998 DON'T KNOW
999 REFUSED

ASK FCR7D_3_A IF FCR24_1 = 01 [ATE FISH YESTERDAY]

ASK FCR7D_3_B IF FCR24_1 = 00 [DID NOT EAT FISH YESTERDAY] AND FFQ3 = 01 [ATE FISH IN PAST 7 DAYS]

FCR7D_3_A Excluding today and yesterday, what was the most recent day of the week when you consumed a meal or snack that included fish or seafood?

FCR7D_3_B Not including today, what was the most recent day of the week, when you consumed a meal or snack that included fish or seafood?

SHOW RESPONSE OPTIONS IN DESCENDING ORDER FROM DAY BEFORE INTERVIEW DAY

- 01 MONDAY
02 TUESDAY
03 WEDNESDAY
04 THURSDAY
05 FRIDAY
06 SATURDAY
07 SUNDAY
998 DON'T KNOW
999 REFUSED

FCR7D_4 For which of the following meal(s) on **[RESTORE DAY OF WEEK]** did you eat fish or seafood?
[READ LIST AND ENTER YES / NO FOR EACH.]

- FCR7D_4_1 Breakfast
FCR7D_4_2 Lunch
FCR7D_4_3 Dinner [OR SUPPER]
FCR7D_4_4 Snack
FCR7D_4_95 Something else [SPECIFY]
- 01 YES
00 NO
998 DON'T KNOW
999 REFUSED

FC7D_5_1 When you ate fish or seafood for **[RESTORE RESPONSE TO FCR7D_4]** on **[RESTORE DAY OF WEEK]**, was it . . .

- 01 The main part of your meal – that is, your entrée
02 Part of a dish – such as pasta, salad, soup, a sandwich
03 An appetizer

- 95 Something else
- 998 DON'T KNOW
- 999 REFUSED

FCR7D_6_1 Did you eat the **[RESTORE RESPONSE TO FCR7D_4]** on **[RESTORE DAY OF WEEK]** where you consumed fish or seafood. . .

- 01 At home
- 02 In a restaurant
- 88 Somewhere Else (e.g. party, office, friend's house) [SPECIFY]
- 998 DON'T KNOW
- 999 REFUSED

ASK FCR7D_6A_1 IF FCR7D_6_1= 01

FCR7D_6A_1 Did you personally prepare this meal or did someone else?

- 01 PREPARER
- 02 SOMEONE ELSE
- 998 DON'T KNOW
- 999 REFUSED

FCR7D_7_1 What type of fish or seafood did you eat for **[RESTORE RESPONSE TO FCR7D_4]** on **[RESTORE DAY OF WEEK]**?

[MULTIPLE RESPONSE QUESTION / CHECK ALL THAT APPLY]

[READ LIST IS NECESSARY TO PROMPT OR TO CLARIFY TYPE OF FISH]

- 000 SALMON [OF ANY TYPE]
- 101 TROUT [OF ANY TYPE INCLUDES: (RAINBOW, CUTTHROAT, LAKE, BROWN, BROOK)]
- 102 STEELHEAD TROUT
- 201 TUNA [FRESH OR CANNED]
- 202 POLLOCK
- 203 TILAPIA
- 204 HAILBUT
- 205 SWORDFISH
- 206 COD
- 301 SHRIMP
- 302 CRAB
- 304 CLAMS
- 305 OYSTERS
- 306 SCALLOPS
- 307 LOBSTER
- 401 SUSHI OR SASHIMI
- 402 FISH 'N' CHIPS (UNSURE OF SPECIFIC TYPE OF FISH)
- 403 FISH STICKS (FROZEN, PURCHASED FROM GROCERY STORE)
- 106 WHITEFISH **[INCLUDES MOUNTAIN OR LAKE WHITEFISH]**
- 107 YELLOW PERCH **[ACCEPT ANY PERCH ANSWER HERE]**
- 108 WALLEYE
- 109 CATFISH [INCLUDES: BULLHEAD CATFISH OR JUST PLAIN CATFISH]
- 110 BASS
- 111 BLUEGILL
- 112 BLACK CRAPPIE
- 113 NORTHERN PIKE
- 114 WHITE STURGEON

- 115 CRAYFISH
- 888 OTHER [SPECIFY]
- 998 DON'T KNOW
- 999 REFUSED

ASK FCR7D_8_1 IF FCR7D_7_1= 000

FCR7D_8_1 Was the salmon you ate a . . .

- 01 Kokanee or Sockeye Salmon
- 02 Coho Salmon
- 03 Chinook Salmon
- 04 Blueback Salmon
- 95 Or some other type of salmon [INCLUDES: KING, SILVER, COPPER RIVER, CHUM, ATLANTIC, PINK, RED]
- 998 DON'T KNOW
- 999 REFUSED

ASK FCR7D_8A_1 IF FCR7D_8_1 = 01, 02, 03, 04 OR FCR7D_7_1 EQ 101, 102, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115

FCR7D_8A_1 Was the **[RESTORE RESPONSE TO FCR7D_7 OR FCR7D_8]** you ate . . .

- 01 Purchased at the market or grocery store
- 02 Caught by you or someone else in an Idaho lake or stream
- 03 Caught by you or someone else in a lake or stream somewhere other than Idaho
- 88 OTHER [SPECIFY]
- 998 DON'T KNOW
- 999 REFUSED

FCR7D_9_1 How many helpings or pieces of **[RESTORE RESPONSE TO FCR7D_7_1]** did you consume for **[RESTORE RESPONSE TO FCR7D_4]** on **[RESTORE DAY OF WEEK]**?

- ___ RECORD NUMBER **[RANGE 1 – 4]**
- 998 DON'T KNOW
- 999 REFUSED

FCR7D_10A_1 What was the size of each helping or piece of **[RESTORE RESPONSE TO FCR7D_7_1]**? If you can please provide your response in number of ounces.

[AS NEEDED: Use your best estimate]

[RECORD NUMBER AND DENOMINATION]

- ___ RECORD ABSOLUTE NUMBER OF OUNCES
- ___ RECORD LOWER RANGE OF NUMBER OF OUNCES
- ___ RECORD UPPER RANGE OF NUMBER OF OUNCES
- 888 OTHER [SPECIFY]
- 998 DON'T KNOW
- 999 REFUSED

ASK FCR7D_7B_1 IF FCR7D_10A_1 = 888, 998, 999 OR RESPONSE PROVIDED IN ANYTHING OTHER THAN OUNCES

FCR7D_10B_1 **[INSERT TREATMENT WORDING]**, would you say the amount of fish or seafood you ate at **[RESTORE RESPONSE TO FCR7D_4]** on **[RESTORE DAY OF WEEK]** was. . .

- 01 Less than one ounce
- 02 Between one (1) to three (3) ounces
- 03 Between four (4) to six (6) ounces

- 04 Between seven (7) to nine (9) ounces
- 05 Between 10 to 12 ounces
- 06 Between 13 to 16 ounces or 1lb
- 06 More than 16 ounces or more than 1lb

FCR7D_11_1 How was the fish or seafood you consumed at **[RESTORE RESPONSE TO FCR7D_4]** on **[RESTORE DAY OF WEEK]** prepared?

- 01 BAKED
- 02 BROILED / GRILLED / BARBEQUED
- 03 CANNED / PICKLED
- 04 DRIED / SMOKED
- 05 FRIED
- 06 MICROWAVED
- 07 POACHED
- 08 RAW
- 09 SOUP / STEW / BOILED
- 10 SAUTEED
- 11 REHEATED / LEFTOVERS
- 888 OTHER [SPECIFY]
- 998 DON'T KNOW
- 999 REFUSED

PSACC You indicated that you had **[Insert (NUMBER_MEALS_7D+ COUNT_MEALS24)]** meals that included fish or seafood in the last seven days. For each meal, you provided us with an estimate of the portion size of fish or seafood that you ate. Using a scale where "0" means "not at all accurate" and "10" means "completely accurate," how confident are you in the accuracy of these portion size estimates?

Not at all accurate										Completely Accurate
00	01	02	03	04	05	06	07	08	09	10

- 998 DON'T KNOW
- 999 REFUSED

IF MORE THAN ONE MEAL IN PAST SEVEN DAYS REPEAT LOOP UNTIL RESPONDENT SAYS NO MORE MEALS

REASONS
[BASE: ALL]

ASK REA1 IF FISH CONSUMER (ATE FISH IN PAST YEAR)

REA1 There are many reasons why people eat fish or seafood. What are the primary reasons why you eat fish or seafood?

[ENTER ALL THAT APPLY]

- 01 HEALTHY / GOOD FOR US
- 02 LOW IN CALORIES
- 03 EASY TO FIND / BUY / LOTS AVAILABLE
- 04 LIKE / ENJOY THE TASTE
- 05 LIKE TO COOK WITH FISH / SEAFOOD
- 06 I AM AN ANGLER / I CATCH MY OWN FISH

- 07 I AM VEGETARIAN BUT I EAT FISH / SEAFOOD
- 08 PART OF MY CULTURE / RELIGION
- 09 LOW COST / INEXPENSIVE
- 10 ALTERNATIVE TO / SOMETHING DIFFERENT THAN MEAT OR CHICKEN
- 888 OTHER [SPECIFY]
- 998 DON'T KNOW
- 999 REFUSED

ASK REA2 OF ALL RESPONDENTS; VARY INTRODUCTION BASED ON WHETHER FISH CONSUMER

REA2 **[Use if TOTAL_ANNUAL_FFQ <12]** There are many reasons why people do not eat fish very often. What are the primary reasons why you don't eat fish or seafood more often?
[ENTER ALL THAT APPLY]

[Use if FISH NON-CONSUMER] There are many reasons why people do not eat fish. What are the primary reasons why you don't eat fish or seafood?
[ENTER ALL THAT APPLY]

- 01 HARD TO FIND / OBTAIN / NOT AVAILABLE
- 02 DON'T KNOW HOW TO COOK / PREPARE IT
- 03 DON'T LIKE IT / DON'T CARE FOR THE TASTE
- 04 COST / CAN'T AFFORD IT
- 05 ALLERGIC TO FISH / SHELLFISH / SEAFOOD
- 06 HEALTH CONCERNS / CAN'T EAT BECAUSE PREGNANT OR OTHER MEDICAL CONDITION
- 07 CONCERNS ABOUT CONTAMINATION / POLLUTION
- 08 CONCERNS ABOUT SUSTAINABILITY OF FISH POPULATION / HOW THEY ARE RAISED
- 09 I AM A VEGAN / VEGETARIAN AND DO NOT EAT ANY TYPES OF MEAT OR FISH
- 10 RELIGIOUS / CULTURAL PROHIBITIONS / REASONS
- 888 OTHER [SPECIFY]
- 998 DON'T KNOW
- 999 REFUSED

DEMOGRAPHICS

[BASE: ALL]

DEMOINT These final questions will help us group your answers with others.

DEMO6 What is the highest grade or year of school you completed?

[READ LIST IF NECESSARY TO PROMPT – STOP AFTER RECEIVING A “YES” ANSWER]

- 01 NEVER ATTENDED SCHOOL OR ONLY COMPLETED KINDERGARTEN
- 02 GRADES 1 THROUGH 8 **[AS NEEDED: ELEMENTARY]**
- 03 GRADES 9 THROUGH 11 **[AS NEEDED: SOME HIGH SCHOOL]**
- 04 GRADE 12 OR GED **[AS NEEDED: HIGH SCHOOL GRADUATE]**
- 05 COLLEGE 1 TO 3 YEARS **[AS NEEDED: SOME COLLEGE OR TECHNICAL SCHOOL]**
- 06 COLLEGE 4 YEARS **[AS NEEDED: COLLEGE GRADUATE]**
- 07 GRADUATE SCHOOL OR ABOVE **[AS NEEDED: ADVANCED DEGREE]**
- 998 DON'T KNOW
- 999 REFUSED / PREFER NOT TO ANSWER

RACE1 Are you of Spanish, Hispanic, or Latino/a origin?

[PROBE ONLY IF RESPONDENT SEEMS UNSURE: "Are you or were your ancestors **Mexican**, Puerto Rican, Cuban, Central or South American, or from Spain?"]

[DO NOT READ RESPONSES]

- 01 YES
- 00 NO
- 998 DON'T KNOW
- 999 REFUSED / PREFER NOT TO ANSWER

RACE2 Which one or more of the following would you say is your race?

[AS NEEDED: You can select as many as apply.]

[READ LIST AND SELECT ALL THAT APPLY; IF RESPONDENT SAYS MIXED RACE OR BIRCIAL PROBE ONCE: What race or races is that?]

[NOTE: IF THEY SAY "HISPANIC" PROBE: "In addition to Hispanic, what other race categories do you consider yourself to be?"]

- 01 White [E.G., CAUCASIAN, EUROPEAN, IRISH, ITALIAN, ARAB, MIDDLE EASTERN]
- 02 Black or African American [E.G., NEGRO, KENYAN, NIGERIAN, HAITIAN]
- 03 American Indian or Alaskan Native
- 04 Asian [E.G. ASIAN INDIAN, CHINESE, FILIPINO, VIETNAMESE OR OTHER ASIAN ORIGIN GROUPS]
- 05 Pacific Islander
- 06 [DO NOT READ] HISPANIC
- 888 [DO NOT READ] OTHER (SPECIFY)
- 998 [DO NOT READ] DON'T KNOW
- 999 [DO NOT READ] REFUSED / PREFER NOT TO ANSWER

ASK RACE3 & RACE 4 IF RACE 2 = 03

RACE3 Are you a member of an Idaho tribe?

- 01 YES
- 00 NO
- 998 [DO NOT READ] DON'T KNOW
- 999 [DO NOT READ] REFUSED / PREFER NOT TO ANSWER

ASK RACE4 IF RACE 3 = 01

RACE4 Which one(s)?

[ENTER ALL THAT APPLY]

[READ LIST AS NECESSARY TO PROMPT]

- 01 COEUR D'ALENE
- 02 KOOTENAI
- 03 NEZPERCE
- 04 SHOSHONE – BANNOCK
- 05 SHOSHONE – PAIUTE
- 88 OTHER [SPECIFY]
- 998 [DO NOT READ] DON'T KNOW
- 999 [DO NOT READ] REFUSED / PREFER NOT TO ANSWER

DEMO8 About how much do you weigh without shoes? **[For responses over 400, code as 400]**

- _____ RECORD NUMBER **[RANGE 1 – 400]**
- 998 DON'T KNOW
- 999 REFUSED

DEMO8_1

- 01 RESPONSE IN POUNDS
- 02 RESPONSE IN KILOGRAMS

ASK DEMO8A IF DEMO8 = 998, 999

DEMO8A Which of the following categories does your weight fall into?

- 01 Less than 125 pounds
- 02 125 to 149 pounds
- 03 150 to 174 pounds
- 04 175 to 199 pounds
- 05 200 pounds or more
- 998 DON'T KNOW
- 999 REFUSED

IF INCQU=1 SKIP DEMO09 AND AUTOCODE AS 01 (LESS THAN \$25K).

DEMO9 Is your annual household income from all sources. . .

[STOP WHEN RESPONDENT SAYS PICKS THE CATEGORY]

- 01 Less than \$25,000
- 02 Less than \$35,000
- 03 Less than \$50,000
- 04 Less than \$75,000
- 05 \$75,000 or more
- 998 **[DO NOT READ]** DON'T KNOW
- 999 **[DO NOT READ]** REFUSED / PREFER NOT TO ANSWER

TEL Which of the following best describes how you make or receive calls at home?

- 01 Only have a cell phone **[AS NEEDED: "To make or receive calls"]**
- 02 Primarily use a cell phone
- 04 Use both a landline or cell phone equally
- 05 Primarily use a landline
- 06 Only have a landline **[AS NEEDED: "To make or receive calls"]**
- 998 **[DO NOT READ]** DON'T KNOW
- 999 **[DO NOT READ]** REFUSED / PREFER NOT TO ANSWER

ASK REC IF TOTAL_ANNUAL_FFQ>03

REC As part of this study we will be re-contacting some of our participants with a short follow-up survey. May we contact you again and ask you a subset of these questions a second time? This helps us to better understand the variation in fish consumption that may occur at different points in time.

- 01 YES
- 00 NO
- 998 **[DO NOT READ]** DON'T KNOW
- 999 **[DO NOT READ]** REFUSED / PREFER NOT TO ANSWER

REC1 **[IF REC = 01]** Confirm phone number dialed and respondent's first name for re-contact.

THANKS

THANKEND Thank you very much for your time. Your participation will assist the **Idaho Department of Environmental Quality** better meet the **OBJECTIVES**.

THANK2 I'm sorry, but we cannot continue without that information. Have a good day/evening.

THANK3 Thank you but we are only interviewing heads of household who are 18 years of age and older.

THANK4 Thank you but we are only interviewing **residents of the State of Idaho**

Data Processing and Calculations

Total Annual Fish Consumption

Frequency Questions

FFQ4_1—Thinking about the last 12 months, on average how often did you have a **meal at home** that **includes** fish or seafood? Please provide your best estimate in terms of number of times per week, month, or year.

FFQ4_2—Thinking about the last 12 months, on average how often did you have a **meal in a restaurant** that included fish or seafood? Please provide your best estimate in terms of number of times per week, month, or year.

FFQ4_3—Thinking about the last 12 months, on average how often did you have a **meal somewhere else such as other people's homes or while at work** that included fish or seafood? Please provide your best estimate in terms of number of times per week, month, or year.

FFQ4_4—Thinking about the last 12 months, on average how often did you have a **snack** that included fish or seafood? Please provide your best estimate in terms of number of times per week, month, or year.

Portion Size Questions

FFQ5_1—When you eat fish or seafood as part of a **meal at home and it is the main part of the meal – that is, your entree**, what do you estimate is the average size of the portion of fish or seafood you eat? Please provide your best estimate in ounces.

FFQ5_2—When you eat fish or seafood as part of a **meal at a restaurant and it is the main part of the meal – that is, your entree**, what do you estimate is the average size of the portion of fish or seafood you eat? Please provide your best estimate in ounces.

FFQ5_3—When you eat fish or seafood as part of a **meal at somewhere other than your home or a restaurant (e.g., someone else's home, your office) and it is the main part of the meal – that is, your entree**, what do you estimate is the average size of the portion of fish or seafood you eat? Please provide your best estimate in ounces.

FFQ5_4—When you eat fish or seafood as a **snack**, what do you estimate is the average size of the portion of fish or seafood you eat? Please provide your best estimate in ounces.

PSEA Questions *(as needed)*

FFQ5_1—Would you say the average size of the portion of fish or seafood you eat as part of a **meal at home** is. . .

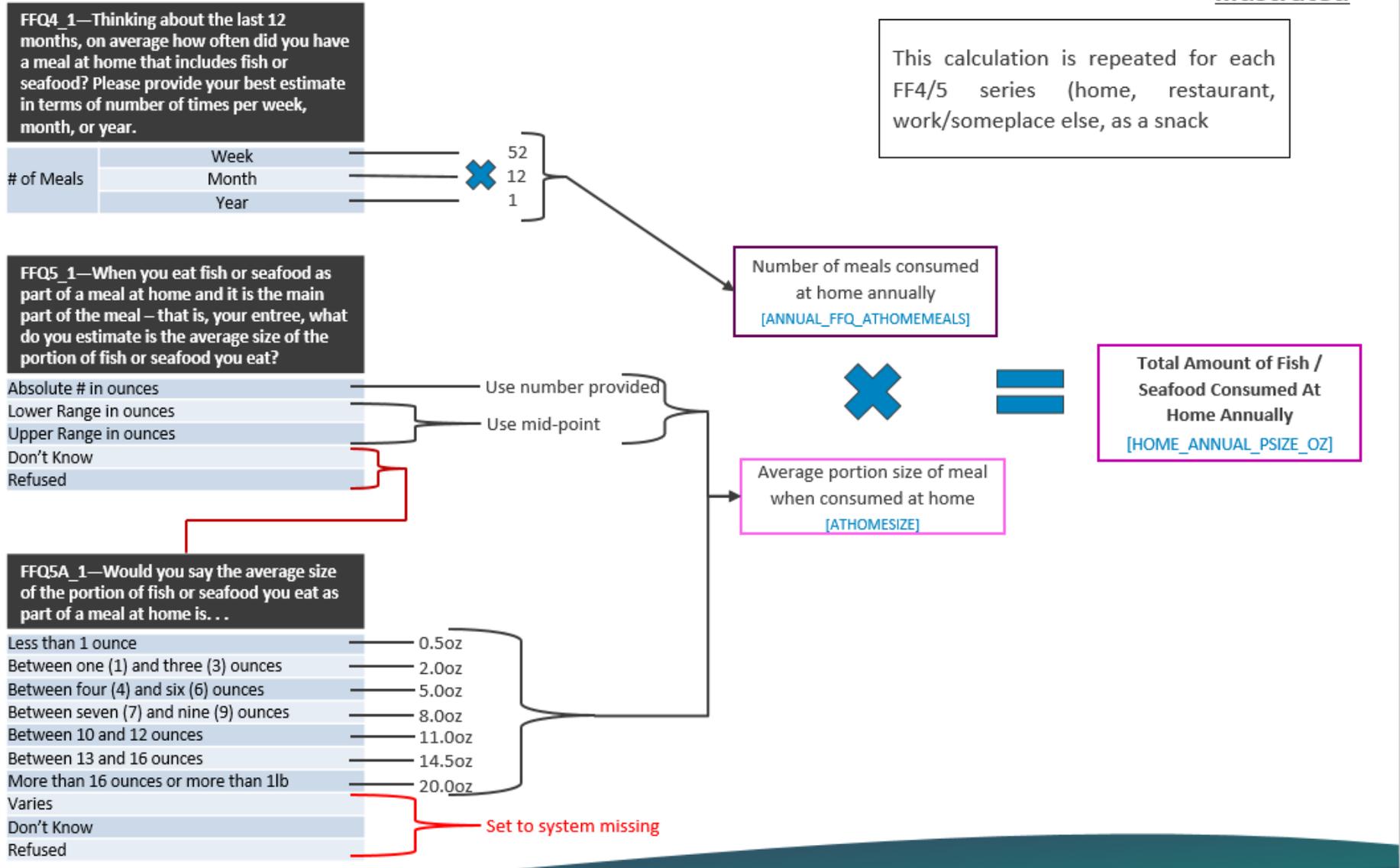
FFQ5_1—Would you say the average size of the portion of fish or seafood you eat as part of a **meal at a restaurant** is. . .

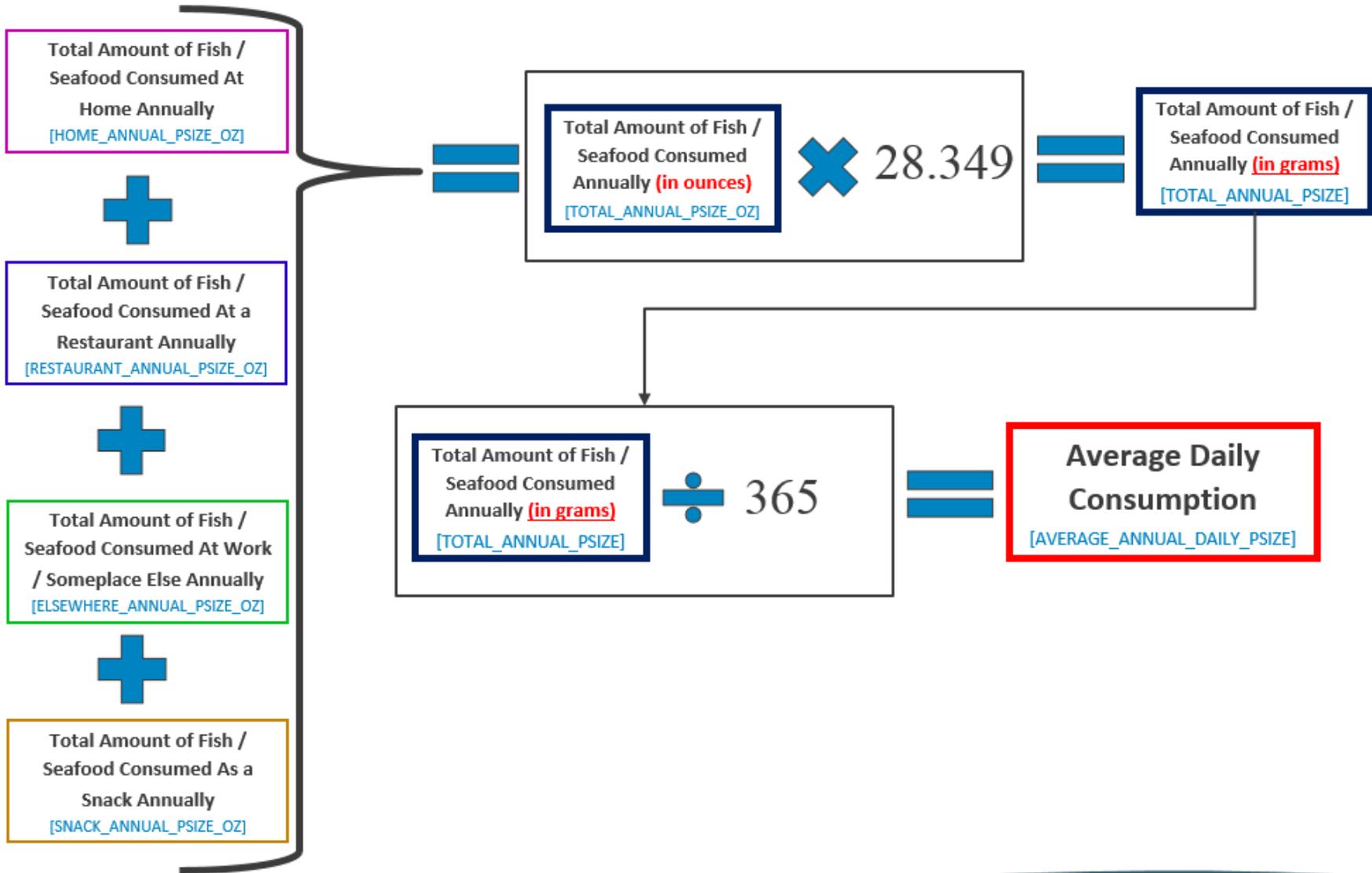
FFQ5_1—Would you say the average size of the portion of fish or seafood you eat as part of a **meal at somewhere other than your home or a restaurant (e.g. someone else's home, your office)** is. . .

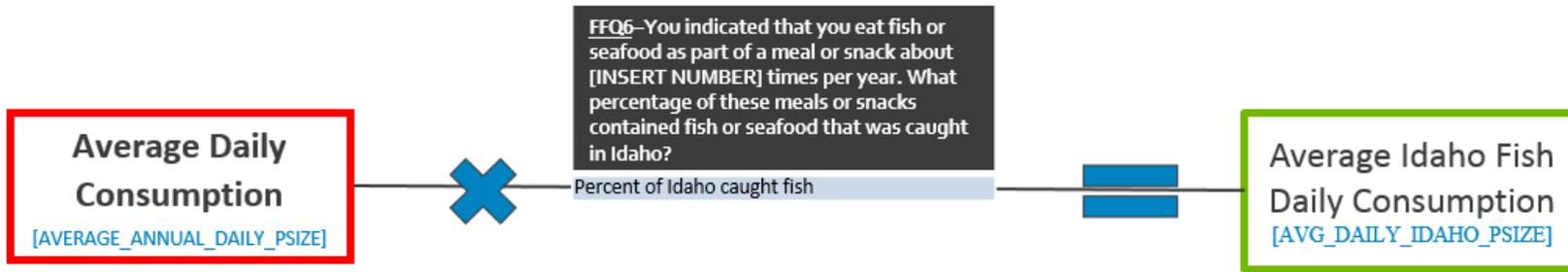
FFQ5_1—Would you say the average size of the portion of fish or seafood you eat as part of as a **snack** is. . .

Percent of Fish/Seafood Caught in Idaho

FFQ6—You indicated that you eat fish or seafood as part of a meal or snack about [RESTORE TOTAL_ANNUAL_FFQ] times per year. What percentage of these meals or snacks contained fish or seafood that was caught in Idaho?







Recall Series – Grouping Fish (Idaho vs. Non-Idaho & Market vs. “Everything Else”)

Type of Fish

FCR24 5 1 / FCR7D 7 1–What type of fish or seafood did you eat for breakfast on [INSERT DAY]?

FCR24 5 2 / FCR7D 7 2–What type of fish or seafood did you eat for lunch on [INSERT DAY]?

FCR24 5 3 / FCR7D 7 3–What type of fish or seafood did you eat for dinner on [INSERT DAY]?

FCR24 5 4 / FCR7D 7 4–What type of fish or seafood did you eat for a snack on [INSERT DAY]?

FCR24 5 5 / FCR7D 7 5–What type of fish or seafood did you eat for any other meal on [INSERT DAY]?

Type of Salmon *(as needed)*

FCR24 6 1 / FCR7D 8 1–Was the salmon you ate for breakfast on [INSERT DAY]. . .

FCR24 6 2 / FCR7D 8 2–Was the salmon you ate for lunch on [INSERT DAY] . .

FCR24 6 3 / FCR7D 8 3–Was the salmon you ate for dinner on [INSERT DAY] . .

FCR24 6 4 / FCR7D 8 4–Was the salmon you ate for a snack on [INSERT DAY] . .

FCR24 6 5 / FCR7D 8 5–Was the salmon you ate for any other meal on [INSERT DAY] . .

Where Acquired *(as needed)*

FCR24 6A 1 / FCR7D 8A 1–Was the fish/seafood you ate for breakfast on [INSERT DAY] . . .

FCR24 6A 2 / FCR7D 8A 2–Was the fish/seafood you ate for lunch on [INSERT DAY] . .

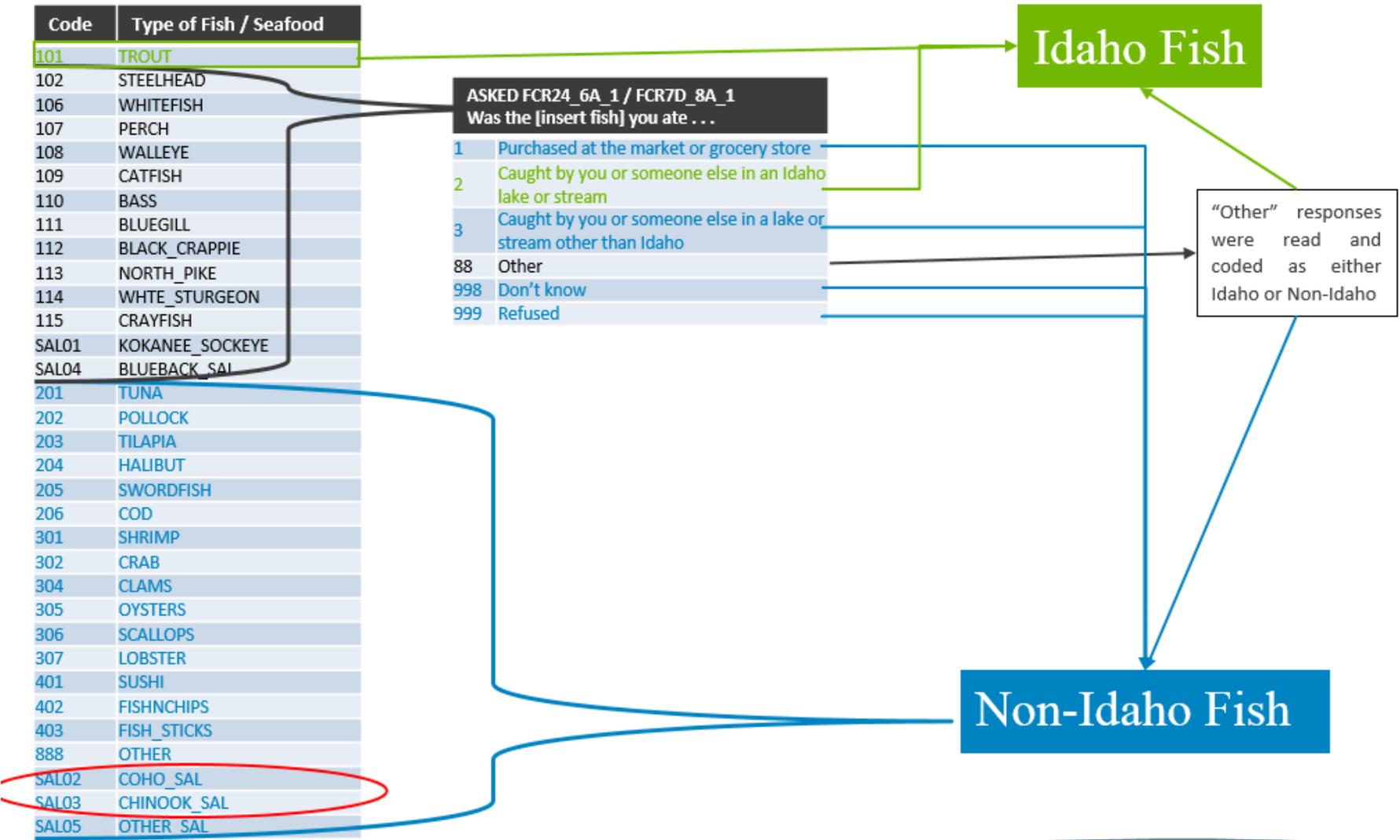
FCR24 6A 3 / FCR7D 8A 3–Was the fish/seafood you ate for dinner on [INSERT DAY] . .

FCR24 6A 4 / FCR7D 8A 4–Was the fish/seafood you ate for a snack on [INSERT DAY] . .

FCR24 6A 5 / FCR7D 8A 5–Was the fish/seafood you ate for any other meal on [INSERT DAY] . .

Response to FCR24_5_1 / FCR7D_7_1

TABLE 10



Non-Idaho Fish

As determined previously

Code	Type of Fish / Seafood
102	STEELHEAD
106	WHITEFISH
107	PERCH
108	WALLEYE
109	CATFISH
110	BASS
111	BLUEGILL
112	BLACK_CRAPPIE
113	NORTH_PIKE
114	WHITE_STURGEON
115	CRAYFISH
SAL01	KOKANEE_SOCKEYE
SAL04	BLUEBACK_SAI
201	TUNA
202	POLLOCK
203	TILAPIA
204	HALIBUT
205	SWORDFISH
206	COD
301	SHRIMP
302	CRAB
304	CLAMS
305	OYSTERS
306	SCALLOPS
307	LOBSTER
401	SUSHI
402	FISHNCHIPS
403	FISH_STICKS
888	OTHER
SAL02	COHO_SAL
SAL03	CHINOOK_SAL
SAL05	OTHER_SAL

ASKED FCR24_6A_1 / FCR7D_8A_1
Was the [insert fish] you ate . . .

- 1 Purchased at the market or grocery store
- 2 Caught by you or someone else in an Idaho lake or stream (COHO/CHINOOK ONLY)
- 3 Caught by you or someone else in a lake or stream other than Idaho
- 88 Other
- 998 Don't know
- 999 Refused

Everything Else

In this determination all fish types 102-115 are the "non-Idaho" fish as determined by slide 11. In this scenario, FCR24_6A_1 determines if they are Market or Everything else.

For this classification, COHO and CHINOOK Salmon are the only species that can be determined by FCR26_6A_1.

Market Fish

Recall Series – Calculating Portion Size

Day / Meal Fish/Seafood Consumed

FCR7D 3–Not including today and yesterday, what was the most recent day of the week when you consumed a meal or snack that included fish or seafood?

FCR24 2 / FCR7D 4–For which of the following meal(s) did you eat fish or seafood [INSERT DAY]?

Type of Fish/Seafood Consumed

FCR24 5 X / FCR7D 7 X–What type of fish or seafood did you eat for [INSERT MEAL (X)] on [INSERT DAY]?

Frequency Questions

FCR24 7 1 / FCR7D 9 1–How many helpings or pieces of [TYPE OF FISH/SEAFOOD] did you consume for breakfast on [INSERT DAY]?

FCR24 7 2 / FCR7D 9 2–How many helpings or pieces of [TYPE OF FISH/SEAFOOD] did you consume for lunch on [INSERT DAY]?

FCR24 7 3 / FCR7D 9 3–How many helpings or pieces of [TYPE OF FISH/SEAFOOD] did you consume for dinner on [INSERT DAY]?

FCR24 7 4 / FCR7D 9 4–How many helpings or pieces of [TYPE OF FISH/SEAFOOD] did you consume for a snack on [INSERT DAY]?

FCR24 7 5 / FCR7D 9 5–How many helpings or pieces of [TYPE OF FISH/SEAFOOD] did you consume for some other meal on [INSERT DAY]?

Portion Size Questions

FCR24 7A 1 / FCR7D 10A 1–What was the size of each helping or piece of [TYPE OF FISH/SEAFOOD]? If you can please provide your response in number of ounces.

FCR24 7A 2 / FCR7D 10A 2–What was the size of each helping or piece of [TYPE OF FISH/SEAFOOD]? If you can please provide your response in number of ounces.

FCR24 7A 3 / FCR7D 10A 3–What was the size of each helping or piece of [TYPE OF FISH/SEAFOOD]? If you can please provide your response in number of ounces.

FCR24 7A 4 / FCR7D 10A 4–What was the size of each helping or piece of [TYPE OF FISH/SEAFOOD]? If you can please provide your response in number of ounces.

FCR24 7A 5 / FCR7D 10A 5–What was the size of each helping or piece of [TYPE OF FISH/SEAFOOD]? If you can please provide your response in number of ounces.

PSEA Questions *(as needed)*

FCR24 7B 1 / FCR7D 10B 1–Would you say the amount of fish or seafood you ate at breakfast on [INSERT DAY] was. . .

FCR24 7B 2 / FCR7D 10B 2–Would you say the amount of fish or seafood you ate at lunch on [INSERT DAY] was. . .

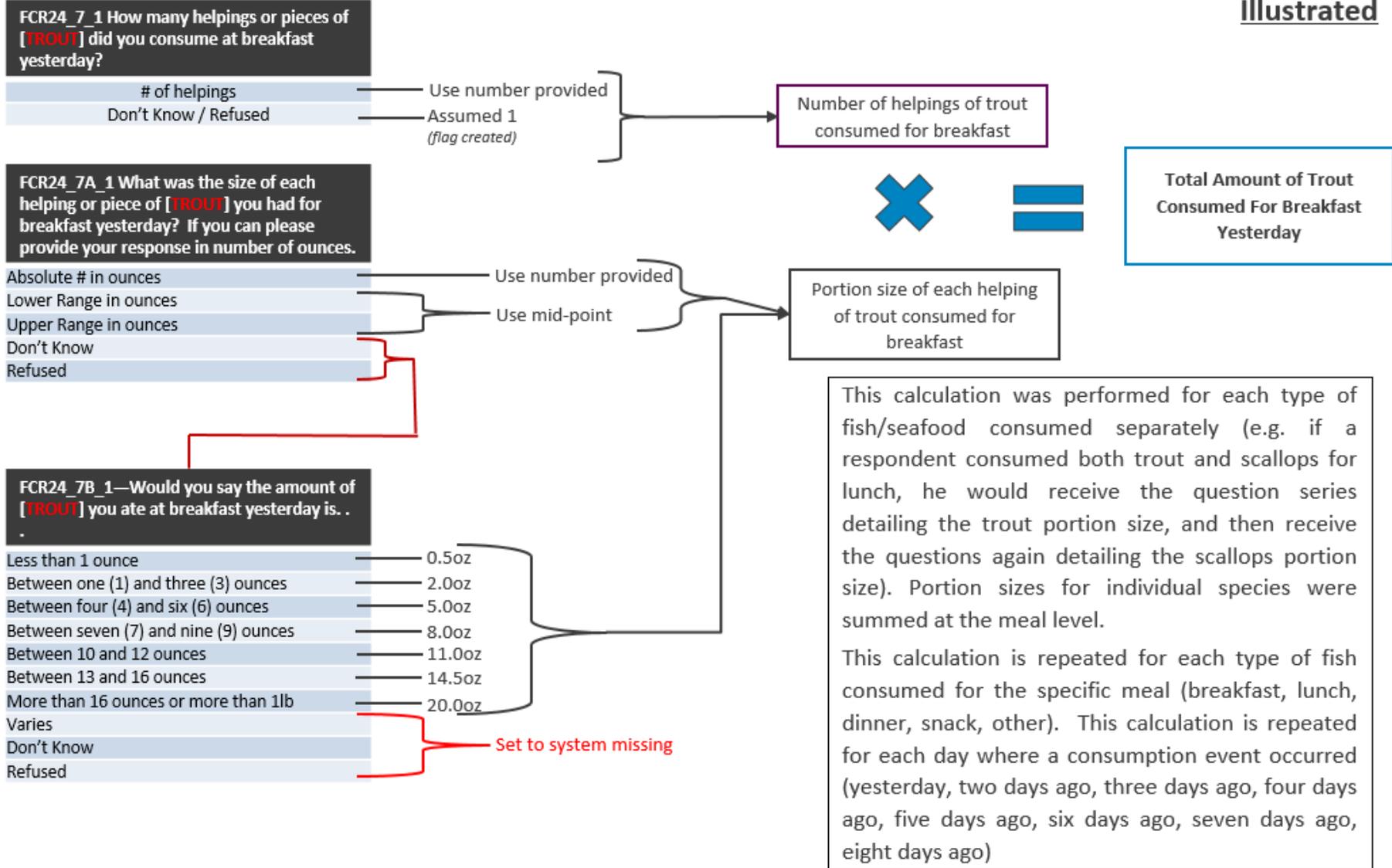
FCR24 7B 3 / FCR7D 10B 3–Would you say the amount of fish or seafood you ate at dinner on [INSERT DAY] was. . .

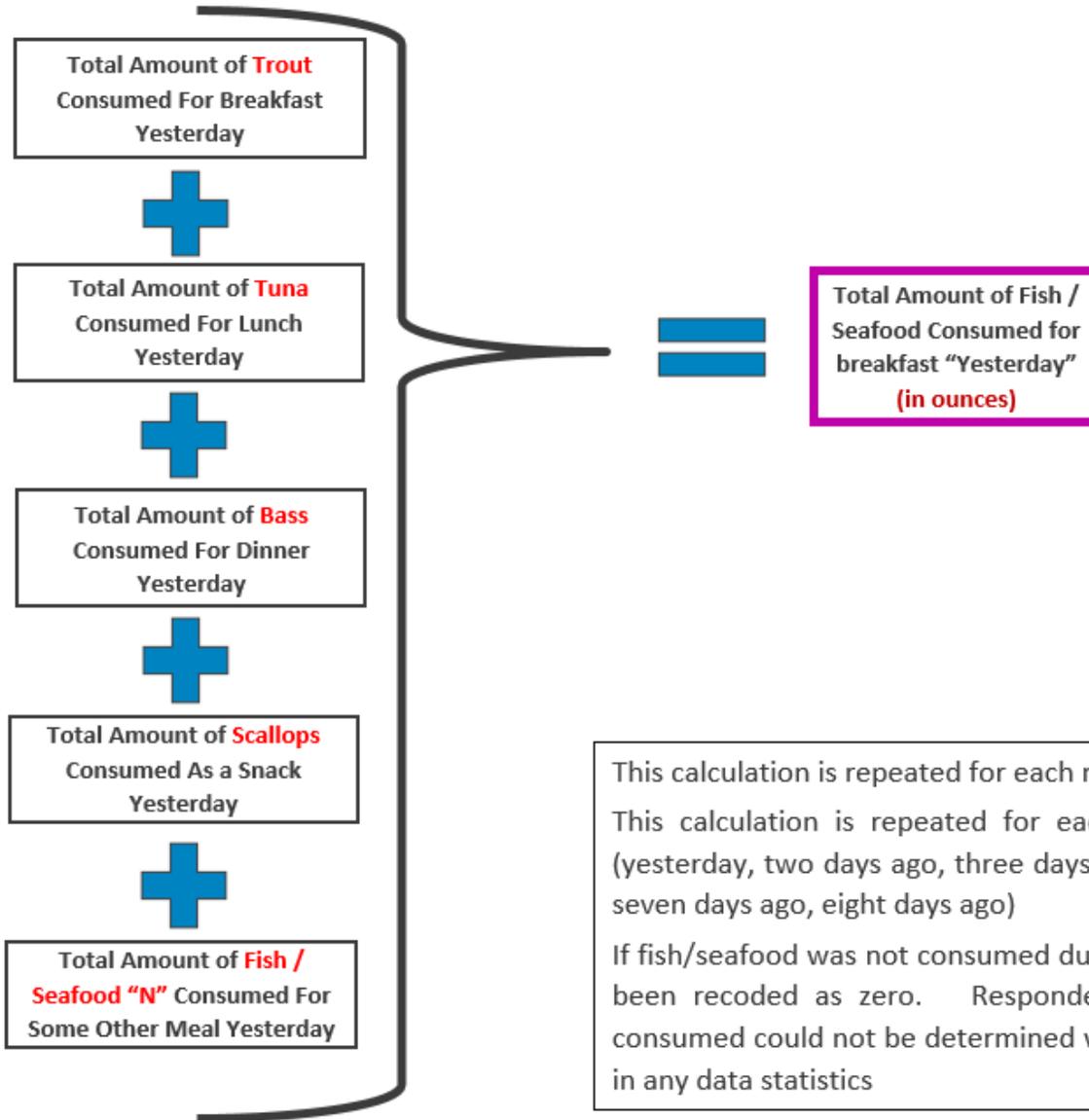
FCR24 7B 4 / FCR7D 10B 4–Would you say the amount of fish or seafood you ate as a snack on [INSERT DAY] was. . .

FCR24 7B 5 / FCR7D 10B 5–Would you say the amount of fish or seafood you ate for some other meal on [INSERT DAY] was. . .

These questions were the same for each day during the recall period for both the initial contact and the re-contact call.

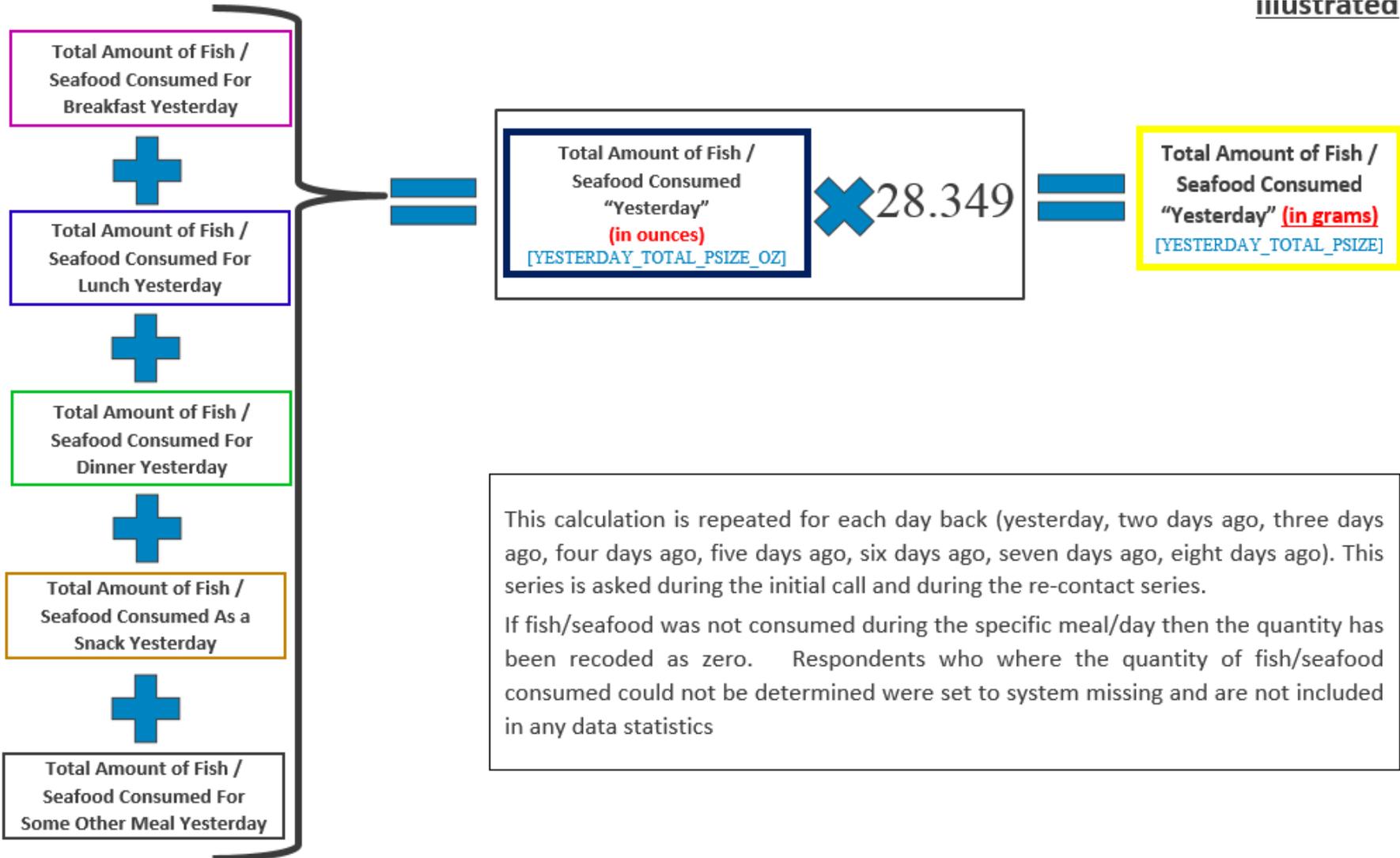
The Frequency, Portion Size and PSEA Questions were asked for each type of fish/seafood consumed separately (e.g. if a respondent consumed both trout and scallops for lunch, he would receive the question series detailing the trout portion size, and then receive the questions again detailing the scallops portion size).



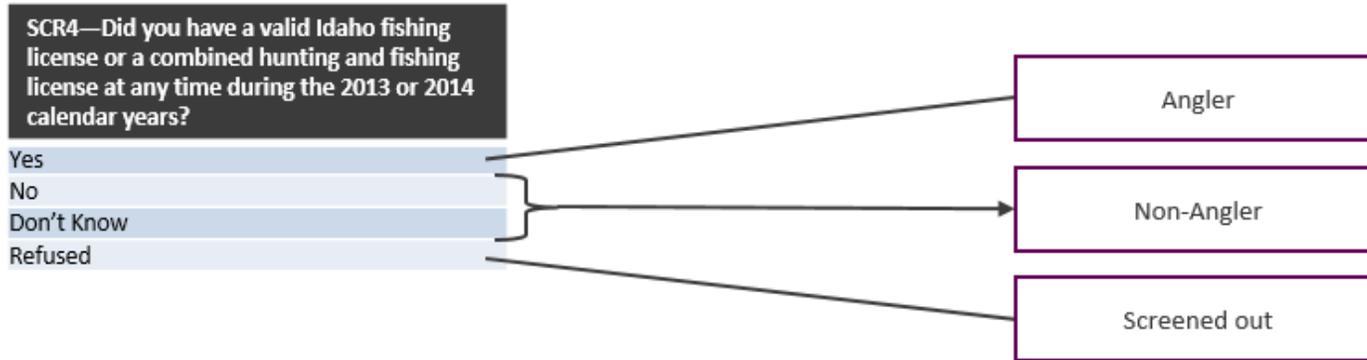


This calculation is repeated for each meal (breakfast, lunch, dinner, snack, other). This calculation is repeated for each day where a consumption event occurred (yesterday, two days ago, three days ago, four days ago, five days ago, six days ago, seven days ago, eight days ago)

If fish/seafood was not consumed during the specific meal/day then the quantity has been recoded as zero. Respondents who where the quantity of fish/seafood consumed could not be determined were set to system missing and are not included in any data statistics



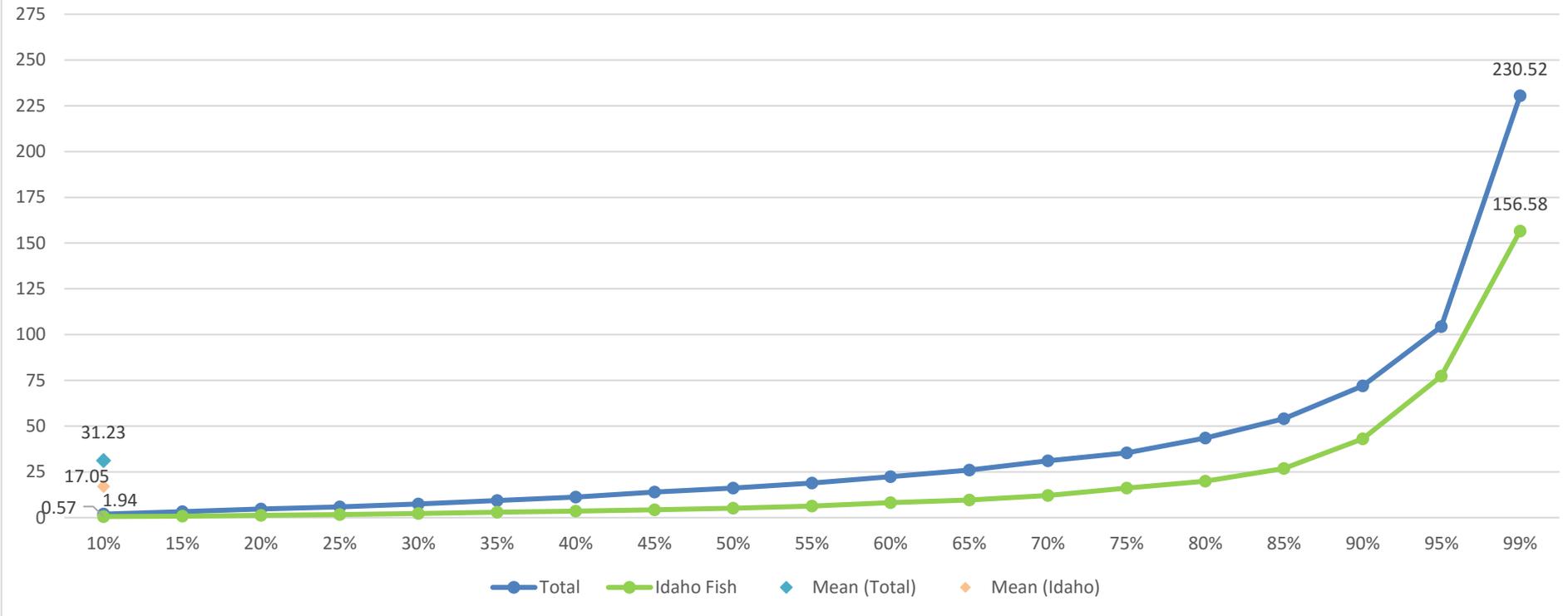
Demographics—Angler vs. Non-Angler Respondents



Supporting Tables (Daily Annual Fish Consumption Rate—FFQ Series among Fish Consumers)

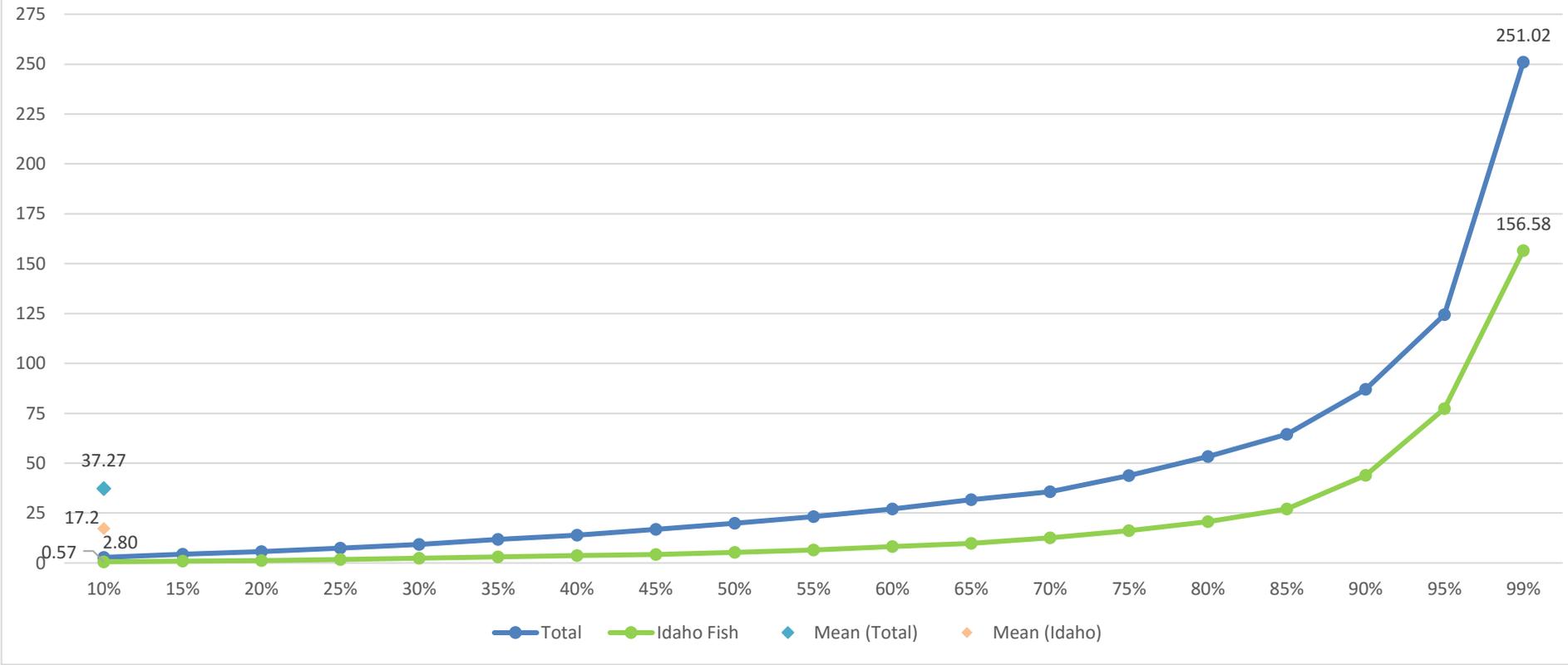
Total Population																
	N	Mean	Std. Dev.	Min	50	55	60	65	70	75	80	85	90	95	99	Max
Total	4,656	31.23	56.87	0.04	16.16	18.95	22.37	25.94	31.07	35.42	43.49	54.06	71.92	104.39	230.52	1386.85
Upper CI (95%)		31.12			16.16	18.72	22.37	25.63	30.99	35.42	43.49	53.82	71.77	104.39	229.90	
Lower CI (95%)		31.34			16.16	19.11	22.37	26.10	31.07	35.42	43.81	54.06	72.08	104.39	230.83	
Idaho	1,314	17.05	36.98	0.00	5.22	6.29	8.14	9.71	12.12	16.08	19.88	26.84	43.00	77.33	156.58	505.5
Upper CI (95%)		16.61			5.18	6.21	8.11	9.69	12.12	16.00	19.57	26.66	42.41	76.33	156.58	
Lower CI (95%)		17.19			5.28	6.52	8.21	9.76	12.35	16.16	20.66	27.09	43.90	77.33	156.58	

Total Idaho Population: Average Grams per Day



Angler Population																
	N	Mean	Std. Dev.	Min	50	55	60	65	70	75	80	85	90	95	99	Max
Total	1,861	37.27	61.59	0.16	19.88	23.15	27.03	31.69	35.73	43.81	53.28	64.46	86.99	124.42	251.02	1177.38
Upper CI (95%)		37.08			19.88	23.15	27.03	31.69	35.42	43.65	53.13	64.31	85.51	123.96	247.30	
Lower CI (95%)		37.47			19.92	23.30	27.49	32.00	36.35	43.81	53.82	65.24	87.61	124.42	251.02	
Idaho	1,300	17.2	37.15	0.00	5.28	6.52	8.22	9.79	12.55	16.16	20.66	27.09	43.90	77.33	156.58	505.5
Upper CI (95%)		17.06			5.28	6.52	8.21	9.76	12.35	16.12	20.23	27.09	43.00	77.33	156.58	
Lower CI (95%)		17.34			5.31	6.76	8.23	9.79	12.68	16.19	20.74	27.34	44.18	77.33	156.58	

Angler Population: Average Grams per Day



Supporting Tables (Age within Gender at the Health District Level)

Health District		Idaho Population 18+			Sample Plan			Achieved (unweighted)		
		Count	% of Health District	% of Total Population	Count	% of Health District	% of Total Population	Count	% of Health District	% of Total Population
Panhandle	ALL MALES	79,793	49%	7%	315	49%	7%	318	50%	7%
	Males 18–34	20,535	13%	2%	81	13%	2%	101	16%	2%
	Males 35–54	28,096	17%	2%	111	17%	2%	93	14%	2%
	Males 55+	31,162	19%	3%	123	19%	3%	124	19%	3%
	ALL FEMALES	82,529	51%	7%	326	51%	7%	324	50%	7%
	Females 18–34	20,221	13%	2%	80	13%	2%	75	12%	2%
	Females 35–54	28,929	18%	3%	114	18%	3%	110	17%	2%
	Females 55+	33,379	21%	3%	132	21%	3%	139	22%	3%
	TOTAL	162,322	100%	14%	641	100%	14%	642	100%	14%
N. Central	ALL MALES	42,876	51%	4%	169	51%	4%	167	44%	4%
	Males 18–34	15,015	18%	1%	59	18%	1%	58	15%	1%
	Males 35–54	12,642	15%	1%	50	15%	1%	50	13%	1%
	Males 55+	15,219	18%	1%	60	18%	1%	59	15%	1%
	ALL FEMALES	41,322	49%	4%	164	49%	4%	214	56%	5%
	Females 18–34	12,816	15%	1%	51	15%	1%	51	13%	1%
	Females 35–54	12,627	15%	1%	50	15%	1%	75	20%	2%
	Females 55+	15,879	19%	1%	63	19%	1%	88	23%	2%
	TOTAL	84,198	100%	7%	333	100%	7%	381	100%	8%

Health District		Idaho Population 18+			Sample Plan			Achieved (unweighted)		
		Count	% of Health District	% of Total Population	Count	% of Health District	% of Total Population	Count	% of Health District	% of Total Population
Southwest	ALL MALES	87,210	49%	8%	344	49%	8%	329	46%	7%
	Males 18–34	27,815	16%	2%	110	16%	2%	124	17%	3%
	Males 35–54	31,548	18%	3%	124	18%	3%	129	18%	3%
	Males 55+	27,847	16%	2%	110	16%	2%	76	11%	2%
	ALL FEMALES	90,769	51%	8%	358	51%	8%	393	54%	9%
	Females 18–34	27,892	16%	2%	110	16%	2%	128	18%	3%
	Females 35–54	31,787	18%	3%	125	18%	3%	143	20%	3%
	Females 55+	31,090	18%	3%	123	18%	3%	122	17%	3%
	TOTAL	177,979	100%	16%	702	100%	16%	722	100%	16%
Central	ALL MALES	161,751	50%	14%	637	50%	14%	595	47%	13%
	Males 18–34	53,805	17%	5%	212	17%	5%	194	15%	4%
	Males 35–54	62,185	19%	5%	245	19%	5%	225	18%	5%
	Males 55+	45,761	14%	4%	180	14%	4%	176	14%	4%
	ALL FEMALES	162,352	50%	14%	640	50%	14%	666	53%	15%
	Females 18–34	50,769	16%	4%	200	16%	4%	200	16%	4%
	Females 35–54	60,584	19%	5%	239	19%	5%	268	21%	6%
	Females 55+	50,999	16%	4%	201	16%	4%	198	16%	4%
	TOTAL	324,103	100%	28%	1,277	100%	28%	1,261	100%	28%

Health District		Idaho Population 18+			Sample Plan			Achieved (unweighted)		
		Count	% of Health District	% of Total Population	Count	% of Health District	% of Total Population	Count	% of Health District	% of Total Population
S. Central	ALL MALES	66,310	50%	6%	261	50%	6%	257	47%	6%
	Males 18–34	20,843	16%	2%	82	16%	2%	69	13%	2%
	Males 35–54	23,352	18%	2%	92	18%	2%	79	14%	2%
	Males 55+	22,115	17%	2%	87	17%	2%	109	20%	2%
	ALL FEMALES	65,989	50%	6%	260	50%	6%	294	53%	6%
	Females 18–34	19,346	15%	2%	76	15%	2%	77	14%	2%
	Females 35–54	22,753	17%	2%	90	17%	2%	85	15%	2%
	Females 55+	23,890	18%	2%	94	18%	2%	132	24%	3%
	TOTAL	132,299	100%	12%	521	100%	12%	551	100%	12%
Southeast	ALL MALES	58,752	50%	5%	232	50%	5%	218	46%	5%
	Males 18–34	20,253	17%	2%	80	17%	2%	87	18%	2%
	Males 35–54	19,531	17%	2%	77	17%	2%	81	17%	2%
	Males 55+	18,968	16%	2%	75	16%	2%	50	11%	1%
	ALL FEMALES	59,902	51%	5%	235	51%	5%	258	54%	6%
	Females 18–34	19,632	17%	2%	77	17%	2%	90	19%	2%
	Females 35–54	19,905	17%	2%	78	17%	2%	77	16%	2%
	Females 55+	20,365	17%	2%	80	17%	2%	91	19%	2%
	TOTAL	118,654	100%	10%	467	100%	10%	476	100%	10%

Health District		Idaho Population 18+			Sample Plan			Achieved (unweighted)		
		Count	% of Health District	% of Total Population	Count	% of Health District	% of Total Population	Count	% of Health District	% of Total Population
East	<i>ALL MALES</i>	70,495	50%	6%	278	50%	6%	252	47%	6%
	Males 18–34	27,461	19%	2%	108	19%	2%	88	16%	2%
	Males 35–54	23,099	16%	2%	91	16%	2%	88	16%	2%
	Males 55+	19,935	14%	2%	79	14%	2%	76	14%	2%
	<i>ALL FEMALES</i>	71,934	51%	6%	283	51%	6%	285	53%	6%
	Females 18–34	27,877	20%	2%	110	20%	2%	103	19%	2%
	Females 35–54	22,640	16%	2%	89	16%	2%	111	21%	2%
	Females 55+	21,417	15%	2%	84	15%	2%	71	13%	2%
	TOTAL	142,429	100%	12%	561	100%	12%	537	100%	12%

