

**1998 FISH CONSUMPTION SURVEY
SPOKANE RIVER, WASHINGTON**

**SURVEY REPORT
NOVEMBER 1998**

(This Internet version does not include references
to appendices nor appendices)

**SPOKANE REGIONAL HEALTH DISTRICT
ASSESSMENT/EPIDEMIOLOGY CENTER**

Executive Summary

This study was conducted by the Assessment/Epidemiology Center at the Spokane Regional Health District at the request of the Washington State Attorney General's Office and the Department of Ecology. Through studies produced by the Department of Ecology, it was learned that contamination levels of heavy metals are increasing in the Spokane River. The purpose of this study was to determine the patterns of fish consumption from the Spokane River.

Data was gathered on the amounts of fish consumed, preparation techniques used to eat the fish, and, to a limited extent, fishing practices. Fishing license holders were sampled to understand the extent in which they fish the Spokane River, the amounts of fish consumed, and preparation techniques used to eat the fish. Of special interest, ethnic communities in the Spokane area who presumptively use the river as a food source, Russian, Hmong, and Laotian, were also sampled for inquiry of fish consumption patterns.

As defined by the guidelines established in a report by the Agency for Toxic Substances and Disease Registry, the respondents of this study consume low amounts of the fish from the Spokane River. The most popular fishing locations of the river are between the Monroe Street Bridge and the Spokane Arm of Lake Roosevelt. The majority of respondents reported fishing during spring and summer. Walleye, rainbow trout (large and small), bass, and perch were commonly reported as fish respondents consumed. The respondents of the Russian community, on average, consumed more of a variety of species of fish from the river, used more parts of fish when preparing them to eat, and fished the Spokane River within Spokane city boundaries more regularly.

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1998 Fish Consumption Survey Spokane River, Washington

Introduction

The Washington State Department of Ecology has established through recent water quality studies that elevated levels of heavy metals specifically cadmium, lead and zinc are present in the Spokane River, 2.5 miles east of the Idaho-Washington state-line continuing west to below the Long Lake Dam. Ecology water quality data indicates that these levels have increased to the point that they now exceed Environmental Protection Agency (EPA) water quality standards established to protect aquatic life. (Press Release, Washington State Department of Ecology, 1997)

With the evidence of heavy metal contamination increasing in the Spokane River concerns are being expressed over the impact to public health and specifically over persons who utilized the river for food source. This concern has introduced the need for a study that distinguishes individual and community-wide patterns and practices of fish consumption specific to fish caught from the Spokane River in Washington State.

Because of the variety of fish species contained in the Spokane River and that different locations along the river display variable levels of heavy metals, a multifaceted approach had to be developed to determine the patterns of fish consumption from the Spokane River (Johnson, et al., 1994). With this in mind, the objectives of this study are to identify, 1) different types of fish caught in the Spokane River by the sampled population, 2) the location of where the fish are caught, 3) populations who consume the fish, and 4) patterns of consumption with regards to the amounts and preparation of fish consumed.

Qualitative and quantitative methods were used to collect data for this study. This study was two pronged; the first prong was to understand how people generally access the Spokane River for fishing. The second prong was to identify how ethnic groups, Russian, Hmong, and Laotian in particular, use the river for fishing and to assess each community's fish consumption patterns.

Fish Consumption Patterns Survey

A series of qualitative data collection methods were employed in order to understand fishing practices of the Spokane River. Using triangulation methodology, the qualitative information gathered from focus groups, interviews, and literature reviews served as the basis for the development of the written survey instrument.

Methodology

A focus group was conducted with the Walleye Club during a monthly meeting and casual interviews were conducted at two local tackle shops. To be consistent with previous research, preceding reports of metals and PCBs (Polychlorinated Biphenyls) in the Spokane River were researched, giving insight to the locations of fishing spots, types of fish, and contamination levels of fish at particular locations along the river (Johnson, Art et al., 1994; and Johnson, E.E., et al. 1992). This information, combined with the findings from the focus group and interviews served as a framework for the development of questions concerning fishing location and types of fish. The information from the focus group, interviews and a model survey of Lake Roosevelt were used to formulate the questions and fixed answers pertaining to preparation of fish to eat, parts of the fish that are consumed, the frequency with which fish are consumed, and demographics.

Using information from the qualitative methods, a survey tool was then designed. This survey was designed as a mail survey where two subgroups were sampled, a random sample of fishing license holders and a sample of individuals from the Walleye Club mailing list. The Walleye Club was sampled separately as supplemental information of fishing and consumption practices pertaining to the Spokane River and is treated as such in the forthcoming analysis.

The random sample of fishing license holders living in Spokane County was generated from a database obtained from the Washington State Department of Fish and Wildlife. From a list of 32,702 entries, three thousand names were randomly selected from which a sample of two thousand was selected. This sampling procedure was necessary due to the poor condition of the list, such as incomplete names and addresses.

Mailing to the Walleye Club was coordinated by the club president to approximately 180 names on their mailing list.

The introduction letter, included in the survey, explained to recipients that the survey should be completed and returned if they fish the Spokane River and it should be returned unmarked if they did not fish the river. A pre-paid postage return envelope was provided to recipients for return of the survey. As an incentive for participation, a ticket was included in the envelope to be returned with the survey in order to be eligible to win one of two \$50 gift certificates

A reminder, follow-up post card was sent out to the sample of fishing license holders approximately three days following the survey mailing.

The survey was designed using Teleform software. This software allowed the surveys, after being scanned, to be scan error checked and automatically entered into SPSS, a statistical software package. The analysis was conducted using SPSS.

The response rate for this sample of people with fishing licenses was 31.35%. The people from the Walleye Club mailing list did not receive a reminder post card. The response rate from this group was 31.11%.

Sample of Fishing License Holders Findings

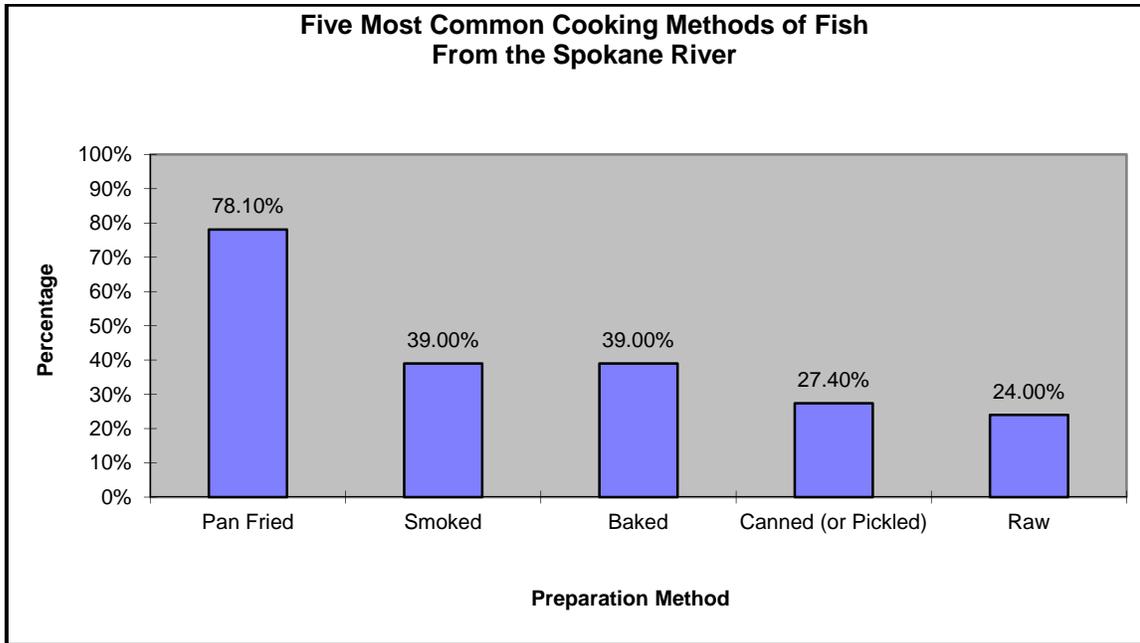
Of the two-thousand person sample, 627 people returned their surveys, (response rate = 31.35%). There were 247 (39.4%) completed surveys indicating these respondents do fish the river; 380 (60.6%) people reported not fishing the river by returning an unmarked survey.

Completed Survey Findings

Of the respondents who completed the survey, 59.1% reported keeping fish for themselves (146 respondents). Of that 59.1%, 111 respondents also catch and release fish (76.0%). Approximately 25% (23.9%) of all respondents report they only catch and release fish (59 respondents). Only 35 respondents (14.2%) report giving or selling the fish they catch to others. There were 42 respondents that reported not catching any fish.

The most common location respondents fish is the Spokane Arm of Lake Roosevelt to Seven Mile Bridge excluding Long Lake (42.1%). The second most popular fishing area along the river is Long Lake (35.2%). Most people in this sample fish in the summer (75.7%), followed by the spring (60.3%) and fall (54.3%). Only 36 respondents (14.6%) reported fishing during winter.

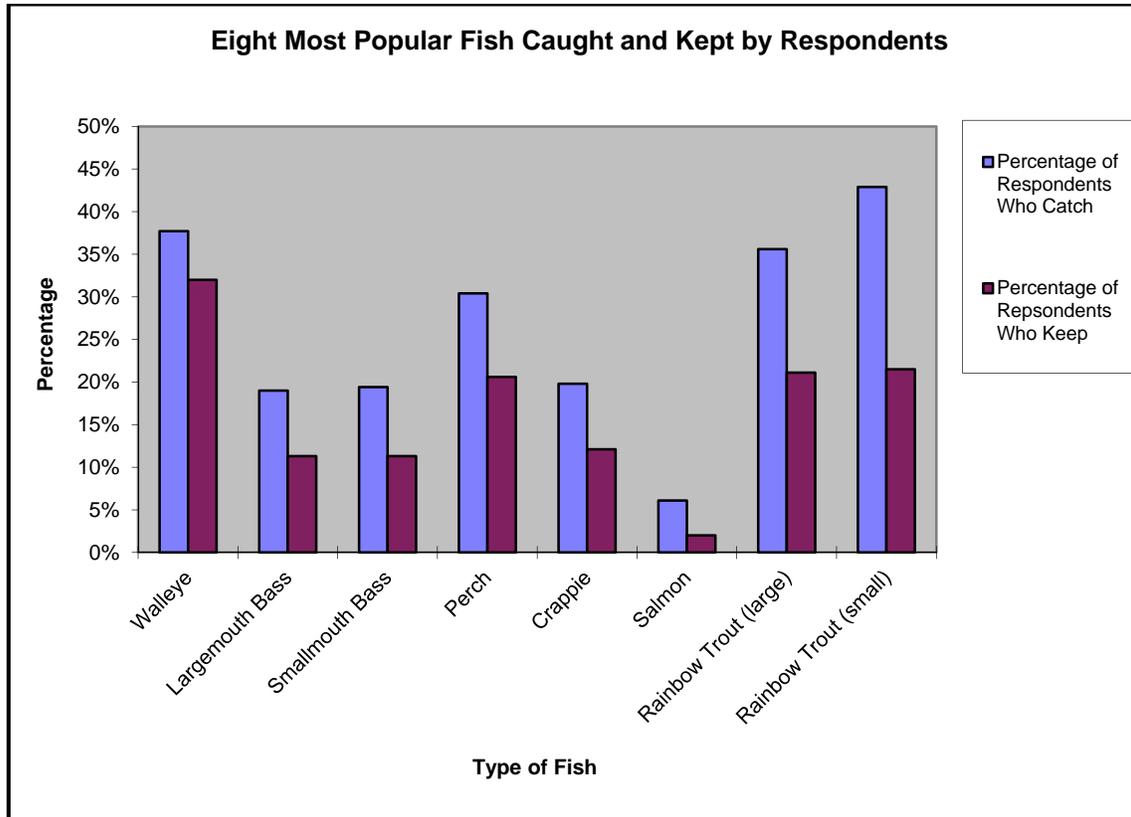
The most frequently consumed part of the fish are the skinned fillets (57.9% of respondents); 33.2% of the respondents eat the whole fish (gutted). The most common methods respondents use to prepare the fish to eat is pan fried (58.3%), baked (28.3%), and smoked (27.9



source: Spokane Regional Health District, Assessment/Epidemiology Center, Fish Consumption Pattern Survey. n= 247

data note: Survey Question 5 “How do you usually prepare fish from the Spokane River?”

Most of the respondents who reported catching fish reported catching various species of fish. The most popular types of fish that were caught from the river were the smaller rainbow trout (42.9% of respondents reported catching this species), walleye (37.7%), the larger rainbow trout (35.6%), and perch (30.4%). These fish were also more likely to be kept and consumed by the respondents.

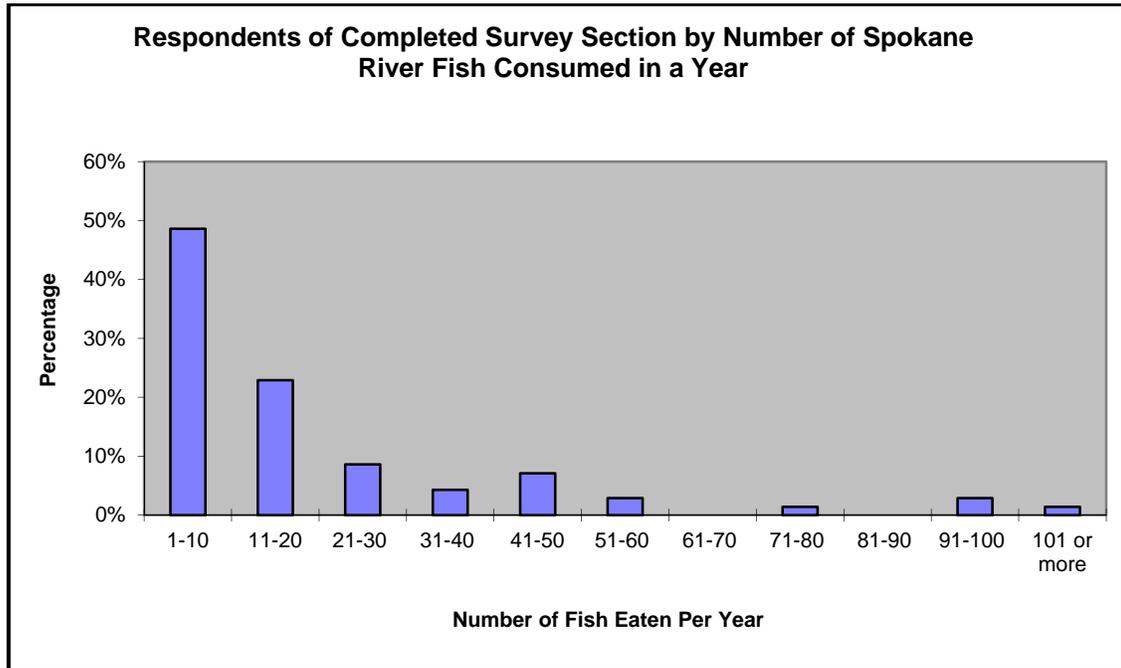


source: Spokane Regional Health District, Assessment/Epidemiology Center, Fish Consumption Pattern Survey. n= 247

data note: The types of fish caught are defined by combining columns 1, 2, and 3 of the consumption matrix, on page 2 of the survey. The types of fish kept are defined by column 3 of the consumption matrix.

The respondents who fish the Spokane River reported the number of years they have fished the river. The range was 0 to 80 years. The mean for the number of reported years the river was fished by any one respondent is 13.51 years. The median is 10.00

Important to understanding fish consumption practices is knowing how many and how often fish are eaten in a year. Many of the respondents who kept fish from the river to eat, did not complete all sections of the survey. For example, they may have reported on how many fish they keep, however they failed to answer how many months out of the year they ate the fish. This limits the analysis to the point of being inconclusive. The following graph reflects how many fish were eaten in a year by the 70 respondents who did complete this section of the survey and reported keeping the fish (47.9%).



source: Spokane Regional Health District, Assessment/Epidemiology Center, Fish Consumption Pattern Survey. n= 70

data note: The number of fish consumed in a year was calculated by multiplying columns 3-7 of the consumption matrix.

Survey Demographics

The most commonly reported income was \$40,000 to \$59,999 (60 respondents, 24.3%). Forty respondents reported their income as \$60,000 to \$79,999 (16.2%), followed by 25 respondents (12.0%) reporting their income as \$30,000 to \$39,999.

Almost half of the respondents reported children in their household (44.1%, 109 households). The number of households with children who eat fish is 85. Adults eat fish in 232 of the respondents' households.

Ethnic Communities

Methodology

Two contractors, a Russian and a Laotian community member, were hired by the Spokane Regional Health District to coordinate the study pertaining to their specific community. They were contracted to convene a focus group, serve as interpreters, translate the written survey, and coordinate survey distribution within those communities.

Focus group questions were derived from the study's objectives. Participants were asked to convey their own practices, fish consumption, and their observations of other anglers on the Spokane River from within their communities.

Surveys were translated into each respective language. The survey and the introduction letter were typed using a Russian *WORD* version from *Microsoft*. The survey was the same as the English version and modifications were made to the introduction to exclude the ticket drawing incentive. This survey was distributed in three locations where Russian community members congregate, two churches and a refugee center that catered to Russian immigrants. Included with the survey was a pre-paid postage return envelope.

The Laotian contractor translated the written survey by hand. This translated survey was mailed out to 17 members of the Laotian community with a pre-paid postage return envelope and also excluded the ticket drawing incentive. No other reminder was mailed to the 17 respondents.

Fewer than five surveys were returned from either group and therefore were not considered for the analysis.

Russian Community Findings

The convener introduced facilitators, stated the study's purpose, and identified the involved organizations. There were approximately thirty adults and children in the room, doorways, and hallway.

The locations attendees reported fishing were, the old Walk in the Wild Zoo, Upriver Dam, River Front Park, downtown area, T.J. Meenach Bridge, Nine Mile Bridge, and Long Lake. Attendees reported catching rainbow trout, German (brown) trout, suckers, catfish, crayfish, pike minnow, smallmouth bass, and perch from the river.

When asked what they do with the fish they catch (eat it, give it away, or release it) overwhelmingly they responded they either eat it or give it away. They only lose the fish "if it jumps off the hook or it is too small". On average they report eating the fish from the Spokane River one time in two weeks or about four pounds in a month. One respondent reported that how much he eats depends on how much fish are caught and added it also depends on the fishing limit. Attendees reported they fish primarily in the fall and spring.

Respondents identified five ways in which they prepare the fish from the Spokane River to eat: cutlets (ground fish-cakes), fried, dried, fish soup, and pickled (herring). The cutlets are prepared by grinding the fish after removal of head and spine; the tiny bones are included in the cutlets. It was reported that a common method to prepare sucker fish to eat was to make cutlets with them. To dry the fish, respondents report, the fish are salted while raw and then dried; they are never cooked. The whole fish is used when it is dried excluding the intestines and the head. Fish soup is

prepared in different ways. Some people use the head others do not. The herring is pickled fish that is stored in a jar and does include bones.

Laotian Community Findings

A total of six people participated in answering questions and entering into a discussion about the Spokane River and their fishing practices. General demographic information was uncovered at two meetings. The average family size for the Laotian community is four. It was estimated that the number of people in the Laotian community in Spokane County was approximately 200.

The participants stated that they fished below Nine Mile Bridge where the Little Spokane and Spokane River meet. Primarily, they fish in the early spring, March and April. The participants estimated that they catch ten to twenty fish of various species per fishing trip. The fish that are caught from the river are generally used for consumption; they do not give them away. The attendees mentioned eating and knew of others to eat catfish, rainbow trout, perch, bass, walleye, and crawdads. They reported that they use suckers for bait and catch and release pike minnow.

During the months that they fish, they eat about two to three meals of Spokane River fish per month. Generally, with the smaller fish, such as catfish, one person eats two fish per meal. It was mentioned that they eat few trout because they are hard to catch. The fish are frozen, to preserve them. Some species of fish are eaten ten or more months out of the year.

The identified methods of preparing the fish to eat included frying, smoking, barbecuing, broiling, and in stews. They reported that the fish are always cleaned and gutted, they do not eat the bones, and always cut off the heads before preparing the fish to eat.

Barriers

Both cultural and language barriers inhibited the free exchange of information within both of the above focus groups. Cultural barriers included the inherent mistrust of public officials and the concept of focus groups as a method of research which would protect their anonymity. This latter cultural barrier was more apparent among the Russian community, however, the event took place in a naturally occurring and spontaneous setting in their church. We had much better participation with the Laotian community when we took a similar opportunity at a community event, rather than the scheduled focus group at the Health District building.

Representatives from both communities expressed concerns over the purpose of our questions. They wanted reassurance we were not inspectors or regulators there to get information that could incriminate them for fishing without a license. The Russian group seemed particularly concerned with the amount of information the facilitators had regarding the sources of metal contamination and the safety of the fish consumed from the Spokane River.

The facilitators felt that the language barriers also contributed to their inability to fully explain the purpose and the process of the study. This may, in fact, be responsible for the low participation from the Laotian community and the low response rate from the translated surveys.

Mitigating these barriers was the inclusion and participation of respected informal leaders from each community who served as both conveners and translators.

Hmong Community

Initially, the Hmong community was also identified as a targeted ethnic community for this study. However, further investigation indicated that the Hmong do not utilize the Spokane River in such a way that they would be of interest to this study.

Limitations

A major limitation to this study was locating and inquiring about fishing practices of the Spokane River of those who fished the river without fishing licenses. Although we were able to make inquiries into the Russian, Laotian, and Hmong communities that fish the river not based on whether they have fishing licenses, this study did not include methodologies to reach people not of these ethnic communities without a fishing license. There were cultural and language barriers in approaching both ethnic communities.

The survey instrument was designed in a manner to be fully completed in order to understand consumption practices of those anglers who fish the river. Many of the respondents did not complete each question of the survey. This limited the analysis of fish consumption patterns due to the inconclusive data.

Discussion

Many different subgroups of Spokane County fish the Spokane River. General anglers, fly-fishermen, people of the Russian and Laotian community, Walleye Club members, people from diverse economic levels, different racial backgrounds, and people from different family sizes. From this study, it is learned that many people use the river for a variety of reasons from sport and recreation to supplement meals at a minimal level.

Generally, the places that people fish along the river are common among all sampled populations of people considered in this study. Highlighting the most popular locations are near the former Walk in the Wild Zoo, Upriver Dam, Greene Street Bridge, Monroe Street Bridge, People's Park, T.J. Meenach Bridge, Devil's Toenail, Seven Mile Bridge, Nine Mile Bridge, Long Lake, and the Spokane Arm of Lake Roosevelt.

The respondents of the Russian community in Spokane County report more frequently fishing primarily within the Spokane City limits. Most respondents from the sample of people with fishing licenses, Walleye Club, and Laotian community report fishing the Spokane Arm of Lake Roosevelt, Long Lake, and Seven Mile Bridge to the Monroe Street Bridge. In a study conducted by the Washington State Department of Ecology in 1994, particular species of fish caught in this area had lower levels of zinc, lead, and cadmium than above the Nine Mile Bridge to above Post Falls, Idaho.

It is reported people generally fish the Spokane River in the spring and the summer. Few respondents in the overall study identified fishing the Spokane River during the winter. Generally Spokane River fish consumption is heavier during the months people fish the river.

Russian respondents tend to eat the fish from the river more frequently than other samples considered in this study. This population also practices procedures to preserve the fish. The respondents from the Laotian community also report freezing their fish as a method of preserving it. Respondents of this study report catching many species of fish from the Spokane River. Walleye, largemouth and smallmouth bass, perch, crappie, various types of trout, sucker fish, pike minnow, catfish and crayfish were all common species caught from the river. Indicated through the number of reported months the fish are eaten and the number of seasons fish are caught, a limited number of respondents of the fishing license sample may preserve walleye, catfish, crayfish, largemouth and smallmouth bass, perch, salmon, and large and small rainbow trout they catch from the river.

Walleye, rainbow trout (large and small), bass, and perch were commonly reported as fish that are caught and consumed from the Spokane River. Samples of these types of fish, reported in a study conducted in 1993, have lower levels of metal concentrations than other species caught closer to the Idaho-Washington state line. (Johnson, Art, et al., 1994) In addition to these species, the Russians and Laotians who responded reported consuming catfish and crawdads (freshwater mussels). Russian respondents also reported consuming suckers and pike minnow. Laotians report catching suckers for bait and catching and releasing pike minnow.

People of the Russian community generally catch and eat rainbow trout, brown trout, suckers, catfish, crayfish, pike minnow, smallmouth bass, and perch. They reported eating the fish approximately once every two weeks; about four pounds a month. This population self-reported that they do preserve the fish they catch in the forms of drying and pickling it. The Russian community is also more likely to consume more of the fish they catch. Russian respondents consume, on average, more of a variety of fish than the other populations studied. They also seem to include more parts of the fish in preparing the fish to eat, as well as using diverse methods of preparing the fish. However, using the same measurements as the ATSDR (Agency for Toxic Substances and Disease Registry) in their report "The Relationship of Human Levels of Lead and Cadmium to the Consumption of Fish Caught in and Around Lake Coeur D'Alene, Idaho," these respondents from the Russian community are classified as low consumers of the fish from the river (< 1 fish meal/week).

The most common methods of preparing fish to eat is pan fried, baked, canned, smoked, and raw. Respondents of the Laotian and Russian communities reported commonly eating the fish in stews or soups. Most often respondents report eating skinned fillets and gutted whole fish.

Conclusion

The results of this study indicate that people do eat fish from the Spokane River. Some species of fish are eaten more than others (walleye, trout, bass, and perch). Among the people sampled for this study, respondents more frequently identified the location that they fish from the Spokane Arm of Lake Roosevelt to Seven Mile Bridge. The respondents of this study seemed to be low consumers of the fish from the Spokane River (< 1 fish meal/week) as defined by the study prepared by ATSDR. (ATSDR, 1989)

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