

## **IDAHO FISH CONSUMPTION ADVISORY PROJECT PROTOCOL**

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### **Preface**

The goal of the Idaho Fish Consumption Advisory Project (IFCAP) is to protect the public from adverse health risks associated with consuming contaminated fish from Idaho and Tribal waters. The program follows the fish advisory guidelines from the U.S. Environmental Protection Agency (EPA 1994, 1995, 1996, 1999) with additional decision-making rules to maximize the limited resources of Idaho's health and environmental agencies. This protocol documents the additional details specific to the Idaho program and is a general guideline for IFCAP. The protocol intends to capture rules that apply to different water types in the State and it is not meant to be a water body specific protocol.

### **IFCAP Organization**

#### Chair:

Bureau of Community and Environmental Health, Division of Public Health, Idaho Department of Health and Welfare.

#### Participants:

Bureau of Laboratories, Division of Health, Idaho Department of Health and Welfare  
Idaho Department of Environmental Quality  
Idaho Department of Fish and Game  
Idaho Department of Agriculture  
US Geological Survey  
US Environmental Protection Agency

#### Liaison:

Governor's Office

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## **Target Water Body Selections**

Prioritization of water bodies must consider the following factors: (1) potential contaminants of concern in the water body; (2) frequent fishing activities; (3) amount of fish for consumption; and (4) public interest in the water body. IFCAP plans to target one to five water bodies per year depending on the size of the selected water body and the resources available to IFCAP.

## **Sampling and Analysis Techniques**

### *Fish Species Selection*

Selection of target fish and shellfish species should involve consideration of the following criteria. (1) Target species should be abundant enough to provide for an adequate fishery and large enough to provide for adequate tissue samples for chemical analysis. (2) The species selected should be those commonly consumed in the area by recreational or subsistence anglers. (3) The species selected should be those that potentially bioaccumulate high concentrations of chemicals.

IFCAP targets popular game species for particular water bodies of interest. Bottom feeders and predator species are particularly of interest. Examples of popular freshwater game species in Idaho are: trout, perch, crappie, bass, and kokanee. Examples of freshwater predatory species are: bass, walleye and crappie. Examples of freshwater bottom feeders are: catfish, sucker, and carp.

### *Fish Size Requirement*

Fish size and age are major factors in contamination uptake and accumulation. IFCAP targets adult fish that are commonly harvested by anglers for consumption. Fish sampled should be within the size limits outlined in the Idaho Department of Fish and Game regulations for specific species.

### *Sampling Time*

Fish species and time of sampling is determined by field biologists on a site-by-site basis. In general, IFCAP attempts to sample fish late in the growing season, which in the State of Idaho is from September through early November. For most species, their lipid content is the highest late in the growing season. Since most organic pollutants tend to accumulate in fat, sampling the fish when their lipid content is the highest gives a more protective measure of contaminant accumulation.

### *Sample Locations*

The sampling location is determined by field biologists on a site specific basis. For larger water bodies, multiple sampling locations may be required to represent the entire water system. Sampling location determination should consider the following factors. (1) The

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common locations where the fish are present and caught. (2) When narrow-ranging fish are the target species, multiple locations may be needed per water body. Narrow-ranging fish are those species that tend to be more territorial or less mobile, therefore, lives in a smaller area within large water (e.g., Largemouth bass).

*Sample Number Requirement*

A certain level of statistical confidence is required to make an informed decision to release an advisory. This confidence depends on the number of fish sampled. The focus of IFCAP is to protect public health; therefore the primary interest is to control the error for not issuing an advisory when advisory is needed. IFCAP determined that 10 fish per target species, per sampling location is needed to reach approximately 90% confidence that an advisory will be correctly issued. The detailed statistical method is described in Appendix A.

*Fish Sampling Techniques and Field Protocols*

Idaho Fish and Game and the US Geological Survey are the primary agencies collecting fish for the IFCAP. Their field sampling techniques and protocols were adopted by IFCAP. The field biologist identifies the fish species, weights, measures, tags, and wraps each fish separately in foil. Fish are then shipped in a frozen state to the Bureau of Laboratories for holding and analysis.

*Tissue Preparation requirement*

IFCAP follows most EPA fish sample handling and analysis procedures (EPA 1999). Fish wet weight and total length should be measured and recorded. For most species, fish fillets are analyzed because the fillet is the primary part of a fish the general public consumes. For fish that are known to be canned and eaten whole (e.g., kokanee and crappie), are gutted and de-headed and the body carcasses are analyzed. IFCAP believes that this preparation best represents the edible portions of those specific fish. Ideally, 10 fish per species per location are collected and analyzed. When there are enough samples, one whole fish is analyzed to gather additional information for ecological risk assessment. The detailed descriptions regarding how to prepare fish tissue and how many fish to analyze are in Appendix B.

*Target Analytes Selection and Laboratory Analytical Requirement*

IFCAP targets selected metals, selenium, mercury, pesticides, polychlorinated biphenyls (PCBs), and polybrominated diphenyl ethers (PBDEs) as contaminants for selected water bodies unless specially noted. IFCAP follows the chemical analytical protocol used by the Bureau of Laboratories. For all target analytes, the Bureau of Laboratories follows EPA recommended sample holding times except for mercury. The maximum holding time for mercury recommended by EPA has changed from 6 months to 28 days. However, the EPA holding times are based on the potentially volatile nature of mercury in (unfrozen) water samples and do not pertain to frozen tissue. Washington Department

of Fish and Wildlife analyzed frozen fish tissue six times ranging from 4 to 86 days without a significant change in mercury concentrations. The data are unpublished but have been reviewed by EPA and the Puget Sound Estuary Program (PSEP, 1996). IFCAP believes that using a 6-month sample holding time for mercury will not decrease the data quality.

### **Fish Advisory Consideration Flow-Chart**

Ideally, IFCAP proposes to have a minimum of 10 fish fillets (or the edible portion) per specie per location analyzed for consideration of a fish advisory. However, it may not be possible to collect 10 samples for all fish species in every sampling event (field sampling variability). In order to provide the most information for the public, IFCAP has made the following decision-making adjustments.

#### Insufficient samples

- When there are insufficient samples (<10) and the fish tissue concentration is lower than the action level, the need for further sampling will be evaluated on a site-specific basis. Sampling occurs only when resources are available.
- When the maximum fish tissue concentration is 3 times higher than the action level regardless of the sample number, re-sampling is recommended and an informational warning message or a temporary fish advisory is considered.
- When the average fish tissue concentration is higher than the action level but there are insufficient samples, re-sampling is recommended and an informational warning message or a temporary fish advisory is considered.

#### Sufficient Samples

- When the average fish tissue concentration is lower than the action level and the sample number is sufficient, an advisory is not needed. Reevaluation will occur only when additional environmental information supports the need.
- When the average fish tissue concentration is higher than the action level and the sample number is sufficient, an advisory will be issued. An issued advisory will be reevaluated when resources are available ( $10 < n < 20$ ). However, when there is enough confidence ( $n > 20$ , 95% confidence) for the advisory, reevaluation will occur only when additional environmental information supports the need.

#### Additional Action

- When the sample number is not sufficient and no further action is recommended, an informational message will be posted on the Idaho Department of Health and Welfare web site.
- If sufficient samples cannot be collected, after two sampling attempts and there is evidence for high exposure, the sampling techniques and timing should be evaluated and improved if possible. The recommendation for re-sampling should be made according to the feasibility of fish collection. If collecting more samples is not

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feasible, IFCAP will consider changing the informational warning message or the temporary advisory to an advisory. Reevaluation should occur when re-sampling is possible and the resources are available.

- Sample data will only be combined if sampling events occur within 5 years of one another. The life span of general sport fish varies widely depending on species. It is reasonable to assume that IFCAP are sampling the same fish population if sampling occurs within 5 years.

The following table summarizes the IFCAP decision-making rules.

**Table 1 Idaho Fish Advisory Project Decision Making Flow-Chart**

**Initial Screening**

	Tissue Concentration	Action Recommended	Site Priority and Justification
$n_1 < 10$	Geometric Mean ( $n_1$ ) < AL	(1) Evaluate the need for re-sampling	Low priority; sample number is not sufficient but there is no evidence for potentially high exposure
	Geometric Mean ( $n_1$ ) < AL but Max $\geq 3AL$	(2) Recommend re-sampling within 5 years	Medium priority; sample number is not sufficient; investigate further because there is potential for high exposure; consider informational warning messages
	Geometric Mean ( $n_1$ ) $\geq$ AL	(3) Issue temporary advisory; resample as soon as possible	High priority; sample number is not sufficient; investigate immediately because there is evidence for high exposure
$n_1 \geq 10$	Geometric Mean ( $n_1$ ) < AL	(4) No advisory; reevaluate when needed	Low priority; sufficient evidence for not issuing an advisory; reevaluate only when additional environmental information supports the needs
	Geometric Mean ( $n_1$ ) < AL but Max $\geq 3AL$	(5) Issue specific advisory; reevaluate when needed	Medium priority; consider informational warning messages or site/species/size specific advisory; reevaluate when resources are available to better identify the specific concern
	Geometric Mean ( $n_1$ ) $\geq$ AL	(6) Advisory; reevaluate when needed	Medium priority; sufficient evidence for an advisory; reevaluate when resources are available to have higher statistical confidence

$n_1$ : the sample number for the first sampling event  
AL: action level for specific contaminants  
Continue to Next Page

**Table 1 Idaho Fish Advisory Project Decision Making Flow-Chart (cont')**

**Resample Event**     Site being reevaluated after 5 years of the initial sampling; data requirement is the same as initial screening.  
                                  Site being reevaluated within 5 years, all data ( $n_1+n_2$ ) will be combined and evaluated.

	Tissue Concentration	Action Recommended	Site Priority and Justification
$n_1+n_2 < 10$	Geometric Mean ( $n_1+n_2$ ) < AL	(7) Reevaluate the need for re-sampling	Low priority; sample number is not sufficient but there is no evidence for potentially high exposure
	Geometric Mean ( $n_1+n_2$ ) < AL but Max ( $n_2$ ) $\geq 3AL$	(8) Reevaluate the need for re-sampling	Medium priority; sample number is not sufficient; investigate further because there is potential for high exposure; consider informational warning messages
	Geometric Mean ( $n_1+n_2$ ) $\geq AL$	(9) Reevaluate/issue temporary advisory; reevaluate the need for re-sampling	High priority; sample number is not sufficient; investigate further because there is evidence for high exposure; evaluate the sampling techniques
$n_1+n_2 \geq 10$	Geometric Mean ( $n_1+n_2$ ) < AL	(10) No advisory; reevaluate when needed	Low priority; sufficient evidence for not issuing an advisory; reevaluate only when additional environmental information supports the needs
	Geometric Mean ( $n_1+n_2$ ) < AL but Max ( $n_2$ ) $\geq 3AL$	(11) Reevaluate/issue specific advisory; reevaluate when needed	Medium priority; consider informational warning messages or site/species/size specific advisory; reevaluate when resources are available to better identify the specific concern
	Geometric Mean ( $n_1+n_2$ ) $\geq AL$	(12) Advisory; reevaluate when needed	Medium priority; sufficient evidence for an advisory; reevaluate when resource is available to have higher statistical confidence
$n_1+n_2 \geq 20$	Geometric Mean ( $n_1+n_2$ ) < AL	(13) No advisory	Low priority; sufficient evidence for not issuing advisory
	Geometric Mean ( $n_1+n_2$ ) < AL but Max ( $n_2$ ) $\geq 3AL$	(14) Reevaluate/issue specific advisory; reevaluate when needed	Medium priority; consider informational warning messages or site/species/size specific advisory; reevaluate when resources are available to better identify the specific concern
	Geometric Mean ( $n_1+n_2$ ) $\geq AL$	(15) Advisory; reevaluate when needed	Medium priority ; sufficient evidence for an advisory; reevaluate when additional environmental information supports the needs

$n_1, n_2$  : the sample number for the first and second sampling event.

AL: action level for specific contaminants

Continued from Previous Page

**IFCAP Risk Assessment Procedure**

IFCAP adopts the standard risk assessment procedures developed by EPA with minor exposure assumption adjustments to best fit Idahoan’s needs. The exposure assumption needs of specialized populations, such as Native Americans, will be evaluated on a site-specific basis.

Exposure Assumption

IFCAP risk assessment assumptions are listed in the following table. IFCAP considers issuing fish advisories when the American Heart Association’s recommendation of 2-3 servings of fish and seafood (8-12 oz) per week cannot be followed without consuming a dose of a contaminant in excess of a health-based screening level, such as a reference dose (RfD).

**Table 2. General Risk Assessment Assumptions**

	General Population	Pregnant Women <sup>a</sup>	Children <sup>b</sup>
Body weight (kg) <sup>c</sup>	80	70	20
Meal size uncooked (oz) <sup>d</sup>	4	4	2.25

a: pregnant women, women planning to be pregnant, and nursing mother

b: children 6 years old or younger

c: adjusted based on the Idaho Behavioral Risk Factor Surveillance Survey (BVRHS, 2001)

d: 1 oz = 28.3 g; 4 oz = 113.4 g

Limited Meals Approach

IFCAP calculates the recommended meals per month using the following equations.

Calculation for non-carcinogen:

$$Meals / Month = \frac{\frac{RfD \times BW}{Conc} \times 30.44days / mo}{MS}$$

Calculation for carcinogen:

$$Meals / Month = \frac{\frac{TR \times BW}{q_1^* \times Conc} \times 70 \times 30.44days / mo}{ED \times MS}$$

where,

RfD: Reference Dose (mg/kg-day)

q<sub>1</sub>\*: Cancer slope factor (mg/kg-day)<sup>-1</sup>

TR: Target cancer risk (10<sup>-5</sup>)

BW: Body weight (kg)



ED: Exposure Duration (30 year)  
Conc: Fish tissue concentration (mg/kg)  
days/mo: Days per month  
MS: Meal size (kg)

### **Health Education**

The goal of the fish advisory is to protect the public from adverse health effects due to consumption of contaminated fish. The objectives of public health education, with regard to the advisory, are as follows:

- the public will check for and heed the advice of the advisory;
- the public will catch and keep only those fish that are deemed safe for consumption for the water body from which they were caught;
- the public will clean and cook the fish in a manner consistent with the advisory;
- the public will limit consumption of fish from certain water bodies as detailed by the advisory; and
- the public will not substitute fish caught in Idaho with commercial fish.

The purpose of fish advisories is to inform the public which fish may be contaminated, which are safe, and which fish should be consumed in limited quantities. The advisory is not mandatory and carries no regulatory authority. It is issued merely as a precautionary message in order to protect public health and safety.

The advisory will contain a section outlining the health benefits of fish consumption. It will also counsel the public not to substitute fish caught in Idaho with store bought fish. The advisory will be widely accessible to the Idaho and Tribal public. Anglers and those consuming the fish anglers bring home will be reached through a variety of sources. IFCAP will utilize signs at fishing locations, posters, pamphlets and handouts, booklets, and online information sources. These materials will be distributed by license agents, retailers, Fish and Game representatives, angler clubs and organizations, and others as identified on a site-specific basis.

The detailed advisory will provide information about the consumption classification of each species for each water body. The advisory will also inform the public that larger, older and predatory fish will have higher levels of contaminants than smaller, younger fish which will eat less contaminated prey. The advisory will present information about contaminants detected in fish tissue in Idaho and Tribal waters such as the sources, environmental fate, and human health effects due to exposure. Additionally, the advisory will contain language contained in the EPA *National Advice on Mercury in Freshwater Fish for Women Who Are or May Become Pregnant, Nursing Mothers, and Young Children* fact sheet. This fact sheet provides recommended fresh water fish consumption rates for those sensitive populations.

In addition to consumption rates for freshwater fish, the advisory will contain information about how to clean and cook fish. Certain pollutants will concentrate in the fat or organs

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of fish. Consequently, it is important to remove the organs and skin and cut away the fat and dark, fatty tissue from fish fillets. When cooking, it is best to bake, broil, or grill the fish on a rack so that the fat will drip off. The fat should be discarded and not used for basting, gravies, sauces, or soup. Frying fish is not recommended because frying will seal in the pollutants concentrated in the fat of the fish.

**References:**

BVRHS 2001. Idaho Behavioral Risk Factors. Bureau of Vital Records and Health Statistics, Idaho Department of Health and Welfare, Boise ID.

EPA 1999. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories. Volume I: Fish Sampling and Analysis. 3<sup>rd</sup> edition – Draft. Office of Water EPA823-R-99-007.

EPA 1994. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories. Volume II: Risk Assessment and Fish Consumption Limits. Office of Water EPA823-B-94-004.

EPA 1996. Guidance for Assessing Chemical Contamination Data for Use in Fish Advisories. Volume III: Risk Management. Office of Water EPA823-R-95-00x.

EPA 1995. Guidance for Assessing Chemical Contamination Data for Use in Fish Advisories. Volume IV: Risk Communication. Office of Water EPA823-R-95-001.

EPA, 2000. PCB Risk Assessment Review Guidance Document. Interim draft.

White and Delahunt 2000. March 1 2000 letter to Jim Johnston. State of Washington Department of Health, Office of Environmental Health Assessments. Olympia, Washington.

### Appendix A Fish Sample Number Recommendation

There are two scenarios for making incorrect decisions regarding issuing a fish advisory that have different consequences. The focus of IFCAP is to protect public health; therefore the primary interest is to control the error for not issuing an advisory when advisory is needed.

		Truly Needs	
		Advisory	No Advisory
IFCAP's Decision	Yes	Correct decision	Advisory Not Needed Over Protection, Economical loss
	NO	Advisory Needed Failed to Protect Public Health	Correct decision

IFCAP's statistician utilized historical mercury fish tissue data from the Brownlee Reservoir, randomly sampled "n" data points for 10,000 times (Monte Carlo Analysis, 10,000 trial) from the log-normal distributed initial data set (true mean = 0.34 ppm), and compared the sample mean to a mercury action level of 0.3 ppm. The percent chance of the sample mean from the sample size "n" that would result in an incorrect decision is presented in the following table.

**Percent chance of error resulting from different sample sizes**

Sample number	% chance of error (when advisory is needed, but not issued)
n = 5	21.8 %
n = 10	12.4 %
n = 15	7.9 %
n = 20	4.7 %

IFCAP has a certain degree of confidence that this example can be extrapolated and further applied to different types of water bodies and chemicals as long as the fish tissue contaminant concentrations from the selected waters are log-normally distributed (typical for most environmental data). The true mean in this example is relatively close to the contaminant action level and that provides us a protective estimate for the percent chance of error. For the same sample size n, the percent chance of error decreases when the true mean departs further from the action level. In other words, when n = 10 and the action level is lower than 0.3ppm, the percent chance of error would be less than 10%.

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Bureau of Community and Environmental Health

Therefore, IFCAP recommends collecting 10 fish per species per location for having a 90% confidence of issuing an advisory when needed. Fish should be analyzed individually to obtain variance for each species and size class from each location.

The Washington Department of Health (WDOH) also reviewed historical data from the State of Washington and took a different approach for determining fish sampling number. Based on published mean and standard deviation values for mercury in fish tissue, it was determined by WDOH that 10 specimens from each sub-population of fish would be needed to provide 95% confidence intervals about the mean that were no more than  $\pm 20$ -30% of the mean. WDOH considers this sample size necessary to generate useful tissue concentration estimates which can be used with consumption data for a health risk assessment (White and Delahunt 2001). Its recommendation corresponds with IFCAP's decision.

Appendix B Field Fish Sampling Guidelines  
(Updated: Jan 05)

B.1 Fish Sampling Periods

Ideally, water bodies where commercial, recreational or subsistence harvesting is commonly practiced should be screened on a biennial basis. If biennial screening is not possible, then water bodies should be screen at least once every 5 years (U.S. EPA, Volume 1: Fish Sampling and Analysis, Third Edition). This will be determined by the Idaho Fish Consumption Advisory Project as funding and other factors allow.

In fresh water, as a general rule, the most desirable sampling period is from late summer to early fall. This late summer to early fall sampling period should not be used if it does not coincide with the legal harvest season of the target species. If the target species can be legally harvested during its spawning period, then sampling may be conducted at this time. Exceptions to the recommended sampling periods will be determined by important regional or site specific factors that favor other sampling periods. The actual sampling period and the reason for its selection should be documented.

B.2 Fish Sampling Protocol

Fish collection should be done in the field after a sampling plan has been developed. This would include identifying the locations and species of fish to be sampled. IFCAP will work with the biologist to develop this sampling plan. This section discussed recommended collection techniques, sample measurements and record keeping, sample processing, preservation, and shipping.

B.2.1 Fish Collection

Collection methods can be divided into two major categories, active and passive. Either active or passive collection methods may be used as long as the methods selected results in collection of a representative fish sample of the type consumed by local sport and subsistence fishers.

Active collection methods use a wide variety of sampling techniques and devices. Devices for fish sampling include electro shocking units, seines, trawls, and angling equipment. Active collection methods are particularly useful in shallow waters. One aspect of sample collection that is of most importance is that the sampler must ensure the collection of live, intact fish. For example, some fish collected by electro shocking methods may have ruptured organs. It is recommended that any fish that show any skin lacerations or found floating dead not be used for analysis.

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Passive collection methods use a wide array of sampling devices including, gill nets, trammel nets, hoop nets, pound nets and d-traps. In deep water, passive collection methods are more efficient than active methods. It is recommended that fish captured in passive collection devices not remain in the water for more than 2 hours after the passive collection device is first deployed and that specimens that show any skin or fin deterioration not be used for analysis.

B.2.2 Target Fish Species

It is recommended that the sampler collects at least one bottom-feeding fish species, and one predator species at each site, if present. Samplers are encouraged to sample as many of the target species listed below as well as fish species that are commonly fished for and consumed in that region. Ideally, IFCAP proposes to have a minimum of 10 fish fillets and one whole fish per specie per location analyzed. However, it might not be possible to collect samples for all fish species and every sampling event.

<b>Recommended Target Species for Idaho Fresh Water</b>		
<b>Family Name</b>	<b>Common Name</b>	<b>Scientific Name</b>
Centrarchidae	Largemouth bass	Micropterus salmoides
	Smallmouth bass	Micropterus dolomieu
	Black crappie	Pomoxis nigromaculatus
	White crappie	Pomoxis annularis
Percidae	Walleye	Sander vitreus
	Yellow perch	Perca flavescens
	Common carp	Cyprinus carpio
Ictaluridae	Channel catfish	Ictalurus punctatus
	Flathead catfish	Pylodictis olivaris
	Brown bullhead	Ameiurus nebulosus
Esocidae	Northern pike	Esox lucius
Salmonidae	Lake trout	Salvelinus namaycush
	Brown trout	Salmo trutta
	Rainbow trout	Oncorhynchus mykiss
	Mountain whitefish	Prosopium williamsoni
	Lake whitefish	Coregonus clupeaformis
	Bonneville cisco	Prsopium gemmifer
	Cutthroat trout	Oncorhynchus clarkii
	Brook trout	Salvelinus fontinalis
	Steelhead	Oncorhynchus mykiss
Chinook salmon	Oncorhynchus tshawytscha	
	Kokanee	Oncorhynchus nerka

	Coho salmon	Oncorhynchus kisutch
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### B.2.3 Fish Size and Measurements

IFCAP recognizes that resource limitations influence the sampling of the various species and sizes of fish. IFCAP also recognizes that there are many different harvesting regulations throughout the state. The following are recommendations to help reduce any variance from national programs.

#### B.2.3.1 Fish Size

Fish captured should be identified immediately and non-target species or juvenile fish should be returned to the water. IFCAP would like to focus on capturing fish for testing of typical harvestable size since the goal of IFCAP is to make consumption advisories. If regulations only allow the harvesting of fish larger than 16", then the sampler should capture a majority of those fish. If possible, IFCAP would like samples from three different size (age) classes of each target species (3 small, 4 medium, 3 large). This would allow us to get a better idea of how the pollutants bio-accumulate in the fish. Since different fish obtain different sizes at different ages and there are different guidelines for harvesting fish, IFCAP ultimately leaves the minimum and maximum sizes for each range and species up to the discretion of the fisheries biologist collecting the fish.

#### B.2.3.2 Length or Size Measurements

Once collected, each individual fish should be sacrificed by a sharp blow to the base of the skull and rinsed with ambient (lake or river) water to remove sediment, detritus, vegetation, or any foreign substance. After rinsing, each fish should be weighed to the nearest gram and measured for total length to the nearest millimeter. The maximum body length is defined as the length from the anterior-most part of the fish to the tip of the longest caudal fin ray. Keep individual records for each fish so later aging can be correlated with individual samples sent to the lab.

#### B.2.3.3 Optional Measurements

IFCAP would also like for experienced fisheries biologist to make a sex determination before shipping of whole fish or after filleting. If resources allow, IFCP would like documentation of the approximate age of each fish and any morphological abnormalities. Either a standard scale sample or a bony spine should be taken for age determination. Four gross morphological conditions have been identified and accepted for use in monitoring programs. They are fin erosion, skin ulcers, skeletal anomalies and neoplasms (i.e. tumors) and should be reported if observed.

#### B.2.4 Fish Preparations for Shipping

After initial measurements, each fish needs to be properly processed to be shipped to the state health lab for testing. IFCAP requires fish to be shipped one of two ways: 1) filleted and frozen or 2) whole and un-frozen shipped to arrive within 24 hours with prior notice given to the lab. Filleting procedures are described in the next section. If the person sampling or capturing the fish does not have the means to fillet the fish, they can have the fish shipped overnight to the state health lab. The un-filleted fish should be wrapped in aluminum foil (dull side toward fish) and then placed in plastic bags and packed on blue ice. The lab must be notified one week prior to receiving the fish. If neither one of these options cannot be done, the collector needs to contact the state health lab about other options.

##### B.2.4.1 Filleting Procedures

It is recommended that the fish are filleted the same day they are captured. If this is not possible, the fish should be wrapped in metal foil (dull side toward fish) and then placed in a plastic bag, packed in a cooler with blue ice and filleted within 24 hours of capture. To fillet the fish, it is recommended that you use two stainless steel knives, two cutting boards (one made of Teflon), and distilled water (can be purchased at your local grocery store) If you do not possess these items contact IFCAP about ways of obtaining them.

For fish having scales, the scales are removed and any adhering slime is removed by rinsing the fish with distilled water prior to filleting. For fish without scales (for example, catfish) the fish should be rinsed with distilled water to remove any slime and then filleted. IFCAP asks that the fillets retain the skin. The skin will be removed at the lab if warranted. For certain fish species that is known to be canned or eaten whole (for example, kokanee), the fish's head, tail, and internal organs (except kidney) should be removed and the rest of the fish will be analyzed.

In order to extract the fillet, first position the fish with its left side up on the pre-cleaned cutting board. Using the pre-cleaned stainless steel knife, remove the scales. It is recommended that fish be scaled on one cutting board and filleted on the Teflon cutting board. If you do not have two cutting boards, rinse off the cutting board with distilled water between scaling and filleting the fish. With a second stainless steel knife, or after rinsing the scaling knife thoroughly with distilled water, remove the fillet, including the belly flap from the left side. Since the fish are likely going to be tested for metals and organics, the fish will have to be stored in a borosilicate glass, quartz, or PTFE container. If you cannot obtain these containers contact the Bureau of Community and Environmental Health and they will work with the lab to get you containers. The lab requires at least a 50



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gram sample but would prefer at least a 100 gram sample. Freeze the samples and hold at a temperature of -20 C or colder until shipped.

B.2.4.2 Shipping

All fish samples and record keeping documents need to be sent to the state health lab at: Bureau of Laboratories, Attn: Ernie Bader, 2220 Old Penitentiary Road, Boise, ID 83712, Phone: (208)334-2235. IFCAP highly recommends calling the lab to inform them of the incoming samples. If the fish have been filleted or gutted and frozen, they should be packed with dry ice and shipped overnight to the lab. If the fish are unfrozen and whole, they should be wrapped in aluminum foil (dull side toward fish), packed with blue ice packs and shipped overnight to the lab. Make sure to include a return address, as the lab will return your container and blue ice packs.

**Appendix C Summary of fish exposure factors recommendation, EPA.**

<b>Population</b>	<b>Fish consumption rate (g/day)</b>	<b>Confidence rating</b>
General	20.1 (average) 63 (95%)	High Medium
Recreational marine anglers	2-7 (average)	Medium
Recreational fresh water anglers	8 (average) 25 (95%)	Medium Medium
Native American	70 (average) 170 (95%)	Medium Low

Note: Average serving size of a fish meal is 129 g (approximately 4.5 oz.).

Adapted from EPA, 2000. PCB Risk Assessment Review Guidance Document. Interim draft.