

# COEUR D'ALENE BASIN FISH SAMPLING AND CONSUMPTION ADVISORY

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Idaho Division of Public Health

Bureau of Community and Environmental Health



IDAHO DEPARTMENT OF HEALTH & WELFARE  
DIVISION OF PUBLIC HEALTH

BEIPC Meeting

February 27, 2019



# Idaho Fish Consumption Advisory Program (IFCAP)

- Goal: To protect the public from adverse health risks associated with consuming contaminated fish from Idaho and Tribal waters
- Members:
  - Idaho Department of Health and Welfare – Bureau of Community and Environmental Health
  - Idaho Department of Environmental Quality
  - Idaho Department of Fish and Game
  - Idaho State Department of Agriculture
  - U.S. Geological Survey
  - U.S. Environmental Protection Agency

Website: [fishadvisory.dhw.idaho.gov](http://fishadvisory.dhw.idaho.gov)



IDAHO DEPARTMENT OF HEALTH & WELFARE  
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## Eat Fish, Be Smart, Choose Wisely

A guide to safe fish consumption for fish caught in Idaho waters



Idaho Department of Health and Welfare  
Bureau of Community and Environmental Health  
866.240.3553

## Consumption Advisories

### Statewide Mercury Advisory For Bass:

A statewide advisory has been issued for all lakes, rivers, reservoirs and other water bodies in Idaho for **BASS** due to mercury contamination. To be safe it is recommended that:

- Women who are pregnant, planning to become pregnant, nursing and children under age 15 should not eat more than 2 meals a **MONTH** of Bass.
- The general population (women not of child bearing age, those older than age 15) should not eat more than 8 meals a **MONTH** of Bass.
- All people **SHOULD NOT** eat any other fish during the month if you eat these amounts of Bass caught in Idaho.

### Store-Bought Fish Advisory:

The Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA) have issued a joint advisory for women who are pregnant, nursing, or planning to become pregnant and for young children. They recommend that these women and children do not eat Shark, Swordfish, King Mackerel, or Tilefish. Other EPA and FDA recommendations include:

- Eat up to 2 meals a week of a variety of fish and shellfish that are lower in mercury such as Shrimp, canned Light Tuna, Salmon, and Pollock.
- Limit meals of Albacore Tuna to 2 meals a month. Albacore ("white") tuna has higher levels of mercury.

### Safe Eating Guidelines for Pregnant Women, Women Planning to become Pregnant, Nursing and Children under age 15:



(Click on image to read advisory)

### Water Body Specific Advisories for Idaho:

Click on the following maps to check water body specific advisories

North Idaho



South Idaho



[Fishadvisory.dhw.idaho.gov](http://Fishadvisory.dhw.idaho.gov)

Hotline: 1-866-240-3553



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# Coeur d'Alene Basin Fish Sampling

- 2002 sampling of Lake Coeur d'Alene only
  - Fish: bass, bullhead, and kokanee
  - Issued joint consumption advisory with State and Coeur d'Alene Tribe
- EPA Record of Decision for Bunker Hill Superfund Site: health advisories to manage the potential for metals exposure through consumption of fish
- 2016 expanded geographical area and species sampling



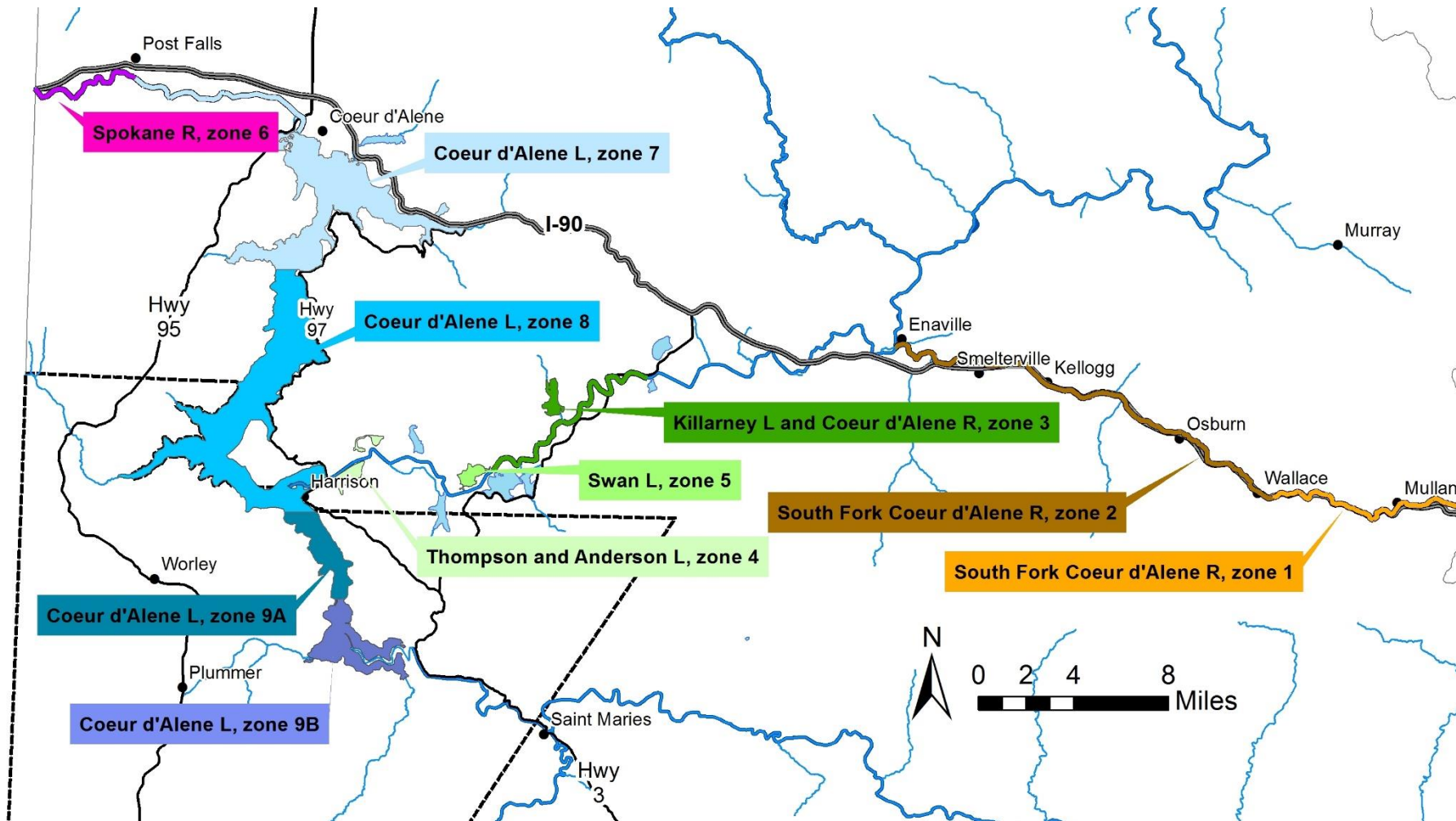


# 2016 Basin Fish Sampling

- Multi-agency and Tribal coordination
- About 290 total fish collected
- Contaminants of human health concern
  - Arsenic (total and inorganic), cadmium, lead, and mercury
- Tissue concentrations by site and species group compared to health effects screening levels
- **Advisory Goal: Determine recommended meals/month for contaminants of concern**



# Sampling Locations and Metals Analysis



## Metals Analysis:

- Lead
- Cadmium
- Mercury
- Total and Inorganic Arsenic

## Sampling Methods:

- Electrofishing (large water and stream)
- Large water gill netting
- Midwater trawl netting

Area	Location	Target Species/Groups
South Fork Coeur d'Alene River (Upper Basin)	Zone 1, Upper	Eastern Brook Trout
		Rainbow Trout
		Cutthroat Trout
	Zone 2, Lower	Eastern Brook Trout
Coeur d'Alene River and Chain Lakes (Lower Basin)	Zone 3, Coeur d'Alene River and Killarney Lake	Cutthroat Trout
		Eastern Brook Trout
		Panfish
		Northern pike
	Zone 4, Swan Lake	Bass
		Bullhead
		Panfish
		Northern pike
	Zone 5, Thompson Lake and Anderson Lake	Bass
		Bullhead
		Panfish
		Northern pike
Spokane River	Zone 6, Spokane River below Post Falls	Bass
		Rainbow Trout
Coeur d'Alene Lake	Zone 7, Northern Lake	Panfish
		Northern pike
		Bass
		Kokanee
	Zone 8, Central Lake	Panfish
		Northern pike
		Bass
		Kokanee
	Zone 9, Southern Lake, Northern Deeper Section	Panfish
		Northern pike
		Bass
	Zone 9, Southern Lake, Southern Shallow Section	Panfish
		Northern pike
		Bass

## Target Species/Groups

Trout, kokanee, bullhead

Panfish included:

- black crappie
- bluegill
- yellow perch

Bass included:

- largemouth
- smallmouth

Attempted collection of 10 fish per target species/group

# Lake Coeur d'Alene



Kokanee



Bullhead

All people are advised to eat Bullhead fillets rather than gutted whole fish.

## Statewide Bass Advisory



Smallmouth Bass



Largemouth Bass

[-click here-](#)

## Other Fish

Kokanee and Bullhead are similar to many fish in the lake that were not tested. It is possible that these fish have high levels of lead, arsenic and mercury, and the guidelines above should be followed for these fish:

**For:** Bluegill, Crappie and Perch less than 8 inches, Pumpkinseed, Rainbow Trout, Brook Trout, Cutthroat Trout & Tench, follow Kokanee guidelines

**For:** Channel Catfish and Suckers, follow Bullhead guidelines

## Pregnant women, women who are nursing or planning to become pregnant:

<b>Kokanee</b> <i>All CDA lakes</i>	10 gutted whole fish meals or 10 fillet meals per month
<b>*Bullhead</b> <i>Northern lake</i>	4 gutted whole fish meals or 24 fillet meals per month
<i>Central lake</i>	2 gutted whole fish meals or 13 fillet meals per month
<i>Southern lake</i>	3 gutted whole fish meals or 15 fillet meals per month

## Children under 15 years of age:

<b>Kokanee</b> <i>All CDA lakes</i>	6 gutted whole fish meals or 6 fillet meals per month
<b>*Bullhead</b> <i>Northern lake</i>	3 gutted whole fish meals or 14 fillet meals per month
<i>Central lake</i>	NO gutted whole fish meals or 7 fillet meals per month
<i>Southern lake</i>	8 gutted whole fish meals or 9 fillet meals per month

## General public (people not in the first two groups):

<b>Kokanee</b> <i>All CDA lakes</i>	12 gutted whole fish meals or 20 fillet meals per month
<b>*Bullhead</b> <i>Northern lake</i>	20 gutted whole fish meals or 69 fillet meals per month
<i>Central lake</i>	8 gutted whole fish meals or 14 fillet meals per month
<i>Southern lake</i>	33 gutted whole fish meals or 61 fillet meals per month

- **Current advisory for Lake CdA (issued 2003)**
  - Kokanee (panfish, trout): General population 20 fillet meals/mo
  - Bullhead (catfish, suckers): General population 14 fillet meals/mo
- **Statewide bass advisory (issued 2008)**
  - Pregnant women and children: no more than 2 meals/month
  - General Population: no more than 8 meals/month



# Health Effects Screening Values

Metal	Screening Value (mg/kg)	EPA Reference Dose (mg/kg-d)
Cadmium	4.0	0.001
Mercury	0.4	0.0001
Lead	0.063	Evaluate using IEUBK Model
Arsenic	1.2 (Chronic noncancer)	0.0003
	0.026 (Inorganic As Cancer)	

- Based on EPA recommended screening values for recreational fishers
- Lead: EPA Integrated Exposure Uptake Biokinetic (IEUBK) model to assess likelihood of elevated blood lead levels in children
- Arsenic: If total arsenic > 0.26 mg/kg, analyze for inorganic arsenic (carcinogenic form)
  - 10% of total arsenic assumed to be inorganic form

# Fish Consumption Analysis

- Based on American Heart Association recommendation of consuming 2 meals of fish/week for health benefits
- Calculate meals/month that are safe to consume for each group
  - Chronic non-carcinogen
    - Compared to EPA Reference Dose
  - Carcinogen (inorganic As)
    - Target cancer risk 1 in 100,000
    - Cancer slope factor: 1.5 mg/kg-d<sup>-1</sup>
    - Exposure duration: 30 yrs adults

Group	Body weight (kg)	Meal size (oz)
General Population	80	8
Pregnant Woman	70	8
Child	20	4

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

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

# Results Overview

- **Cadmium:** Did not exceed screening value (4.0 mg/kg) for any samples
  - Not a likely health concern
- **Total Arsenic:**
  - Did not exceed chronic screening value (1.2 mg/kg) for any samples
  - 30 samples analyzed for inorganic arsenic based on tissue conc > 0.26 mg/kg total arsenic
- **Inorganic Arsenic:**
  - Did not exceed cancer screening value of 0.026 mg/kg
- **Lead:** Evaluated using IEUBK Model - Not likely to affect blood lead levels
- **Mercury:** Greatest concern for driving consumption advisory recommendations

# Lead analysis

- IEUBK Model – Determine the probability of exceeding a blood lead level of 5 ug/dL (CDC reference level) for children under 7 years old.
- Target level: less than 5% probability of exceeding 5 ug/dL
- Accounts for multiple routes of lead exposure
  - Dietary
  - Water
  - Air
  - Soil/Dust
- Can generate site-specific scenarios
- Results by age group for 6 months to 7 years old





# IEUBK Model Inputs

- Soil Exposure:
  - Typical soil default: Idaho 95<sup>th</sup> percentile background soil lead: 32.7 mg/kg (USGS)
  - Mean soil lead in Box communities: 129-270 mg/kg
- Dietary Exposure
  - High exposure scenario: 50% of diet is fish
  - Typical exposure scenario: 10% diet is fish
- Model defaults for air and water exposure and bioavailability
- Evaluated using highest mean fish lead concentration

# Lead Results

- Two sites with mean > 0.063 mg/kg screening value
  - CDA River Bullhead: 0.112 mg/kg
  - SF CDA River Lower Trout: 0.082 mg/kg
- All other sites: 0.011 – 0.040 mg/kg
- At highest mean fish lead concentration and high exposure scenario (50% fish consumption) – **no likely increase in BLLs at 32.7 mg/kg soil lead**

## Soil lead: 32.7 mg/kg

Highest Mean Fish Concentration (0.112 mg/kg)		
High Exposure (50% Fish Diet)		
Age Group (months)	BLL Geomean (ug/dL)	% Above 5 ug/dL
6 to 11	1.426	0.38
12 to 23	1.656	0.94
24 to 35	1.621	0.83
36 to 47	1.564	0.67
48 to 59	1.600	0.39
60 to 71	1.340	0.25
72 to 84	1.287	0.19

# Lead: Site specific comparison

**Soil lead: 270 mg/kg**

Highest Mean Fish Concentration (0.112 mg/kg)				
Age Group (months)	Typical Exposure (10% Fish Diet)		High Exposure (50% Fish Diet)	
	BLL Geomean (ug/dL)	% Above 5 ug/dL	BLL Geomean (ug/dL)	% Above 5 ug/dL
6 to 11	3.8	27.1	3.9	29.0
12 to 23	4.3	38.0	4.5	41.7
24 to 35	4.0	32.4	4.3	37.1
36 to 47	3.8	28.5	4.1	33.4
48 to 59	3.2	16.6	3.4	21.3
60 to 71	2.7	9.3	3.0	13.3
72 to 84	2.4	5.8	2.7	9.2

- **Lead from fish is not the main source of lead exposure**
  - Soil lead is main source of exposure
- Based on fish consumption recommendations, unlikely to achieve high exposure for general population
- Consumption advisory not necessary based on lead

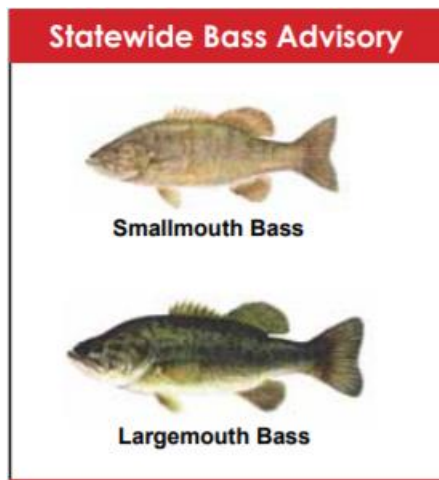
# Mercury

- No mean concentration exceeded screening value.
- Individual fish samples exceeded screening value
  - Primarily bass, panfish, pike
  - Tissue concentration: 0.023 – 0.941 mg/kg
- Calculations of recommended meals/month indicate mercury is of greatest human health concern
- Bass: Nearly all sites within current statewide advisory
- Consider meal recommendations for additional species
  - Protective of other contaminants





# Mercury trends



- Common driver of fish advisories throughout Idaho and the United States
  - Current Idaho statewide bass advisory
  - USA: 81% of all advisories were based at least partly on mercury
- Regional sources: Atmospheric deposition – coal burning, industrial emissions
- Idaho:
  - 40% of lakes sampled had average fish mercury greater than 0.3 mg/kg (DEQ 2008)
  - 20% of river sites sampled had fish with mercury greater than 0.3 mg/kg (DEQ 2010)
  - **2016 CdA Basin:** 2 of 10 sample zones had fish (bass) with average mercury greater than 0.3 mg/kg

## Meal Size: 8 oz for adults, 4 oz for children

Meals/month

Species Group	Location	GP	PW	Child
Bass	River and Chain Lakes	4	2	2
	Northern Lake	4	2	2
	Central Lake	2	2	1
	Southern Lake	3	2	1
Bullhead (fillet)	River and Chain Lakes	12	11	6
	Northern Lake	69	24	14
	Central Lake	14	13	7
	Southern Lake	61	15	9
Kokanee	All Lake Coeur d'Alene	13	11	6
Northern pike	River and Chain Lakes	5	5	2
	Northern Lake	8	7	4
	Central Lake	7	6	3
	Southern Lake	5	4	2
Panfish	River and Chain Lakes	7	6	3
	Southern Lake	11	9	5

## Proposed consumption recommendations for species with less than 8 meals/mo

- Bass generally covered by current statewide advisory for children and PW
  - Pregnant women and children < 2 meals/mo
  - General population < 8 meals/mo
  - Recommend lower limits for some sites
- Advisory recommended for northern pike, panfish (children in particular)

## IDAHO FISH CONSUMPTION ADVISORY FOR SELECTED WATERS



A fish advisory means that you should monitor the amount of certain kinds of fish that you eat because of the possibility of consuming contaminants (e.g. mercury).

For information call Department of Health and Welfare at

**1-866-240-3553**

or visit

**[www.fishadvisory.dhw.idaho.gov](http://www.fishadvisory.dhw.idaho.gov)**

There is a statewide consumption advisory for both Largemouth and Smallmouth Bass because of mercury contamination. The waters listed on this map also have consumption advisories for the following fish species:

- |                    |                   |
|--------------------|-------------------|
| 1. Rainbow Trout   | 9. Walleye        |
| 2. Cutthroat Trout | 10. Catfish       |
| 3. Brown Trout     | 11. Bullhead      |
| 4. Lake Trout      | 12. Perch         |
| 5. Kokanee         | 13. Carp          |
| 6. Whitefish       | 14. Sucker        |
| 7. Bluegill        | 15. Northern Pike |
| 8. Crappie         | 16. Brook Trout   |

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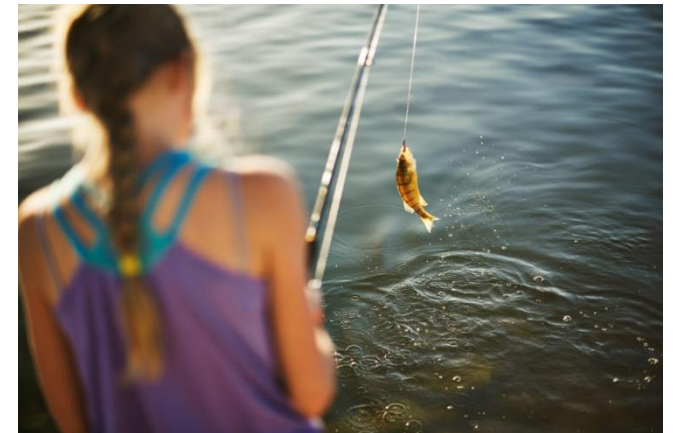
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Hotline: 1-866-240-3553

# Summary and Timeline

- Mercury is the main contaminant of concern driving advisories for the Coeur d'Alene Basin
- Expanded advisory proposed for northern pike, panfish
- Issue a joint advisory with State and Coeur d'Alene Tribe
- Project Timeline
  - Finalized CDA Basin Advisory report – April 2019
  - Public Advisory Document Updated – April/May 2019





# Questions



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