

# Protecting Public Health in Oregon via Fish Consumption Advisories

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Oregon  
Health  
Authority

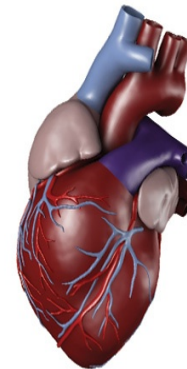
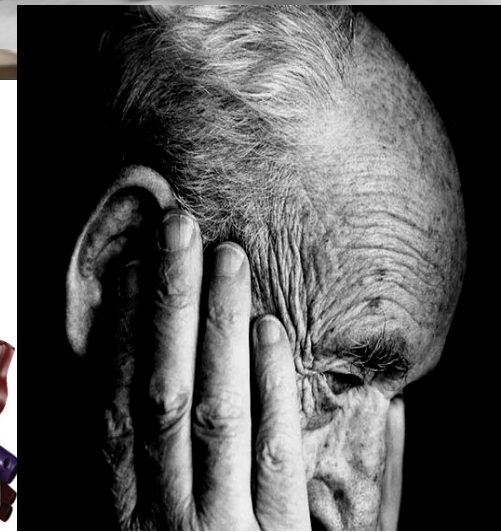
# Part 1: Overview

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## **FISH AND HEALTH, CONTAMINANTS OF CONCERN, AND FACTORS THAT INFLUENCE EXPOSURE**

# Fish is Good For You

- High protein
- Low fat
- Vitamins and Minerals
- **Omega 3 Fatty Acids**
  - Body can't synthesize
  - Only get through diet
  - Fish - concentrated source
- Lower blood pressure
- Help with ratio of H/L density cholesterol
- Reduce
  - heart attack/stroke
  - age-related diseases
  - promotes healthy brain function and development



*Some fish from some locations can become contaminated with chemicals. There are two most commonly found in Oregon*

# Polychlorinated Biphenyls (PCBs)

- Many sources – Pre 1970 ban
- Persistent in environment & biological tissue

## Health effects:

- Fat soluble
  - Accumulate in fatty tissue & clear slowly
- Impair fetal brain development
  - Increased learning & behavior problems
- Endocrine (hormone) disruptor
  - Especially thyroid
  - Children/babies sensitive
- Cause cancer



# Mercury in Sediment = Methylmercury

- Mercury occurs naturally (soil, geology, volcanoes)
- Release enhanced through human activity
- Can travel long distances
- Deposits in sediment
- **Bacteria convert inorganic mercury to methylmercury**
  - readily absorbed by plankton and consumed by fish

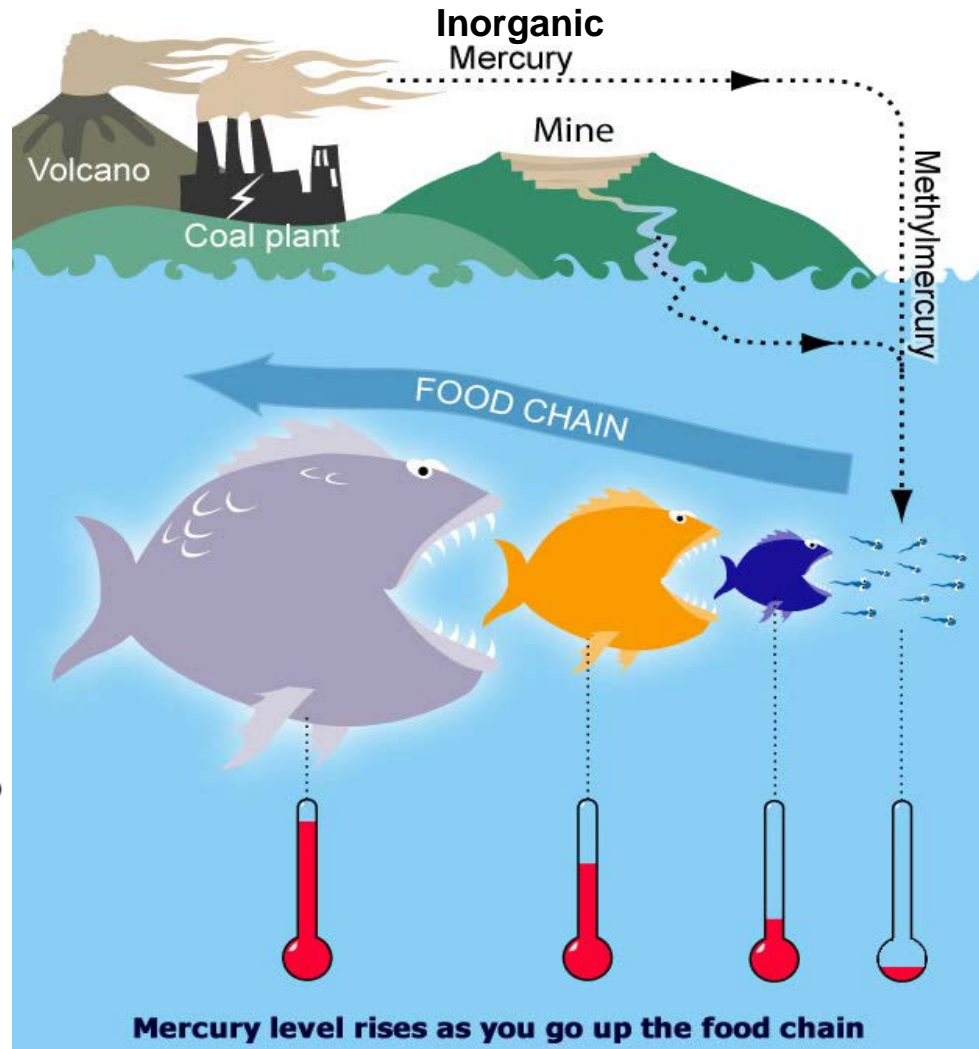
## Health effects:

- Impaired fetal and childhood brain development
- Frank toxicity (producing signs and symptoms)
  - memory loss
  - vision problems
  - tremors
  - kidney disease



# Methylmercury and Biomagnification

Throw this guy back!  
He's smart so he must be old



Hg settles out in sediment – Bacteria convert to organic methylmercury – Bugs/plankton ingest – Fish eat  
Methylmercury is also dissolved back into the water column

# Does Size Really Matter?

In a way... **Age is what really matters**, but size is usually a good surrogate for age in fish.

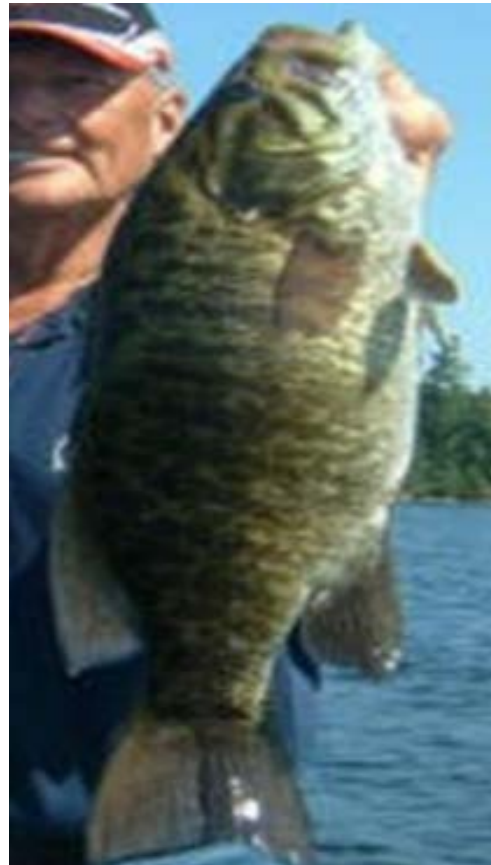
**Learn how to choose healthier, safer fish to eat**

Which \*smallmouth bass has the most “total” mercury?

Which bass has the “highest concentration” of mercury?  
(*most Hg/kg of tissue*)

Moral of the story:

**Get your picture taken with the big bass, then throw it back and catch one of it's great grandchildren to eat.**



\*Species often problematic in Oregon

# Species Matters

Some species accumulate more contaminants

## Why?

Fish behavior differs between species

- What they eat
- How much they eat
- Habitats they like

Bottom feeders

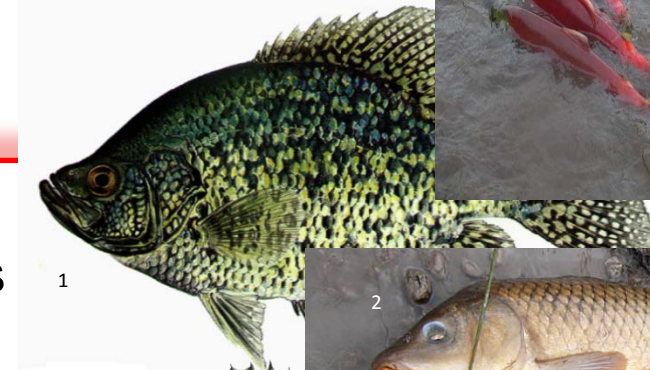
- more PCBs

Predatory piscivorous feeders

- more mercury

Resident fish (1-7): More

Migratory fish: Less



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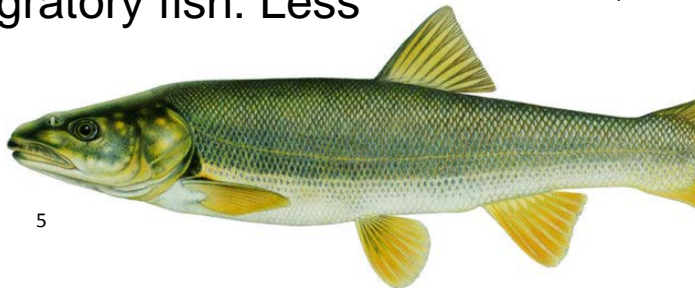
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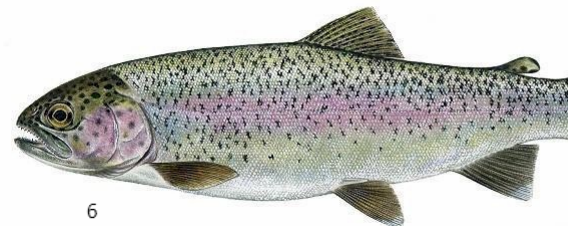
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# Who You are Matters

## Sensitivity

Individual response to same body-weight normalized dose of chemical

## Vulnerability

Size of dose depends on a persons...

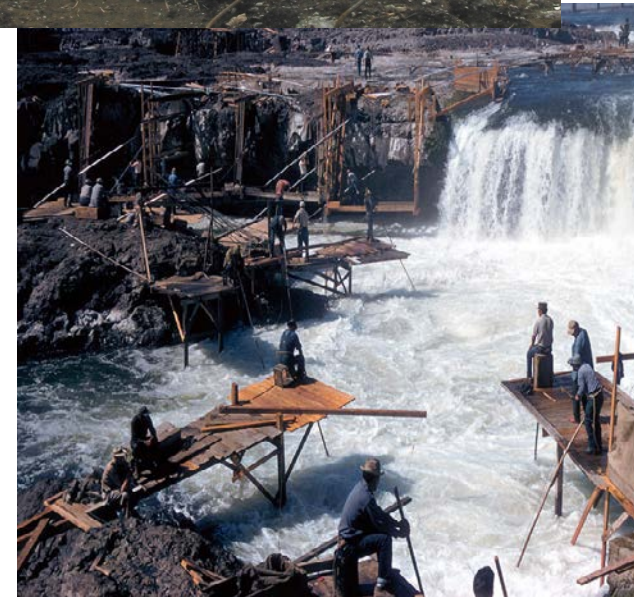
- activities
- what they eat
- how much they eat
- where they get food

## Sensitive/Vulnerable populations

- A developing fetus
  - mother's total body burden of contaminants
- Women – childbearing age (18-45)
- Children under 6
- Cultures eating more fish and fish parts
- Subsistence fishers

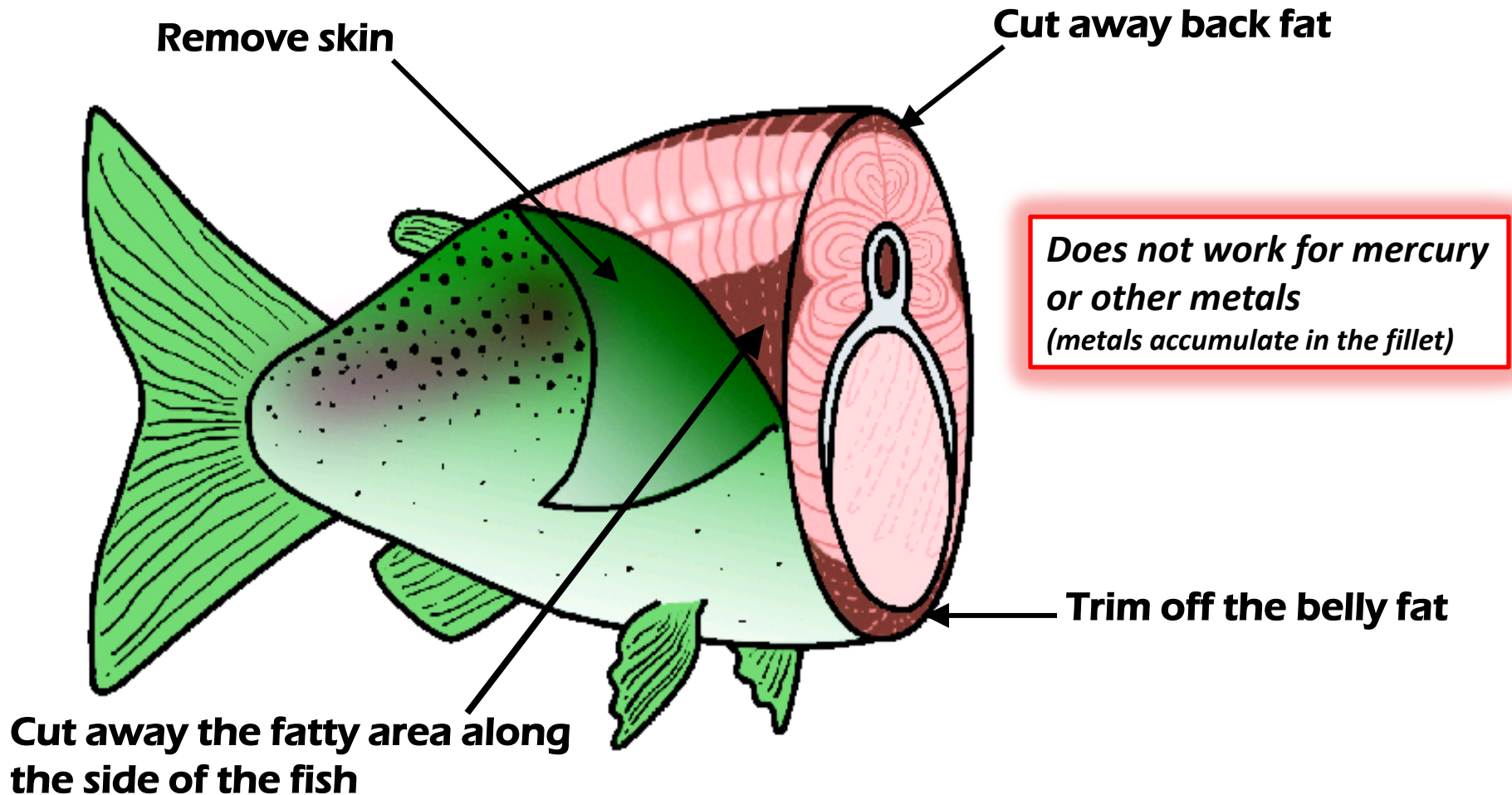
\*Adults tolerate more contaminants

\* PCBs accumulate over a lifetime/limited consumption = reduce body burden



# Prepare Fish Properly

Proper methods can reduce fat soluble contaminants like PCBs



## **Part 2: A Case Study**

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**COLUMBIA RIVER FISH ADVISORIES,  
CULTURAL SIGNIFICANCE,  
PARTNERSHIPS  
AND  
COMMUNICATION AND OUTREACH**

# Historical Fishing Rights & Methods

People have been fishing & consuming fish along the Columbia for centuries. These activities are why many Native American and subsistence fishers and their families are at greatest risk.



# Data, DEQ, OHA and You

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- 2009** DEQ and EPA sampled fish tissue from Mid-Columbia
- 2011** DEQ released data  
Fish tissue sampled from Bradford Island
- 2012** Data received by OHA
- 2013** Data analysis finalized and technical memo complete

## DEQ Role

### Clean Water

**Goal:** Reduce contaminant concentration in fish (through clean water)  
*Use EPA data to calculate allowable fish tissue concentration (mg/kg fish)*

## OHA Role

### Public Health

**Goal:** Protect people based on current conditions (reduce consumption = reduced exposure)  
*Use EPA and DEQ data to calculate fish consumption rate (kg fish/day)*

## DEQ and OHA

**Ultimate Goal:**

Clean water, clean fish, zero fish advisories

# Calculating Safe Consumption Limits

Advisories are used as an interim protection measure until waterways can provide clean fish for unlimited consumption.

*(DEQ & OHA use the same data in calculations but solve for different variables)*

## DEQ Regulation

Allowable fish tissue concentration  
(mg/kg fish)

$$= \frac{\text{EPA Reference Dose (mg/kg-day)} \times \text{Body Weight (kg)}}{\text{Assumed Fish Consumption Rate (kg fish/day)}}$$

## OHA Advisory

Recommended fish consumption rate  
(kg fish/day)

$$= \frac{\text{EPA Reference Dose (mg/kg-day)} \times \text{Body Weight (kg)}}{\text{Actual Measured Fish Tissue Concentration (mg/kg fish)}}$$

# How Much Fish *is* Safe to Eat?

## Calculating the recommended fish consumption rate

*Example: Bonneville Dam at Bradford Island Fish Advisory*

$$\frac{0.00002 \text{ mg/kg-day} \times 70 \text{ kg}}{10.14^* \text{ mg/kg fish}} = 0.000138 \text{ kg fish/day}$$

*\*1/2 of arithmetic mean concentration in 19 individual bass samples  
Reduction assumes fish are prepared as recommended to reduce PCB exposure  
(skin, internal organs, and fatty tissue removed before cooking)*

$$\frac{0.000138 \text{ kg fish/day} \times 30.44 \text{ days/month}}{0.227^* \text{ kg/meal}} = 0.02 \text{ meals/month}$$

*\*0.227 kg = 8 ounces*

# Columbia River Fish Advisories



- Fish tissue data collected in 2011 - Analysis complete in spring 2013
- Both issued September 23, 2013
- Total river miles under advisory -151 (from Bonneville Dam to McNary)
- Collaboration between Oregon (OHA) and Washington (DOH)
- Coordinated planning, timing and outreach efforts with:
  - Tribes (Yakama, Warm Springs, Umatilla, Nez Perce)
  - CRITFC
  - Agency partners
  - OR Bass and Panfish Club
  - Others



## Concerns:

- Tribal input vital (*importance of river/fish to livelihood*)
  - Deadline too aggressive
  - Economic impact on harvest and fall salmon run
  - Economic impact of public perception of advisories (*message to reflect concerns*)
  - Tribal and subsistence fishers need to be informed and prepared
    - Flyer developed & released prior to advisory with tribal input



# Columbia River Fish Advisories



## Bonneville Dam Fish Advisory at Bradford Island

- Revised 2009 advisory for SM bass
- Covers 1 mile area  
(*Bonneville Dam to Ruckel Creek*)
  - Driver – PCB  
(*mercury of concern*)
  - High contamination from historical dumping practices  
(*debris piles*)
  - After initial clean-up: *Conc. higher in bass than before*
  - Do not eat - “resident” fish
  - Migratory fish ok to eat

## Mid-Columbia Fish Advisory

- First advisory for Mid- Columbia
- Covers 150 mile stretch  
(*Ruckel Creek to McNary Dam*)
  - Drivers – mercury & PCBs
  - Contamination from different sources
  - 1 meal/week - “resident” fish
  - Do not eat
    - northern pikeminnow  
(*consistent w/WA statewide advisory*)
  - Migratory fish ok to eat

# Communication and Outreach

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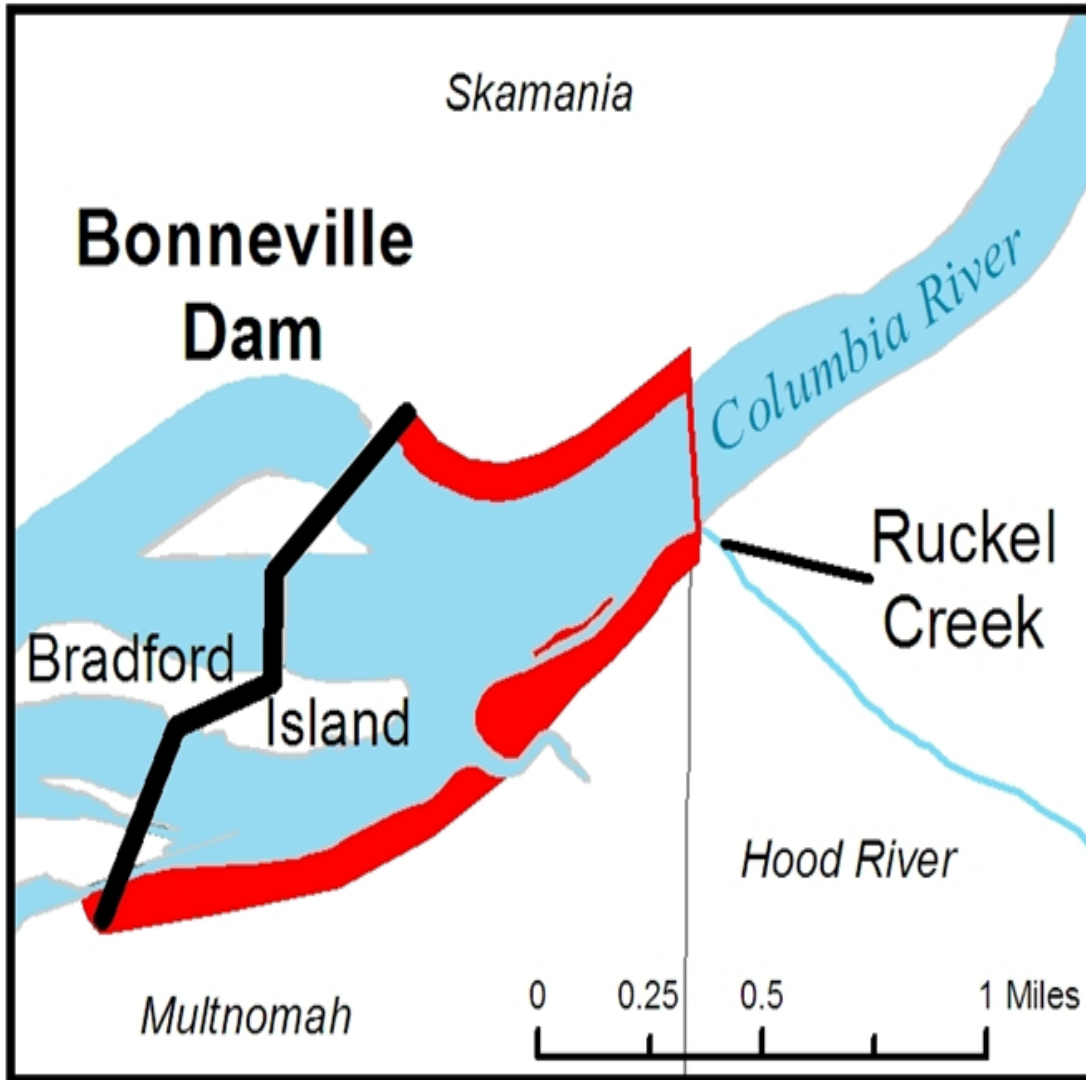
- Conversations and meetings with stakeholders and partners
  - Outreach conducted in OR and WA
- Joint press release (Sept. 23, 2013)
- Flyer and map for Bradford Island Advisory distributed
- Mid-Columbia factsheet, fish chart and map distributed
- Mass mailing through tribes to all registered fishers
- Angler school: ODFW - Oregon Bass and Panfish Club + other volunteers
- Word of mouth through tribes
  - Mentioned at 8/5/2013 fishers meeting
  - Fishery monitors, game wardens and others spread the word
    - Informal communication network between tribal members – effective
- Posted information on state websites

OR: <https://public.health.oregon.gov/HealthyEnvironments/Recreation/FishConsumption/Pages/index.aspx>

WA: <http://www.doh.wa.gov/CommunityandEnvironment/Food/Fish/Advisories.aspx#MiddleColumbiaRiver>

CRITFC: <http://www.critfc.org/>

# Bonneville Dam Fish Advisory at Bradford Island



**NOTICE!**

## BONNEVILLE DAM FISH ADVISORY AT BRADFORD ISLAND

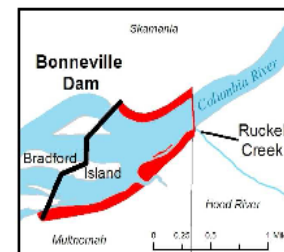
DO NOT EAT		HEALTHY TO EAT	
Carp		Salmon	
Bluegill		Steelhead	
Sucker		American Shad	
Small mouth bass		Lamprey	
Large mouth bass			
Sturgeon			
Yellow Perch			
Crappie			
Walleye			
Catfish			

Fish Illustrations Credit: USFWS, Sturgeon: Joseph R. Tomelleri

When fishing between Bradford Island and Ruckel Creek eat only salmon, steelhead, shad & lamprey. Due to chemical contamination, all other fish living in this area are not safe to eat.



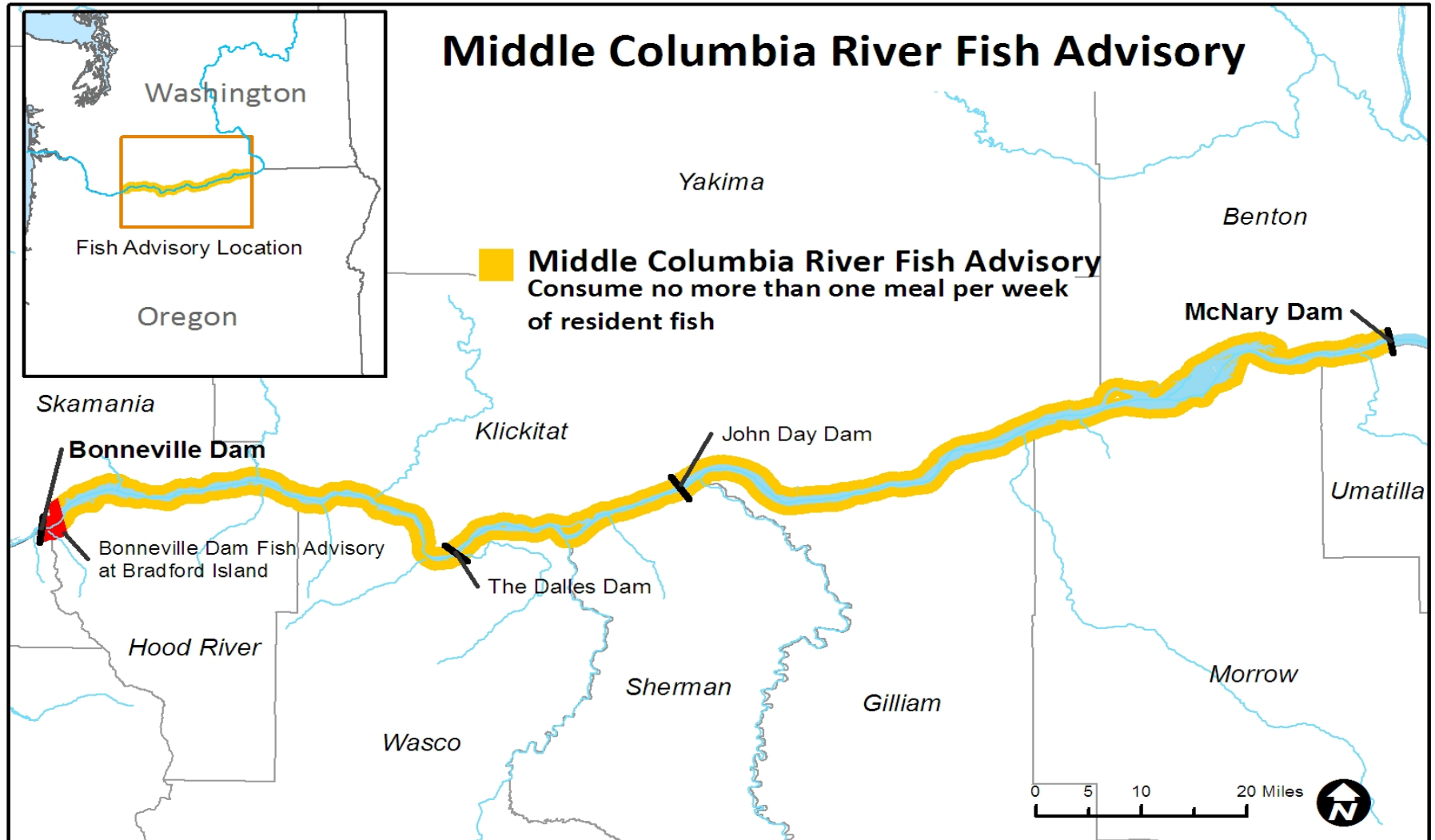
It is especially important for babies, children, women who are pregnant, plan to become pregnant and/or are nursing to follow this advisory. Health effects of eating contaminated fish can include lifelong learning problems and cancer.



For more information, call: 1-877-290-6767 or visit: [www.healthoregon.org/fishadv](http://www.healthoregon.org/fishadv)










**Oregon Health** **Partners in Health**





# Mid-Columbia Fish Advisory Map



# Mid-Columbia Fish Advisory

## Mercury and PCBs

LIMIT	OR	Meals Per Week
Bass		<p><b>Eat only 1 meal per week</b> of any combination of these species: bass, bluegill, carp, catfish, crappie, sucker, sturgeon, walleye, or yellow perch.</p> <p>If you eat the recommended amount no other fish should be eaten that week.</p>
Bluegill		
Carp		
Catfish		
Crappie		
Sucker		
Sturgeon		
Walleye		
Yellow Perch		

HEALTHY CHOICE		
Salmon		<p><b>Enjoy these fish</b></p> <p>Salmon, steelhead, lamprey, and shad are low in contaminants.</p>
Steelhead		
Lamprey		
Shad		

DO NOT EAT		
Northern Pikeminnow		DO NOT EAT

# What Was learned?

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- Time needed to inform necessary stakeholders at all levels
- Assign lead to identify partners, stakeholders and audiences early on
- Public perception of Oregon/Washington fish is a sensitive issue
  - Messaging needs to reflect concern
- Timing of advisories may have cultural and economic implications
- Gather and integrate cultural input when necessary
- Staff-level roles and communication must be clearly defined
- Determine level of management involvement early
  - Especially with decisions having cultural significance



# Successes

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- Fishers informed in a timely manner
  - Strong supporting materials available
- Adequate time to inform and engage tribal and state leadership
  - Opportunity to gain perspective and to gather and integrate input
- Interim Bradford Island flyer protected tribal fishers pre advisory
- Timing of press release and advisory accommodated tribal needs
- Messaging protected public health while promoting healthy choices through consumption of migratory fish
  - Provided information to the public without causing alarm
- Relationship and trust between partners and stakeholders strengthened



# Questions/Discussion

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