

November 2-5, 2009  
Portland, Oregon

# 2009 National Forum on Contaminants in Fish

The Governor Hotel • Portland, Oregon

November 2-5, 2009

## **Appendix C**

## **State Information Exchange**







## Table of Contents

Alabama .....	Attended but did not provide a poster
Alaska .....	C-1
American Samoa .....	Unable to attend
Arizona .....	Attended but did not provide a poster
Arkansas .....	C-3
Aroostook Band of Micmacs .....	Attended but did not provide a poster
California .....	C-4
Cheyenne River Sioux Tribe .....	Attended but did not provide a poster
Colorado .....	C-6
Connecticut .....	C-8
Delaware .....	Unable to attend
District of Columbia .....	Attended but did not provide a poster
Florida .....	C-9
Georgia .....	C-10
Great Lakes Indian Fish and Wildlife Commission .....	Attended but did not provide a poster
Guam .....	Attended but did not provide a poster
Hawaii .....	C-13
Idaho .....	C-14
Illinois .....	C-15
Indiana .....	C-17
Iowa .....	Unable to attend
Kansas .....	Unable to attend
Kentucky .....	C-21
Louisiana .....	C-22
Maine .....	Attended but did not provide a poster
Maryland .....	C-23
Massachusetts .....	C-24
Michigan .....	C-25
Minnesota Chippewa Tribe .....	Unable to attend
Minnesota .....	C-27
Mississippi .....	C-29
Missouri .....	C-30



Montana .....	C-32
Nebraska .....	C-33
Nevada .....	Attended but did not provide a poster
New Hampshire* .....	C-34
New Jersey .....	C-36
New Mexico .....	C-38
New York .....	C-39
North Carolina .....	Attended but did not provide a poster
North Dakota .....	C-40
Ohio* .....	C-41
Oklahoma .....	C-43
Oregon .....	C-45
Pennsylvania .....	C-46
Puerto Rico .....	Unable to attend
Rhode Island .....	Unable to attend
South Carolina .....	C-47
South Dakota .....	C-48
Tennessee .....	Unable to attend
Texas .....	C-49
Utah .....	C-51
Vermont .....	Unable to attend
Virgin Islands .....	Unable to attend
Virginia .....	C-52
Washington .....	C-54
West Virginia .....	C-57
Winnebago Tribe of Nebraska .....	C-58
Wisconsin .....	C-59
Wyoming .....	C-61

\* *Unable to attend but provided a poster.*



## Alaska

## Developing Balanced Fish Consumption Advice for Alaskans

- In October 2007, the State of Alaska issued its first statewide fish consumption guidelines for women of childbearing age and young children.
- The guidelines were developed by a multi-disciplinary group of local scientific experts from state and federal agencies, the University of Alaska, and tribal health organizations.
- In general, contaminant levels in Alaska fish are low. Current guidance on meal restrictions for sensitive populations are based on mercury as the main contaminant of concern.
- The guidelines reflect a comprehensive risk/benefit approach to optimize the public's health. Sources of data include:
  - Contaminant levels in Alaska fish
  - Human biomonitoring data for Alaskans
  - Fish consumption rates in Alaska
  - Nutrition-related disease rates and trends in Alaska
- Since 2002, over 750 women of childbearing age throughout Alaska have participated in the state's free Hair Mercury Biomonitoring Program. The median hair mercury level is 0.47 ppm, suggesting that women's exposure to mercury from eating Alaska fish is low.
- The state's fish consumption advice for Alaskans will be updated as needed to reflect the most current data.

## Mercury Toxicity Values Used by Alaska

Does your State use a tiered risk approach for different populations?

**Yes.** Alaska only provides restrictive guidance for sensitive populations; the general population is encouraged to eat as much fish from Alaska waters as they like.

**Sensitive Populations:** "women who are or can become pregnant, nursing mothers, and young children (aged 12 yrs and under)"

"RfD" for sensitive populations:  $4 \times 10^{-4}$  mg/kg/day\*

One meal per week trigger: 0.64 ppm Hg

One meal per month trigger: 2.0 ppm Hg

\*Basis of this RfD is detailed in an *Epidemiology Bulletin*; see lower right corner of this poster for ordering information.

## Guidelines for Women of Child-bearing Age and Young Children (age ≤ 12) Eating Alaska Fish

Fish MeHg Conc. ppm ww	Meals per month	Species; using a. Mean
0 - .150	Unlimited	Pacific Cod Walleye pollock Black rockfish Pacific ocean perch King salmon Chum salmon Pink salmon Red salmon Silver salmon Halibut 0 - 19.9 pounds Lingcod 0 - 29.9 inches
>.150 - .320	16	Sablefish Rougheye rockfish Northern pike Halibut 20 - 39.9 pounds Lingcod 30 - 39.9 inches
>.320 - .400	12	Halibut 40 - 49.9 pounds
>.400 - .640	8	Yelloweye rockfish Halibut 50 - 89.9 pounds Lingcod 40 - 44.9 inches
>.640 - 1.23	4	Salmon shark Spiny dogfish Halibut ≥ 90 pounds Lingcod ≥ 45 inches

\*Calculations performed using 6 oz meal size, and MRL dose of 0.4 ug/kg BW/day established by the Alaska Scientific Advisory Committee for Fish Consumption. Calculations assume a single species diet.

## Guide to Eating Fish Safely for Alaska Women and Children

Mix and match your fish meals\* for up to:

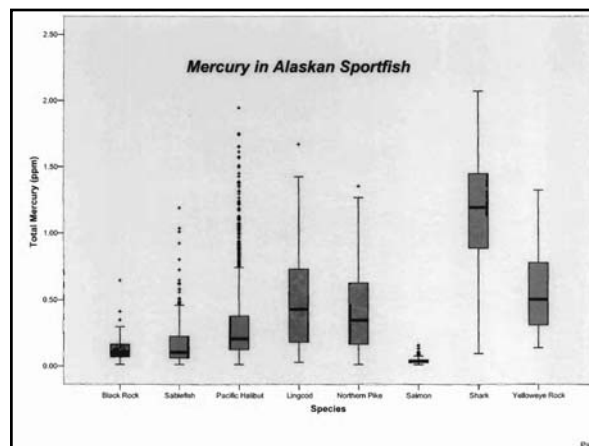
12 POINTS PER WEEK

\*A meal is 6 oz of fish and 1 oz of oil or butter. For children up to 12 years old, use 3 points per week.



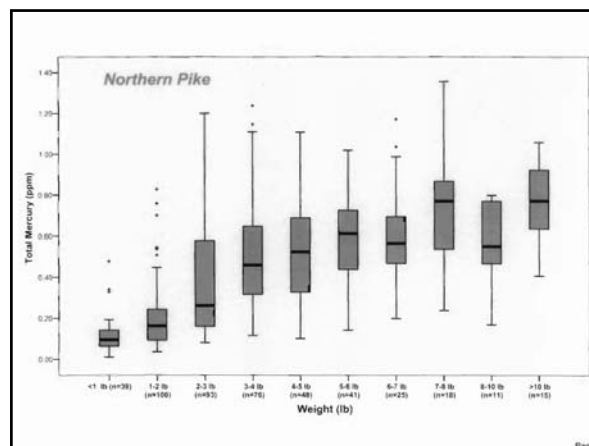
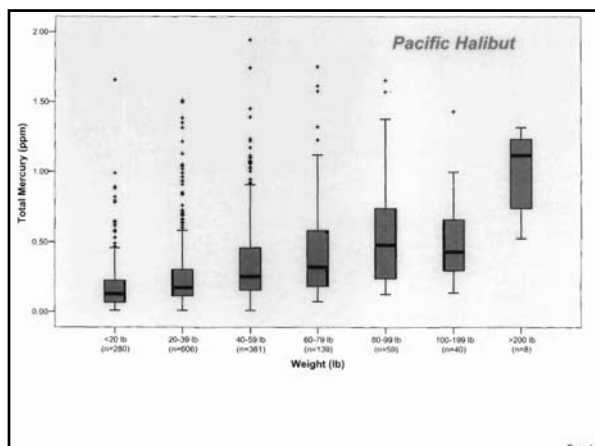
## Risk Communication Materials Used by Alaska to Inform Fishers

Communication Material	Distribution efforts
Pamphlets or fact sheets	Point System (see accompanying panel) currently undergoing pre-testing; brochure under development
Signs at fishing access points	
Posters (medical offices, libraries, fishing license outlets, etc.)	Posted at villages near National Wildlife Refuges in AK (see poster on AK pike for more details)
Fishing regulation booklets	Notice in 5 regional booklets, ~400,000-450,000 printed annually
Journal or magazine publications	Alaska magazine
Press releases	Two issued February and October 2007
State Website: <a href="http://www.epi.hss.state.ak.us/ehf/fish">http://www.epi.hss.state.ak.us/ehf/fish</a>	Online since October 2007 Average hits: 1,361 per month
Other methods: presentations, meetings, workshops	Statewide meetings with tribal leaders, industry partners (commercial fishermen, seafood processors, seafood marketing), health providers





## Alaska (continued)





## Arkansas

Considerations for Methylmercury in Fish Advisory Values Used by Arkansas: Populations Addressed, Toxicological Bases, and Points of Departure (Present & Past)				
General Population	Sensitive Population (Pregnant women, nursing women, or women planning to become pregnant)	Sensitive Population (Children under 7 years of age)	General Population	General Population and Sensitive Population(s)
Food & Drug Administration (FDA) Action Level: 1 ppm mercury in fish tissue (*default value)	Environmental Protection Agency (EPA) Chronic Oral Reference Dose (RfD): $1 \times 10^{-4}$ mg/kg/day with an adult body weight of 70 kg	EPA Chronic Oral RfD: $1 \times 10^{-4}$ mg/kg/day with a child body weight of 16 kg	Agency for Toxic Substances & Disease Registry (ATSDR) Chronic Oral Minimal Risk Level (MRL): $3 \times 10^{-4}$ mg/kg/day with an adult body weight of 70 kg	(1994) Arkansas Department of Health Fish Consumption Guidelines (notices intended for persons routinely eating more than 2 meals of fish/month from affected waters)
No consumption $\geq 1$ ppm mercury in fish tissue*	4 meals/month $\geq 0.23$ ppm mercury in fish tissue	4 meals/month $\geq 0.055$ ppm mercury in fish tissue	4 meals/month $\geq 0.72$ ppm mercury in fish tissue	2 meals/month $\geq 1$ ppm mercury in fish tissue for the general population only
	2 meals/month $\geq 0.47$ ppm mercury in fish tissue	2 meals/month $\geq 0.10$ ppm mercury in fish tissue	No consumption $\geq 1$ ppm mercury in fish tissue*	No consumption $\geq 1$ ppm for the sensitive population*
	No consumption $\geq 1$ ppm mercury in fish tissue*	No consumption $\geq 1$ ppm mercury in fish tissue*		No consumption $\geq 1.5$ ppm for the general population

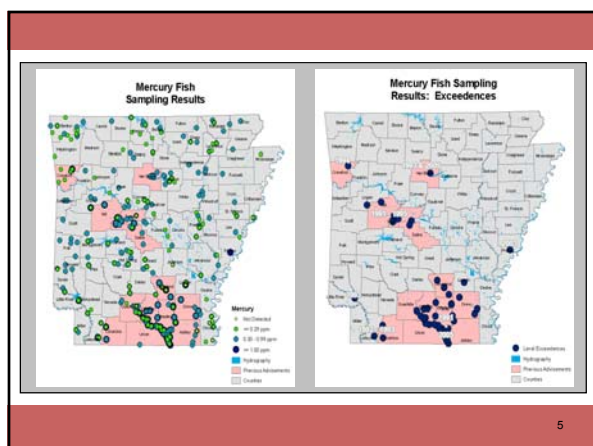
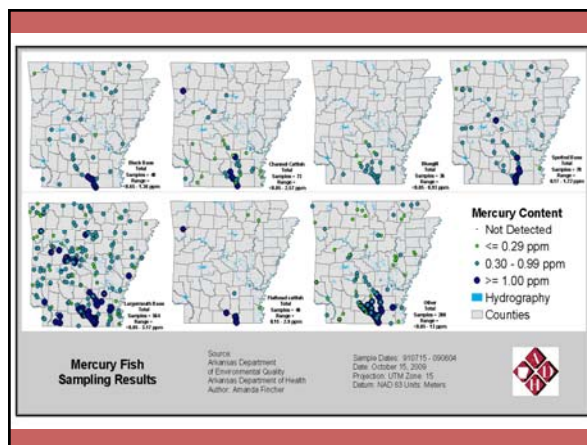
## Risk Communication Materials Used by Arkansas to Inform Fishers (2008-2009)

Communication Material	Number Distributed Per Year
Pamphlets and fact sheets (hardcopy mail-outs and state website hits)	Approx. 288,000
Signs at fishing access points	39
Fishing regulation booklets	500,000 (printed)
Presentations and group meetings	4
Journal, magazine, and news publications	Approx. 5 in-state
Program promotional items (insulated drink can holder)	448

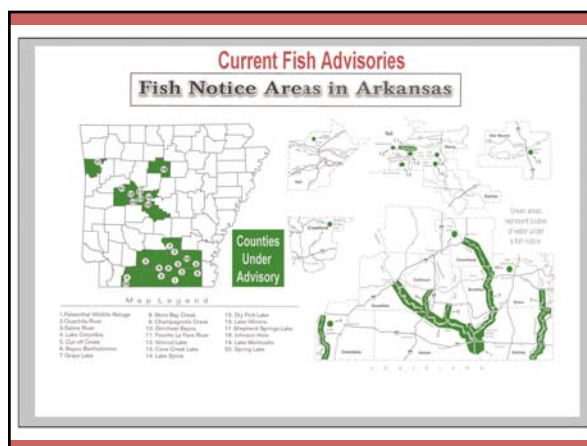
2

## Review Process

- Sample set included over 1,100 fish sampling results taken intermittently over a total 15-year period.
- Results were mapped according to GPS location.
- Results were separated by fish species and compared with mercury consumption advisories.
- High mercury results were reviewed by location with full sampling information.



5



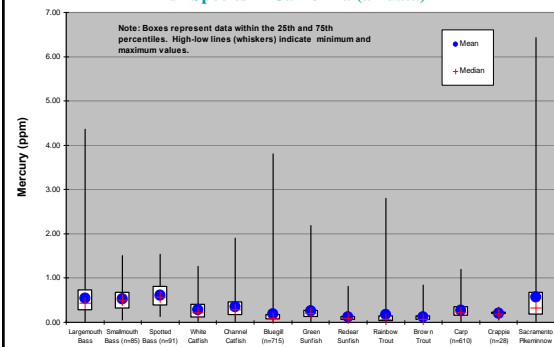


## California

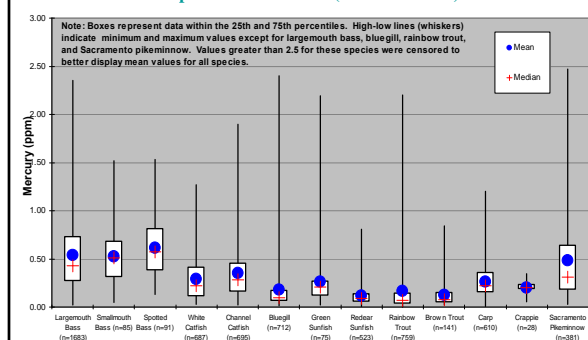
Graphic #1 - Basis for Mercury Advisory Values Used by California: Populations addressed, toxicological bases, and points of departure

General Population (Women over 45 and men)	Sensitive Population (Women 18-45)	Sensitive Population (Children 1-17)	Other Population of Concern – please add populations of concern
(Toxicological value or basis of advisory)	(Toxicological value or basis of advisory)	(Toxicological value or basis of advisory)	(Toxicological value or basis of advisory)
3x10 <sup>-4</sup> mg/kg-day	1x10 <sup>-4</sup> mg/kg-day	1x10 <sup>-4</sup> mg/kg-day	Not applicable
1 meal/week > 0.440 - 1.310 ppm mercury in fish tissue	1 meal/week > 0.150 - 0.440 ppm mercury in fish tissue	1 meal/week > 0.150 - 0.440 ppm mercury in fish tissue	Not applicable
California no longer issues meal/month advisories because this consumption level cannot provide significant benefit to consumers	California no longer issues meal/month advisories because this consumption level cannot provide significant benefit to consumers	California no longer issues meal/month advisories because this consumption level cannot provide significant benefit to consumers	Not applicable
No consumption > 1.310 ppm mercury in fish tissue	No consumption > 0.440 ppm mercury in fish tissue	No consumption > 0.440 ppm mercury in fish tissue	Not applicable

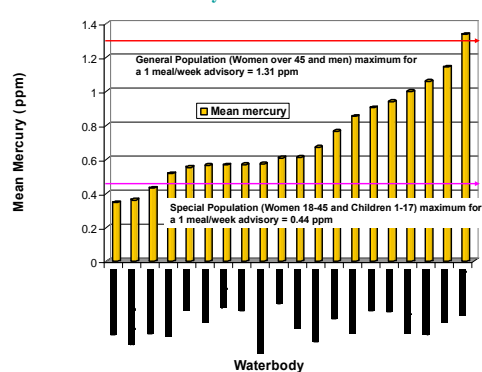
Graphic #2a - Mercury Concentrations in Selected Fish Species in California (all data)



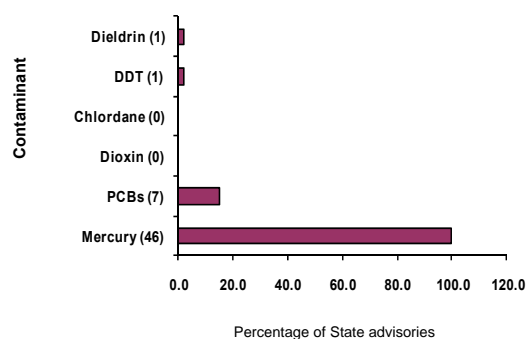
Graphic #2b - Mercury Concentrations in Selected Fish Species in California (truncated data)



Mean Mercury Concentrations in Largemouth Bass by Lake in California



Number of Waterbody-specific Advisories (in Parentheses) and Percentage Issued in California for Major Contaminants



Locations Where Fish Advisories Have Been Issued in California





## California (continued)

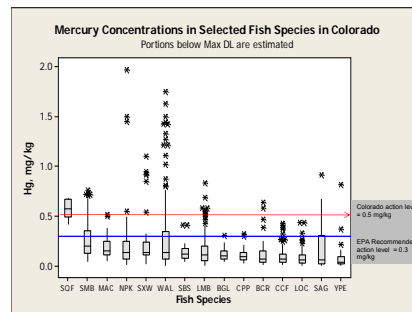
Risk Communication Materials Used by California to Inform Fishers	
Communication Material	California Examples
Pamphlets or fact sheets	<ul style="list-style-type: none"> <li>•See examples of new brochures for advisories for specific water bodies.</li> <li>•Technical and non-technical fact sheets for mercury and PCBs.</li> </ul>
Signs at fishing access points	Signs are posted by counties, municipalities, and special programs on a case-by-case basis. There is no statewide mandate for posting.
Fishing regulation booklets	Advisories are included in Ocean and Freshwater Sport Fishing Regulation Booklets from CA Department of Fish and Game: <a href="http://www.dfg.ca.gov/regulations/index.html">http://www.dfg.ca.gov/regulations/index.html</a>
Press releases	Issued for new advisories, reports, and updates.
State Website	<a href="http://www.oehha.ca.gov/fish.html">http://www.oehha.ca.gov/fish.html</a>
Advisory reports	Reports for new or updated advisories describing the data and how they were used to develop the advisory.
Other reports	<ul style="list-style-type: none"> <li>•OEHA advisory protocol (ATLs)</li> <li>•General Protocol for Sport Fish Sampling and Analysis</li> </ul>



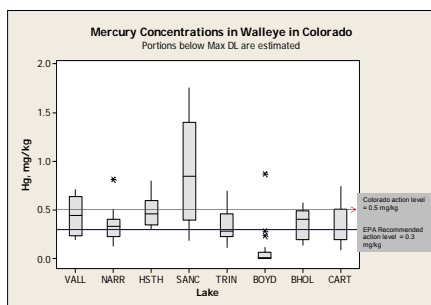
## Colorado

Basis for Mercury Advisory Values Used by COLORADO: Populations addressed, toxicological bases, and points of departure

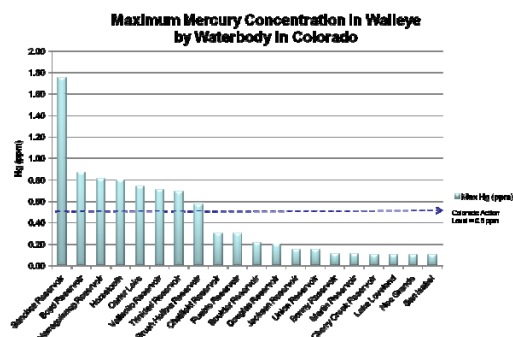
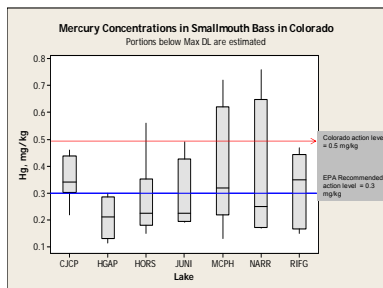
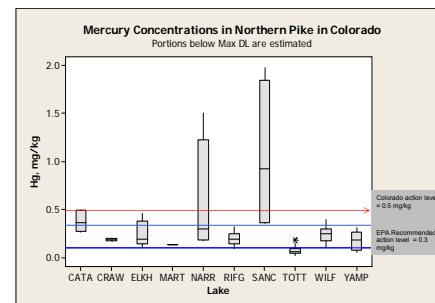
General Population	Women of Childbearing Age (15-44 years)	Children – Under the age of 6
EPA recommended body weight values of 70 kg. Reference dose (RfD) of 0.0001 mg/kg/day. RSC to total fish exposure = 1. This means that other sources of mercury to the total body burden are not taken into account in deriving FCA's.	EPA recommended body weight values of 64 kg (for women of reproductive age). Reference dose (RfD) of 0.0001 mg/kg/day. RSC to total fish exposure = 0.73. The EPA estimated RSC to be 0.000077 mg methylmercury/kg/day (i.e., 27% of the RfD) to account for marine fish consumption.	EPA recommended body weight value of 14.5 kg. Reference dose (RfD) of 0.0001 mg/kg/day. RSC to total fish exposure = 0.73. The EPA estimated RSC to be 0.000077 mg methylmercury/kg/day (i.e., 27% of the RfD) to account for marine fish consumption.
1 meal/week $\geq$ 0.116 ppm mercury in fish tissue	1 meal/week $\geq$ 0.077 ppm mercury in fish tissue	1 meal/week $\geq$ 0.046 ppm mercury in fish tissue
1 meal/month $\geq$ 0.464 ppm mercury in fish tissue	1 meal/month $\geq$ 0.309 ppm mercury in fish tissue	1 meal/month $\geq$ 0.186 ppm mercury in fish tissue
No consumption $\geq$ 0.933 ppm mercury in fish tissue	No consumption $\geq$ 0.622 ppm mercury in fish tissue	No consumption $\geq$ 0.378 ppm mercury in fish tissue



Many of the fish Hg results were below detection limits. In order to estimate percentiles with this data, the Robust RSC method of Helsel and Cohn (1988) was implemented using MINITAB. Boxes represent data within the 25<sup>th</sup> and 75<sup>th</sup> percentiles.



All of the lakes shown above have FCA's issued for Walleye. Thirteen reservoirs with Walleye data were not included in this graph because there was not enough data above the detection limit to calculate percentiles.



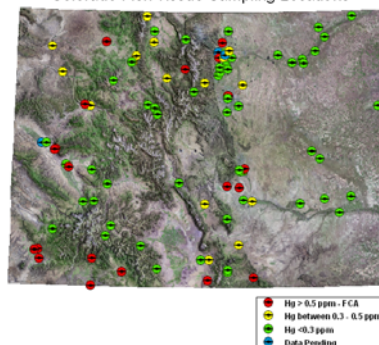


## Colorado (continued)

Waterbodies in Colorado with Fish Consumption Advisories		
Waterbody	Pollutant	Species
Beechey Lake	Mercury	Largemouth Bass
Big Lake	Mercury	Walleye
Brush Hollow	Mercury	Walleye
Carter Lake	Mercury	Walleye
Copeland Reservoir	Mercury	Northern Pike
Echo Canyon Reservoir	Mercury	Largemouth Bass, Yellow Perch, Black Crappie
Elkhead Reservoir	Mercury	Largemouth Bass, Smallmouth Bass, Northern Pike, Black Crappie
Granby Lake	Mercury	Lake Trout
Hornet Reservoir	Mercury	White Bass, Walleye
Horseshoe Lake	Mercury	Smallmouth Bass, Sauger
Juntura Reservoir	Mercury	Smallmouth Bass
McPhee Reservoir	Mercury	Smallmouth Bass, Largemouth Bass, Black Crappie
Paragon Reservoir	Mercury	Northern Pike, Walleye, Smallmouth Bass
Navajo Reservoir	Mercury	Northern Pike, Smallmouth Bass
Purdy Mesa Lake*	Mercury	Largemouth Bass
Red Egg Reservoir	Mercury	Smallmouth Bass, Northern Pike, Walleye
Rocky Mountain Lake	Mercury	Largemouth Bass
Sanchez Reservoir	Mercury	Northern Pike, Walleye
Sawatch Lake	Selenium	All Fish
Teller Reservoir	Mercury	Northern Pike, Largemouth Bass, Bullhead, Crappie, Channel Catfish
Tiffin Lake	Mercury	Walleye
Trinidad Reservoir	Mercury	Walleye
Vallecito Reservoir	Mercury	Northern Pike, Walleye
White Springs Ranch	Perchloroethylene (PCE)	Largemouth Bass, Western White Sucker, European Rudd

\* Samples were not prior to the lake being drained in 2008. No current data exists after the reservoir was refilled.

Colorado Fish Tissue Sampling Locations

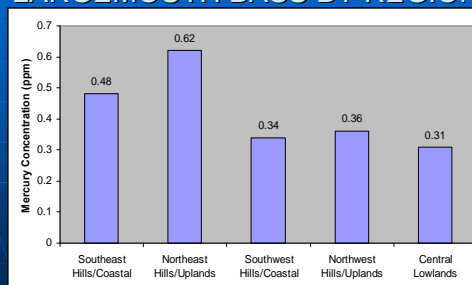
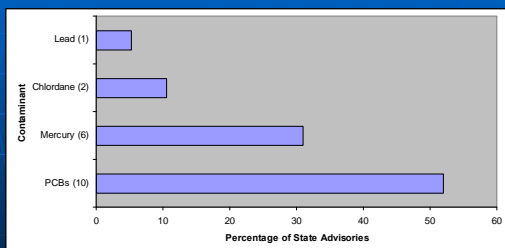




## Connecticut

MERCURY TOXICITY VALUES USED  
BY CONNECTICUT

Mercury Concentration (ppm, wet weight)	Advice Sensitive Population	Advice General Population
	Rfd= 0.1 ug/kg/day	Rfd= 0.3 ug/kg/day
Mean= <1.0	1 Meal/Month	1 Meal/Week
Mean = ≥1.0	Do Not Eat	One Meal/Month
Single Meal= ≥ 2.0	Do Not Eat	1 Meal/Month

AVERAGE MERCURY  
CONCENTRATIONS IN  
LARGEMOUTH BASS BY REGIONNUMBER OF WATERBODY-SPECIFIC  
ADVISORIES AND PERCENT ISSUED IN  
CONNECTICUTRISK COMMUNICATION MATERIALS USED BY  
CONNECTICUT TO INFORM FISHERS

Communication Material	Number Distributed Per year
Pregnant Women's Guide (English)	40,000
Pregnant Women's Guide (Spanish)	30,000
Recreational Fisherman's Guide (English)	30,000
Recreational Fisherman's Guide (English)	10,000
Supermarket Fish Poster	5,000
Supermarket Fish Coupon	100,000
Press Release	1-2
Magnets	4,000

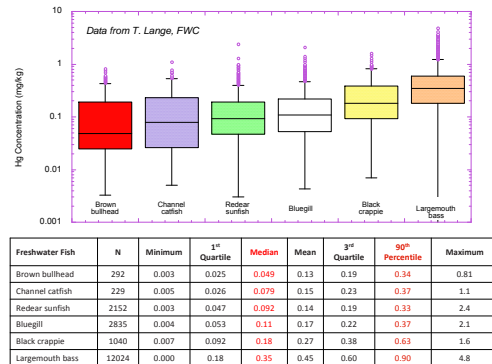


# Florida

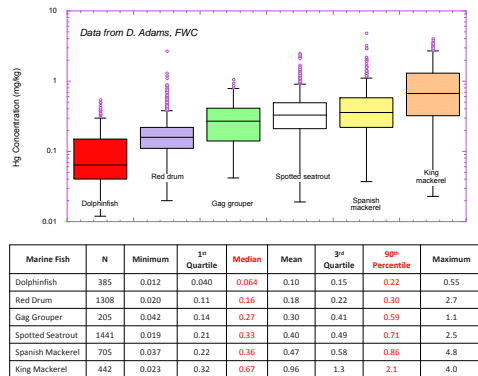
**Basis for Decision-making for Florida Fish Consumption Advisories as Regards Mercury Levels in Fish**

General Population	Sensitive Population (Women of childbearing age)	Sensitive Population (Children ≤ 15 years of age)	Other Populations of Concern (N/A)
(Toxicological value or basis of advisory)	(Toxicological value or basis of advisory)	(Toxicological value or basis of advisory)	(Toxicological value or basis of advisory)
RfD= 0.3 micrograms MeHg/kg body wt/day meal = 6 oz. cooked body wt. 70 kg	RfD= 0.1 micrograms MeHg/kg body wt/day meal = 6 oz. cooked body wt. 64 kg	RfD= 0.1 micrograms MeHg/kg body wt/day	
1 meal/week <0.6 ppm mercury in fresh fish tissue	1 meal/week <0.2 ppm mercury in fresh fish tissue	1 meal/week <0.2 ppm mercury in fresh fish tissue	1 meal/week ≥ ____ ppm mercury in fish tissue
1 meal/month <1.5 ppm mercury in fish tissue	1 meal/month <0.85 ppm mercury in fish tissue	1 meal/month <0.85 ppm mercury in fish tissue	1 meal/month ≥ ____ ppm mercury in fish tissue
No consumption ≥1.5 ppm mercury in fish tissue	No consumption ≥0.85 ppm mercury in fish tissue	No consumption ≥0.85 ppm mercury in fish tissue	No consumption ≥ ____ ppm mercury in fish tissue

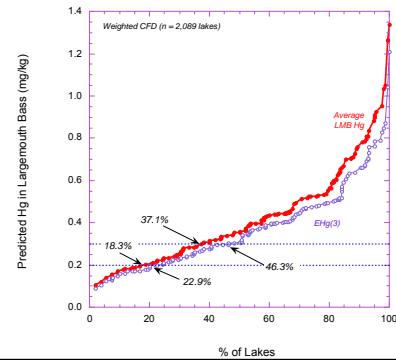
**Mercury Distribution in Florida Freshwater Fish**



**Mercury Distribution in Florida Marine Fish**



**Mercury in Largemouth Bass in Florida Lakes**



**Florida Health Advisories for Fish Consumption by Waterbody Assessment Unit**  
Advisories are for mercury unless otherwise noted.

**Florida Fish Advisories Consumption**

- One meal/week or less (general population)
- NO NOT EAT

100% NOT EAT marine advisories for the sensitive population are for shark, king mackerel, blackfin tuna, cobia, and tile fish for the entire Florida coast.





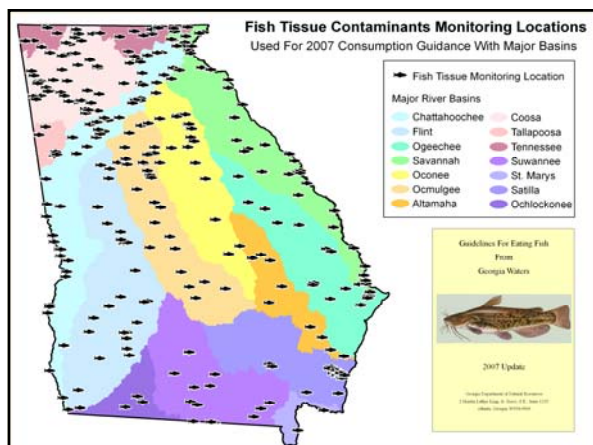
## Georgia

### Georgia's Fish Advisory Program

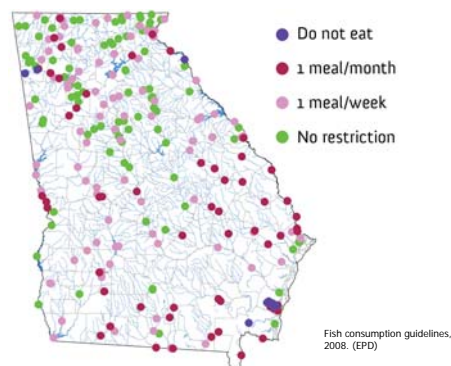
R.O. Manning, Ph.D., DABT

### Overview

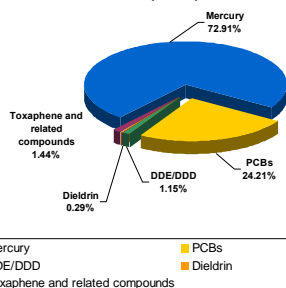
The Georgia Department of Natural Resources (DNR) monitors fish tissue contamination and issues consumption advisories. Analyses for 43 different contaminants are conducted on composites of edible fillet tissue. Standardized risk assessment methodologies incorporating U.S. EPA's potency factors for carcinogens and reference doses for toxics are utilized to evaluate the data for human health concerns. Fish consumption advisories are tailored to provide information in an understandable format. The strategy relates contamination of fish tissue to number of meals of fish that may be eaten over a given period of time. Advisory information is generated for a particular water body and species/size of fish, ranging from "unlimited consumption" to "don't eat" with intermediate recommendations of one meal per week or month. Information targeting the sport angler is placed in the Fishing Regulations published annually by DNR. Other, more detailed pamphlets are produced for general distribution through DNR's State and Regional offices, Health Departments, and popular fishing-related outlets. Additionally, site-specific fact sheets are produced for localized areas of concern and for special target audiences.



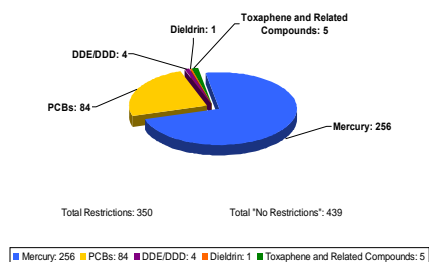
### Maximum Recommended Restriction



### Percent of Restriction Advisories in Georgia for Each Contaminant Tested (2008)

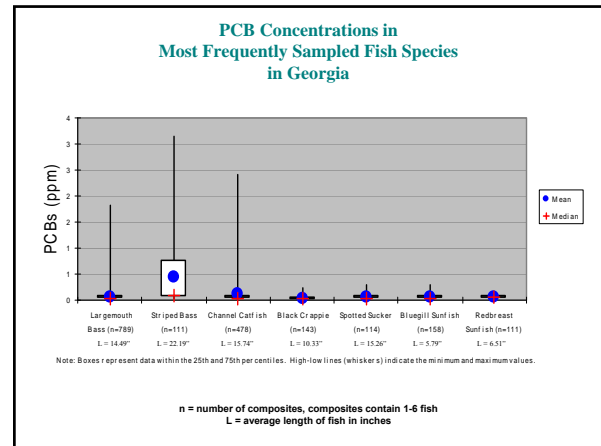
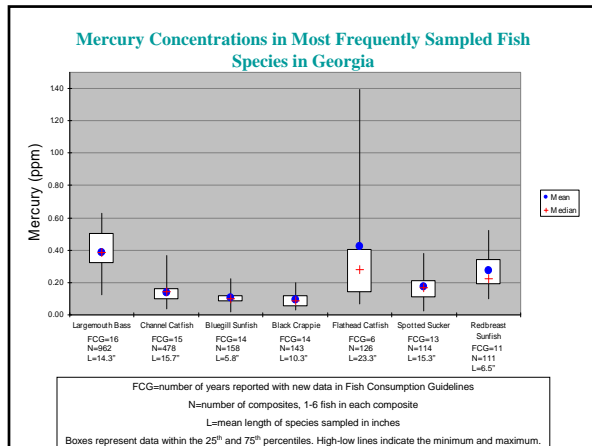


### Number of Restrictions per Contaminant Tested in Georgia Waters (2008)





## Georgia (continued)



## Mercury Toxicity Values Used by Georgia

Georgia does not use a tiered risk approach for different populations.

Georgia uses a single risk approach for the general population.

$$RfD = 1 \times 10^{-4} \text{ mg/kg/day}$$

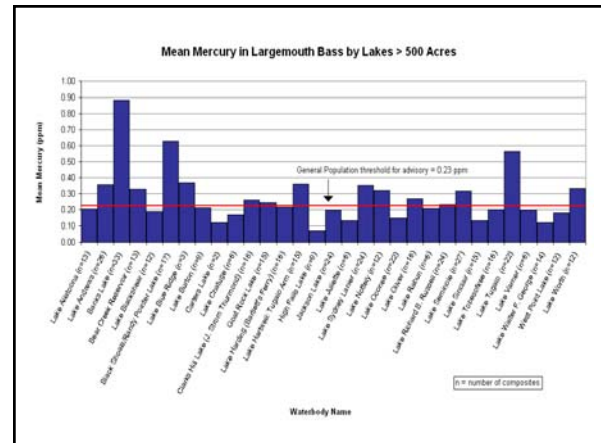
No restriction < 0.23 ppm

1 meal/week > 0.23 ppm

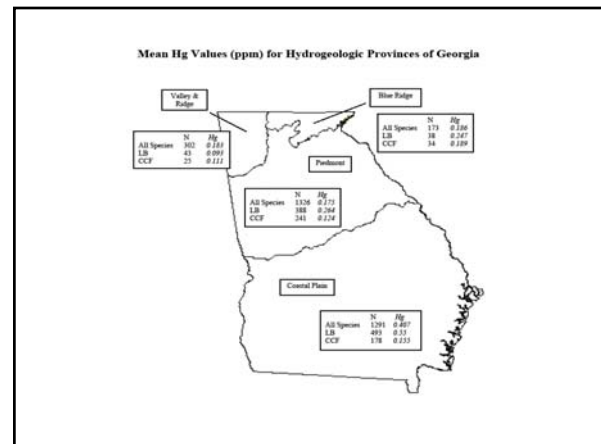
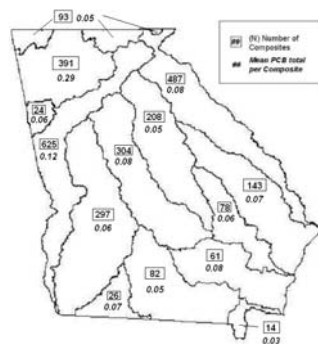
1 meal/month > 0.7 ppm

Do not eat > 2.3 ppm

Georgia's "Risk-Based" Approach accounts for a range of meal sizes (1/4 to 1/2 lb), varying meal frequencies, and can also be used to assess multiple contaminants.

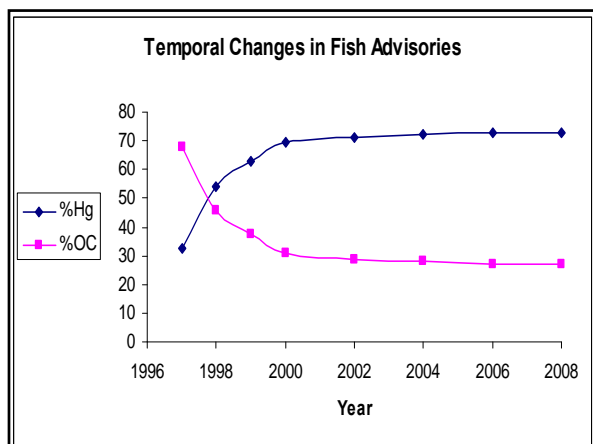


## Number of Composites and Mean PCB Concentrations (ppm) by River Basin





## Georgia (continued)



### Findings

- Out of 43 contaminants monitored, Hg & PCBs account for > 95% of advisories.
- Hg accounts for the majority (75%) of those.
- Increasing trophic level and age correlate with increased Hg concentrations.
- Hydrology and physiography account for significant variation in Hg with increasing concentrations measured in riverine and coastal plain fishes

### Example of GADNR's Materials

- Guidelines for Eating Fish from Georgia Waters
- A Woman's Guide to Eating Fish from...
  - Four regions of GA, available in Spanish also
  - Available at: [www.georgiaepd.org/Documents/fish\\_guide.html](http://www.georgiaepd.org/Documents/fish_guide.html)
- 2009 GA Sport Fishing Regulations
  - Available at: [www.09gafw.pub.jfgriffin.com/](http://www.09gafw.pub.jfgriffin.com/)

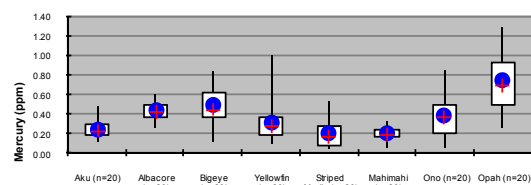


## Hawaii

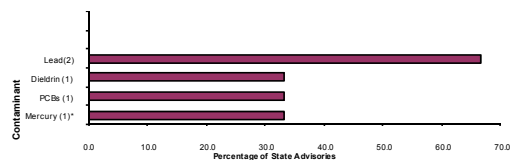
Graphic #1 - Basis for Mercury Advisory Values Used by Hawaii Department of Health-Populations addressed, toxicological bases, and points of departure

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children)	Other Population of Concern – please add populations of concern
No Advisory	(Toxicological value or basis of advisory) EPA's reference dose 1E-04 mg/kg-day	(Toxicological value or basis of advisory) EPA's reference dose 1E-04 mg/kg-day	(Toxicological value or basis of advisory)
1 meal/week ≥ ____ ppm mercury in fish tissue	1 meal/week ≥ _0.23_ ppm mercury in fish tissue	1 meal/week ≥ _0.23_ ppm mercury in fish tissue	1 meal/week ≥ ____ ppm mercury in fish tissue
1 meal/month ≥ ____ ppm mercury in fish tissue	1 meal/month ≥ ____ ppm mercury in fish tissue (Hawaii DOH does not have this category)	1 meal/month ≥ ____ ppm mercury in fish tissue (Hawaii DOH does not have this category)	1 meal/month ≥ ____ ppm mercury in fish tissue
	2 meal/month ≥ _0.47_ ppm mercury in fish tissue	2 meal/month ≥ _0.47_ ppm mercury in fish tissue	
No consumption ≥ ____ ppm mercury in fish tissue	No consumption ≥ _0.94_ ppm mercury in fish tissue	No consumption ≥ _0.94_ ppm mercury in fish tissue	No consumption ≥ ____ ppm mercury in fish tissue

Graphic #2 - Mercury Concentrations in Selected Fish Species in Hawaii



Graphic #5 - Number of Waterbody-specific Advisories (in Parentheses) and Percentage Issued in Hawaii for Major Contaminants



\* Statewide advisory for marine fish

Graphic #6 - Risk Communication Materials Used by Hawaii to Inform Fishers

Communication Material	Number distributed per year
Pamphlets or fact sheets	10,000
Signs at fishing access points	Signs at Ala Wai Canal and Pearl Harbor
Posters (medical offices, libraries, fishing license outlets, etc.)	
Fishing regulation booklets	
Journal or magazine publications	
Press releases	
State Website	<a href="http://hawaii.gov/health/about/family-child-health/wic/pdf/fishsafety.pdf">http://hawaii.gov/health/about/family-child-health/wic/pdf/fishsafety.pdf</a>
Other method (Please specify)	Public Meetings



## Idaho

**Idaho Fish Consumption Advisory Project (IFCAP)**

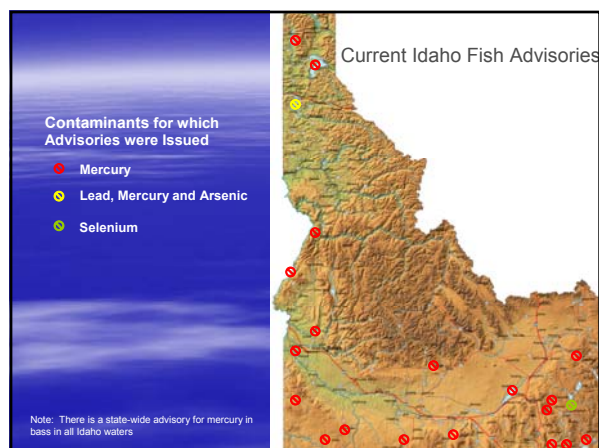
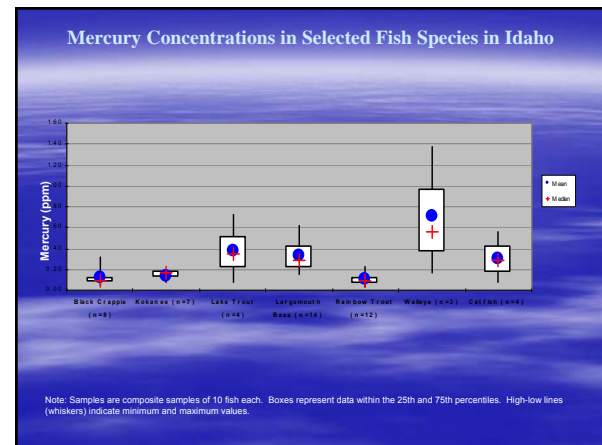
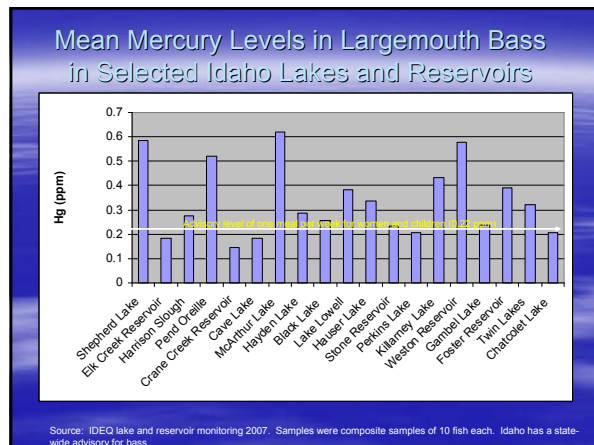
**Members:**

- Idaho Dept of Health and Welfare (chair)
- Idaho Dept of Environmental Quality
- Idaho Dept of Fish and Game
- Idaho State Dept of Agriculture
- US EPA (Idaho Office)
- USGS (Idaho Office)

**Advisory Communication Materials**

- Pamphlets for WIC Clinics
- Signs at Fishing Access Points
- Fishing Regulation Booklet
- State Website

General Population	Women who are pregnant/nursing or wanting to become pregnant and Children
ATSDR Chronic Oral MRL 0.0003 mg/kg/day Adult weight = 80 kg Meal size = 8 oz uncooked	EPA RfD 0.0001 mg/kg/day Adult female weight = 70 kg Children = 20 kg Meal size = 8 oz uncooked Children's Meal size = 2.2 oz uncooked
1 meal/week $\geq$ 0.75 ppm mercury in fish tissue	1 meal/week $\geq$ 0.22 ppm mercury in fish tissue
1 meal/month $\geq$ 3.0 ppm mercury in fish tissue	1 meal/month $\geq$ 0.9 ppm mercury in fish tissue
No consumption when less than one meal per month can be consumed	No consumption when less than one meal per month can be consumed



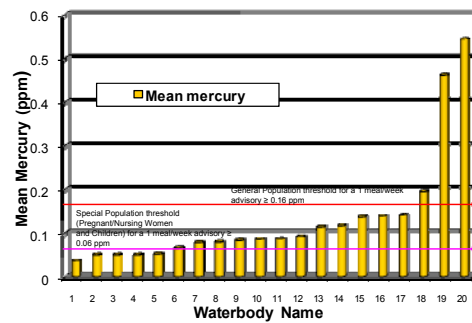


## Illinois

**Basis for Mercury Advisory Values Used by Illinois: Populations addressed, toxicological bases, and points of departure**

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children)	Sensitive Population (Women of child-bearing age)
Basis for 1 meal/week and 1 meal/month is withdrawn EPA Reference Dose of 0.0003 mg/kg/d; basis for No consumption is FDA Action Level	Basis for 1 meal/week and 1 meal/month is EPA Reference Dose of 0.0001 mg/kg/d; basis for No consumption is FDA Action Level	Basis for 1 meal/week and 1 meal/month is EPA Reference Dose of 0.0001 mg/kg/d; basis for No consumption is FDA Action Level	Basis for 1 meal/week and 1 meal/month is EPA Reference Dose of 0.0001 mg/kg/d; basis for No consumption is FDA Action Level
1 meal/week $\geq$ 0.16 ppm mercury in fish tissue	1 meal/week $\geq$ 0.06 ppm mercury in fish tissue	1 meal/week $\geq$ 0.06 ppm mercury in fish tissue	1 meal/week $\geq$ 0.06 ppm mercury in fish tissue
1 meal/month $\geq$ 0.66 ppm mercury in fish tissue	1 meal/month $\geq$ 0.23 ppm mercury in fish tissue	1 meal/month $\geq$ 0.23 ppm mercury in fish tissue	1 meal/month $\geq$ 0.23 ppm mercury in fish tissue
No consumption $\geq$ 1.0 ppm mercury in fish tissue	No consumption $\geq$ 1.0 ppm mercury in fish tissue	No consumption $\geq$ 1.0 ppm mercury in fish tissue	No consumption $\geq$ 1.0 ppm mercury in fish tissue

**Mean Mercury Concentrations in Largemouth Bass by Lake in Illinois**



**Information about Largemouth Bass in Illinois Lakes, 1985-2008**

Lake #	Lake Name	# of Samples	Avg. Length (inches)
1	Horseshoe L. (Madison Co.)	3	14.3
2	Anderson L.	1	13.3
3	Baldwin L.	2	13.2
4	Heidecke L.	1	16.1
5	L. Springfield	4	16.1
6	L. Shelbyville	4	16.7
7	Clinton L.	3	15.9
8	Crab Orchard L.	27	15.6

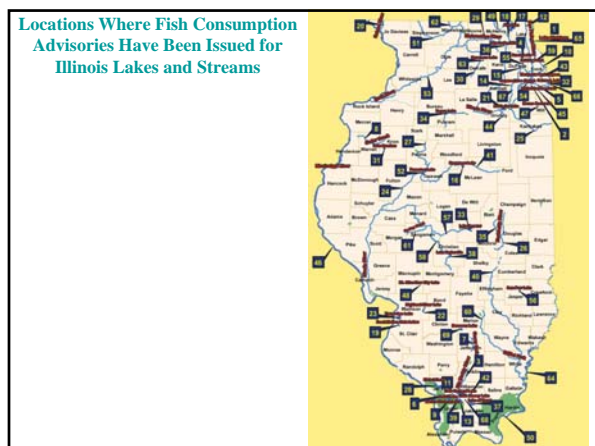
Lake #	Lake Name	# of Samples	Avg. Length (inches)
9	L. Carlyle	11	16.4
10	L. Decatur	6	15.6
11	Rend L.	6	15.5
12	L. Taylorville	3	15.5
13	Braidwood L.	4	15.3
14	Lake of Egypt	5	15.0
15	Lou Yeager L.	6	14.8
16	Fox Chain O'Lakes	24	14.4

Lake #	Lake Name	# of Samples	Avg. Length (inches)
17	L. Sangchris	5	16.5
18	Newton L.	2	16.2
19	Cedar L.	16	16.6
20	Kinkaid L.	9	17.4

**Risk Communication Materials Used by Illinois to Inform Fishers**

Communication Material	Number distributed per year
Pamphlets or fact sheets	200
Signs at fishing access points	0
Posters (medical offices, libraries, fishing license outlets, etc.)	0
Fishing regulation booklets	>500,000
Journal or magazine publications	0
Press releases	1
State Website Hits	5,739
Other method – Refrigerator magnets	500



**Illinois (continued)**



## Indiana

**Water**

**Indiana's Fish Contaminants Monitoring and Fish Consumption Advisory Programs**

Poster Presentation by  
James R. Stahl  
Biological Studies Section  
Assessment Branch  
Office of Water Quality  
Indiana Department of Environmental Management

Presented at  
The 10<sup>th</sup> National Forum on Contaminants in Fish  
November 2-5, 2009  
Portland, Oregon

**Water**

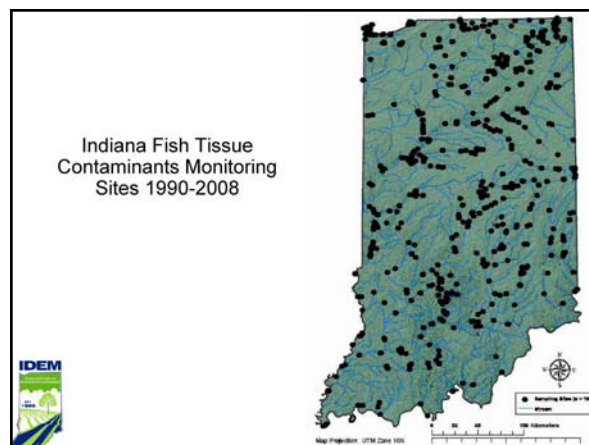
**Our Mission**

The Office of Water Quality's mission is to monitor, protect, and improve Indiana's water quality to ensure its continued use as a drinking water source, habitat for wildlife, recreational resource and economic asset.

**Water**

**Fish Tissue Contaminants Monitoring Analysis Tasks**

- **Metals** - Cadmium, Lead, Mercury (on all samples)
- **Other Metals** - Chromium, Copper, Nickel, Zinc
- **Organochlorine Pesticides** - DDT, Chlordane, Dieldrin, Heptachlor, etc. (on all samples)
- **Total Polychlorinated Biphenyls (PCBs)** (on all samples)
- **PCB Congeners, Dioxins and Furans**
- **Polycyclic Aromatic Hydrocarbons** - Anthracene, Fluoranthene, Fluorene, Naphthalene, Phenanthrene, etc.
- **Semi-Volatile Organic Compounds**
- **Volatile Organic Compounds**
- **General** - Percent Fat, Percent moisture (on all samples)
- Polybrominated Diphenyl Ether (PBDE)

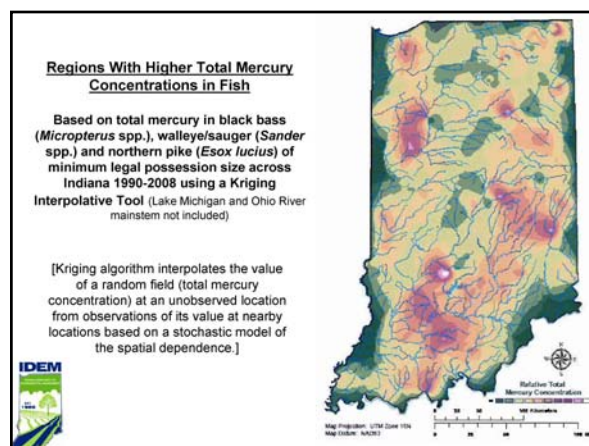


**Water**

**Indiana Fish Tissue Contaminants Analysis for Mercury Database Records**

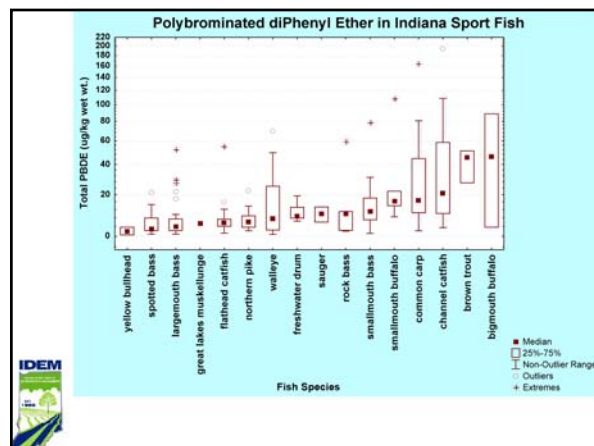
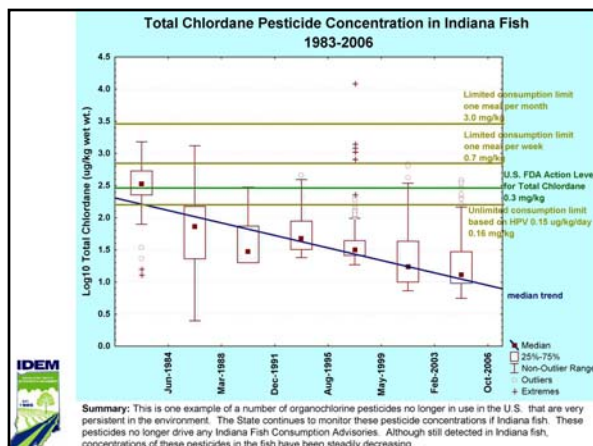
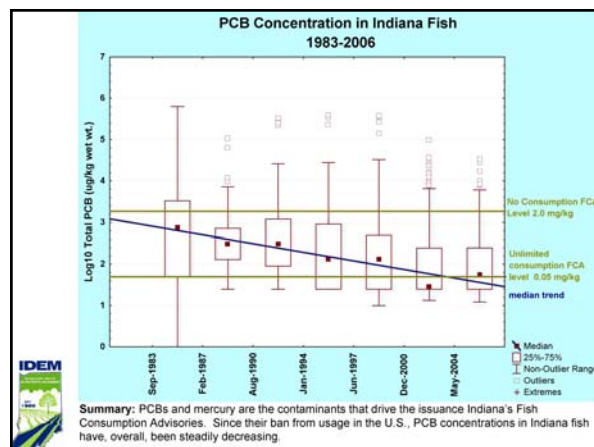
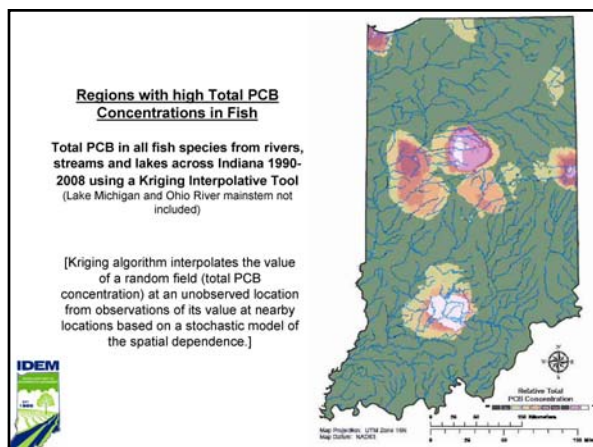
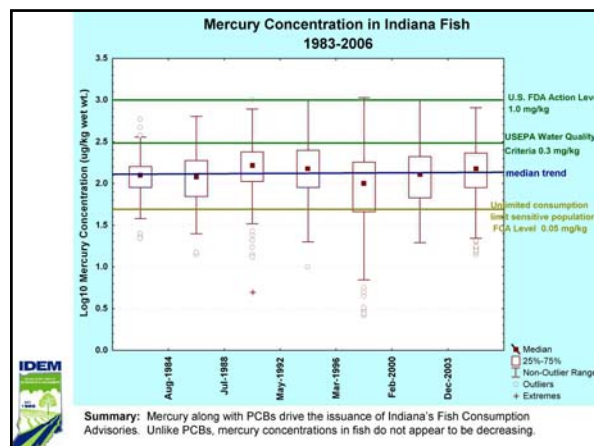
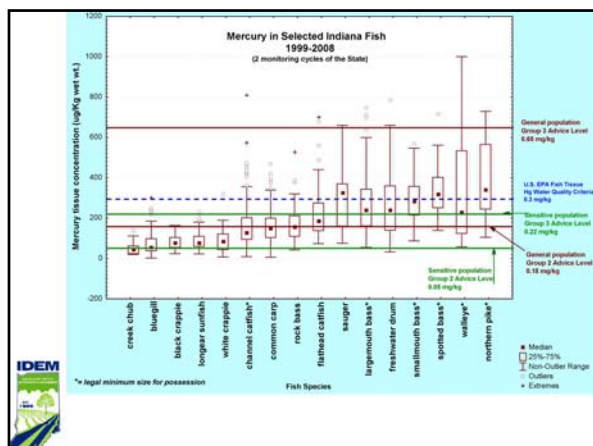
>4000 records on more than 50 species

» Common carp	23%
» Largemouth bass	10%
» Channel catfish	8%
» Moxostoma spp.	6%
» Creek chub	5%
» Longear sunfish	4%
» Smallmouth bass	5%
» Bluegill	3%
» Freshwater drum	3%



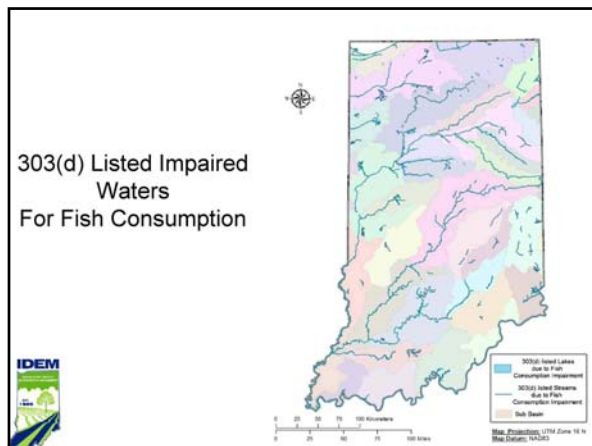


## Indiana (continued)





## Indiana (continued)



**Water**

Indiana Fish Consumption Advisory on the World Wide Web

<http://www.in.gov/isdh/23650.htm>

<http://fn.cfs.purdue.edu/fish4health/indiana/index.html>

**Water**

Basis for Mercury Advisory Values Used by The State of Indiana: Populations Addressed, Toxicological Bases, and Points of Departure

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children under the age of 15)
(Toxicological value or basis of advisory) <b>RfD</b> <b>0.3 ug/kg day<sup>-1</sup></b>	(Toxicological value or basis of advisory) <b>RfD</b> <b>0.1 ug/kg day<sup>-1</sup></b>	(Toxicological value or basis of advisory) <b>RfD</b> <b>0.1 ug/kg day<sup>-1</sup></b>
1 meal/week mercury in fish tissue <b>&gt;0.15 ppm</b>	1 meal/week mercury in fish tissue <b>&gt;0.05 ppm</b>	1 meal/week mercury in fish tissue <b>&gt;0.05 ppm</b>
1 meal/month mercury in fish tissue <b>&gt;0.65 ppm</b>	1 meal/month mercury in fish tissue <b>&gt;0.22 ppm</b>	1 meal/month mercury in fish tissue <b>&gt;0.22 ppm</b>
No consumption mercury in fish tissue <b>&gt;5.6 ppm</b>	No consumption mercury in fish tissue <b>&gt;0.94 ppm</b>	No consumption mercury in fish tissue <b>&gt;0.94 ppm</b>

**2009 SAFE EATING GUIDELINES FOR SELECTED SPORT FISH FROM MOST OF INDIANA'S INLAND WATERS\***

Women of childbearing years, nursing mothers and all children under 15 may eat:	Women beyond their childbearing years and men may eat:
<b>Unlimited consumption:</b> None	<b>Unlimited consumption:</b> Any species under the size specified in a Group 1 in the site specific guidance table.
<b>2 meals per week:</b>	<b>Not applicable.</b>
<b>1 meal per week:</b> Any fish species listed in group 1 from a waterbody: - largemouth bass <12 inches - northern pike <12 inches - rock bass <12 inches - smallmouth bass <12 inches - white perch <12 inches - yellow perch <12 inches - walleye <12 inches	<b>1 meal per week:</b> - 10 total bass (smallmouth, largemouth and rock bass) or larger shorter than 20 inches - northern pike <20 inches - rock bass <20 inches - smallmouth bass shorter than 20 inches - white perch <20 inches - yellow perch <20 inches - walleye <20 inches
<b>2 meals per month:</b> Any fish species listed in group 2 from a waterbody: - largemouth bass <12 inches - northern pike <12 inches - rock bass <12 inches - smallmouth bass <12 inches - white perch <12 inches - yellow perch <12 inches - walleye <12 inches	<b>2 meals per month:</b> - 10 total bass (smallmouth, largemouth and rock bass) or larger shorter than 20 inches - northern pike <20 inches - rock bass <20 inches - smallmouth bass shorter than 20 inches - white perch <20 inches - yellow perch <20 inches - walleye <20 inches
<b>Do Not Consume:</b> Any species listed in group 3 from a waterbody: - largemouth bass >12 inches - northern pike >12 inches - rock bass >12 inches - smallmouth bass >12 inches - white perch >12 inches - yellow perch >12 inches - walleye >12 inches	<b>Do Not Consume:</b> Any species listed in group 3 from a waterbody: - largemouth bass >12 inches - northern pike >12 inches - rock bass >12 inches - smallmouth bass >12 inches - white perch >12 inches - yellow perch >12 inches - walleye >12 inches

**Commercial Fish Consumption\***

Fresh or canned salmon, shellfish like shrimp, crab, and oysters; tilapia; herring; canned "light" tuna; scallops, sardines, pollock; cod; and catfish	Unlimited for all adults One meal per week **
Canned albacore "white" tuna (6 oz.), tuna steak, halibut, and lobster	1 meal per week for adults One meal per month**
Shark, swordfish, tile fish, king mackerel, orange roughy, Spanish mackerel, marlin, grouper, bass (Chilean), walleye (Great Lakes)	1 meal per month for adult males and females Do not eat**

\*References:  
1. C. R. Santerre, PhD, *Fish for Your Health*. Department of Foods and Nutrition, Purdue University - Version 2.1, Copyright 2006  
2. US Dept. of Health and Human Services and US EPA - 2004; EPA & FDA: Advice for Women Who Might Become Pregnant  
3. Choose Wisely 2004, Wisconsin DNR  
4. An Expectant Mother's Guide to Eating Minnesota Fish, 2004

\*\*Consumption guidelines for the sensitive population: women of childbearing years, nursing mothers, and all children under the age of 15 years.

A meal is 3 ounces (before cooking) of fish for a 150-pound person, or 2 ounces of uncooked fish for a 40-pound child. Tip: Subtract or add 1 ounce of uncooked fish for every 20 pounds of body weight.

**Risk Communication Materials Used by the State of Indiana to Inform Fishers and Consumers of Fish**

Communication Material	Number distributed per year
Pamphlets or fact sheets	100 - 1000
Signs at fishing access points	Not done by the state; typically posted by local interest groups
Posters (medical offices, libraries, fishing license outlets, etc.)	None
Fishing regulation booklets	Distributed by Indiana Dept. of Natural Resources; 500,000 produced annually
Journal or magazine publications	None
Press releases	Typically done annually after release of the Fish Consumption Advisory (FCA)
State Website	Yes, with annual updates to the Fish Consumption Advisory
Other method (Please specify)	Other than the annual FCA, advice or communication on consumption of fish is only provided on an as-needed basis



### Why Eat Fish?

Pregnant or nursing women who eat fish that is high in omega-3 fatty acids will pass these nutrients to their babies and support healthy brain and eye development.

### Before Eating Fish That You Catch

Check with your State's health department for the local fish consumption advisories and avoid eating highly contaminated fish.

[www.fishchoiceshaz.org](http://www.fishchoiceshaz.org)


### Learn More

For more information please visit our website:

<http://fishchoiceshaz.org/brochures/>

C.R. Swensen, Ph.D.  
Health and Nutrition  
University of Nebraska-Lincoln  
[swensen@unl.edu](mailto:swensen@unl.edu)

## Fish for your Health



### How Much Fish to Eat?

Health experts recommend that women eat 8 ounces per week of low to medium mercury fish (e.g. salmon, trout, cod, haddock, etc.) and 3 ounces of fish a day of a stick of eelards.

### Do Not Eat Raw Fish

When pregnant, avoid eating raw oysters, raw fish, and other refrigerated seafood. Do not eat raw fish to young children.

### Supported by:

Indiana State Department of Health  
Maternal Child Health

Created 2007  
Revised June 2008

### High Mercury Never Eat

wordfish  
shark  
swordfish  
halibut  
king (also known as  
peterson)  
Spanish mackerel  
Chlorine sea bass  
goblin snapper  
orange roughy  
mullus (Giant lakes)  
stranger (Giant lakes)

From Gulf of Mexico

### Moderate Mercury 4 ounces per week

tuna (canned)  
halibut  
salmon  
bass (Atlantic, black, striped)  
bluefish  
flounder  
white croaker (shad)  
sea trout (sea-run)  
rockfish  
cod  
carr  
yellow perch  
Spanish mackerel (S. Atlantic)  
halibut (Atlantic)



### Lowest Mercury 12 ounces per week

shrimp  
cannery (wild or farmed)  
cod  
catfish  
crayfish  
clams  
flounder  
herring  
mackerel (Atlantic, jack, chub)  
trout  
salmon (Atlantic, jack, chub)  
sea-run  
cod  
yellow perch  
Spanish mackerel (S. Atlantic)  
halibut (Atlantic)

### Best Choices Lowest in Mercury & Highest in Health Fat

salmon  
rainbow trout  
herring  
mackerel (Atlantic, jack, chub)  
cod  
yellow perch  
sea-run

Getting only 6 ounces per week of these fish provides enough omega-3 fatty acids.

# Indiana State Department of Health Outreach

## Fish Information Survey

Please help us learn our educational materials by answering the following questions. Check the answer that best fits your answer, and return this postage paid card to us. Thank you! Did you find the information on eating fish provided in the brochure for me useful?

Yes \_\_\_\_\_ No \_\_\_\_\_

How much more fish did you consume/learn about after you read the brochure?

None \_\_\_\_\_ A little \_\_\_\_\_ A lot \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

How often do you eat fish? (check one) Before, after, or sometime after reading the brochure? Yes \_\_\_\_\_ No \_\_\_\_\_

## Choosing Where to Fish

When you go fishing, you should choose a place that is safe for you and your family. The Indiana Department of Health has a list of safe fishing locations. You can find this list on our website at [www.in.gov/health](http://www.in.gov/health). You can also call 1-800-453-3862 for more information.

## Choosing Fish

When you choose fish, you should choose a type of fish that is safe for you and your family. The Indiana Department of Health has a list of safe fish types. You can find this list on our website at [www.in.gov/health](http://www.in.gov/health). You can also call 1-800-453-3862 for more information.

## Cooking Fish

When you cook fish, you should choose a way to cook it that is safe for you and your family. The Indiana Department of Health has a list of safe cooking methods. You can find this list on our website at [www.in.gov/health](http://www.in.gov/health). You can also call 1-800-453-3862 for more information.

When you eat fish, you should choose a type of fish that is safe for you and your family. The Indiana Department of Health has a list of safe fish types. You can find this list on our website at [www.in.gov/health](http://www.in.gov/health). You can also call 1-800-453-3862 for more information.

When you eat fish, you should choose a type of fish that is safe for you and your family. The Indiana Department of Health has a list of safe fish types. You can find this list on our website at [www.in.gov/health](http://www.in.gov/health). You can also call 1-800-453-3862 for more information.

When you eat fish, you should choose a type of fish that is safe for you and your family. The Indiana Department of Health has a list of safe fish types. You can find this list on our website at [www.in.gov/health](http://www.in.gov/health). You can also call 1-800-453-3862 for more information.

When you eat fish, you should choose a type of fish that is safe for you and your family. The Indiana Department of Health has a list of safe fish types. You can find this list on our website at [www.in.gov/health](http://www.in.gov/health). You can also call 1-800-453-3862 for more information.

When you eat fish, you should choose a type of fish that is safe for you and your family. The Indiana Department of Health has a list of safe fish types. You can find this list on our website at [www.in.gov/health](http://www.in.gov/health). You can also call 1-800-453-3862 for more information.

When you eat fish, you should choose a type of fish that is safe for you and your family. The Indiana Department of Health has a list of safe fish types. You can find this list on our website at [www.in.gov/health](http://www.in.gov/health). You can also call 1-800-453-3862 for more information.

When you eat fish, you should choose a type of fish that is safe for you and your family. The Indiana Department of Health has a list of safe fish types. You can find this list on our website at [www.in.gov/health](http://www.in.gov/health). You can also call 1-800-453-3862 for more information.

When you eat fish, you should choose a type of fish that is safe for you and your family. The Indiana Department of Health has a list of safe fish types. You can find this list on our website at [www.in.gov/health](http://www.in.gov/health). You can also call 1-800-453-3862 for more information.

When you eat fish, you should choose a type of fish that is safe for you and your family. The Indiana Department of Health has a list of safe fish types. You can find this list on our website at [www.in.gov/health](http://www.in.gov/health). You can also call 1-800-453-3862 for more information.

When you eat fish, you should choose a type of fish that is safe for you and your family. The Indiana Department of Health has a list of safe fish types. You can find this list on our website at [www.in.gov/health](http://www.in.gov/health). You can also call 1-800-453-3862 for more information.

Indiana State  
Department of Health

1-800-453-3862

www.in.gov/health

Safe Fish Types

Safe Cooking Methods

Safe Fish Locations

Safe Fish Types

Safe Cooking Methods

Safe Fish Locations

Safe Fish Types

Safe Cooking Methods

Safe Fish Locations

Safe Fish Types

Safe Cooking Methods

Safe Fish Locations

Safe Fish Types

Safe Cooking Methods

Safe Fish Locations

Safe Fish Types

Safe Cooking Methods

Safe Fish Locations

Safe Fish Types

Safe Cooking Methods

Safe Fish Locations

Safe Fish Types



**IDEM**  
Indiana Department of Environmental Management

We Protect Hoosiers and Our Environment

**Water**



## State Cooperation: Unified Ohio River Fish Consumption Advisories

- Ohio River is divided into three assessment segments for establishing Fish Consumption Advisories.
- All fish tissue contaminants data coordinated is cleared through ORSANCO.
- States sharing common segments release the same FCA information for their common segments.



Main courtesy of Ohio River Valley Water Sanitation Commission (ORSANCO)

**Acknowledgements:** Indiana specific maps were produced by Cindy Martin, Ali Stephan and Myra McShane of the IDEM Assessment Branch, Office of Water Quality. Ohio River Segments map courtesy of Jeff Thomas of the Ohio River Valley Water Sanitation Commission (ORSANCO). The Indiana State Department of Health (ISDH) outreach material provided by LaNetta Alexander. The Indiana Department of Natural Resources (IDNR) Fishing Guide provided by Tom Flatt. The author thanks all staff who assisted and/or advised in the production of this poster. This presentation would not have been possible without the years of hard work, dedication and cooperation by staffs from the IDEM, ISDH and IDNR.

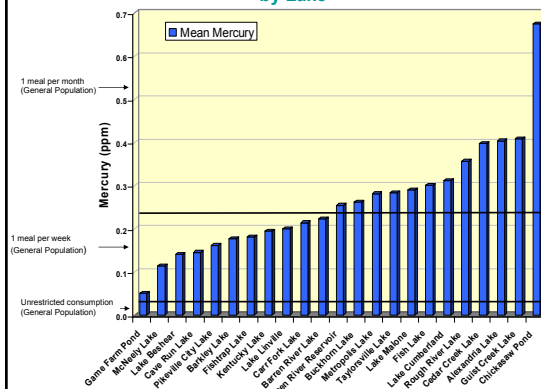


## Kentucky

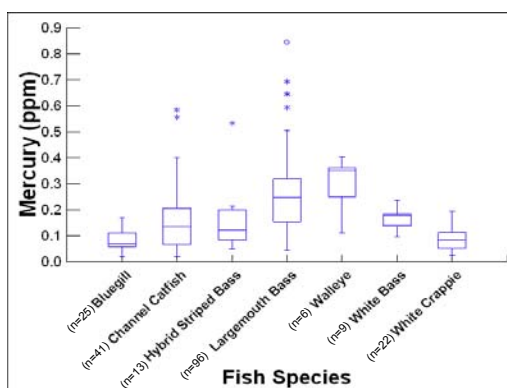
**Basis for Mercury Advisory Values Used by Kentucky: Populations addressed, toxicological bases, and points of departure**

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children under 6)
Reference Dose 1.0 e-04 mg/kg/day	Reference Dose 1.0 e-04 mg/kg/day Plus Safety Factor of 0.1	Reference Dose 1.0 e-04 mg/kg/day Plus Safety Factor of 0.1
1 meal/week $\geq 0.03$ ppm mercury in fish tissue	1 meal/week $< 0.29$ ppm mercury in fish tissue	1 meal/week $< 0.29$ ppm mercury in fish tissue
1 meal/month $\geq 0.24$ ppm mercury in fish tissue	1 meal/month $\geq 0.03$ ppm mercury in fish tissue	1 meal/month $\geq 0.03$ ppm mercury in fish tissue
6 meals/year $\geq 0.95$ ppm mercury in fish tissue	6 meals/year $\geq 0.24$ ppm mercury in fish tissue	6 meals/year $\geq 0.24$ ppm mercury in fish tissue
No consumption $\geq 1.9$ ppm mercury in fish tissue	No consumption $\geq 0.95$ ppm mercury in fish tissue	No consumption $\geq 0.95$ ppm mercury in fish tissue

**Mean Mercury Concentrations in Largemouth Bass by Lake**



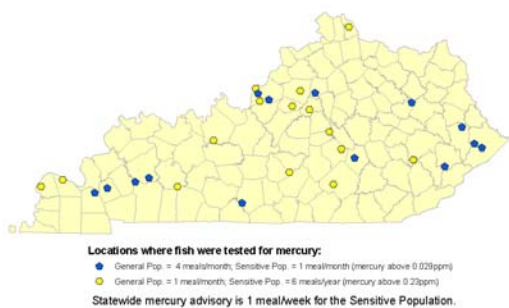
**Mercury Concentrations in Selected Fish Species**



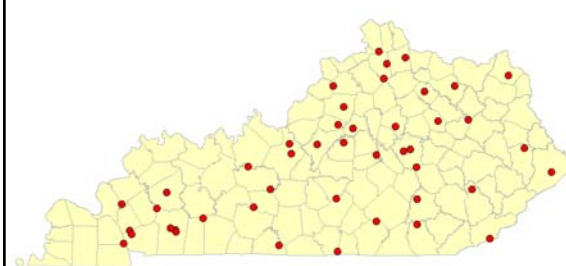
**Locations Where Fish Advisories Have Been Issued**



**Locations Where Mercury Concentrations in Largemouth Bass Exceed Kentucky's Mercury Thresholds**



**2009 Probabilistic Mercury Fish Tissue Sample Locations**





## Louisiana

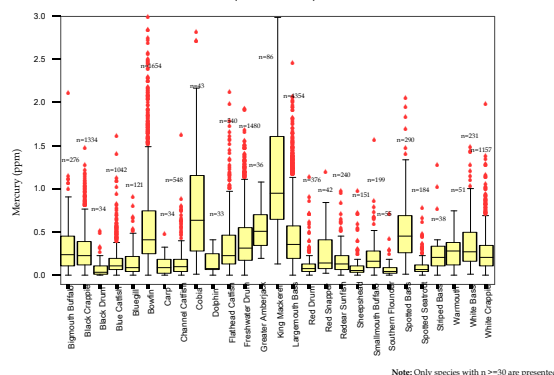
Basis for Louisiana's Mercury Advisory Values (2009)

General Population	Sensitive Population - Women of Child-bearing Age and Young Children (< 7 years)
Toxicological value = 0.0003 mg/kg-day (ATSDR's MRL)	Toxicological value = 0.0001mg/kg-day (EPA'S RfD)
3 meals/ month $\geq 0.73$ ppm	3 meals/ month $\geq 0.25$ ppm
2 meals/ month $\geq 0.95$ ppm	2 meals/ month $\geq 0.33$ ppm
1 meal/ month $\geq 1.42$ ppm	1 meal/ month $\geq 0.49$ ppm
Less than 1 meal/ month $> 2.83$ ppm	Less than 1 meal/ month $> 0.97$ ppm

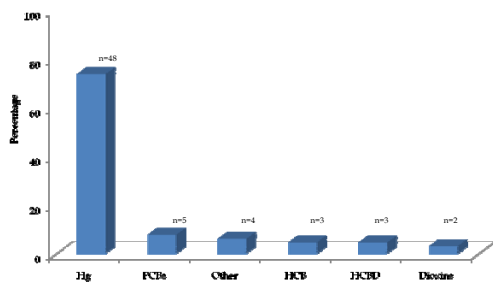
Assumptions: These assumptions apply when no reliable community-specific data exist.

Bodyweight - Adult = 70 kg Child = 35 kg  
Meal size - Adult = 0.227 kg (8 oz.) Child = 0.1135 kg (4 oz.)  
Consumption Rate - Adult = 30 g/day Child = 15 g/day

Louisiana's Species-Specific Fish-Tissue Mercury Concentrations (1994-2009)



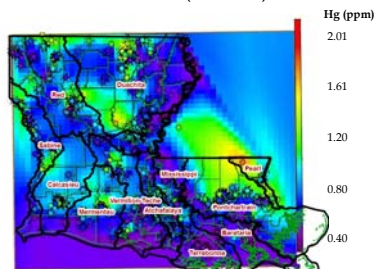
Louisiana Advisories Issued for Major Contaminants (2009)



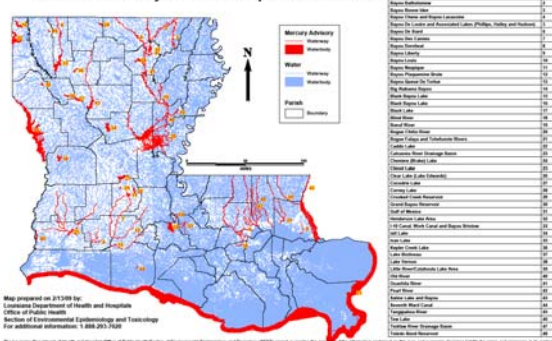
Risk Communication Materials used by Louisiana Fish Advisory Program to Inform Fishers (1994-2009)

Communication Material	Number Distributed per Year
Pamphlets or fact sheets	>500
Signs at fishing access points	1-5
Posters (medical offices, libraries, fishing license outlets, ect.)	-
Fishing regulation booklets	>1000
Journal or Magazine publications	1-2
Press releases	1-3
State Website	1
Other method (please specify)	-

Average Mercury Concentrations for Louisiana Largemouth Bass (29-43 cm) (1994-2009)



Louisiana Mercury Fish Consumption Advisories





# Maryland

## Fish Consumption Advisories



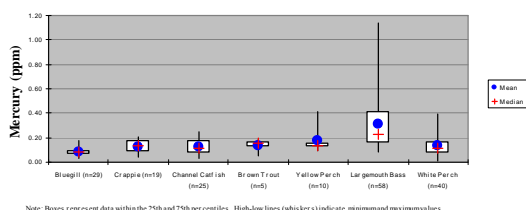
Basis for Mercury Advisory Values Used by  
Maryland Department of the Environment:

### Populations addressed, toxicological bases, and points of departure

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children)
<p>Toxicological/Reference Dose = 0.0001 mg/kg-day  Body Weight = 75.0 kg  Meal Size = 226 mg  mercury in fish tissue</p> <p>1 meal/month = 2 1/200 parts mercury in fish tissue</p> <p>No consumption &gt; 2.082 ppm mercury in fish tissue</p>	<p>Toxicological/Reference Dose = 0.0001 mg/kg-day  Body Weight = 67.0 kg  Meal Size = 226 mg  mercury in fish tissue</p> <p>1 meal/month = 2.899 ppm mercury in fish tissue</p> <p>No consumption &gt; 1.835 ppm mercury in fish tissue</p>	<p>Toxicological/Reference Dose = 0.0001 mg/kg-day  Body Weight = 14.5 kg  Meal Size = 85.05 kg  mercury in fish tissue</p> <p>1 meal/month = 0.519 ppm mercury in fish tissue</p> <p>No consumption &gt; 1.659 ppm mercury in fish tissue</p>

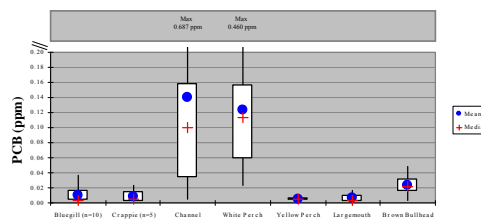
\* A "No consumption advisory" is based on a concentration that would result in less than half a meal per month. An advisory of 1 meal every other month is issued when a given concentration results in a 0.5 to 0.99 meal per month.

### Mercury Concentration in Select Fish Species in Maryland



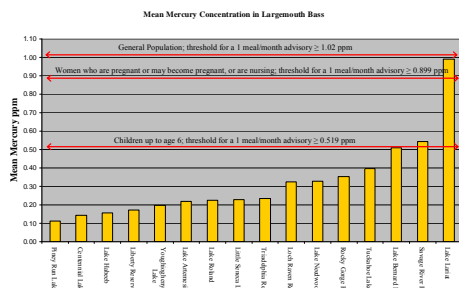
Note: Boxes represent data within the 25th and 75th per centiles. High-low lines (whiskers) indicate minimum and maximum values.

### PCB Concentrations in Select Fish Species in Maryland



Note: Boxes represent data within the 25th and 75th percentiles. High-low lines (whiskers) indicate the minimum and maximum

### Mean Mercury Concentrations in Largemouth Bass by Lake in Maryland





## Massachusetts

### State-wide Fish Consumption Advisory (Mercury)

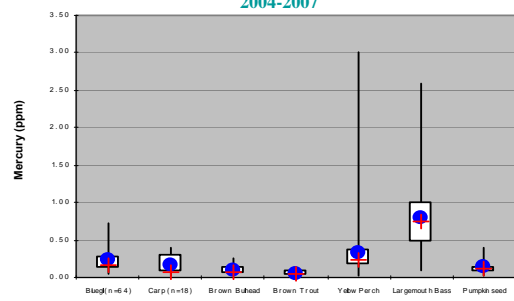
- First issued in 1994; extended in 2001
- Advice to pregnant women, nursing mothers, women who may become pregnant, and children under 12:
  - Do not eat any shark, swordfish, king mackerel, tuna steak, or tilefish.
  - Do not eat fish from freshwater bodies
  - For all other fish (including canned tuna), do not eat more than 12 oz (about two meals) per week.

### Water Body-Specific Mercury Advisory Values Used by MDPH:

Advice		General Population
Frequency	Applies to	
Limit to 2 meals/month	All fish	The mean of any species and all fish are between 0.5 and 1 ppm
	Specific species	The mean of any species is between 0.5 and 1 ppm and the mean of all fish is less than 0.5 ppm
	Non-specific species	The mean of any species is greater than 1 ppm and the mean of all species is between 0.5 and 1 ppm
No Consumption	All fish	The mean of all species is greater than 1 ppm
	Specific species	2 SCENARIOS: The mean of any species is greater than 1 ppm and the mean of all species is between 0.5 and 1 ppm The mean of any species is greater than 1 ppm and the mean of all species is less than 0.5 ppm

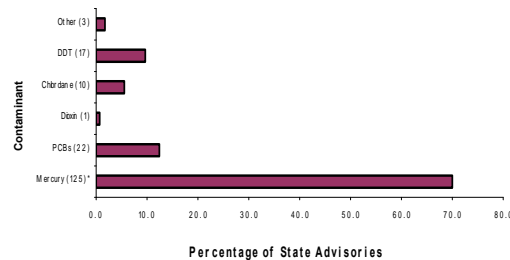
BASIS: ½ the FDA Action Level, i.e., 0.5 ppm

### Mercury Concentrations in Selected Fish Species in Massachusetts from 2004-2007



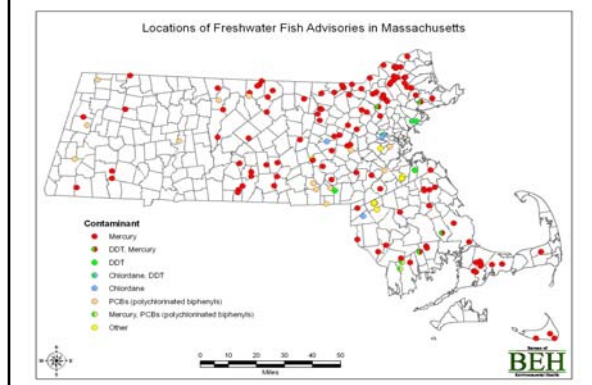
Note: Boxes represent data within the 25th and 75th percentiles. High whiskers (whiskers) indicate minimum and maximum values.

### Number of Waterbody-specific Advisories (in Parentheses) and Percentage Issued in Massachusetts for Major Contaminants



\*Statewide advisory in effect

### Locations Where Fish Advisories Have Been Issued in Massachusetts



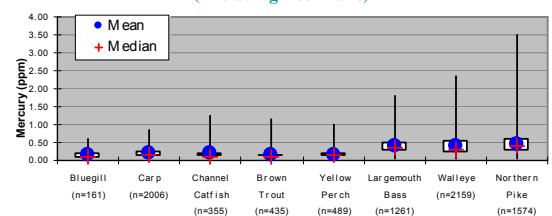


## Michigan

Graphic #1 - Basis for Mercury Advisory Values Used by Michigan: Populations addressed, toxicological bases, and points of departure

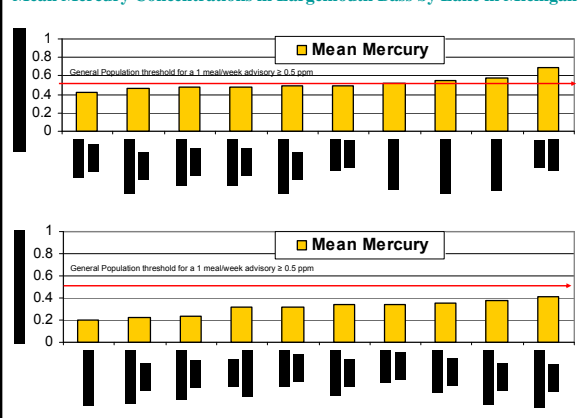
General Population	Sensitive Population (Pregnant/nursing women, children)
The MDCH uses 2 trigger levels to assess the need for fish consumption advisories based on mercury. Mercury concentrations are plotted with respect to length. A "restrict consumption" advisory is issued for lengths above which the mercury concentrations exceed the 0.5 ppm trigger level. A "no consumption" advisory is issued for lengths above which the mercury concentrations exceed 1.5 ppm. When linear regression analysis was not appropriate, median concentrations were used to place species and size classes into appropriate advisory categories.	
1 meal/week $\geq$ 0.5 ppm mercury in fish tissue	1 meal/month $\geq$ 0.5 ppm mercury in fish tissue
No consumption $\geq$ 1.5 ppm mercury in fish tissue	No consumption $\geq$ 1.5 ppm mercury in fish tissue

Mercury Concentrations in Selected Fish Species in Michigan Waters (Excluding Deer Lake)

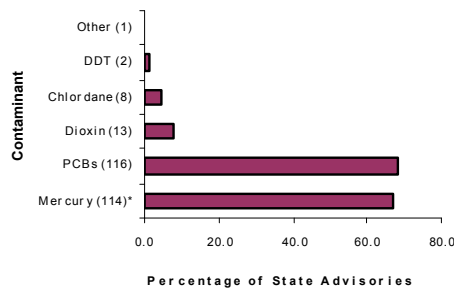


Note: Boxes represent data within the 25th and 75th percentiles. High-low lines (whiskers) indicate minimum and maximum values.

Mean Mercury Concentrations in Largemouth Bass by Lake in Michigan



Number of Waterbody-specific Advisories (in Parentheses) and Percentage Issued in Michigan for Major Contaminants



\* Statewide advisory in effect

Graphic #6 - Risk Communication Materials Used by Michigan to Inform Fishers about the Fish Consumption Advisories

Communication Materials Distributed	Number Per Year (2008)
Fish Consumption Advisory Booklet	10,000
Fish Consumption Advisory – fact sheets and brochures	30,000
Wild Game Consumption Advisory brochure	1,400
Signs at fishing access points	120 (not per year)
Press releases	2-3 times number of news outlets
Report Evaluation Fish Consumption	12,900





### Michigan (continued)

[illegible][illegible]


## Eating River Fish

Michigan Department of Community Health  
**MDCH**  
Michigan Department of Community Health


Saginaw & Tittabawassee River fish, from Midland to Saginaw Bay, have dioxins & PCBs that may harm your health.

**Everyone Do Not Eat**


No More Pescado




**carp**




**catfish**




**white bass**




Women & Children  
Do Not Eat  
Mujeres y Niños  
No Comen Pescado



**smallmouth bass**



**Wetleye**



longer than 18 inches  
de mayor de 18 pulgadas

women & children – do not eat  
mujeres y niños – no comen pescado











everyone else – one meal a week  
resto de la población – una vez por semana

shorter than 18 inches  
menor de 18 pulgadas

women & children – one meal a month  
mujeres y niños – una vez al mes

everyone else – unlimited meals  
resto de la población – ilimitado vez

**All Other Fish**

## Eating Fish from the Detroit River



Michigan Department of Community Health  
**MDCH**  
Michigan Department of Community Health

**Fish are part of a healthy diet.**

Most of us are used to eat. But some fish have high amounts of chemicals in them. Eating some types of fish too often can cause health problems, especially for women and children.



**Trout and Coho Fish**

Trimming and cooking off the fat can remove up to 80% the chemicals. Cook fish on a rack or grill.



**Trout and Coho Fish**

These fish are lower in chemicals and are a better choice to eat.



**Trout and Coho Fish**

These fish are lower in chemicals and are a better choice to eat.



**Trout and Coho Fish**

These fish are lower in chemicals and are a better choice to eat.



**Trout and Coho Fish**

These fish are lower in chemicals and are a better choice to eat.



**Trout and Coho Fish**

These fish are lower in chemicals and are a better choice to eat.



**Trout and Coho Fish**

These fish are lower in chemicals and are a better choice to eat.



**Trout and Coho Fish**

These fish are lower in chemicals and are a better choice to eat.



**Trout and Coho Fish**

These fish are lower in chemicals and are a better choice to eat.

**Trout and Coho Fish**






These fish are lower in chemicals and are a better choice to eat.

**For more information and a free copy of the Michigan Fish Consumption Guide, call the Michigan Department of Community Health.**

**1-800-486-5942**

at our website: [www.michigan.gov/foodandnutrition](http://www.michigan.gov/foodandnutrition)

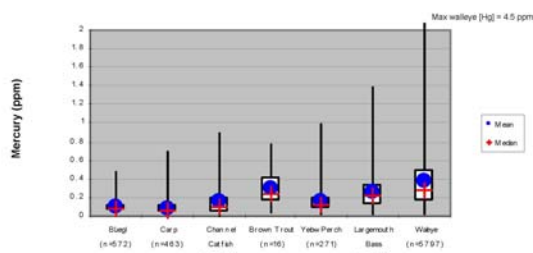


## Minnesota

**Basis for Mercury Advisory Values Used by Minnesota:**  
Populations addressed, toxicological basis, and points of departure

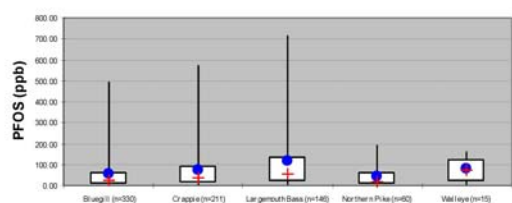
General Population	Sensitive Population (Women of child-bearing age and children < 15 years old)
0.3 µg/kg/day	0.1 µg/kg/day
1 meal/week > 0.16 ppm mercury in fish tissue	1 meal/week > 0.05 ppm mercury in fish tissue
1 meal/month > 0.65 ppm mercury in fish tissue	1 meal/month > 0.22 ppm mercury in fish tissue
No consumption > 2.8 ppm mercury in fish tissue	No consumption > 0.95 ppm mercury in fish tissue

**Mercury Concentrations in Selected Fish Species in Minnesota Lakes**



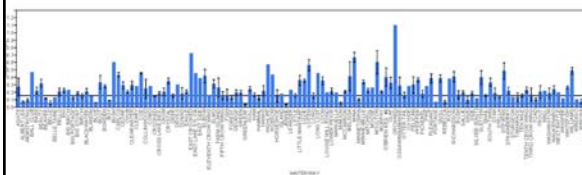
Note: Boxes represent data within the 25th and 75th percentiles. High-low lines (whiskers) indicate the minimum and maximum values.

**PFOS Concentrations in Selected Fish Species in Minnesota Lakes**



Note: Boxes represent data within the 25th and 75th percentiles. High-low lines (whiskers) indicate the minimum and maximum values.

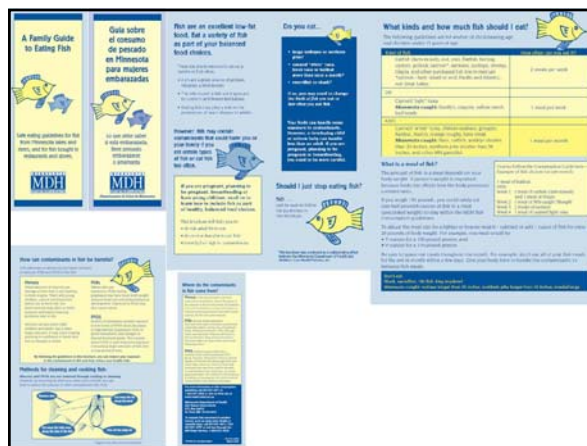
**Mean Mercury Concentrations in Largemouth Bass by Lake in Minnesota**



Reference lines:  
Sensitive Population threshold (Pregnant/Nursing Women and Children) for a 1 meal/week advisory > 0.05 ppm  
General Population threshold for a 1 meal/week advisory > 0.16 ppm

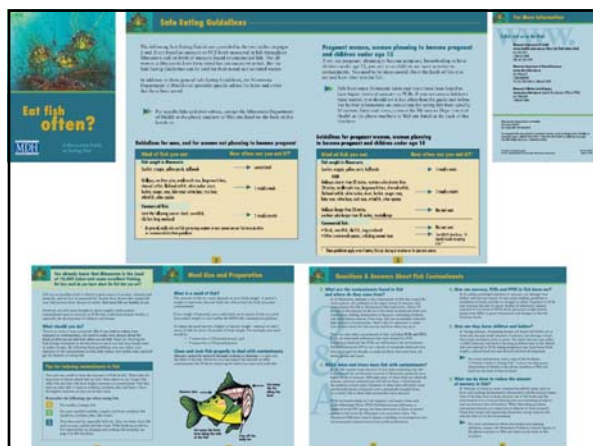
**Risk Communication Materials Used by Minnesota to Inform Fishers**

Communication Material	Number distributed per year
"Eat fish often?" brochure	30,000
Mom's guide brochure - English	75,000
Mom's guide brochure - Spanish	8,000
Fishing regulation booklets	1.3 million
Magnets	30,000
Press releases	1 - 2
State Website	80,000





## Minnesota (continued)

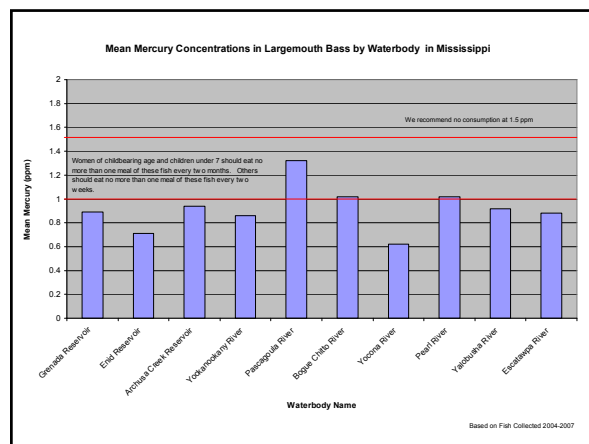




## Mississippi

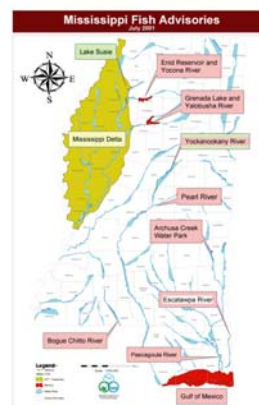
**Graphic #1 - Basis for Mercury Advisory Values Used by Mississippi:**  
Populations addressed, toxicological bases, and points of departure

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children)
(Toxicological value or basis of advisory)	(Toxicological value or basis of advisory)	(Toxicological value or basis of advisory)
1.0 mg/kg/day	0.07 mg/kg/day	0.07 mg/kg/day
1 meal/2 weeks $\geq$ 1.0 ppm mercury in fish tissue	1 meal/2 month $\geq$ 1.0 ppm mercury in fish tissue	1 meal/2 month $\geq$ 1.0 ppm mercury in fish tissue
No consumption $\geq$ 1.5 ppm mercury in fish tissue	No consumption $\geq$ 1.5 ppm mercury in fish tissue	No consumption $\geq$ 1.5 ppm mercury in fish tissue

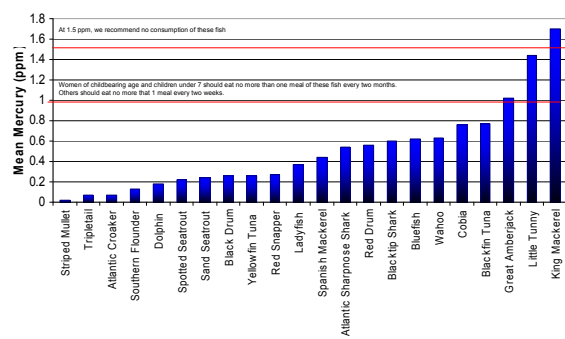


**Risk Communication Materials Used by Mississippi to Inform Fishers about DDT in the Mississippi Delta**

Communication Material	Number Distributed
Pamphlets or fact sheets	71,000 sent to MS Delta Health Care Providers printed in English and Spanish.
Informational Letters	Mailed 1,400 directly to MS Delta Churches, 600 Commercial Fishermen, and 400 Fish Markets
Posters	Printed in English and Spanish sent along with the pamphlets
Fishing Regulation Booklets	Fish advisories are printed in the MS Department of Wildlife, Fisheries, and Parks, Outdoor Digest which are distributed at license sales counters.
Coloring Books	Distributed 17,000 copies in Mississippi Delta 3 <sup>rd</sup> Grade Schools, Libraries, and Health Offices.
Press Releases	Kick-off June 28, 2001 with a Media Field Trip, Radio Messages on Urban talk radio, Gospel and Blues stations, outdoor programming and a PSA and song on 78 radio stations.
Booths and Displays	Attended Wildlife Expositions and Outdoor shows.
Signs at Fishing Access Points	Metal Signs were installed at all Public Boat Landings
State Website	<a href="http://www.deq.state.ms.us">www.deq.state.ms.us</a>
Fish Advisory Hotline	This was discontinued after several years due to lack of use.



**Mean Mercury Levels in Marine and Estuarine Fish of Mississippi**



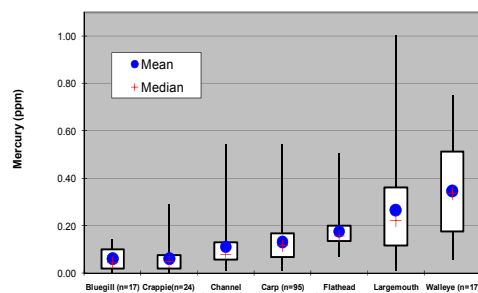


## Missouri

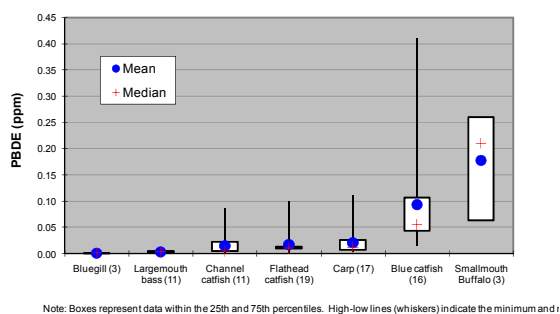
Graphic #1 - Basis for Mercury Advisory Values Used by Missouri: Populations addressed, toxicological bases, and points of departure

Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children)	Women of Childbearing Age
<i>(Toxicological value or basis of advisory)</i> Taken from "Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories Volume 2" Table 4-3 on page 4-5	<i>(Toxicological value or basis of advisory)</i> Taken from "Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories Volume 2" Table 4-3 on page 4-5	<i>(Toxicological value or basis of advisory)</i> Taken from "Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories Volume 2" Table 4-3 on page 4-5
1 meal/week $\geq$ 0.12 ppm mercury in fish tissue	1 meal/week $\geq$ 0.12 ppm mercury in fish tissue	1 meal/week $\geq$ 0.12 ppm mercury in fish tissue
1 meal/month $\geq$ 0.31 ppm mercury in fish tissue	1 meal/month $\geq$ 0.31 ppm mercury in fish tissue	1 meal/month $\geq$ 0.31 ppm mercury in fish tissue
No consumption $\geq$ 1 ppm mercury in fish tissue	No consumption $\geq$ 1 ppm mercury in fish tissue	No consumption $\geq$ 1 ppm mercury in fish tissue

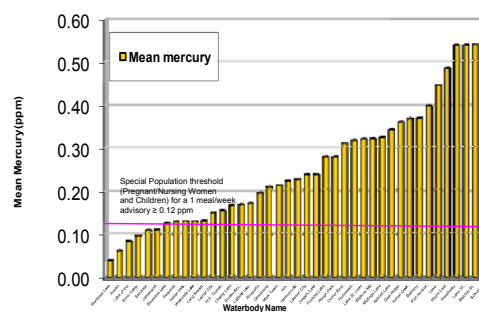
Graphic #2 - Mercury Concentrations in Fillets from Selected Fish Species in Missouri (1999-2007)



Graphic #3 - PBDE Concentrations in Fillets from Selected Fish Species in Missouri (2006-2007)



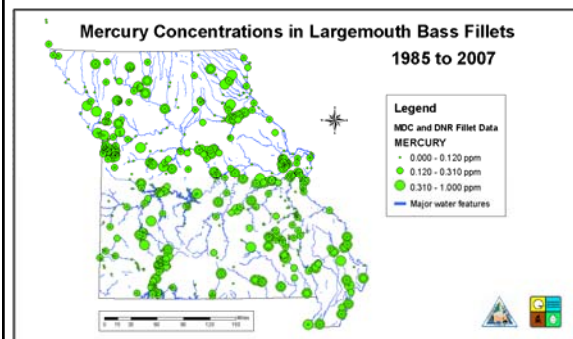
Graphic #4 - Mean Mercury Concentrations in Fillets from Largemouth Bass by Lake in Missouri (2007)



Graphic #6 - Risk Communication Materials Used by Missouri to Inform Fishers

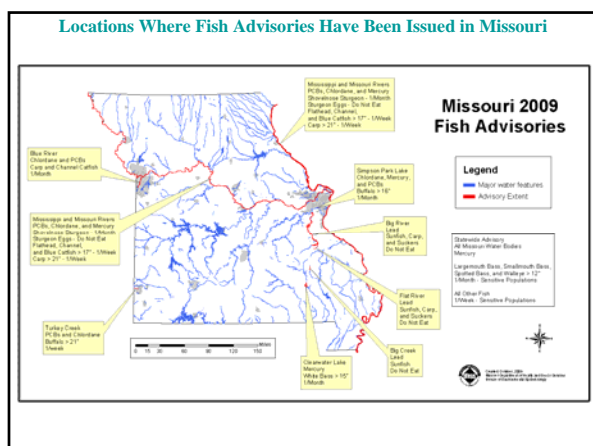
Communication Material	Number distributed per year
Missouri Fish Advisory	600
Coloring Book	6,000
Small flyers	1,200
Fishing regulation booklets	700,000
Exhibits and Displays	15
Signs at fishing access points	10
Press releases	Once at the beginning of the fishing season
State Website	20,000 hits
Articles	2
Health Consultation	1

Graphic #7 - Locations Where Mercury Concentrations in Largemouth Bass Were Below or Above Missouri Mercury Thresholds





## Missouri (continued)



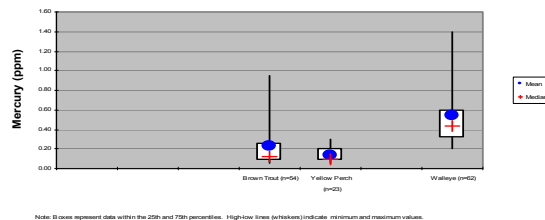


## Montana

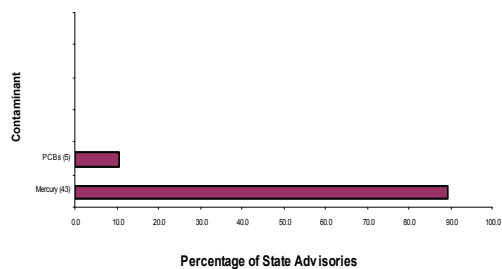
**Graphic #1 - Basis for Mercury Advisory Values Used by Montana Fish, Wildlife, and Parks: Populations addressed, toxicological bases, and points of departure**

General Population	Sensitive Population (Pregnant/nursing women, children)
EPA reference Dose RfD mg/kg/day 0.1	EPA reference Dose RfD mg/kg/day 0.1
1 meal/month $\geq$ 0.22 ppm mercury in fish tissue	1 meal/month $\geq$ 0.09 ppm mercury in fish tissue
No consumption $\geq$ 2.85 ppm mercury in fish tissue	No consumption $\geq$ 1.18 ppm mercury in fish tissue

**Graphic #2 - Mercury Concentrations in Selected Fish Species in Montana**



**Graphic #5 - Number of Waterbody-specific Advisories (in Parentheses) and Percentage Issued in Montana for Major Contaminants**



**Graphic #6 - Risk Communication Materials Used by Montana Fish, Wildlife, and Parks to Inform Fishers**

Communication Material	Number distributed per year
Pamphlets or fact sheets	5,000 pamphlets / 2-3years
Signs at fishing access points	(3) Consumption restrictions
Fishing regulation booklets	285,000
Press releases	2
State Website	Updated annually



## Nebraska

### Basis for Mercury Advisory Values Used by the Nebraska Fish Tissue Program: Populations addressed, toxicological bases, and points of departure

#### Populations Addressed: "General Population"

Nebraska's fish consumption advisories are issued for the "general population." However, risk assessment levels account for sensitive subpopulations represented by women of child-bearing age and children less than 15 years of age, as well as the general population.

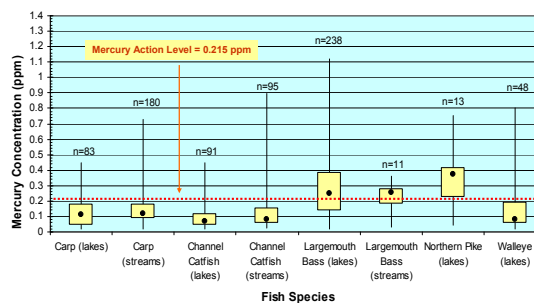
#### Methyl Mercury RfD: 0.0001 mg/kg body weight/day

Nebraska utilizes EPA's Risk Assessment Methodology to determine human health risk for the general population. In doing so, we use the following assumptions: 1) 70 year lifetime exposure, 2) 8-oz weekly consumption, 3) 154-lb consumer body weight, 4) 1:10,000 risk level applied, 5) no reduction of contaminants by filleting/cooking methods, and 5) total absorption of contaminants ingested.

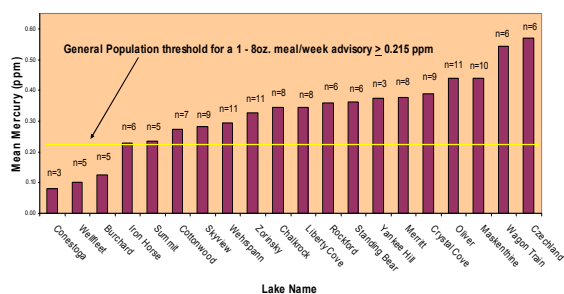
#### Limited Consumption Advisories: One – 8 oz. meal/week $\geq$ 0.215 mg/kg (ppm) mercury in fish tissue

Composite fish samples of a single species having mercury concentrations  $\geq$  0.215 mg/kg (ppm) trigger the issuance of a "limited" fish consumption advisory. These waterbodies remain on the "Fish Consumption Advisory List" until future sampling reveals acceptable risk levels.

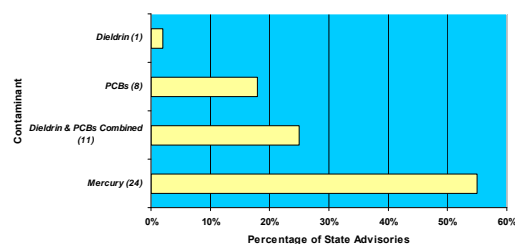
### Mercury Concentrations in Selected Fish Species in Nebraska (1980 – 2005)



### Mean Mercury Concentrations in Largemouth Bass by Lake in Nebraska



### Number of Waterbody-specific Advisories (in Parentheses) and Percentage Issued in Nebraska for Major Contaminants



### Locations Where Fish Consumption Advisories For Mercury Have Been Issued in Nebraska















## New Hampshire

## New Hampshire Statewide Mercury Fish Consumption Advisory Risk Based Consumption Limits

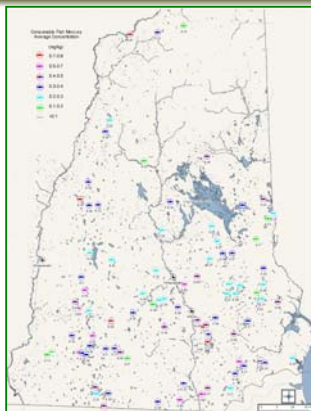
$$\# \text{ Meals} = \frac{\text{Reference Dose} \times \text{Portion Size}}{\text{Fish Concentration}}$$

Fish Mercury Concentration 0.76 mg/kg		
	Reference Dose mg/kg-day	meals/month
Sensitive People	0.1	1
Other Adults	0.3	4

### Mercury Concentrations in NH Fish Greater than Twelve Inches Long

	Species	Number of Samples	Average Length (inches)	Average Mercury (mg/kg)
	Yellow perch	36	13.7	0.99
	Smallmouth bass	118	14.6	0.98
	Largemouth bass	263	14.2	0.73
	Eastern chain pickerel	147	16.7	0.67
	White perch	24	14.4	0.63
	Brown bullhead	12	12.9	0.36
	Cusk	22	24.1	0.35
	White sucker	53	16.8	0.31
	Lake trout	18	21.5	0.30
	Landlocked salmon	9	16.1	0.12

## Mercury Concentrations in New Hampshire Consumable Fish



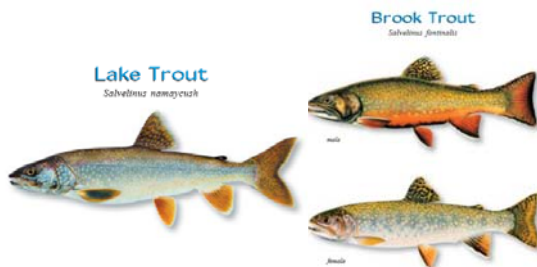
## NH Fish Stocking Program



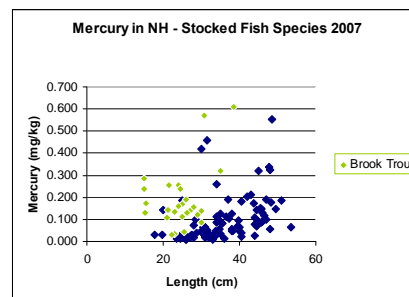
**Fish have been stocked in NH lakes and streams for over 100 years.**

**Six NH hatcheries produce nearly a million catchable-size brook, brown, rainbow and tiger trout annually.**

## New Hampshire Native Trout



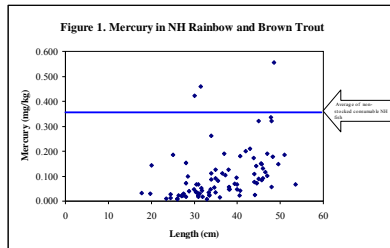
### All NH Stocked Species Fish Mercury





## New Hampshire (continued)

### Rainbow and Brown Trout



### NH Trout Advisory

Stocked rainbow and brown trout can be safely consumed more frequently than the statewide advisory.

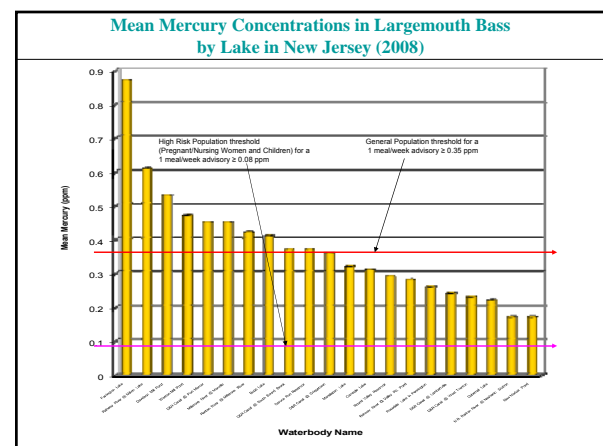
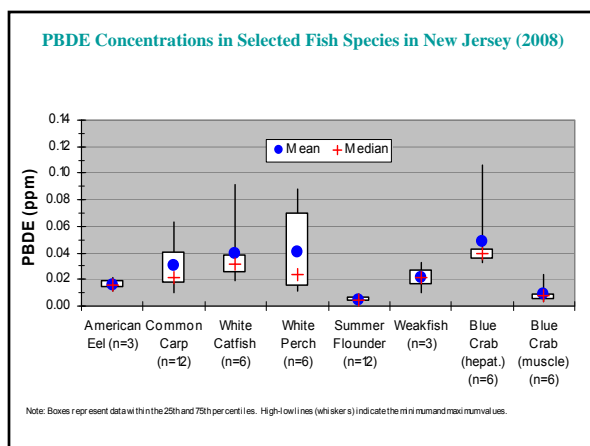
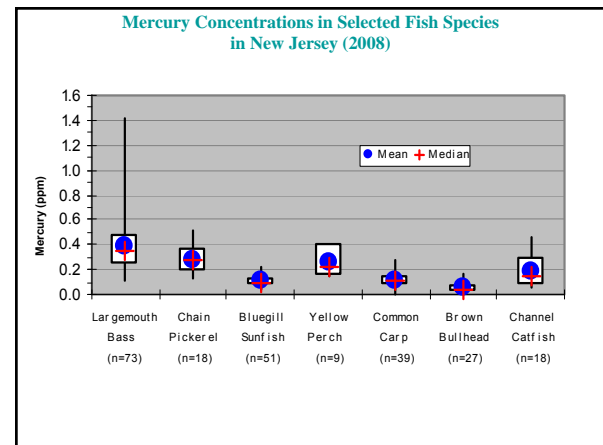
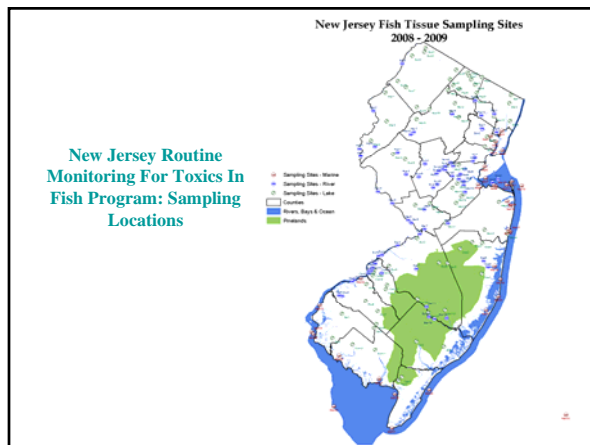
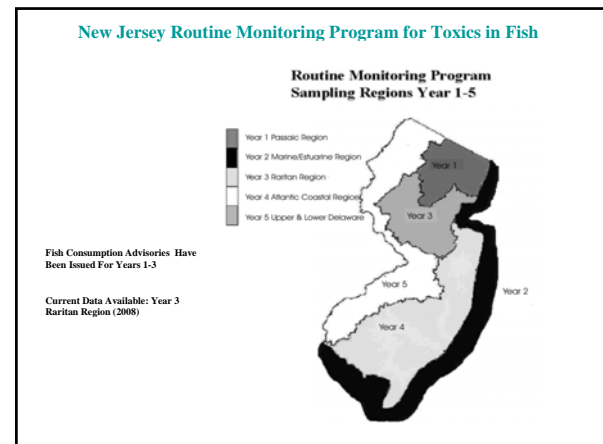
Women of childbearing age and children can safely eat up to six meals of stocked trout each month, others can eat six meals per week.





## New Jersey

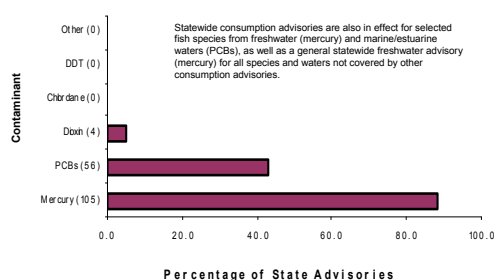
Basis for Mercury Advisory Values Used by New Jersey: Populations addressed, toxicological bases, and points of departure	
General Population	Sensitive Population (Women of child-bearing age, pregnant/nursing women & children)
(Toxicological value or basis of advisory) Reference dose (RfD) – $3 \times 10^{-4}$ mg/kg-day	(Toxicological value or basis of advisory) Reference dose (RfD) – $7 \times 10^{-5}$ mg/kg-day
1 meal/week $\geq 0.35$ ppm mercury in fish tissue	1 meal/week $\geq 0.08$ ppm mercury in fish tissue
1 meal/month $\geq 0.94$ ppm mercury in fish tissue	1 meal/month $\geq 0.19$ ppm mercury in fish tissue
No consumption $> 2.81$ ppm mercury in fish tissue	No consumption $> 0.54$ ppm mercury in fish tissue





## New Jersey (continued)

**Number of Waterbody-specific Advisories New Jersey and Percentage Issued in New Jersey (2009) for Major Contaminants**



**Risk Communication Materials Used by New Jersey to Inform Fishers**

Communication Material	Number distributed per year
Pamphlets or fact sheets	Approximately 75,000 brochures and pamphlets are distributed to various outreach centers
Signs at fishing access points	Limited signage issued yearly
Posters (medical offices, libraries, fishing license outlets, etc.)	Information provided to WIC centers and physicians
Fishing regulation booklets	Approximately 400,000 Fish and Wildlife Digests distributed by NJDEP Division of Fish and Wildlife
Journal or magazine publications	See above, limited other publications
Press releases	Press releases issued for yearly advisory updates
State Website <a href="http://www.FishSmartEatSmartNJ.org">www.FishSmartEatSmartNJ.org</a>	Up to 1,600 web hits/month on main page; Up to 8,200 web hits/month for 2009 brochure

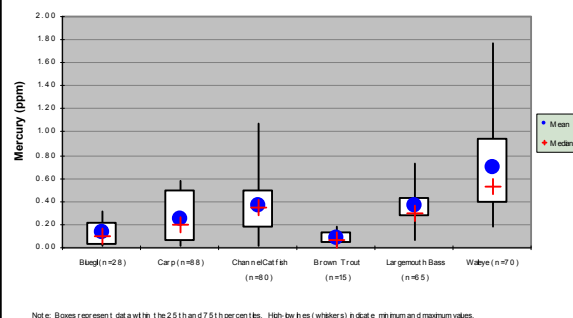


## New Mexico

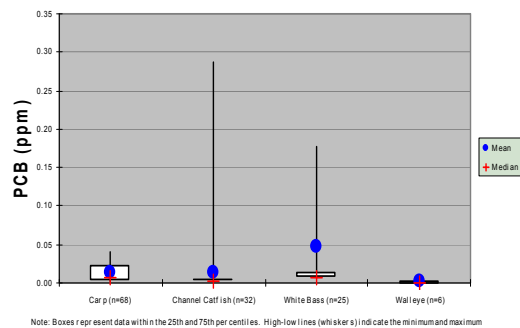
Basis for Mercury Advisory Values Used by New Mexico: Populations addressed, toxicological bases, and points of departure

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children)	Other Population of Concern – please add populations of concern
<p>RfD = <math>1 \times 10^{-4}</math> mg/kg/d Adult body weight = 70 kg Assumed meal size = 8 oz.</p> <p>New Mexico issues all advisories based on the consumption limit tables published in Chapter 4 of <i>Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 2 (3rd Edition)</i>. For mercury, these limits are intended to be protective of children and pregnant/nursing women.</p>	New Mexico does not currently issue advisories for specific sub-populations.	New Mexico does not currently issue advisories for specific sub-populations.	New Mexico does not currently issue advisories for specific sub-populations.
4 meals/month: $\geq 0.12$ ppm mercury in fish tissue			
1 meal/month: $\geq 0.47$ ppm mercury in fish tissue			
No consumption: $\geq 1.9$ ppm mercury in fish tissue			

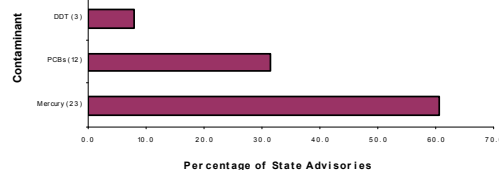
Mercury Concentrations in Selected Fish Species in New Mexico



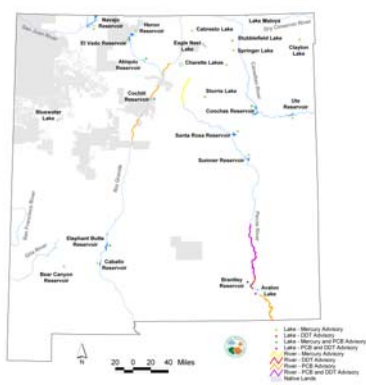
Total PCB Concentrations in Selected Fish Species in New Mexico



Number of Waterbody-specific Advisories (in Parentheses) and Percentage Issued in New Mexico for Major Contaminants

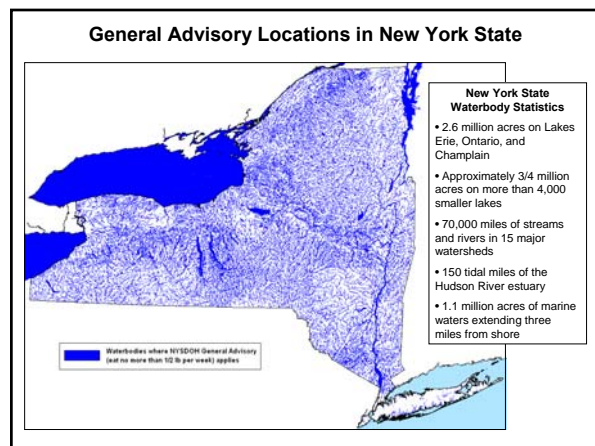
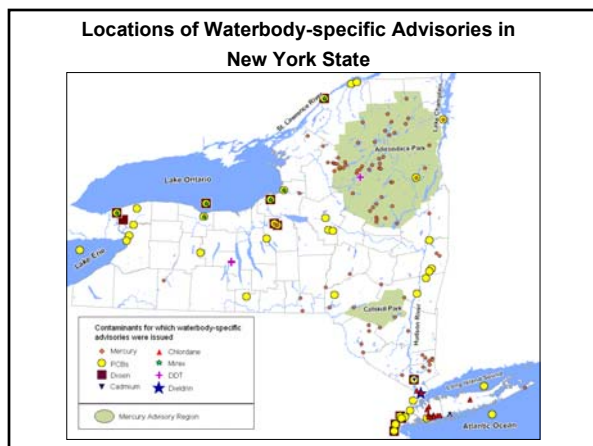
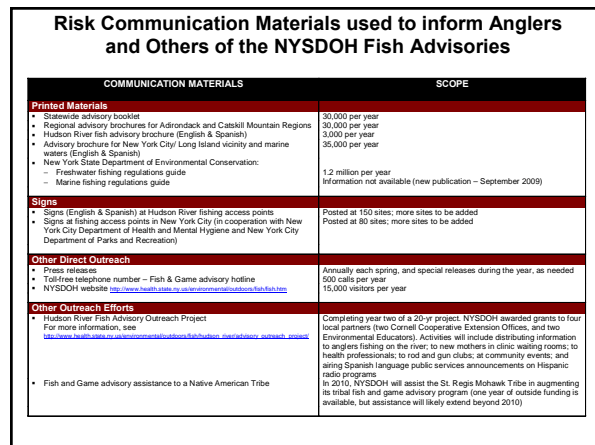
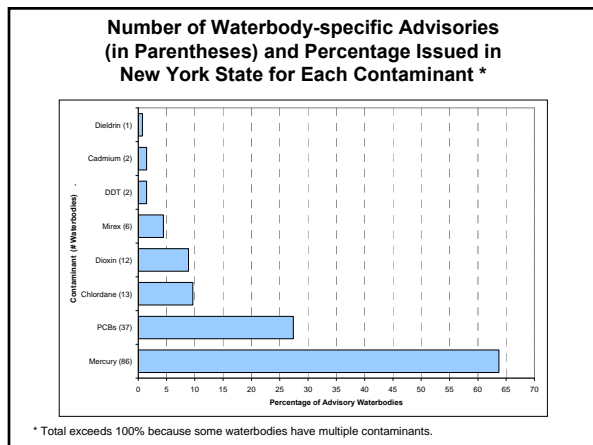
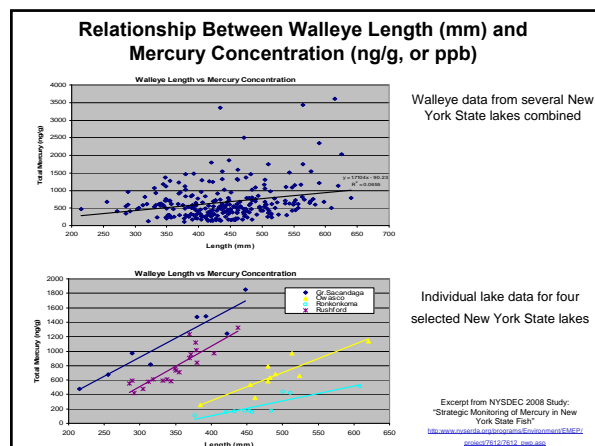
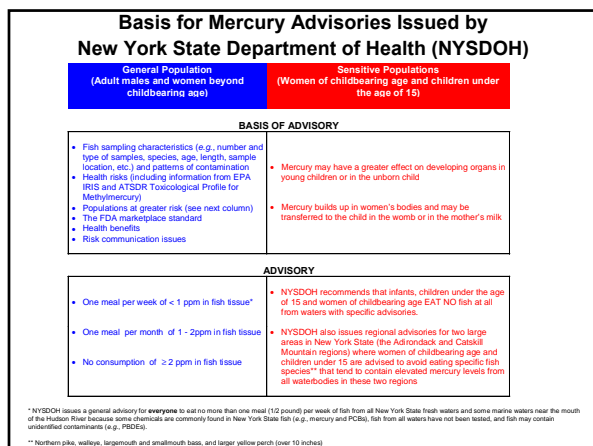


New Mexico Fish Consumption Advisories





## New York



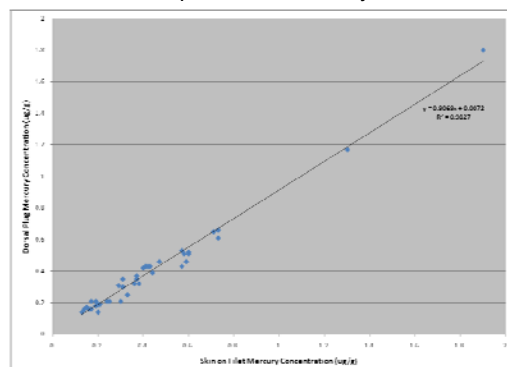


## North Dakota

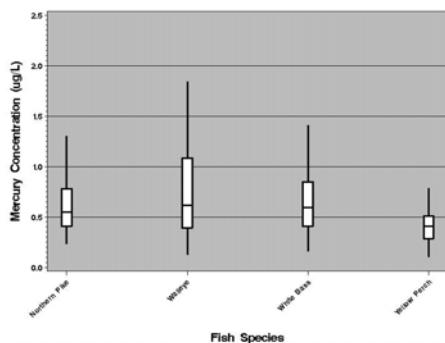
**Basis for Mercury Advisory Values Used by the  
North Dakota Department of Health**  
Populations addressed, toxicological bases, and points of departure

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children < 15 years)
Based on: Reference Dose = 0.0003 mg/kg/day Average Body Weight = 60 kg (132 lbs) Average Meal Size = 8 oz.	Based on: Reference Dose = 0.0001 mg/kg/day Average Body Weight = 60 kg (132 lbs) Average Meal Size = 8 oz.	Based on: Reference Dose = 0.0001 mg/kg/day Average Body Weight = 40 kg (88 lbs) Average Meal Size = 8 oz.
1 meal/week $\leq$ 0.603 ppm mercury in fish tissue	1 meal/week $\leq$ 0.201 ppm mercury in fish tissue	1 meal/week $\leq$ 0.402 ppm mercury in fish tissue
1 meal/month $\leq$ 2.413 ppm mercury in fish tissue	1 meal/month $\leq$ 0.804 ppm mercury in fish tissue	1 meal/month $\leq$ 1.608 ppm mercury in fish tissue
No consumption > 2.413 ppm mercury in fish tissue	No consumption > 0.804 ppm mercury in fish tissue	No consumption > 1.608 ppm mercury in fish tissue

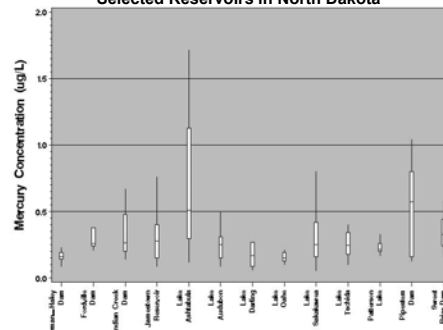
**Relationship Between Mercury Concentrations in Dorsal Plug Samples and Skin on Filet Samples Collected from Walleye in North Dakota**



**Mercury Concentrations in Selected Fish Species in Devils Lake North Dakota (1991-2004)**



**Mercury Concentrations in Walleye Collected from Selected Reservoirs in North Dakota**





General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children)
0.0001 mg of mercury/kg/day <i>U.S. EPA Reference Dose</i>	0.0001 mg of mercury/kg/day <i>U.S. EPA Reference Dose</i>	0.0001 mg of mercury/kg/day <i>U.S. EPA Reference Dose</i>
2 meals/week > 0.050 ppm mercury in fish tissue	2 meals/week > 0.050 ppm mercury in fish tissue	2 meals/week > 0.050 ppm mercury in fish tissue
1 meal/week > 0.110 ppm mercury in fish tissue	1 meal/week > 0.110 ppm mercury in fish tissue	1 meal/week > 0.110 ppm mercury in fish tissue
1 meal/month > 0.220 ppm mercury in fish tissue	1 meal/month > 0.220 ppm mercury in fish tissue	1 meal/month > 0.220 ppm mercury in fish tissue
No consumption ≥ 1.000 ppm mercury in fish tissue	No consumption ≥ 1.000 ppm mercury in fish tissue	No consumption ≥ 1.000 ppm mercury in fish tissue

Mercury (ppm)

Striped Bass (n=202)

Brown Trout (n=7)

Common Carp (n=68)

Channel Catfish (n=68)

Largemouth Bass (n=68)

White Perch (n=20)

Yellow Perch (n=15)

Median values represent data within the 25th and 75th percentiles. Red line shows individual's median value and whiskers extend.

Max = 9.7      Max = 23.1      Max = 6.4

PCBs (ppm)

Bluegill Sunfish (n=22)    Brown Trout (n=6)    Common Carp (n=67)    Channel Catfish (n=37)    Largemouth Bass (n=31)    Walleye (n=119)    Yellow Perch (n=62)

Note: Boxes represent data within the 25th and 75th percentiles. High-low lines (whiskers) indicate the minimum and maximum values. Total PCBs are the sum of Aroclor 1242, 1248, 1254, and 1260.

Mean Mercury (ppm)

General Population Threshold for a 1 meal/week exposure at 0.11 ppm

Species	Mean Mercury (ppm)	Group
Cape May	0.08	n=6
Weakfish	0.15	n=6
Dear	0.21	n=6
Chesapeake	0.08	n=6
Potomac	0.22	n=6
Indian	0.08	n=6
Johnson	0.21	n=6
Westchester	0.21	n=6
Clear Fork	0.08	n=6
La Grange	0.35	n=6
Sea	0.48	n=6
James	0.13	n=5
Outer	0.11	n=5
Outer	0.27	n=5
Outer	0.08	n=5
Outer	0.08	n=5
Westport	0.15	n=5

Contaminant	Percentage of State Advisories
Mercury (72)*	65
PCBs (41)	35
Lead (4)	5
Mirex (1)	1
DDT (1)	1
PAHs (1)	1

\*Statewide advisory in effect

Communication Material	Number distributed per year
Pamphlets for WIC Clinics	12,000
Fishing regulation booklets	500,000
Press releases	1
State Website	15,000
Color cards for anglers	5,000
Fact sheets for anglers	500



**Ohio (continued)**

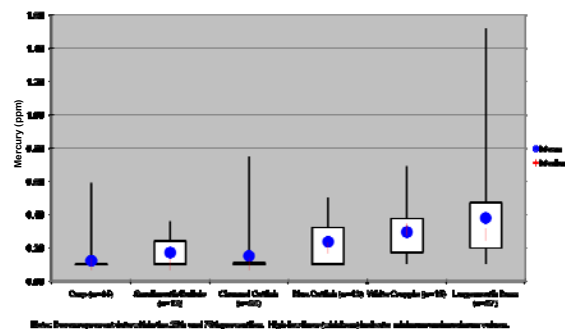


## Oklahoma

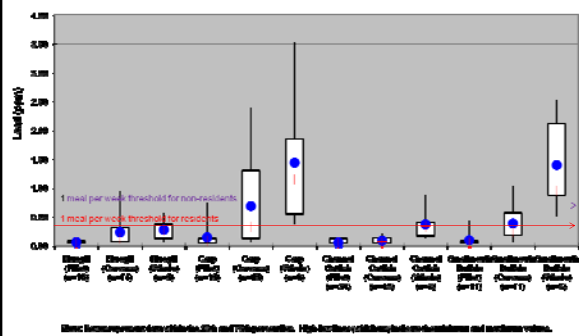
Basis for Mercury Advisory Values Used by Oklahoma DEQ: Populations addressed, toxicological bases, and points of departure

General Population	Sensitive Population (Women of Child Bearing Age)	Sensitive Population (Children)
RfD = 0.0002 mg/kg-d Assumptions: 70 kg body weight 8 oz meal size	RfD = 0.0001 mg/kg-d Assumptions: 70 kg body weight 8 oz meal size	RfD = 0.0001 mg/kg-d Assumptions: 35 kg body weight 4 oz meal size
2 meal/month $\geq 1.0$ ppm mercury in fish tissue	2 meal/month $\geq 0.5$ ppm mercury in fish tissue	2 meal/month $\geq 0.5$ ppm mercury in fish tissue
No consumption $\geq 1.5$ ppm mercury in fish tissue	No consumption $\geq 1.0$ ppm mercury in fish tissue	No consumption $\geq 1.0$ ppm mercury in fish tissue

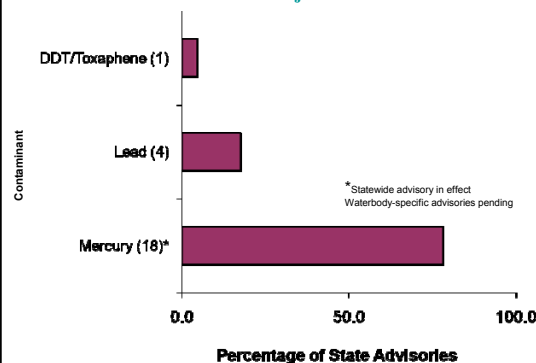
Mercury Concentrations in Selected Fish Species in Oklahoma



Lead Concentrations in Selected Fish Species and Preparations in the Grand Lake Watershed of Oklahoma (Tri-State Lead Mining District)



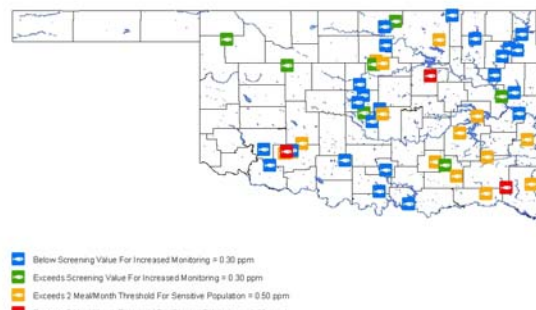
Number of Waterbody-specific Advisories and Percentage Issued in Oklahoma for Major Contaminants



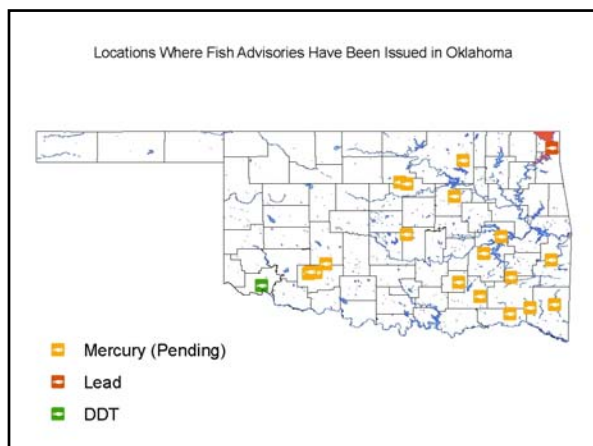
Graphic #6 - Risk Communication Materials Used by Oklahoma DEQ to Inform Fishers

Communication Material	Number distributed per year
Pamphlets or fact sheets	5000
Signs at fishing access points	0
Posters (medical offices, libraries, fishing license outlets, etc.)	100
Fishing regulation booklets	0
Journal or magazine publications	0
Press releases	3
State Website	200
Other method (Please specify)	Newspaper Interviews - 5

Locations Where Mercury Concentrations in Largemouth Bass Were Below or Above Oklahoma DEQ Mercury Thresholds





**Oklahoma (continued)**



## Oregon

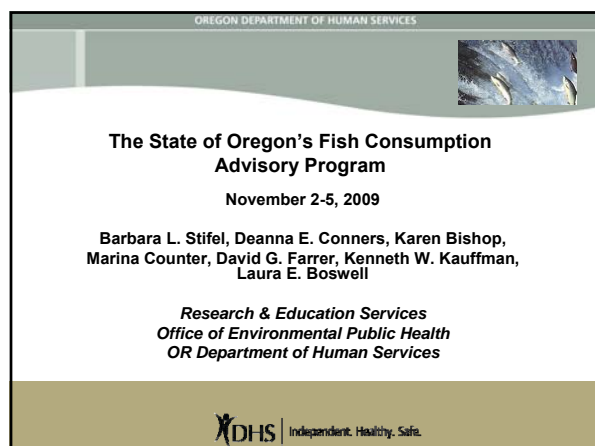


Table 1. Risk values used for target contaminants of concern (COC) in Oregon's Fish Consumption Advisory Program.

Parameter	COC	Numerical Value
Oregon Screening Value	CH <sub>3</sub> Hg	0.35 mg/kg fish tissue
	PCBs	0.023 mg/kg fish tissue
Reference Dose (RfD)	CH <sub>3</sub> Hg	0.0001 mg/kg/d
	PCBs	0.00002 mg/kg/d
Body Weight (BW)	CH <sub>3</sub> Hg	70 kg adults / 16 kg child
	PCBs	70 kg adults / 16 kg child
Cooking Adjustment Factor (CAF)	CH <sub>3</sub> Hg	1 (0% cooking reduction)
	PCBs	0.5 (50% cooking reduction)
Time Averaging Factor (T <sub>ap</sub> )	CH <sub>3</sub> Hg	30.44 days/month
	PCBs	30.44 days/month
Meal Size (MS)	CH <sub>3</sub> Hg	0.227 kg adults / 0.113 kg child
	PCBs	0.227 kg adults / 0.113 kg child

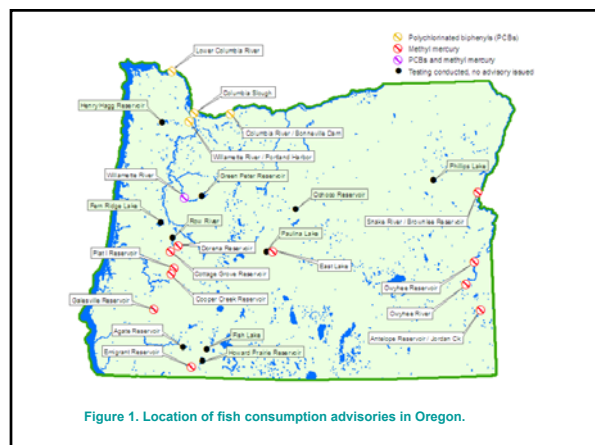


Figure 1. Location of fish consumption advisories in Oregon.

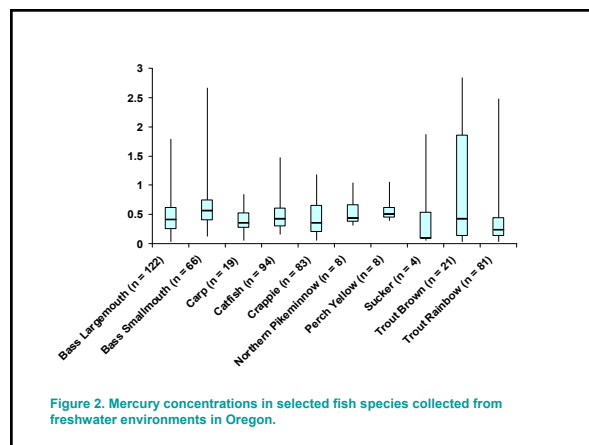


Figure 2. Mercury concentrations in selected fish species collected from freshwater environments in Oregon.

Table 2. Risk communication materials used by Oregon's Fish Consumption Advisory Program.

Communication Material	Dissemination Details
<b>Brochures</b> English: 5,060 (01/08 – 10/09) Spanish: 1,780 (01/08 – 10/09) Also available in Russian, Chinese, Laotian, Vietnamese	Brochures distributed to: • 18 WIC (Women, Infants & Children) programs throughout the state • 9 Local county health departments • 9 Health clinics • 5 Program partners & agencies
<b>Healthy Fish Guide Wallet Card*</b> Signs at fishing access points Advisory page in Oregon's Sport Fishing Regulation booklet Press releases State website 5 Mini-grants awarded to community groups*	New – reflects regional collaboration Posted by local health departments 600,000 booklets distributed per year by OR Dept of Fish & Wildlife Sent to all media outlets for each advisory www.healthoregon.org/fishadv Developed culturally relevant materials for hard to reach populations

\*Funded under ATSDR (Agency for Toxic Substances and Disease Registry) cooperative agreement to conduct public health assessments and health consultations for Superfund sites.



## Pennsylvania

### Basis for Mercury Advisory Values Used by Pennsylvania: Populations addressed, toxicological bases, and points of departure

General Population*	Points of Departure
Reference Dose RfD = 0.0001 mg Hg/kg/day U.S. EPA Fact Sheet (9/99)	Pennsylvania issued, in April 2001, a statewide, general advisory that applies to all possible contaminants, not just mercury, but even those whose presence or effects are currently unknown, and for those waters that haven't been tested, and for untested species or fish in waters with advisories for specific segments or species.
<b>1 meal/week</b> 0.13 – 0.25 ppm mercury in fish tissue	<b>Statewide, general 1 meal/week advisory for all sport-caught fish.</b>
<b>2 meals/month</b> 0.26 – 0.50 ppm mercury in fish tissue	
<b>1 meal/month</b> 0.51 – 1.0 ppm mercury in fish tissue	
<b>6 meals/year</b> 1.1 – 1.9 ppm mercury in fish tissue	
<b>Do Not Eat</b> > 1.9 ppm mercury in fish tissue	Pennsylvania recognizes the U.S. Food and Drug Administration (FDA) advisory to pregnant women and women of childbearing age not to eat four species of fish sold in stores: shark, swordfish, king mackerel, and tilefish, but has not issued a similar advisory since it is outside the scope of the State's program.

\* Meal advice in these advisories intended to protect the sensitive population (pregnant/nursing women, of childbearing age, and children), including the general population.

### Basis for PCB & Chlordane Advisory Values Used by Pennsylvania: Populations addressed, toxicological bases, and points of departure

PCB's	Chlordane	Points of Departure
General Population*	General Population*	
Health Protection Value HPV = 0.00005 mg PCB/kg/day (Great Lakes Protocol)	Health Protection Value HPV = 0.00015 mg Chlordane/kg/day (Great Lakes Fish Advisory Task Force Protocol)	Pennsylvania issued, in April 2001, a statewide, general advisory that applies to all possible contaminants, not just mercury, but even those whose presence or effects are currently unknown, and for those waters that haven't been tested, and for untested species or fish in waters with advisories for specific segments or species.
<b>1 meal/week</b> 0.06 – 0.2 ppm PCB's in fish tissue	<b>1 meal/week</b> 0.16 – 0.65 ppm Chlordane in fish tissue	<b>Statewide, general 1 meal/week advisory for all sport-caught fish.</b>
<b>1 meal/month</b> 0.21 – 1.0 ppm PCB's in fish tissue	<b>1 meal/month</b> 0.66 – 2.82 ppm Chlordane in fish tissue	
<b>6 meals/year</b> 1.1 – 1.9 ppm PCB's in fish tissue	<b>6 meals/year</b> 2.83 – 5.62 ppm Chlordane in fish tissue	
<b>Do Not Eat</b> > 1.9 ppm PCB's in fish tissue	<b>Do Not Eat</b> > 5.62 ppm Chlordane in fish tissue	
		Pennsylvania's fish consumption advisories apply only to <b>recreationally or sport-caught fish</b> from Pennsylvania waters, not commercial or store-bought fish from other or unknown waters.

\* Meal advice in these advisories intended to protect the sensitive population (pregnant/nursing women, of childbearing age, and children), including the general population.

### Risk Communication Materials Used by Pennsylvania to Inform Consumers and Public



### Risk Communication Materials Used by Pennsylvania to Inform Consumers and Public

Communication Material	Number distributed per year
<b>Pamphlets or fact sheets</b>	<ul style="list-style-type: none"> <li>• DEP Fact Sheet on Fish Consumption Advisories;</li> <li>• Special publication for 2008 Great Lakes workshop for females;</li> <li>• Updated and more statewide; also available as on-line pub.</li> </ul>
<b>Signs at fishing access points</b>	None
<b>Posters (medical offices, libraries, fishing license outlets, etc.)</b>	None
<b>Fishing regulation booklets</b>	issued to each licensed angler; handed out at sports shows and education events; is also available at fishing stores and outlets, and on-line at PFBC's website. (approx 1 million printed /distributed each year)
<b>Journal or magazine publications</b>	Not a typical outlet / venue
<b>Press releases</b>	issued at least twice annually; to announce annual advisory updates and the state hatchery trout PCB results.
<b>State Websites</b>	PADEP: <a href="http://www.depweb.state.pa.us">www.depweb.state.pa.us</a> Keyword: "Fish Advisories" PFBC: <a href="http://www.fish.state.pa.us/bookfish.htm">www.fish.state.pa.us/bookfish.htm</a>
<b>Other method (Please specify)</b>	appearances at various workshops, forums, conferences, and periodically featured on specialty radio and television sports and environmental shows.

### Locations Where Species- / Waterbody-Specific Advisories Have Been Issued In Pennsylvania



### Pennsylvania's Fish Consumption Advisory Program consists of two interagency workgroups:

#### Technical Workgroup / Policy Workgroup:

- Department of Environmental Protection
- Department of Health
- PA Fish and Boat Commission
- Department of Agriculture
- Governor's Policy Office (on Policy Workgroup only)



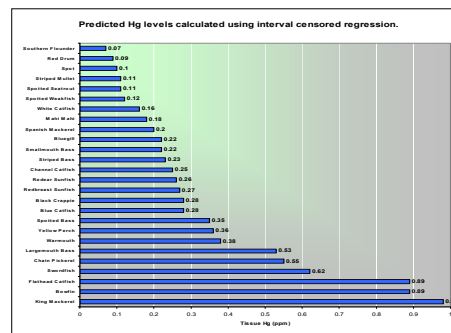


## South Carolina

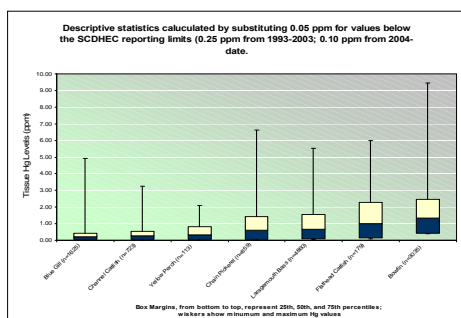
### Basis for Mercury Advisory Values Used by SCDHEC

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children)
3 x 10 <sup>-4</sup> mg/kg/day reference dose (Species specific)	If any advisory type exists for any species for a water body the advise is No Consumption of any fish species from the water body.	If any advisory type exists for any species for a water body the advise is No Consumption of any fish species from the water body.
1 meal/week ≥ 0.25 ppm mercury in fish tissue		
1 meal/month ≥ 0.66 ppm mercury in fish tissue		
No consumption ≥ 1.00 ppm mercury in fish tissue	No consumption ≥ 0.25 ppm mercury in fish tissue	No consumption ≥ 0.25 ppm mercury in fish tissue

### Tissue Mercury Levels for SC Fishes Values Calculated by Interval Censored Regression



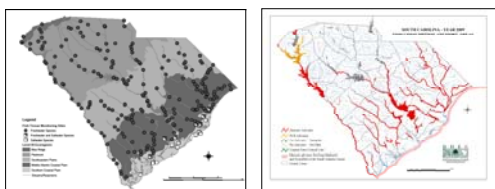
### Tissue Mercury Levels for SC Fishes



### Risk Communication Materials Used by SCDHEC to Inform Fishers

Communication Material	Number distributed per year
Pamphlets or fact sheets	6000 (bikes and fact sheets (English and Spanish))
Signs at fishing access points	207 (4 public use lands (English and Spanish))
Posters (medical offices, libraries, fishing license outlets, etc.)	NA
Fishing regulation booklets	NA
Journal or magazine publications	NA
Press releases	At least 1 per year
State Website	www.scdhec.gov/fish
Other method (Phone calls)	Public Public Service Announcements, Toll-Free Helpline, Public Meetings and Presentations, SCDHEC Action Strategy Report

### Maps of SC Sampling Locations and Consumption Advisory

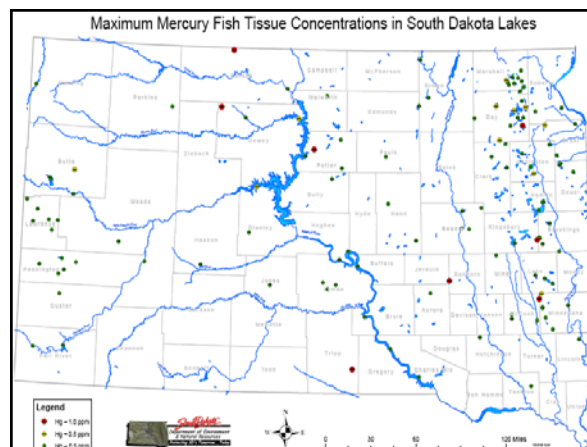
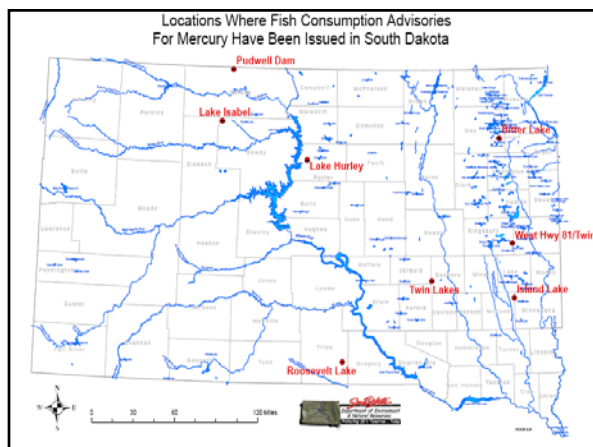
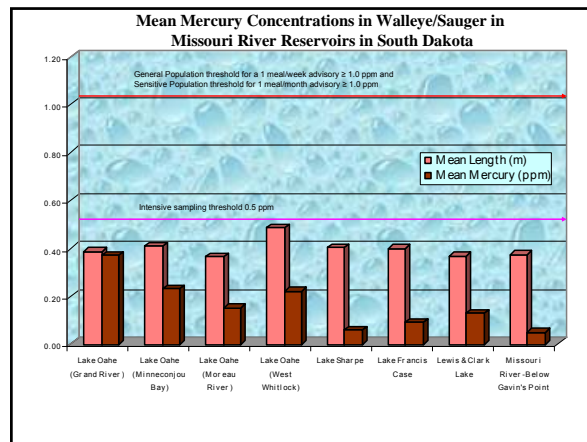




## South Dakota

**Basis for Mercury Advisory Values Used by South Dakota:  
Populations Addressed, Toxicological Bases, and Points of Departure**

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children under 7 years of age)
1.0 ppm Hg FDA Advisory Level	1.0 ppm Hg FDA Advisory Level	1.0 ppm Hg FDA Advisory Level
0.5 ppm Hg Intensive Sampling Action Level	0.5 ppm Hg Intensive Sampling Action Level	0.5 ppm Hg Intensive Sampling Action Level
1 meal/week $\geq 1.0$ ppm mercury in fish tissue	1 meal/month $\geq 1.0$ ppm mercury in fish tissue	1 meal/month $\geq 1.0$ ppm mercury in fish tissue
Advisories are size and species specific (example – Bitter Lake Day County, walleye all sizes and northern pike over 30 inches)	Advisories are size and species specific (example – Bitter Lake Day County, walleye all sizes and northern pike over 30 inches)	Advisories are size and species specific (example – Bitter Lake Day County, walleye all sizes and northern pike over 30 inches)



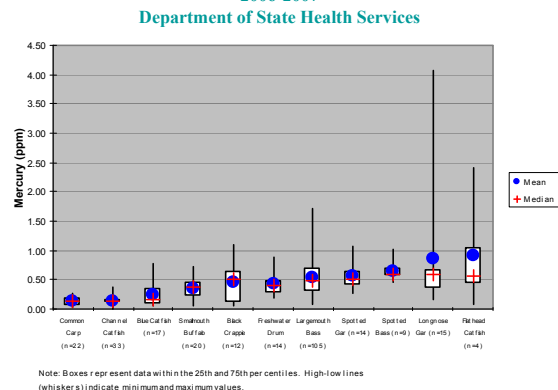


## Texas

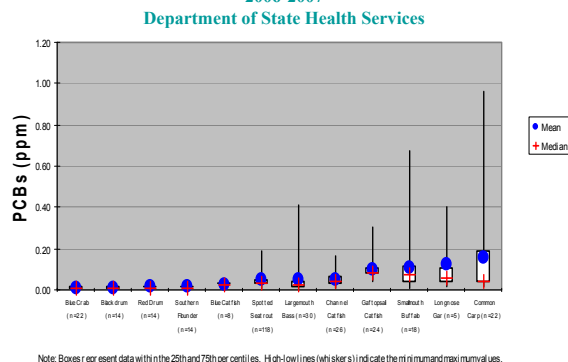
**Graphic #1 - Basis for Mercury Advisory Values Used by [Program name]: Populations addressed, toxicological bases, and points of departure**

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children ≤ 12)	Other Population of Concern – please add populations of concern
(Toxicological value or basis of advisory)	(Toxicological value or basis of advisory)	(Toxicological value or basis of advisory)	(Toxicological value or basis of advisory)
ATSDR MRL 0.0003 mg/kg/day	ATSDR MRL 0.0003 mg/kg/day	ATSDR MRL 0.0003 mg/kg/day	NA
Body Weight (70 kg) Consumption Rate (0.030 kg/day)	Body Weight (70 kg) Consumption Rate (0.030 kg/day)	Body Weight (35 kg) Consumption Rate (0.030 kg/day)	
1 meal/week _____ ppm mercury in fish tissue NA	1 meal/week _____ ppm mercury in fish tissue NA	1 meal/week _____ ppm mercury in fish tissue NA	1 meal/week _____ ppm mercury in fish tissue NA
2 meal/month _____ ppm mercury in fish tissue (8-ounce meals) NA	1 meal/month _____ ppm mercury in fish tissue NA	2 meal/month _____ ppm mercury in fish tissue (4-ounce meals) NA	1 meal/month _____ ppm mercury in fish tissue NA
No consumption _____ ppm mercury in fish tissue	No consumption _____ ppm mercury in fish tissue	No consumption _____ ppm mercury in fish tissue	No consumption _____ ppm mercury in fish tissue NA

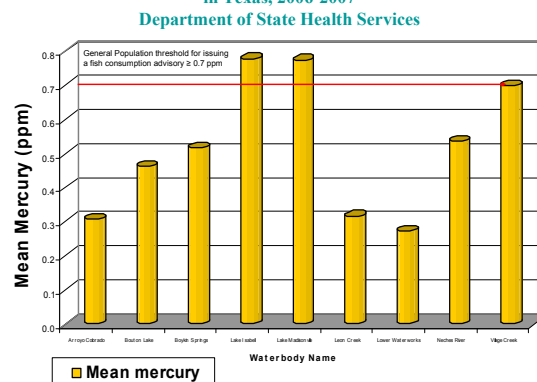
**Graphic #2 - Mercury Concentrations in Selected Fish Species in Texas 2006-2007**



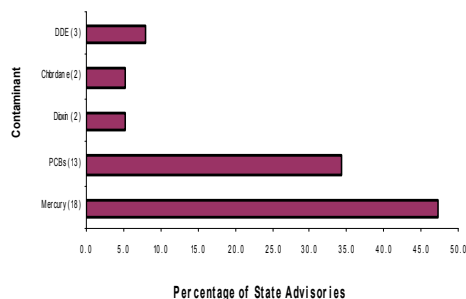
**Graphic #3 - PCB Concentrations in Selected Fish Species in Texas 2006-2007**



**Graphic #4 - Mean Mercury Concentrations in Largemouth Bass by Lake in Texas, 2006-2007**



**Graphic #5 - Number of Waterbody-Specific Advisories (in Parentheses) and Percentage Issued in Texas for Major Contaminants**

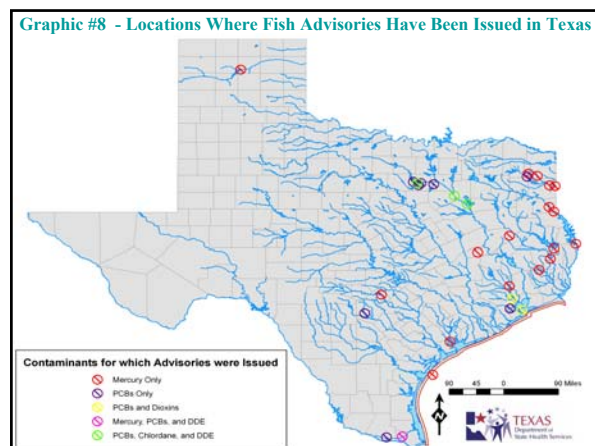
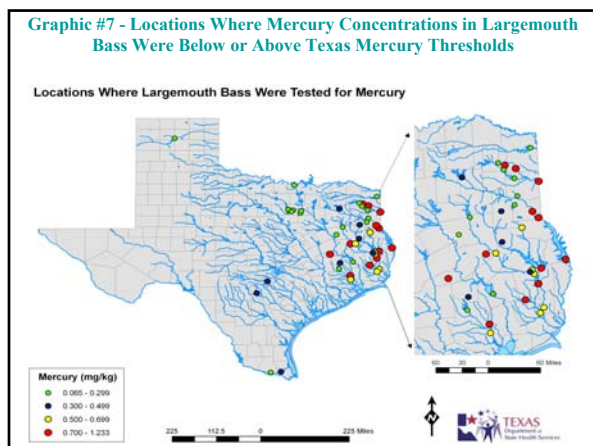


**Graphic #6 - Risk Communication Materials Used by Texas to Inform Fishers**

Communication Material	Number distributed per year
Pamphlets or fact sheets	Department of State Health Services (DSHS) distributes an advisory booklet to fishers.
Signs at fishing access points	Signs are posted at public access points for all water bodies where an advisory is issued.
Posters (medical offices, libraries, fishing license outlets, etc.)	NA
Fishing regulation booklets	Texas Parks and Wildlife Department annually publishes a fishing regulation booklet that is distributed to all licensed fishers. The booklet contains advisory information and DSHS contact information. <a href="http://www.tpwd.state.tx.us/fishbook">www.tpwd.state.tx.us/fishbook</a>
Journal or magazine publications	NA
Press releases	A press release is issued along with all new fish advisories.
State Website	DSHS maintains a Web site that is updated as needed or when a new advisory is issued. <a href="http://www.dshs.state.tx.us/fishbook">www.dshs.state.tx.us/fishbook</a>
Other method (Please specify)	DSHS presents advisory information to angler groups and local groups as requested.



## Texas (continued)



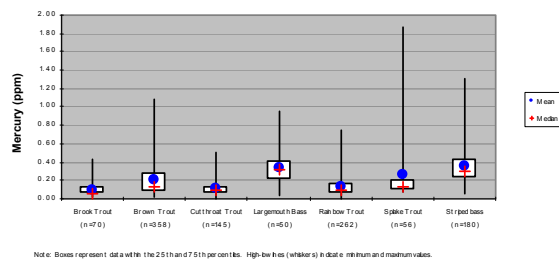


## Utah

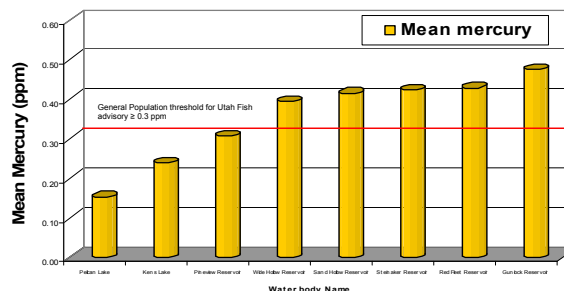
Graphic #1 - Basis for Mercury Advisory Values Used by UTAH Populations addressed, toxicological bases, and points of departure

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children)	Other Population of Concern – please add populations of concern
(Toxicological value or basis of advisory) RID = 0.0001 mg/kg/day Average adult = 70 kg 227 gram meal	(Toxicological value or basis of advisory) RID = 0.00003 mg/kg/day Average child = 16 kg 113 gram meal	(Toxicological value or basis of advisory) RID = 0.00003 mg/kg/day Average child = 16 kg 113 gram meal	(Toxicological value or basis of advisory) NA
1 meal/month $\geq$ 0.9 ppm mercury in fish tissue	1 meal/month $\geq$ 0.13 ppm mercury in fish tissue	1 meal/month $\geq$ 0.13 ppm mercury in fish tissue	NA
No consumption $\geq$ 0.94 ppm mercury in fish tissue	No consumption $\geq$ 0.26 ppm mercury in fish tissue	No consumption $\geq$ 0.26 ppm mercury in fish tissue	NA

Graphic #2 - Mercury Concentrations in Selected Fish Species in Utah

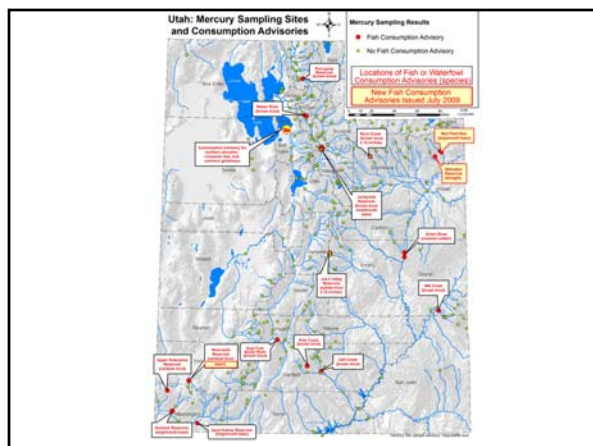


Graphic #4 - Mean Mercury Concentrations in Largemouth Bass by Lake in Utah



Graphic #6 - Risk Communication Materials Used by Utah to Inform Fishers

Communication Material	Number distributed per year
Pamphlets or fact sheets	3,800 site specific 500 Baby your Baby
Signs at fishing access points	66; 6 signs at 11 sites
Posters (medical offices, libraries, fishing license outlets, etc.)	
Fishing regulation booklets	250,000 – 300,000 annually
Journal or magazine publications	
Press releases	3 statewide in 2009
State Website	(# of hits not tallied)
Other method (Please specify)	16,000 business style cards Presentations to local interest groups



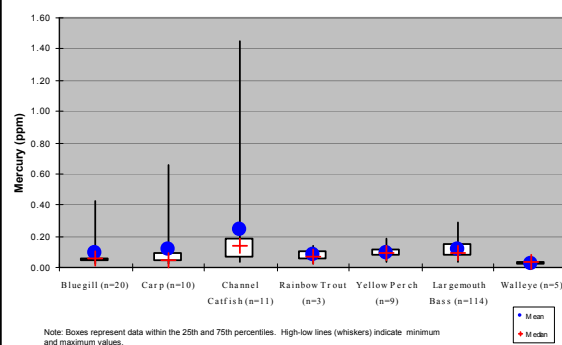


## Virginia

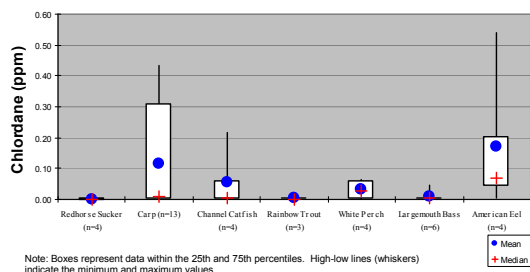
**Basis for Mercury Advisory Values Used by Virginia Department of Health:**  
Populations addressed, toxicological bases, and points of departure

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children)
RfD 0.0001 mg/kg/day from National Academy of Science	RfD 0.0001 mg/kg/day from National Academy of Science	RfD 0.0001 mg/kg/day from National Academy of Science
<b>Assumptions:</b> Body weight 70 kg Time period 30 days Fish meal size 8 ounces 2 meals/month	Developed from NAS RfD for sensitive and non-sensitive population	Developed from NAS RfD for sensitive and non-sensitive population
2 meals/month $\geq 0.5$ ppm mercury in fish tissue	No consumption $\geq 0.5$ ppm mercury in fish tissue	No consumption $\geq 0.5$ ppm mercury in fish tissue
1 meal/month $\geq 1$ ppm mercury in fish tissue		
No consumption $\geq 2$ ppm mercury in fish tissue		

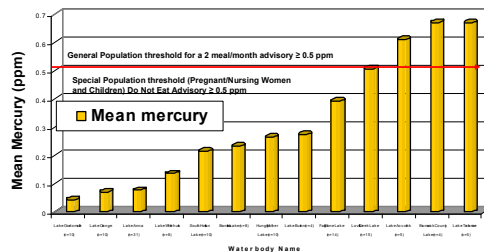
**Mercury Concentrations in Selected Fish Species in Virginia 2009**



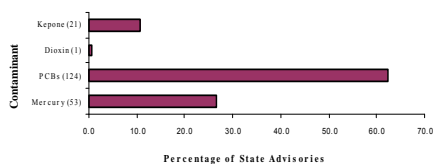
**Chlordane Concentrations in Selected Fish Species in Virginia 2009**



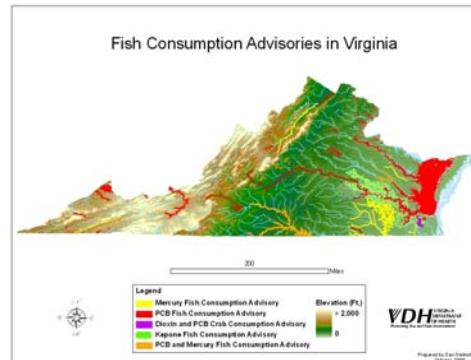
**Mean Mercury Concentrations in Largemouth Bass by Lake in Virginia 2008-2009**



**Number of Waterbody-specific Advisories (in Parentheses) and Percentage Issued in Virginia for Major Contaminants**

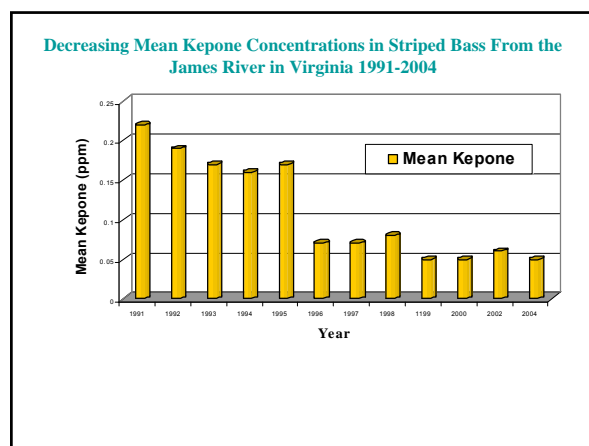
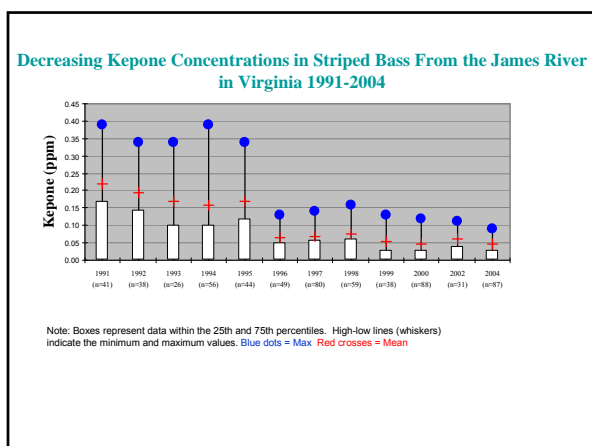


**Locations Where Fish Advisories Have Been Issued in Virginia**





## Virginia (continued)





## Washington

### Washington State Department of Health Office of Environmental Health, Safety & Toxicology

Washington State Department of Health (DOH) works to protect and improve the health of people in Washington State. Part of this mission is to reduce or eliminate exposures to health hazards in the environment, including contaminants found in fish. To accomplish this, DOH collaborates with numerous state and federal agencies on the collection and analyses of contaminants in fish. DOH's role is to evaluate fish contaminant levels for potential public health impacts and to convey information on risks and benefits to fish consumers by way of fish advisories, news releases, fact sheets, signs, and community meetings. The following outlines activities and findings in Washington State:

- Highest mercury concentrations were found in northern pikeminnow
- Highest fish mercury concentrations from 2005 – 2008 were located in lakes on the Olympic Peninsula
- PCBs account for greater than 55% of all advisories, mercury accounts for 27%
- 120 Health Fish Guides are distributed
- DOH fish website receives over 80,000 annual hits
- Washington State has 13 waterbody specific fish advisories
- Washington has two statewide mercury advisories
- DOH has issued fish advisories for commercial fish
- OEHS provides advice to consumers of store-bought fish

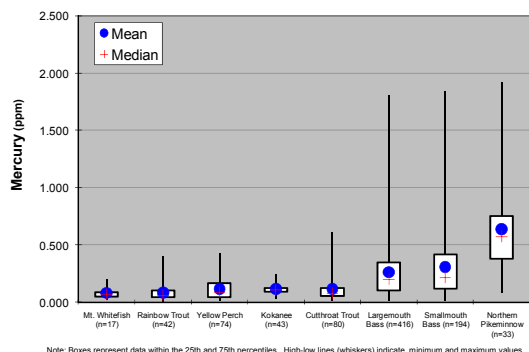


### Basis for Mercury Advisory Values Used by Washington State: Populations addressed, toxicological basis, and points of departure

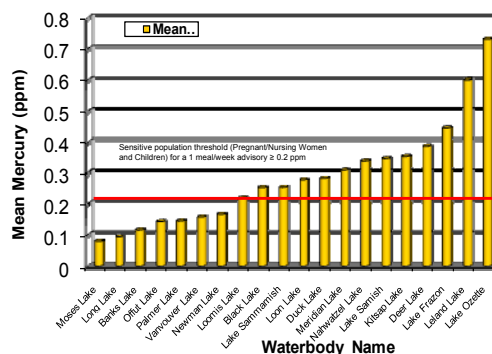
General Population *	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children 0-6 yrs)	Other Populations of Concern – high consumers *
(Toxicological value or basis of advisory) RfD 1x10 <sup>-4</sup> mg/kg/day	(Toxicological value or basis of advisory) RfD 1x10 <sup>-4</sup> mg/kg/day	(Toxicological value or basis of advisory) RfD 1x10 <sup>-4</sup> mg/kg/day	(Toxicological value or basis of advisory) RfD 1x10 <sup>-4</sup> mg/kg/day
1 meal/week ≤ 0.2 ppm mercury in fish tissue	1 meal/week ≤ 0.2 ppm mercury in fish tissue	1 meal/week ≤ 0.2 ppm mercury in fish tissue	1 meal/week ≤ 0.2 ppm mercury in fish tissue
1 meal/month ≤ 0.8 ppm mercury in fish tissue	1 meal/month ≤ 0.8 ppm mercury in fish tissue	1 meal/month ≤ 0.8 ppm mercury in fish tissue	1 meal/month ≤ 0.8 ppm mercury in fish tissue
No consumption > 0.8 ppm mercury in fish tissue	No consumption > 0.8 ppm mercury in fish tissue	No consumption > 0.8 ppm mercury in fish tissue	No consumption > 0.8 ppm mercury in fish tissue
2 meals/week ≤ 0.1 ppm mercury in fish tissue	2 meals/week ≤ 0.1 ppm mercury in fish tissue	2 meals/week ≤ 0.1 ppm mercury in fish tissue	2 meals/week ≤ 0.1 ppm mercury in fish tissue

\*No specific advice given to the general population or high fish consumers. Those concerned with mercury are advised to follow sensitive population guidelines.

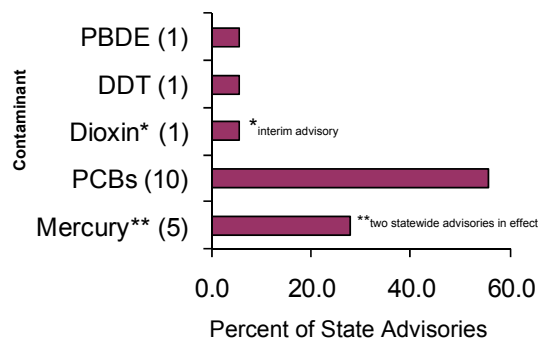
### Mercury Concentrations in Selected Fish Species in Washington State



### Mean Mercury Concentrations in Largemouth Bass by Lake in Washington State



### Number of Waterbody-specific Advisories (in Parentheses) and Percentage Issued in Washington State for Major Contaminants



### Risk Communication Materials Used by Washington State Dept. of Health to Inform Fishers

Communication Material	Number distributed per year
Healthy Fish Guide	•120,000 (Health professionals, Child Profile, WIC, Local Health, NGOs, public requests and others)
Fact sheets	•Issued along with advisory, provided via website & outreach events ~300
Signs at fishing access points	(2009) 140 signs - Lake Washington, Green Lake, Lower Duwamish Waterway
Posters (medical offices, libraries, fishing license outlets, etc.)	
Fishing regulation booklets	650,000 at 550+ license dealers
Journal or magazine publications	UW Medical Center -Caring for Yourself and Your Baby - 1800 Health Research for Action UC Berkeley - Perspectives: Fish Contamination -2400 American Academy of Pediatrics - Newborn Intensive Care: What Every Parent Needs to Know (3 <sup>rd</sup> ed)- 4000
Press releases	Variable
State Website	Fish Program Site: Average annual hits 80,000 Specific Recreational Advice: 60,000
Other method (Please specify)	Healthy Fish Guide- Provides commercial & recreational advice



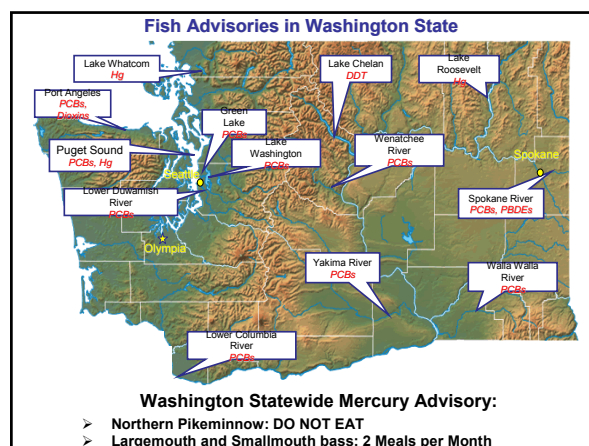
### Map of Bass' Hg Concentrations in Washington State 2005 – 2008

Map of Bass' Hg Concentrations in Washington State 2005 – 2008

Legend (Hg (ppb)):

- 0 - 100
- 101 - 200
- 201 - 300
- 301 - 400
- 400

Source: Furl & Meredith  
Washington State Dept. of Ecology 2009



## Risk Communication: Healthy Fish Guide

### Fishing for the Safest Seafood?

**SAFE TO EAT  
2-3 MEALS  
PER WEEK**

OR

**SAFE TO EAT  
1 MEAL  
PER WEEK**

**Look for this symbol.**

**Follow this advice to reduce your exposure to mercury, PCBs, and other toxics:**

<ul style="list-style-type: none"> <li>▼ Anchovies</li> <li>Butterfish</li> <li>Catfish</li> <li>Clams</li> <li>Cod (Atlantic)</li> <li>Cod (Alaska, King, Snow)</li> <li>Crab (Cooking)</li> <li>Crab-Imitation</li> <li>Crayfish</li> <li>Flounder/Sole</li> <li>Pinkfish (Atlantic)</li> <li>▼ Herring</li> <li>▼ Mackerel (domestic)</li> <li>▼ Oysters</li> <li>Pollock/Fish sticks</li> </ul>	<ul style="list-style-type: none"> <li>▼ Salmon (pink canned)</li> <li>▼ Chinook (Alaska)</li> <li>▼ Chum (Alaska, AK)</li> <li>▼ Coho (Silver)</li> <li>▼ Farmed *</li> <li>▼ Pink (Hawaii)</li> <li>▼ Sockeye (red)</li> <li>▼ Sardines</li> <li>Scallops</li> <li>Shrimp/Prawns</li> <li>Squid/Calamari</li> <li>Tilapia (US, Canada/South America)</li> <li>▼ Trout</li> </ul>	<ul style="list-style-type: none"> <li>▼ Black sea bass</li> <li>Chilean sea bass</li> <li>▼ Chinook salmon</li> <li>Coaker</li> <li>Hairtail/mullet (Alaska)</li> <li>Lobster (on can)</li> </ul>
---	--	--

A seafood serving or "meal" is about the size and thickness of your hand, or 1 oz. for every 20 lbs. of body weight.

**100 lb. Adult = 8 oz.    80 lb. Child = 4 oz.**

**Women who are or may become PREGNANT, NURSING MOTHERS, and CHILDREN should NOT eat:**

<ul style="list-style-type: none"> <li>Mackerel (Alaska)</li> <li>Marlin (canned)</li> <li>Shark</li> <li>Swordfish</li> <li>Tieflish</li> </ul>	<ul style="list-style-type: none"> <li>▼ Tunas, Albacore (canned, Alaskan, OR, CA freshwater) (except light)</li> </ul>	<ul style="list-style-type: none"> <li>Starla Straka</li> <li>Burbot</li> <li>Bigeye</li> <li>(canned/freshwater)</li> <li>Yellowfin</li> </ul>
--	---	---

**▼ Highest in mercury contain 3 fatty acids**

**ORANGE TEXT:** Overfished, farmed, or caught using methods harmful to marine life and/or environment.

For environmental and health information, visit [www.fish.wa.gov/fishfarm/index.html](http://www.fish.wa.gov/fishfarm/index.html).

Fish not listed? Call Doh: 1-877-485-7316


## Risk Communication, Education, and Outreach


[illegible]

## Recreational Fish Advisories

**SPORT FISHING RULES**      2009/2010 pamphlet edition

# FISHING IN WASHINGTON





**Effective from May 1, 2008, to  
April 30, 2009, both dates inclusive.**

*Pat McManamon*

### Let Fish! Read This! Advice from the Washington Department of Health

- **When you fish in Washington waters, please follow these important guidelines:**
  - **Don't eat fish from Puget Sound, the Strait of Juan de Fuca, or the Olympic Peninsula.** These areas are closed to eating fish because of concerns about contaminants in the water. The health benefits of eating fish are greatly outweighed by the risk of eating contaminated fish. For more information, visit [www.wa.gov/fish](http://www.wa.gov/fish).
  - **Remember Atlantic Salmon is Mercury-free.** The National Council on American-Soviet Fisheries has determined that Atlantic salmon is free of mercury, making it safe to eat. However, other species of salmon may contain mercury. For more information, visit [www.wa.gov/fish](http://www.wa.gov/fish).
  - **Never buy, sell, or consume recreational fish and fishing gear that is older than 10 years.** Older gear can contain lead, mercury, and other contaminants.

### Safe and Enjoyable Fish Advisories - Consumption Recommendations

Washington Department of Health (DOH) has developed consumption advisories for recreational fish and fishing gear that are older than 10 years. DOH is not responsible for the safety of recreational fishing gear or the safety of the fish caught in Washington waters.

Washington Department of Health (DOH) Consumption Advisories		Recreational Fish Advisories		Comments	Recreational Fishing Gear
Fish Species	Consumption Advisories	Fishing Gear	Comments	Comments	Comments
Alaska Salmon	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Atlantic Salmon	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Brown Trout	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Brook Trout	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Channel Catfish	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Coho Salmon	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Crappie	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Cutthroat Trout	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Delta Smelt	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Golden Shiner	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Green Sturgeon	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Halibut	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Herring	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Klamath Trout	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Landlocked Salmon	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Longnose Dace	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Mollusks	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Fish	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Invertebrates	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Mollusks	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Fish	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Invertebrates	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Mollusks	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Fish	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Invertebrates	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Mollusks	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Fish	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Invertebrates	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Mollusks	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Fish	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Invertebrates	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Mollusks	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Fish	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Invertebrates	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Mollusks	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Fish	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Invertebrates	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Mollusks	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Fish	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Invertebrates	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Mollusks	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Fish	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Invertebrates	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Mollusks	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Fish	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Invertebrates	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Mollusks	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Fish	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Invertebrates	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Mollusks	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Fish	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Invertebrates	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Mollusks	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Fish	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Invertebrates	Safe to eat	Safe to use	Safe to use	Safe to use	Safe to use
Marine Mollusks	Safe to eat	Safe to use	Safe to use	Safe to use	



## Washington (continued)

Washington State Dept. of Health Website:

<http://www.doh.wa.gov/ehp/oehas/fish/>

Contacts:

Dave McBride (360) 236-3176 <a href="mailto:Dave.McBride@doh.wa.gov">Dave.McBride@doh.wa.gov</a>	Joan Hardy (360) 236-3173 <a href="mailto:Joan.Hardy@doh.wa.gov">Joan.Hardy@doh.wa.gov</a>	Liz Carr (360) 236-3191 <a href="mailto:Liz.Carr@doh.wa.gov">Liz.Carr@doh.wa.gov</a>
--	--	--

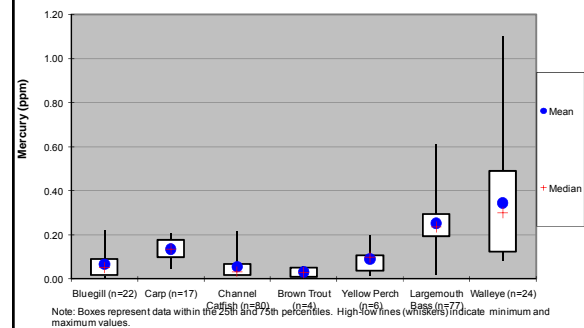


## West Virginia

Graphic #1 - Basis for Mercury Advisory Values Used by West Virginia: Populations addressed, toxicological bases, and points of departure

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children)	Other Population of Concern – please add populations of concern
<p>(Toxicological value or basis of advisory)</p> <p>RfD: 0.0011 mg/kg/day</p>			
1 meal/week $\geq$ .05 ppm mercury in fish tissue	<p>The size of the fish meal depends on an individual body weight. Adjust serving sizes, follow the advice in the meal size table. Please note that consumption advice is given in terms of meals for a given period such as a meal a week. Unless otherwise specified, an eight-ounce meal size is the standard amount allowed for an "average" adult. The average adult weighs approximately 150 pounds (equivalent to 70 kg). Because individuals and family members may weigh more or less than the average adult, you can use the following table as a general guide to adjust serving sizes to body weight.</p>		
2 meals/month $\geq$ .22 ppm mercury in fish tissue Note: Category added in 2005.			
1 meal/month $\geq$ .047 ppm mercury in fish tissue	<p>Remember that 3.0 ounces of precooked fish is about the size of the palm of your hand or a deck of cards</p>		
6 meals/year $\geq$ .94 ppm mercury in fish tissue			
No consumption $\geq$ 1.88 ppm mercury in fish tissue	<p>Remember that 1.5 ounces of precooked fish is about one-half the size of the palm of your hand or one-half of a deck of cards</p>		

Graphic #2 - Mercury Concentrations in Selected Fish Species in West Virginia



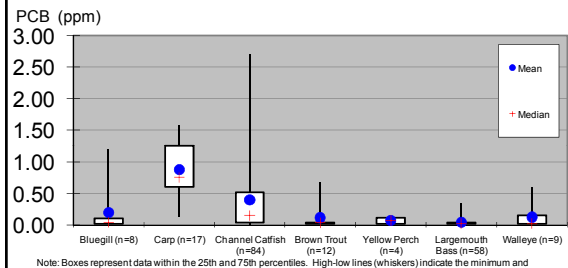
Graphic #3 - Locations Where Mercury Concentrations in Largemouth Bass Were Below or Above West Virginia Mercury Thresholds

## Locations where fish were tested for mercury:

- Up to 2 meals per week  $\leq$  .22 ppm
- Up to 2 meals per month  $\leq$  .47 ppm
- Up to DO NOT EAT  $\leq$  1.88 ppm



Graphic #4 - PCB Concentrations in Selected Fish Species in West Virginia



Graphic #5 - Locations Where PCB Concentrations in Largemouth Bass Were Below or Above West Virginia PCB Thresholds

## Locations where fish were tested for PCB:

- Up to 1 meals per week  $\leq$  .15 ppm
- Up to 2 meals per month  $\leq$  .34 ppm
- Up to DO NOT EAT  $\leq$  1.34 ppm



Graphic #6 - Risk Communication Materials Used by West Virginia to Inform Fishers

Communication Material	Number distributed per year
Pamphlets or fact sheets	2000
Signs at fishing access points Note: Kanawha River Dioxin Only	8 (placed in 2003)
Posters (medical offices, libraries, fishing license outlets, etc.)	0
Fishing regulation booklets	250,000
Journal or magazine publications	0
Press releases	1
State Website - Hits	1941
Other method (Please specify)	Conferences



## Winnebago Tribe of Nebraska

### Basis for Mercury Advisory Values Used by Winnebago Tribe of Nebraska: Populations addressed, toxicological bases, and points of departure

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children)	Sensitive Population (Elderly)
0.3 mg/kg	0.3 mg/kg	0.3 mg/kg	0.3 mg/kg
No consumption $\geq$ 0.3 mg/kg mercury in fish tissue	No consumption $\geq$ 0.3 mg/kg mercury in fish tissue	No consumption $\geq$ 0.3 mg/kg mercury in fish tissue	No consumption $\geq$ 0.3 mg/kg mercury in fish tissue

Mercury advisory value is based on EPA Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 1: Fish Sampling and Analysis – Third Edition. In order to protect the public, a general no consumption advisory was posted. More detailed fish consumption rates will be posted pending further investigation.

### Risk Communication Materials Used by Winnebago Tribe of Nebraska to Inform Public

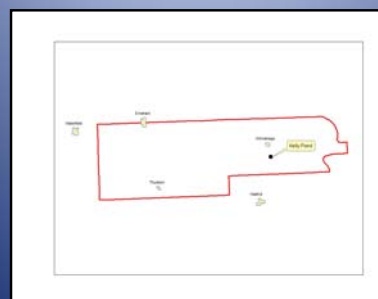
Communication Materials	Number Distributed Per Year
Tribal Council	- First informed in 2005/permission granted to post no consumption advisory - Updated 2007 and 2009
Signs posted at fishing access points	- First posted in 2005 - Replaced in 2007
Winnebago Tribal newspaper (Winnebago Indian News)	- Posted yearly - Distributed in Post Office boxes of those with yearly subscriptions and consignment sales at local store and gas station
Other method: Fish Tissue Study: 2005 and 2007	- Written/Oral Presentation given to Tribal Safety Committee and written (only) given to Tribal Council and Physical Resources Department in 2008 - Tribal Safety Committee consists of representation from Tribal offices and Health Department - Anticipated update in 2010

### Mercury Concentrations in Kelly Pond: Winnebago Tribe of Nebraska

Year	Species	Common Name	Mercury Level (mg/kg)
2005	Predator	Black Crappie	0.54*
2005	Bottom Feeder	Black Bullhead	0.17
2006	Predator	Black Crappie	0.55*
2007	Predator	Largemouth Bass	0.32*
2007	Bottom Feeder	Channel Catfish	0.39*
2009	Predator	Black Crappie	0.32*
2009	Predator	Largemouth Bass	0.18

Note: \* = Designates a level above the advisory value

### Location Where Fish Advisory Has Been Issued for the Winnebago Tribe of Nebraska





## Wisconsin

**Basis for Mercury Advisory Values Used by Wisconsin:**  
Populations addressed, toxicological bases, and points of departure

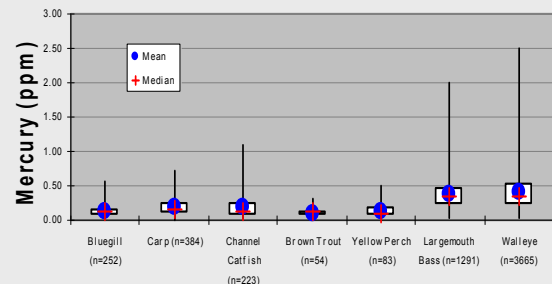
General Population – Men and Older Women	Sensitive Population – Pregnant/nursing women or of childbearing age AND children under age 15
<b>0.3 µg Hg/kg/day</b>	<b>0.1 µg Hg/kg/day</b>
1 meal/week $\geq$ 0.16 ppm Hg in edible portions	1 meal/week $\geq$ 0.05 ppm mercury in edible portions
1 meal/month $\geq$ 0.65 ppm mercury in edible portions	1 meal/month $\geq$ 0.22 ppm mercury in edible portions
No consumption $\geq$ 2.81 ppm mercury in edible portions (not needed in WI to date)	No consumption $\geq$ 0.95 ppm mercury in edible portions

Statewide advice applies to all inland waters (non-Great Lakes) and ranges from unrestricted to do not eat depending on the fish species based on statewide Hg concentration (averages and distribution) and other factors including communication considerations.

Exceptions or site-specific advice is provided for species at locations where higher or lower concentrations of mercury are found, for locations where PCBs or other pollutants require more stringent advice.

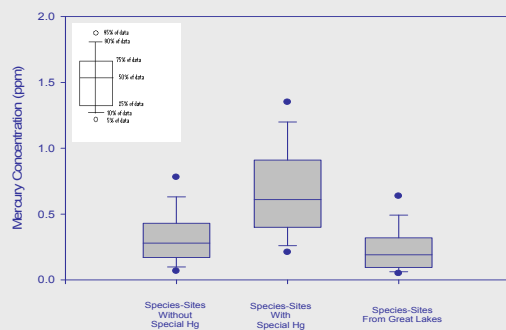


**Mercury Concentrations in Selected Fish Species in Wisconsin**  
edible portions, 1998-2007, all locations

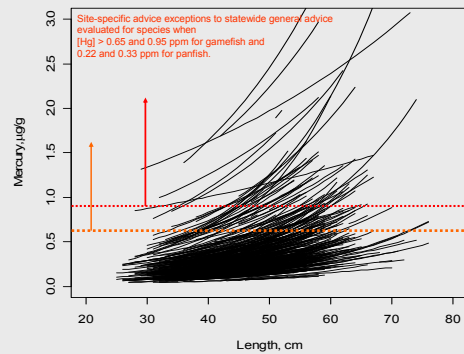


Note: Boxes represent data within the 25th and 75th percentiles. High-low lines (whiskers) indicate the minimum and maximum.

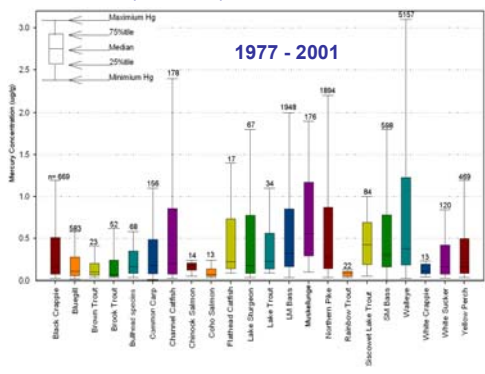
**Mercury concentrations (ppm) in filets of Wisconsin fish**  
(all species, 1990-2005)



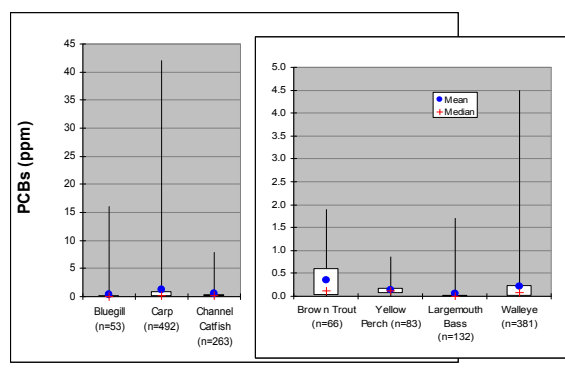
**Predicted Mercury Concentration – Length Relationship in Walleye in Wisconsin by Lake (Rasmussen et al 2007)**



**Mercury Concentrations in Selected Fish Species in Wisconsin**  
edible portion samples, 1977-2001, all locations

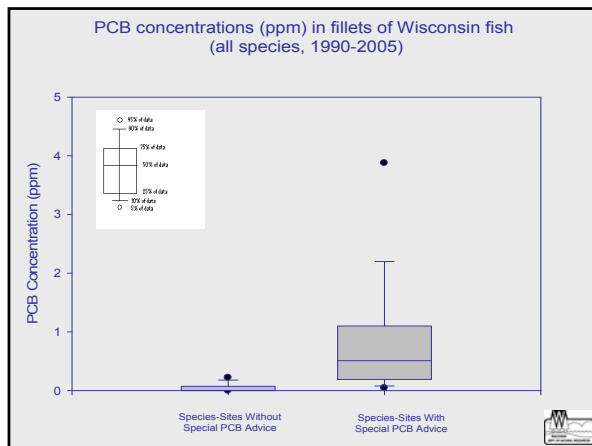


**PCB Concentrations in Selected Fish Species in Wisconsin**  
edible portion samples, 1998-2007, all locations sampled





## Wisconsin (continued)

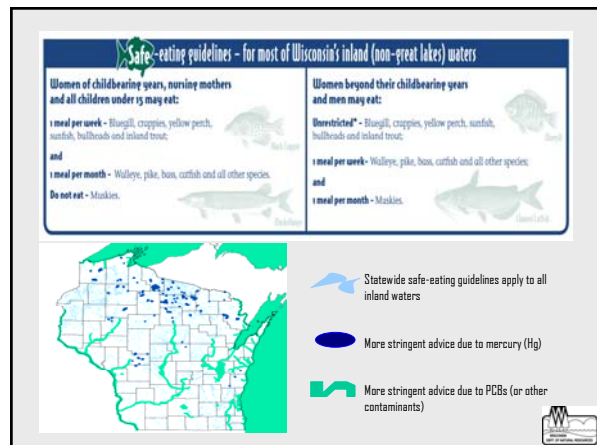


Number of Waterbody-specific Advisories Issued in Wisconsin by Contaminant (2009)

STATEWIDE ADVISORY IN EFFECT FOR ALL OTHER WATERS (INLAND, NON-GREAT LAKES)	
48	Polychlorinated biphenyls (PCBs) 33%
102	Mercury 70%
4	Dioxin/Furans (2,3,7,8 substituted TECs) 3%
3	Perfluorochemicals – PFOS 2%
0	Polybrominated diphenylethers (PBDEs)
0	Other Heavy Metals (e.g. Lead, Chromium, Nickel, Cadmium, Arsenic)
0	Banned Pesticides (e.g. DDT and metabolites, Chlordane, Dieldrin)
146	Total advisory reaches with exceptions to statewide advice (some with multiple contaminants)

Risk Communication Materials Used by Wisconsin to Inform Anglers and the Public

Communication Material	Number distributed per year
Pamphlets or fact sheets	28,000 advisory booklets, 150,000 fishing reports, plus Undetermined fact sheets
Signs at fishing access points	only at limited priority locations due to maintenance workload and signage overload
Posters (medical offices, libraries, fishing license outlets, etc.)	
Fishing regulation booklets	1,000,000
Journal or magazine publications	Yes, varies by year
Press releases	Annually and occasionally
State Website	<a href="http://dnr.wi.gov/fish/consumption/">http://dnr.wi.gov/fish/consumption/</a> <a href="http://dhs.wi.gov/eh/fish/">http://dhs.wi.gov/eh/fish/</a> plus local health agencies
Other method (Please specify)	Twitter and Govdel (10 messages/year, 660 Twitter followers, 18,000 Govdel subscribers)





## Wyoming

## Wyoming's Nascent Fish Contaminants Program

Timothy P. Ryan, PhD Wyoming Department of Health



Table 1. Basis for Mercury Advisory Values Used by Wyoming: Populations addressed, toxicological bases, and points of departure.

General Population	Sensitive Population (Pregnant/nursing women)	Sensitive Population (Children)
Prudent consumption $\leq$ .30 ppm mercury in fish tissue	2 meal/week $<$ .30 ppm mercury in fish tissue	2 meal/week $<$ .30 ppm mercury in fish tissue
1-2 meal/month $\geq$ .30 ppm mercury in fish tissue	No consumption $\geq$ .30 ppm mercury in fish tissue	No consumption $\geq$ .30 ppm mercury in fish tissue

Figure 1. 2007-2009 Fish advisory published in the Wyoming Fishing Regulations.

**Hook into Health**  
Advice on eating fish

From the Wyoming Department of Health

Most fish are healthy to eat and good for you – high in protein and other nutrients and low in fat. But some kinds of fish contain high amounts of mercury, which can cause health problems in people, especially children. People should avoid eating too much of these types of fish. To help you make the healthiest choices, the Wyoming Department of Health in cooperation with the Wyoming Game and Fish Department offer the following advice.

Women of childbearing age, pregnant women, nursing mothers and children under 15 years	Fish LOW in Mercury Up to 2 meals per week	Fish HIGH in Mercury Do not eat
All other people	Suggest prudent consumption 1-2 meals per month	

**Fish That Are Low in Mercury**

<b>Ocean Fish</b> • Cod • Canned light tuna • Crab • Frozen ready to cook fish • Flounder • Halibut • Haddock • Hake	• Herring • Lobster • Mahi Mahi • Ocean perch • Oysters • Salmon	<b>Freshwater Fish</b> • Wyoming-caught trout • Other Wyoming fish continue to be monitored - • Goldeneye Reservoir has been found to have low levels of mercury in all species. • Farm-raised catfish and tilapia
--	---	--

**Fish That Are HIGH in Mercury**

<b>Ocean Fish</b> • Canned white tuna (albacore tuna) • Shark • King mackerel • Marlin • Orange roughy • Tuna (fresh/frozen)	<b>Freshwater Fish</b> • Channel catfish, sauger, and walleye from Big Horn, Seminoe, and Pathfinder reservoirs
--	--

In general, Wyoming fish are low in mercury. To the safe, women of childbearing age, pregnant women, nursing mothers and children under the age of 15 should eat more small Wyoming-caught fish and eat fewer large fish. This is because the longer a fish lives the greater its chance of accumulating mercury in its tissues. Also, fish that feed on other fish or bottom-feeders are more likely to accumulate mercury (like channel catfish, bass, sauger, and walleye). These guidelines are based on current information from the Wyoming Game and Fish Department. As further testing results become available guidelines may change. Please visit [www.health.wyo.gov](http://www.health.wyo.gov) for more information.

\*Guidance is based on limited data. As more testing is done, fish will be categorized accordingly.

## Abstract:

Fish from thirty-one Wyoming lakes were sampled for mercury and selenium contamination. Ten lakes yielded fish exceeding the 0.3 ppm mercury criterion; these lakes were prioritized for more comprehensive sampling. No fish exceeded the selenium screening value of 20 ppm.

## Screening Study:

In 2007, Wyoming issued its first fish consumption advisory (Figure 1). Between 2000 and 2007 the Wyoming Game and Fish Department collected fish from 31 lakes for mercury and selenium analysis (Figure 2). Waters were selected for sampling based on two criteria; 1) having a fish population dominated by at least one of the EPA recommended target species for inland waters and common in Wyoming (i.e. walleye, lake trout, brown trout, rainbow trout), and 2) considered to be a moderately to heavily utilized recreational fishery.

Ten lakes yielded fish exceeding the EPA 0.3 ppm criterion for methylmercury (based on consumption of 0.0175 kg fish/day) (Figure 3). Fish have since been extirpated from one of the waters, Goldeneye Reservoir, by high salinity resulting from the ongoing drought. The remaining nine lakes are large reservoirs with extensive catchments, except for Half Moon Lake. These lakes were prioritized for more rigorous sampling, that could support consumption advisories, in order of the most contaminated sample collected from each lake; reasoning that the spectrum of sizes and species collected by managers reflect the catch available to anglers.

Wyoming waters are low in species diversity, so the 31 screened lakes yielded only 12 species. Seven of these species: walleye, channel catfish, sauger, brown trout, northern pike, smallmouth bass, and lake trout exceeded the 0.3 ppm criterion in one or more lakes. Only walleye, channel catfish and brown trout are common. Fortunately, the most commonly caught and sought after species in Wyoming, rainbow trout and cutthroat trout, were never found in excess of the 0.3 ppm criterion, even in very large specimens. Rainbow, cutthroat, and for Kokanee salmon provide a risk free alternative for consumption in every reservoir except Big Horn. Also, walleye, though present in seven of the nine prioritized lakes, are not common in Wyoming.

Figure 2. Location of lakes in Wyoming selected for the screening study between 2000 and 2007.

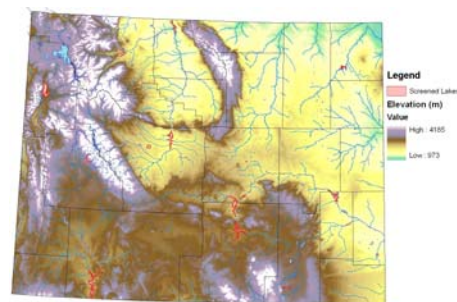
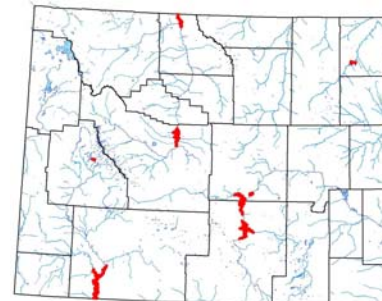


Figure 3. Wyoming waters yielding fish samples exceeding 0.3 ppm Hg. Numbers reflecting their priority for more intensive sampling to support consumption advisories.



## For further information

Please contact Timothy Ryan at [timothy.ryan@health.wyo.gov](mailto:timothy.ryan@health.wyo.gov) or (307) 777-2931.