

# **SURVEY OF WEST VIRGINIA RESIDENTS' CONSUMPTION OF FISH**

**Conducted for the West Virginia Department of  
Environmental Protection  
by Responsive Management**

**November 2008**

# BACKGROUND

- **West Virginia's current methylmercury fish tissue criterion of 0.5 ug/g is different from EPA's recommended criterion of 0.3 ug/g**
- **West Virginia's current mercury criteria for protection of aquatic life are different from the criteria currently recommended by EPA**

# WEST VIRGINIA CURRENT MERCURY CRITERIA

47CSR2  
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C <sup>3</sup>	A <sup>4</sup>	
	ACUTE <sup>1</sup>	CHRON <sup>2</sup>	ACUTE <sup>1</sup>	CHRON <sup>2</sup>			
8.18 Mercury The total organism body burden of any aquatic species shall not exceed 0.5 ug/g as methylmercury.					0.5	0.5	
8.18.1 Total mercury in any unfiltered water sample shall not exceed (ug/l):	2.4		2.4		0.15	0.14	
8.18.2 Methylmercury (water column) Not to exceed (ug/l):		.012		.012			

# Current Recommended Federal Criteria

Priority Pollutant	CAS Number	Freshwater		Saltwater		Human Health for the consumption of		FR Cite/ Source
		CMC (acute) (µg/L)	CCC (chronic) (µg/L)	CMC (acute) (µg/L)	CCC (chronic) (µg/L)	Water + Organism (µg/L)	Organism Only (µg/L)	
8a Mercury	7439978	1.4 <a href="#">D,K,hh</a>	0.77 <a href="#">D,K,hh</a>	1.8	0.94		0.3 mg/kg <a href="#">J</a>	62FR42180 EPA823-R-01-001
8b Methylmercury	22967928							

D. Criterion is for Dissolved Hg. The old aquatic life criterion - expressed as total Hg - was multiplied by a recommended conversion factor to convert it from total to dissolved. See "[Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria](#)," - Attached. Conversion Factor is summarized in Appendix A below.

K This recommended criterion is based on a 304(a) aquatic life criterion that was issued in the [1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water](#). **(This document must be purchased from NTIS)** (EPA-820-B-96-001, September 1996). This value was derived using the GLI Guidelines (60FR15393-15399, March 23, 1995; 40CFR132 Appendix A); the difference between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. None of the decisions concerning the derivation of this criterion were affected by any considerations that are specific to the Great Lakes.

J This fish tissue residue criterion for methylmercury is based on a total fish consumption rate of 0.0175 kg/day. This is the number derived from the summation of the different fish trophic levels (See Barb Smith's spreadsheet from 4/10/06)

hh This recommended water quality criterion was derived from data for inorganic mercury (II), but is applied here to total mercury. **If a substantial portion of the mercury in the water column is methylmercury, this criterion will probably be under protective.** In addition, even though inorganic mercury is converted to methylmercury and methylmercury bioaccumulates to a great extent, **this criterion does not account for uptake via the food chain** because sufficient data were not available when the criterion was derived.

## Appendix A - Conversion Factors for Dissolved Metals

Metal	Conversion Factor freshwater CMC	Conversion Factor freshwater CCC	Conversion Factor saltwater CMC	Conversion Factor saltwater CCC <sup>1</sup>
Mercury	0.85	0.85	0.85	0.85

## **BACKGROUND cont.**

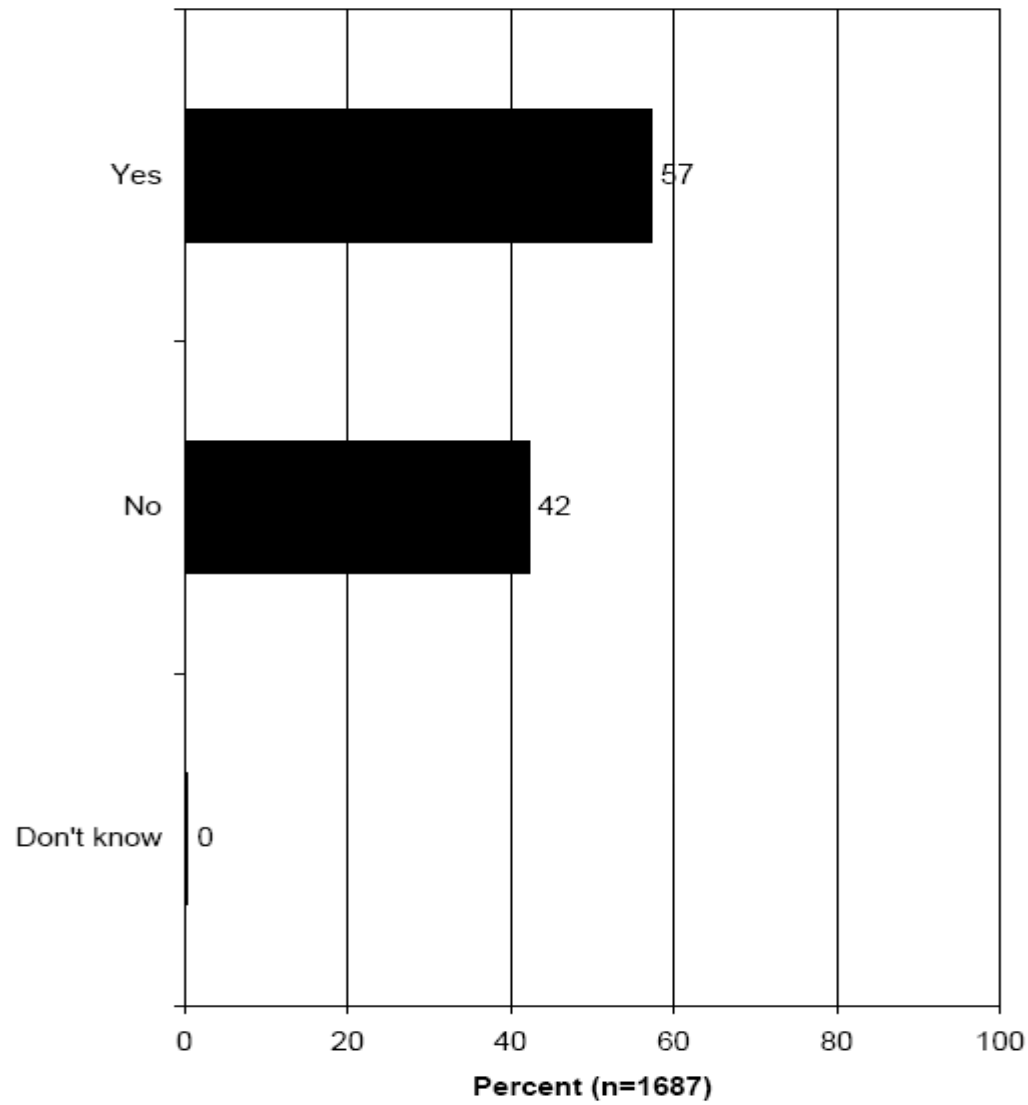
- **In 2005, Responsive Management conducted a telephone survey for The West Virginia DNR**
- **Published a document entitled “West Virginia Residents Attitudes Toward Wildlife, Their Participation In Wildlife-Related Recreation, And Their Consumption Of Fish Caught In West Virginia”**
- **Data indicated that the fish consumption rates for WV residents may be less than the rates computed by EPA for the general U.S. population**



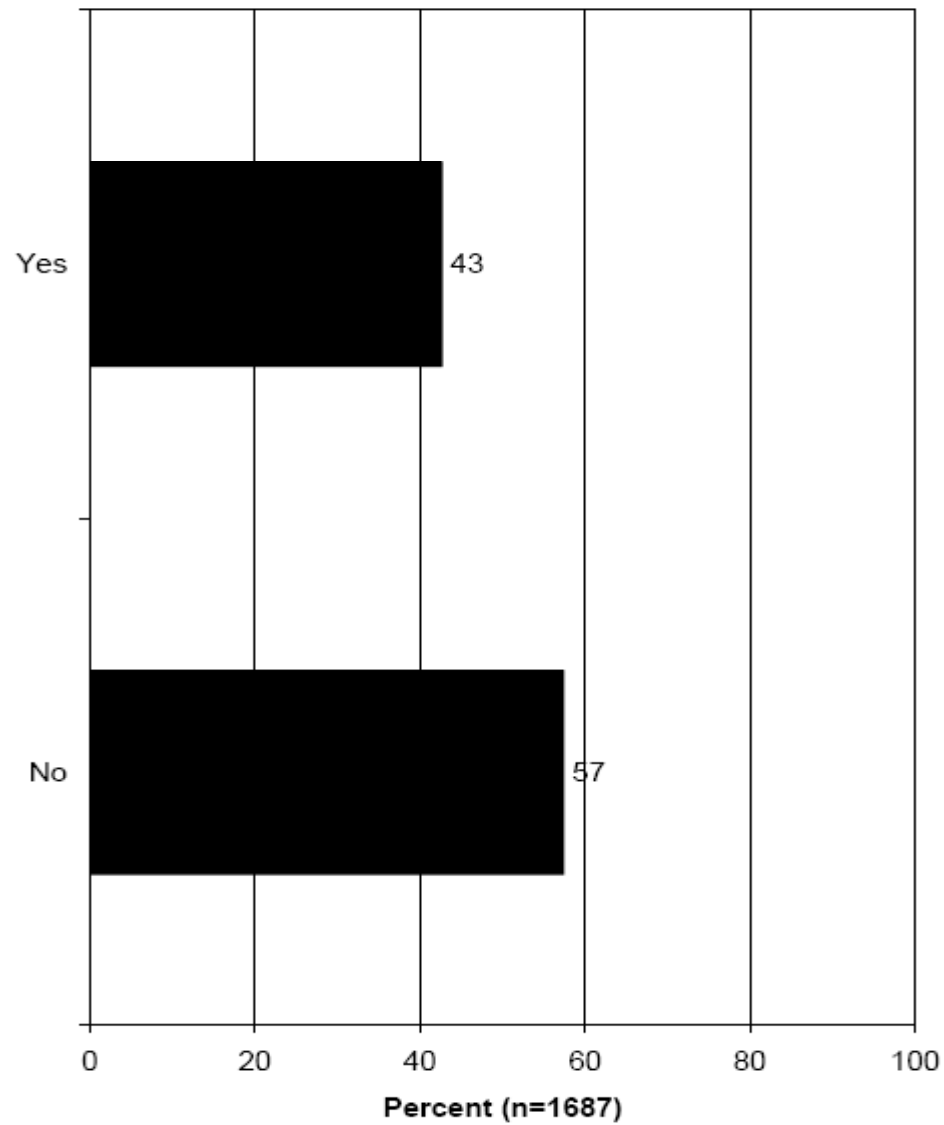
# **SURVEY OF WEST VIRGINIA RESIDENTS CONSUMPTION OF FISH**

- **Telephone Survey of West Virginia Residents  
18 Years of Age and Older**
- **Conducted in October 2008**
- **1,687 Interviews Completed**

**Q11. Have you eaten any freshwater fish, saltwater fish, or shellfish in the past 12 months?**

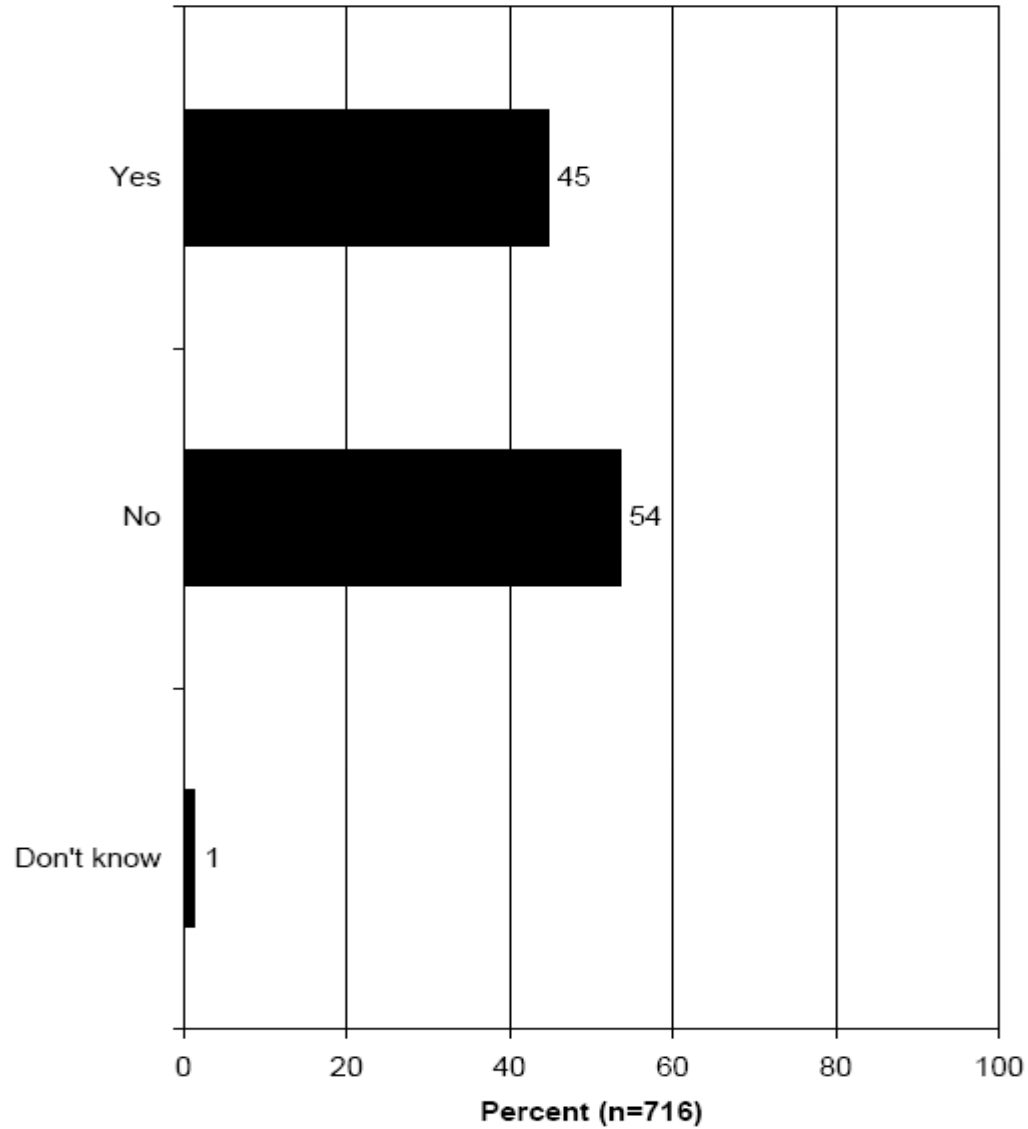


**Total percentage of all West Virginia residents from the sample who have eaten freshwater fish in the past 12 months.**

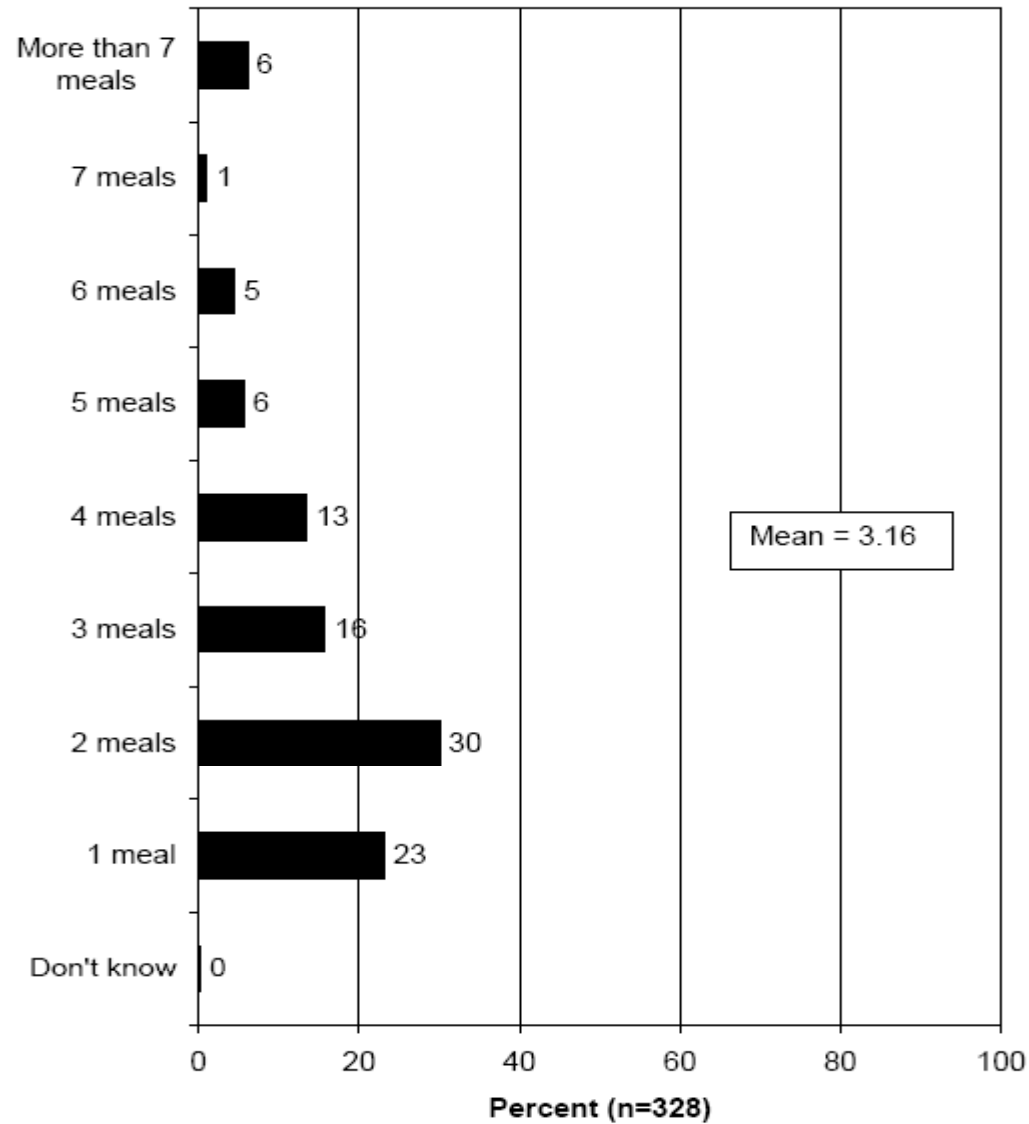




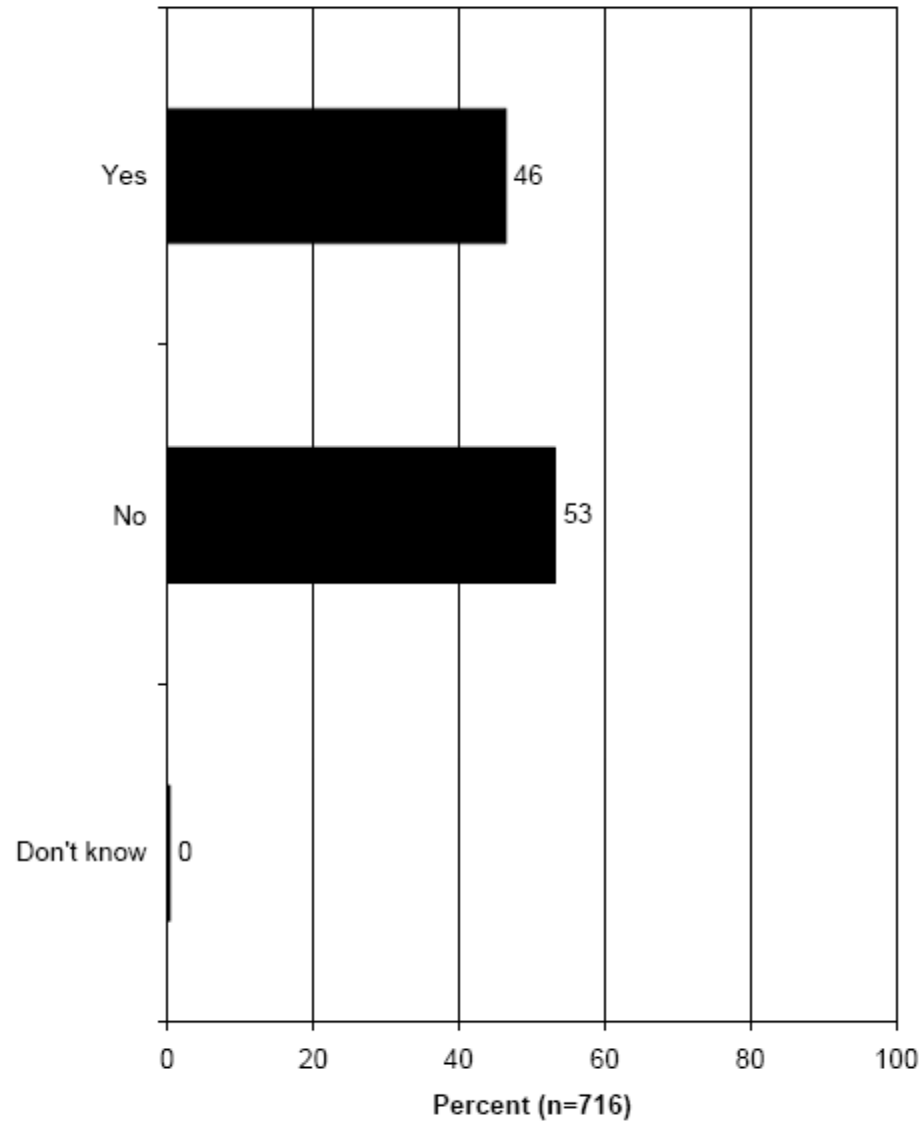
**Q17. Have you eaten any freshwater fish in the past 30 days? (Asked of those who have eaten any freshwater fish in the past 12 months.)**



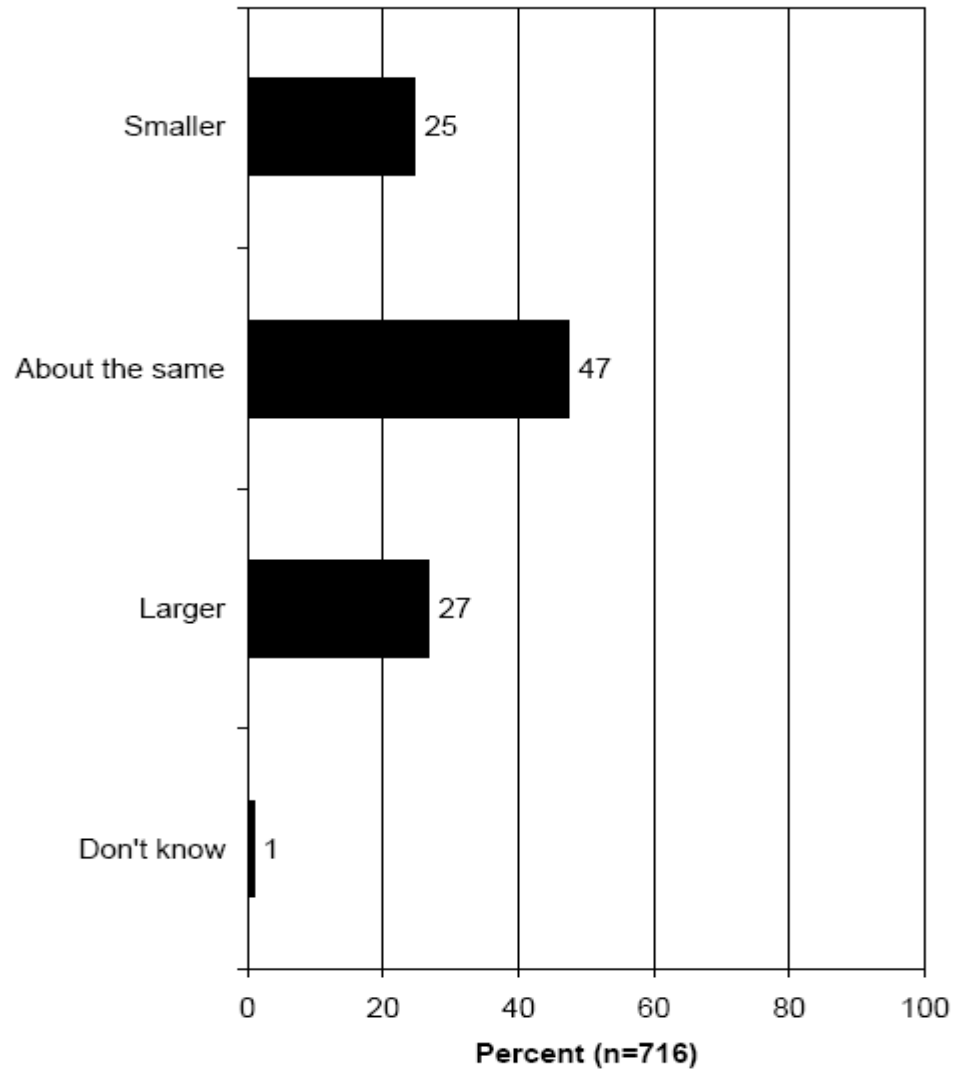
**Q18. How many meals with freshwater fish would you say you have eaten in the past 30 days? (Asked of those who ate freshwater fish in the past 30 days.)**



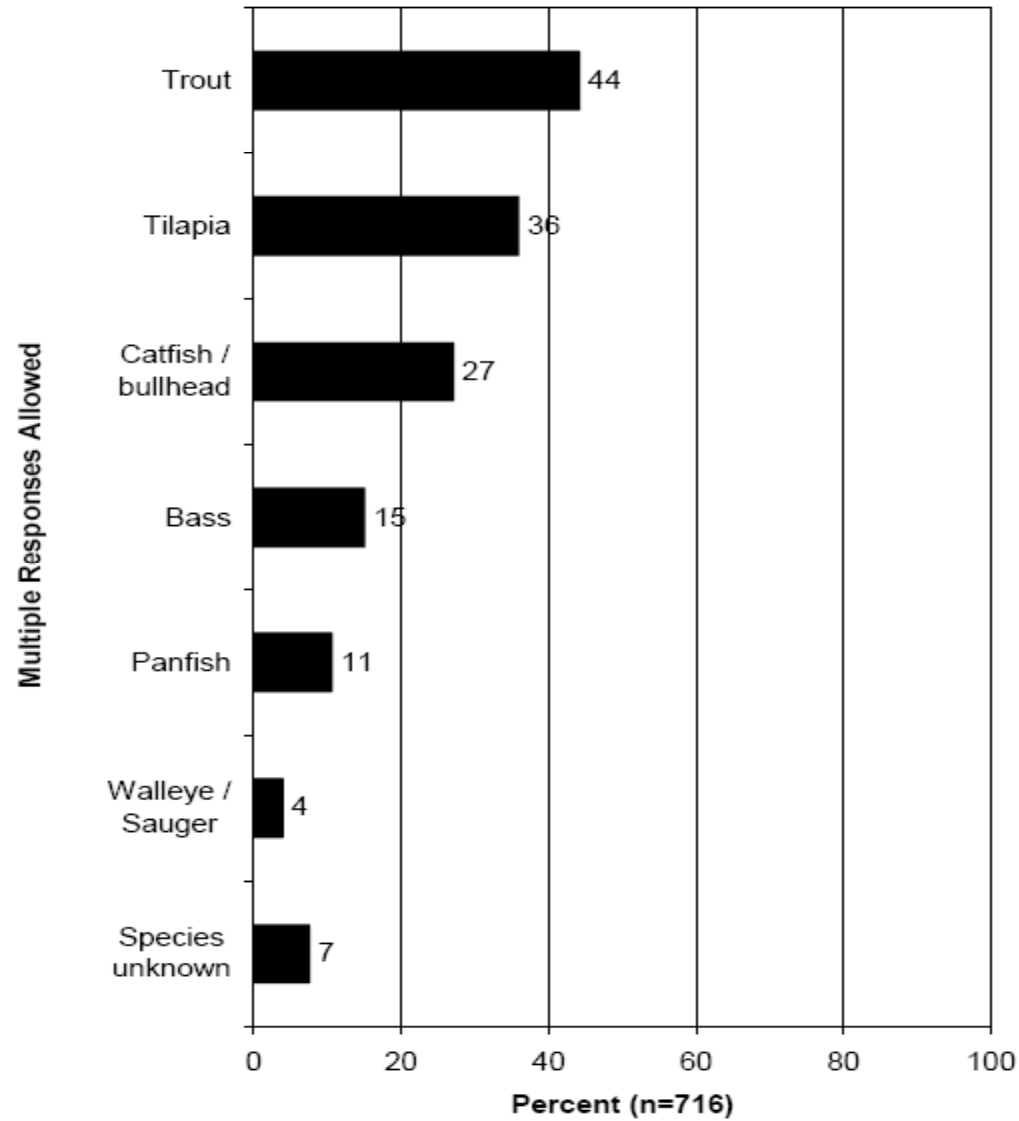
**Q24. Have you been freshwater fishing in the past 12 months? (Asked of those who have eaten freshwater fish in the past 12 months.)**



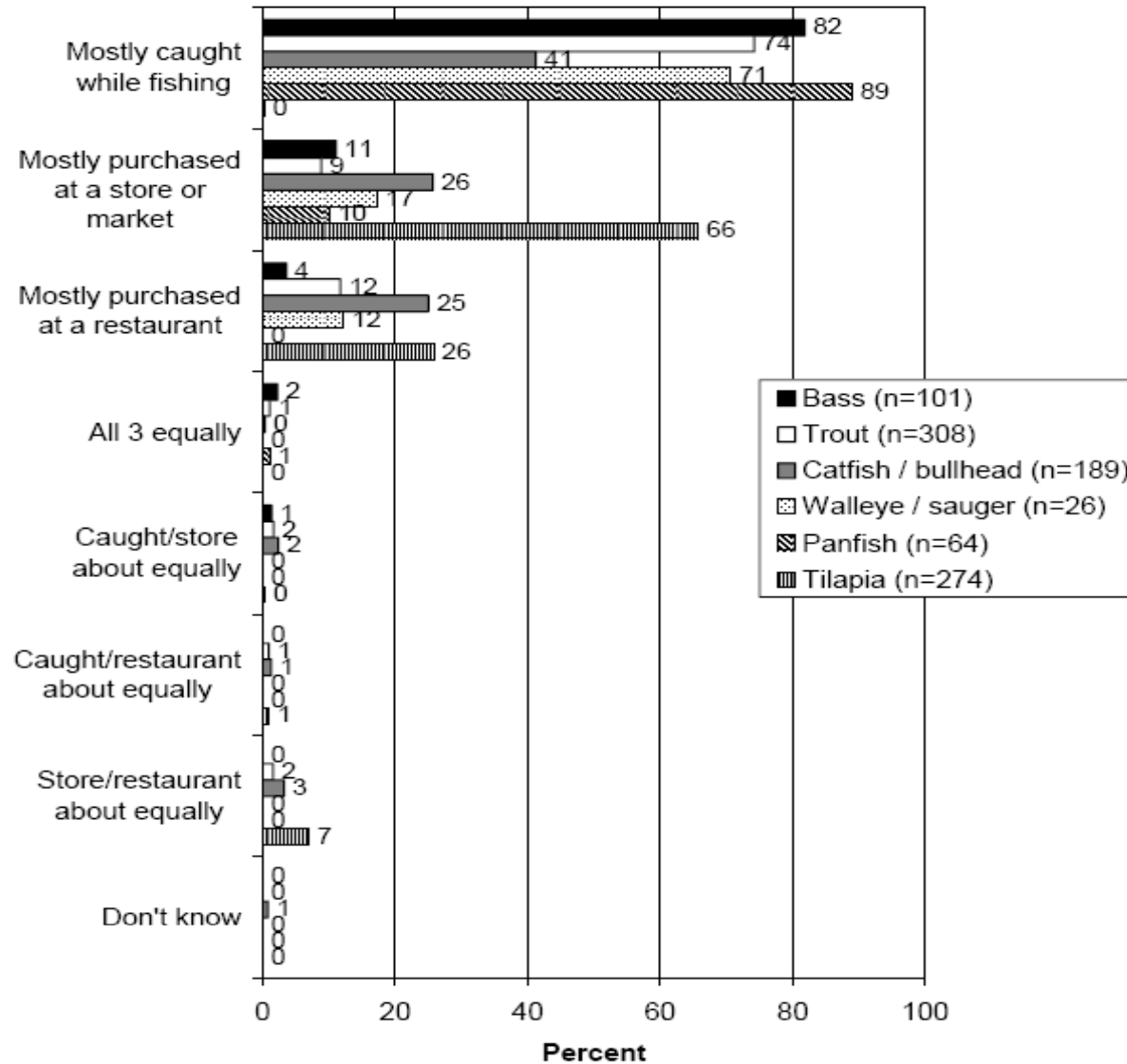
**Q26. When you ate freshwater fish in the past 12 months, would you say you usually ate a portion that was smaller, about the same, or larger than 8 ounces? (Asked of those who have eaten freshwater fish in the past 12 months.)**



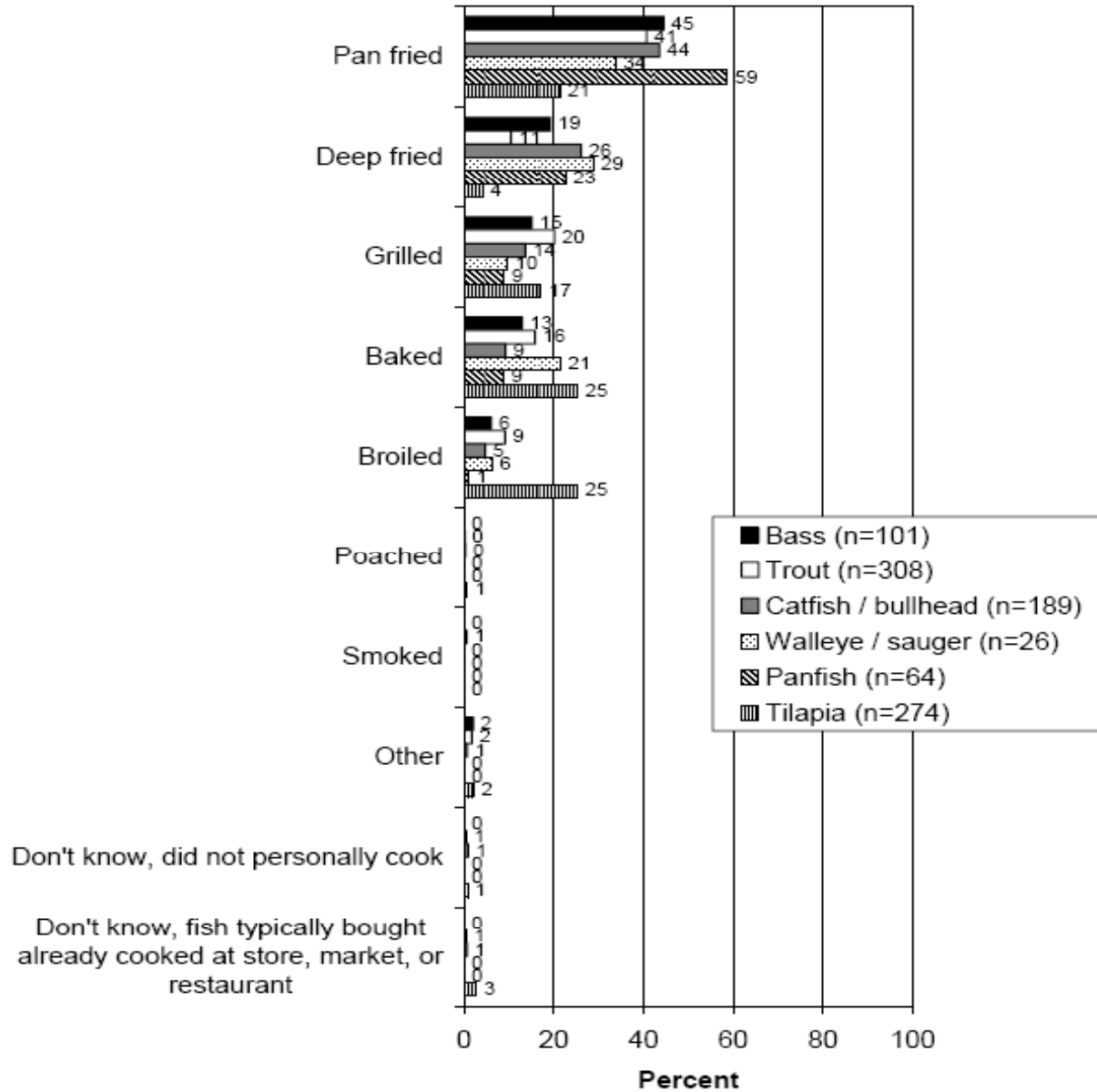
**Q27. Which species or type of freshwater fish did you eat in the past 12 months? (Asked of those who have eaten freshwater fish in the past 12 months.)**



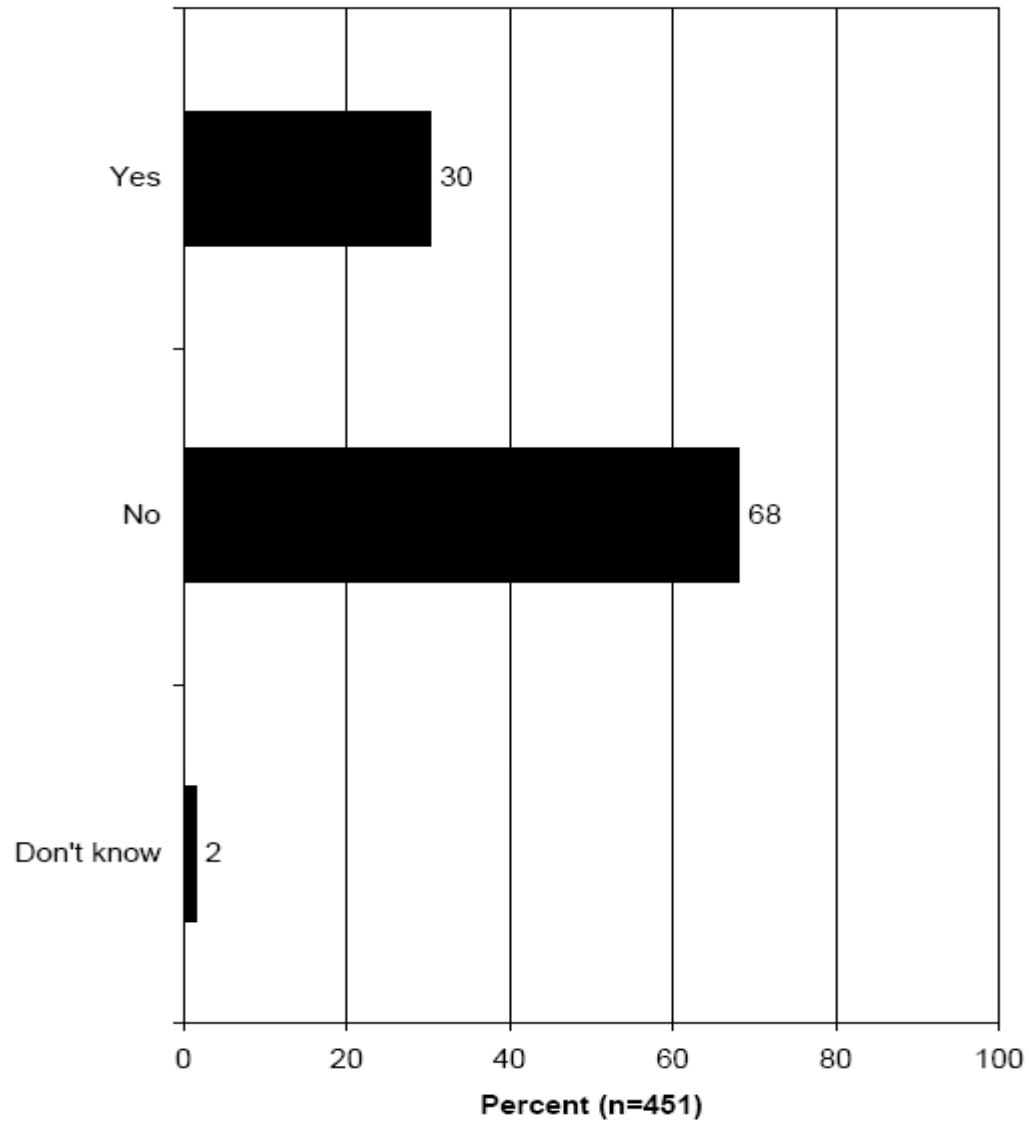
**Q92. Was the freshwater fish you ate in the past 12 months mostly caught while fishing by you, family, or a friend, mostly purchased at a store or market, or mostly purchased at a restaurant?**



**Q98. When you ate freshwater fish in the past 12 months, how was the fish typically cooked?**

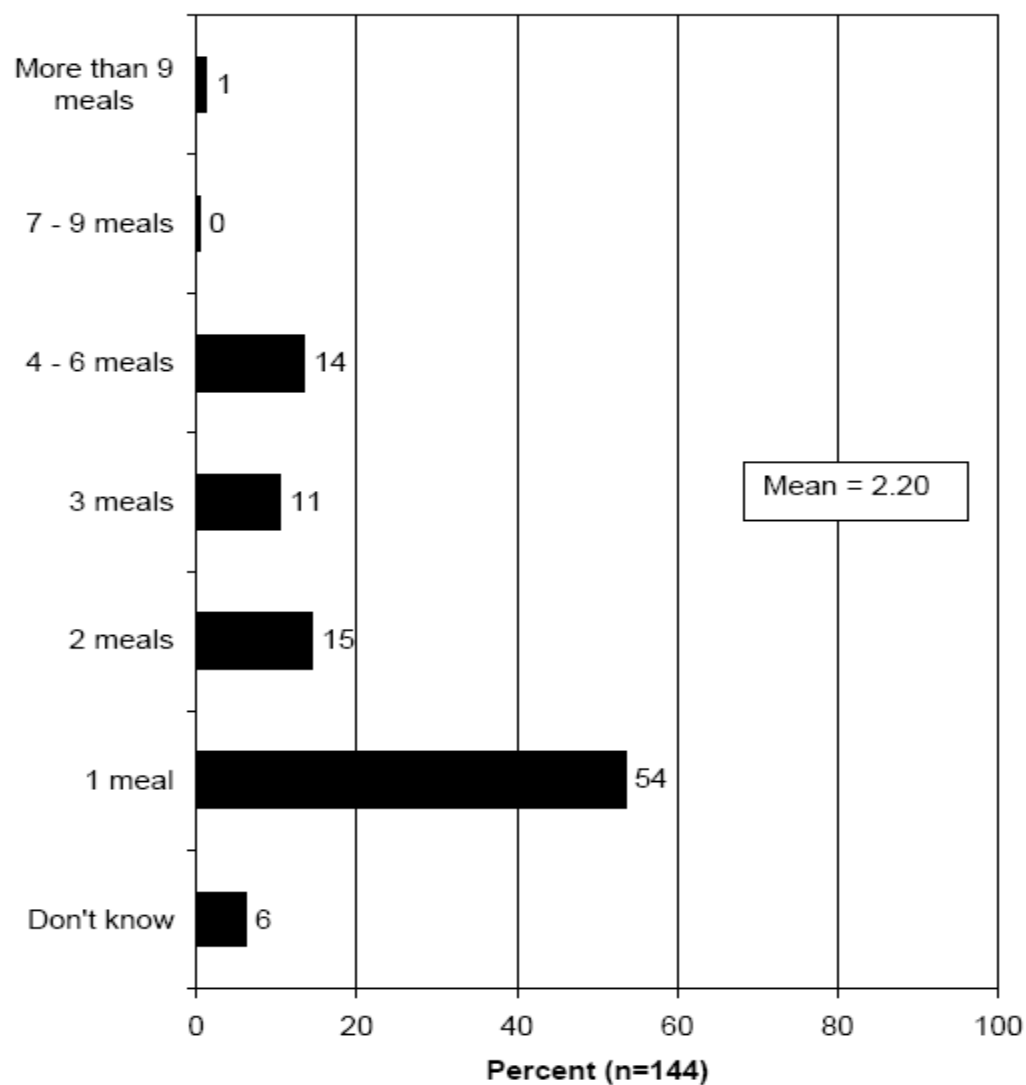


**Q280. Has your child eaten any freshwater fish in the past 12 months? (Asked of those who have at least one child 17 or younger living in the household.)**

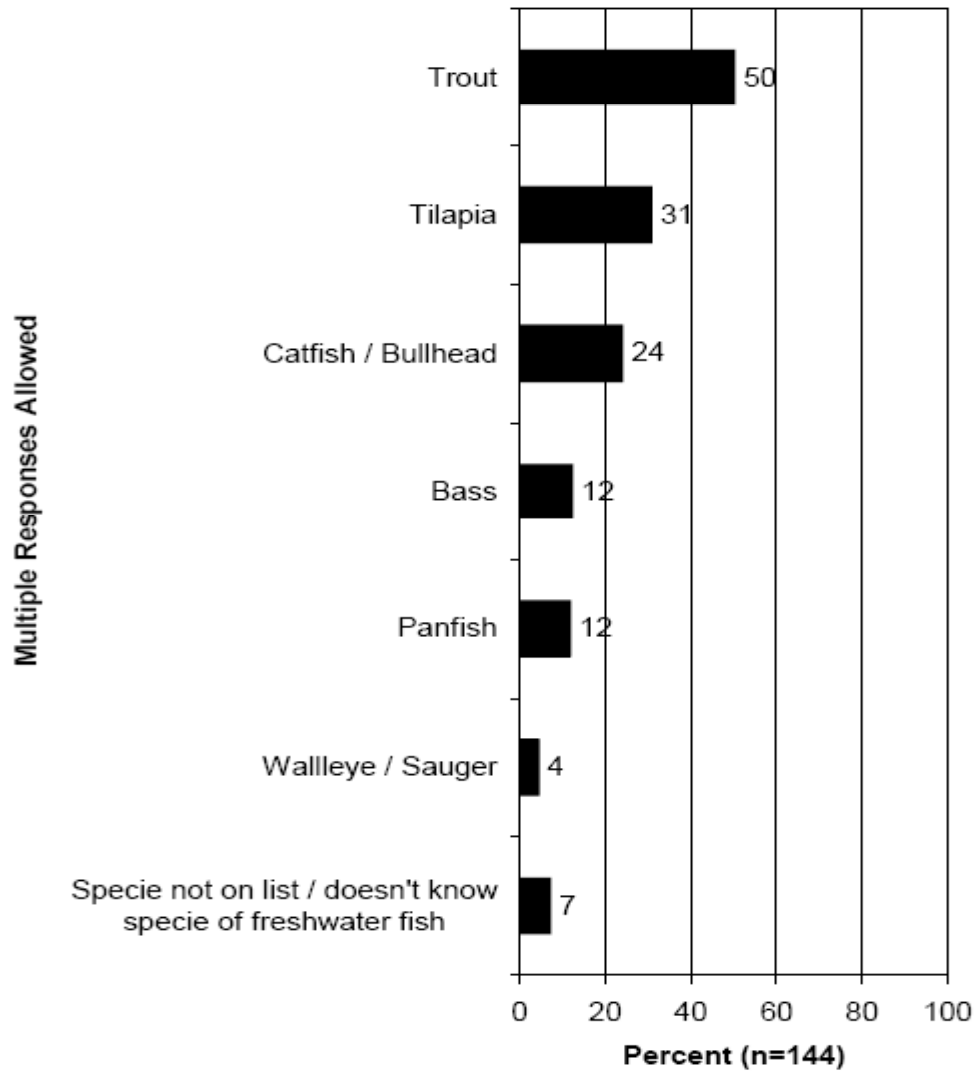




**Q281. How many meals with freshwater fish did your child typically eat per month in the past 12 months? (Asked of those who have at least one child 17 or younger living in the household who has eaten freshwater fish in the past 12 months.)**



**Q284. Which species of freshwater fish did your child eat in the past 12 months? (Asked of those who have at least one child 17 or younger living in the household who has eaten freshwater fish in the past 12 months.)**



## WV Daily Freshwater Fish Consumption

Weighted	random	90% of West Virginia residents 18 and older consume up to <b>9.94175056657534</b> grams of freshwater fish daily.
	fixed	90% of West Virginia residents 18 and older consume up to <b>9.94175056657534</b> grams of freshwater fish daily.
Unweighted	random	90% of West Virginia residents 18 and older consume up to <b>9.24272122986301</b> grams of freshwater fish daily.
	fixed	90% of West Virginia residents 18 and older consume up to <b>9.32039115616438</b> grams of freshwater fish daily.

## FORMULA FOR CALCULATING METHYLMERCURY FISH TISSUE CRITERION

$$TRC = \frac{BW \times (RfD - RSC)}{\sum_{i=2}^4 FI}$$

Where:

- TRC* = Fish tissue residue criterion (mg methylmercury/kg fish tissue) for freshwater and estuarine fish and shellfish.
- RfD* = Reference Dose (based on noncancer human health effects). For methylmercury it is 0.1 µg/kg body weight/day.
- RSC* = Relative source contribution (subtracted from the RfD to account for methylmercury in marine fish consumed<sup>8</sup>) estimated to be 0.027 µg/kg body weight/day.
- BW* = Human body weight (default value of 70 kg for adults).
- FI* = Fish intake at trophic level (TL) *i* (*i* = 2, 3, 4); total default intake of uncooked freshwater and estuarine fish is 17.5 g fish/day for the general U.S. adult population.<sup>9</sup>

## Calculated Methylmercury Body Burden Criteria Utilizing WV Fish Consumption Rates

Weighted	random	@ 9.95 g fish/day TRC = 0.514 ug/g
	fixed	@ 9.95 g fish/day TRC = 0.514 ug/g
Unweighted	random	@ 9.25 g fish/day TRC = 0.553 ug/g
	fixed	@ 9.33 g fish/day TRC = 0.548 ug/g

# CONCLUSIONS

- Utilizing the newly established WV fish consumption rates, the calculated fish tissue criterion for methylmercury ranges from 0.514 to 0.553 ug/g
- The calculated range of 0.514 to 0.553 ug/g methylmercury is consistent with the current WV fish tissue criterion of 0.5 ug/g methylmercury
- The scientific evidence supports the conclusion that WV's current fish tissue criterion of 0.5 ug/g is protective of human health, therefore a revision is unnecessary



dep

west virginia department of environmental protection