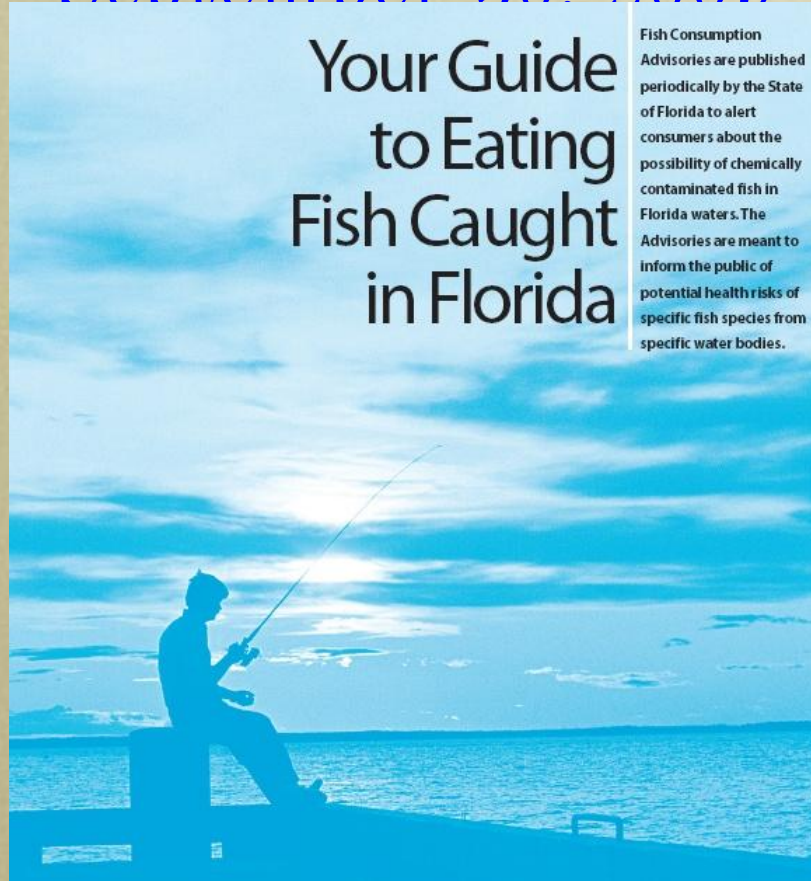


# Santa Fe Springs Basin Working Group

September 30, 2009

## Your Guide to Eating Fish Caught in Florida

**Fish Consumption Advisories** are published periodically by the State of Florida to alert consumers about the possibility of chemically contaminated fish in Florida waters. The Advisories are meant to inform the public of potential health risks of specific fish species from specific water bodies.



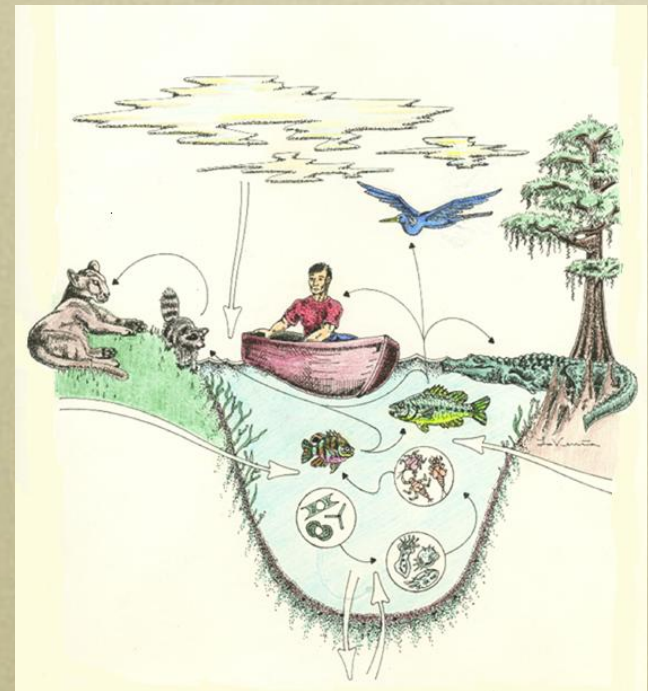
Ted Lange, Florida Fish and Wildlife Conservation Commission

# Mercury Research and Monitoring



# National Issues-Fish Consumption Advisories

- Fish Consumption Advisories responsibility of states
- U.S. Fish Consumption Advisories: 98% are due to 5 bioaccumulative chemicals
  - Mercury (76% of total)
  - DDT and its metabolites
  - Chlordane
  - Dioxins
  - PCBs





- Advisories exist for specific waterbodies only
- ▨ Statewide lakes only advisory included in count
- ▩ Statewide rivers and lakes advisory included in count
- Statewide coastal advisory included in count
- Statewide advisory for marine fish included in count
- No advisories for chemical contaminants

AS = 1    VI = 0    □  
 GU = 2    PR = 0    □

a -Includes (1) advisory from the Cheyenne River Sioux Tribe  
 b -Includes (28) advisories from the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) and the Minnesota Chippewa Tribes  
 c -Includes (297) advisories from the (GLIFWC)  
 d -Includes (30) advisories from the (GLIFWC)  
 e -Includes (1) advisory from the St. Regis Mohawk Tribe  
 f -Includes (2) advisories from the Aroostook Band of Micmacs

2006 Total = 3,852



Source: [www.epa.gov/waterscience/fish/advisories](http://www.epa.gov/waterscience/fish/advisories); 2/17/08

# Florida Advisories: Breakdown

- FW Contaminants
  - Methyl-mercury: 281
  - Polychlorinated biphenyls (PCBs): 2
  - Organochlorinated pesticides: 2
  - Dioxins: 1
- Marine
  - Methyl-mercury: All
  - Saxitoxins: Puffer fish in IRL
- ESOC
  - PBDE, PPCP, EMC, nanoparticles, biological metabolites



# OMEGA MEDICINE?

*Is fish oil good for what ails you?*

Consumer Reports, 2007

## The Bottom Line

- So far, there's decent evidence that DHA and EPA—the omega-3 fats in fish oil—can reduce your risk of a heart attack, but not your risk of cancer, memory loss, or macular degeneration.

## AHA Scientific Statement

### Fish Consumption, Fish Oil, Omega-3 Fatty Acids, and Cardiovascular Disease

Penny M. Kris-Etherton, PhD, RD; William S. Harris, PhD; Lawrence J. Appel, MD, MPH;  
for the Nutrition Committee

American Heart Association, Inc. 2002

TABLE 5. Summary of Recommendations for Omega-3 Fatty Acid Intake

Population	Recommendation
Patients without documented CHD	Eat a variety of (preferably oily) fish at least twice a week. Include oils and foods rich in $\alpha$ -linolenic acid (flaxseed, canola, and soybean oils; flaxseed and walnuts)
Patients with documented CHD	Consume $\sim$ 1 g of EPA+DHA per day, preferably from oily fish. EPA+DHA supplements could be considered in consultation with the physician.
Patients needing triglyceride lowering	Two to four grams of EPA+DHA per day provided as capsules under a physician's care



# The Hg Problem in Florida

- 1982 investigation of defunct battery salvage plant on Chipola River (GFC, DEP, HRS)
- Results: No heavy metals except THg

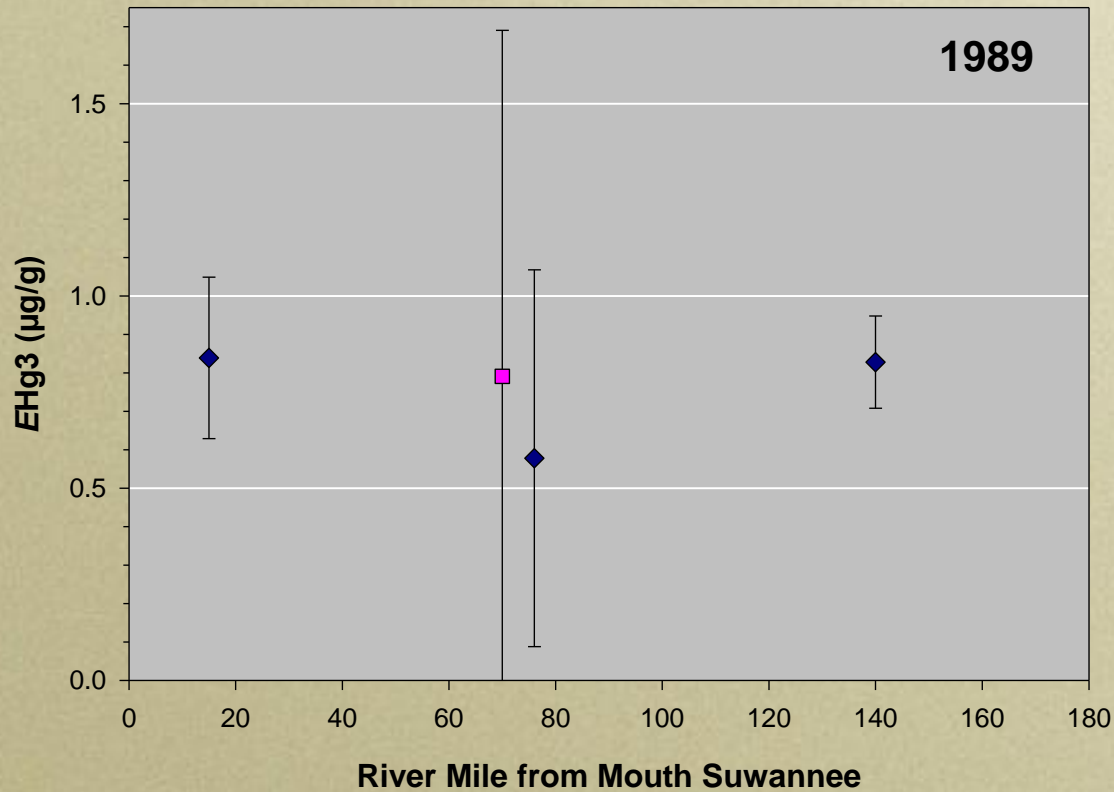


- Chipola: Low Hg
- Santa Fe (Pristine Reference): Higher Hg
- FDA Criteria: 1  $\mu\text{g/g}$

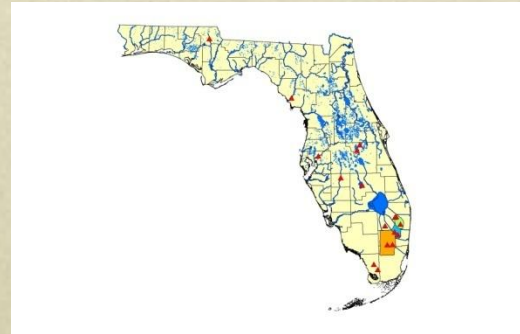


# Suwannee River System

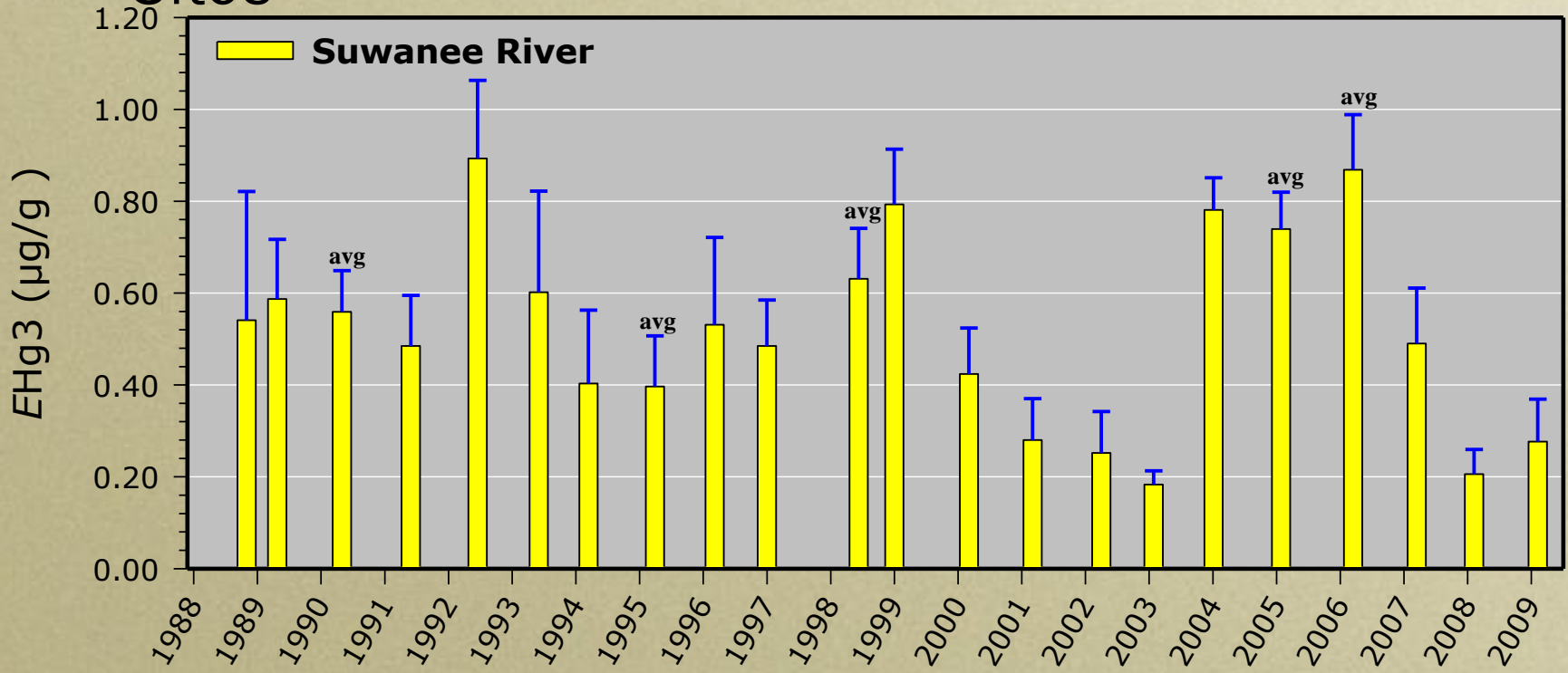
- Suwannee and Sante Fe River 1989



# Suwannee River System

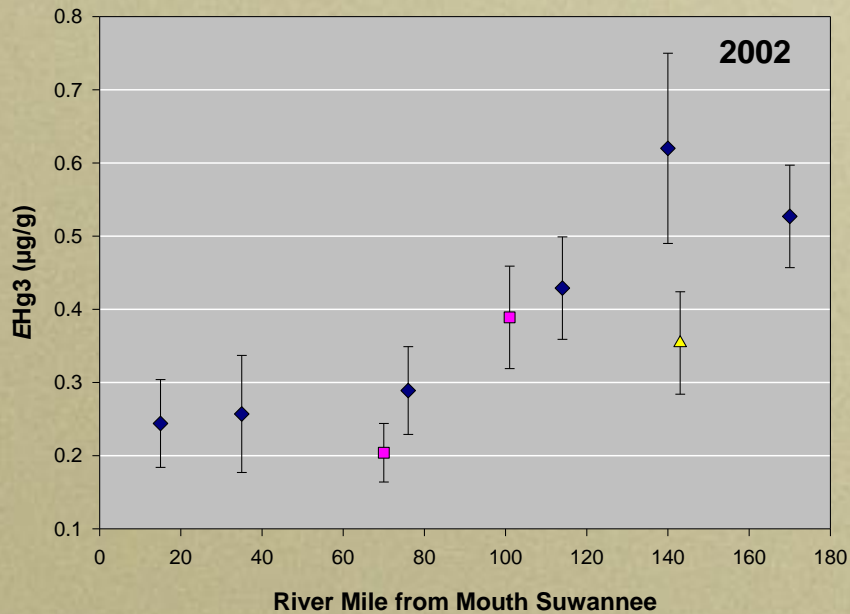


- Trends in Mercury Bioaccumulation - 17 Sites

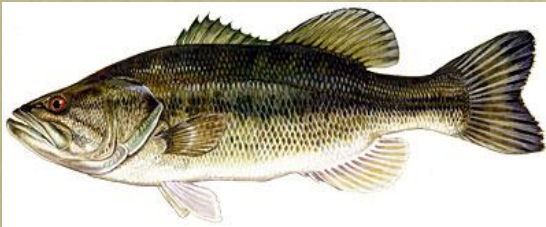


# Suwannee River System

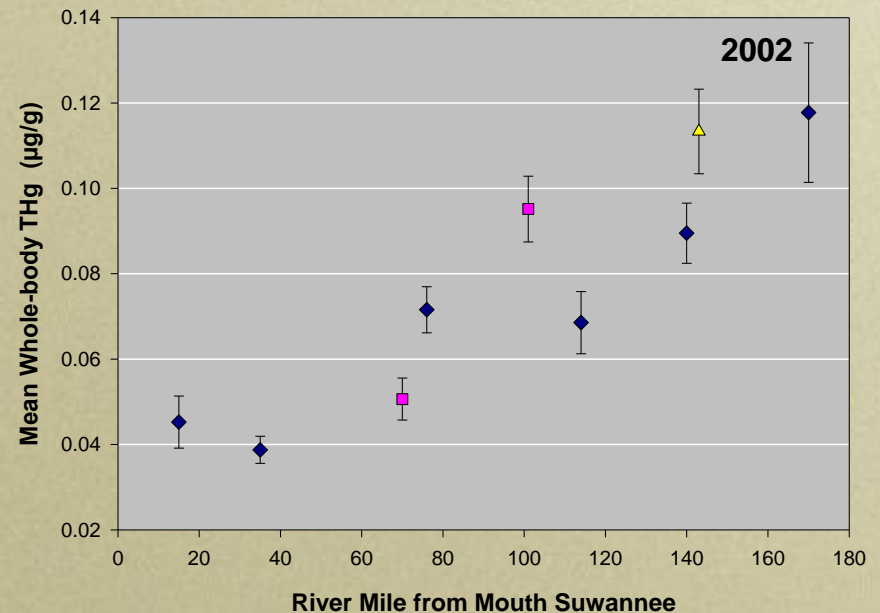
- 2002 Synoptic survey of LMB and RBSU
  - Chipola sites in pink: Sandy Point and Oleno SP.



LMB

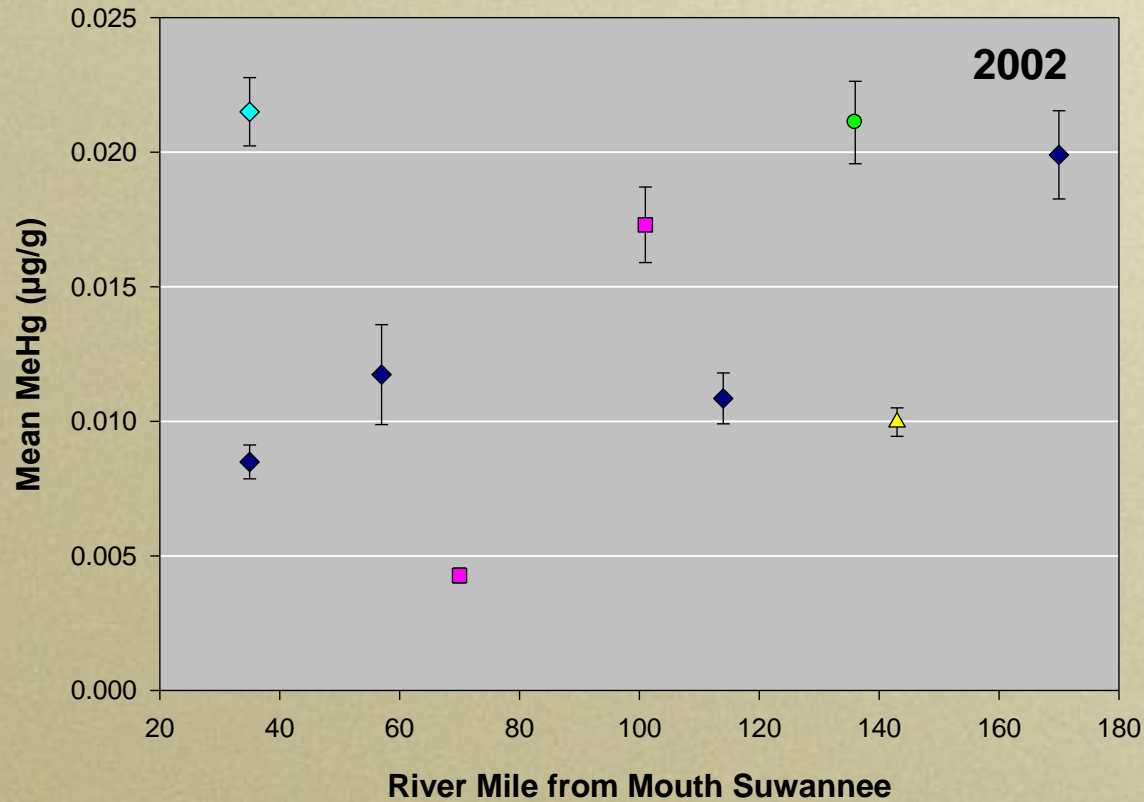


RBSU



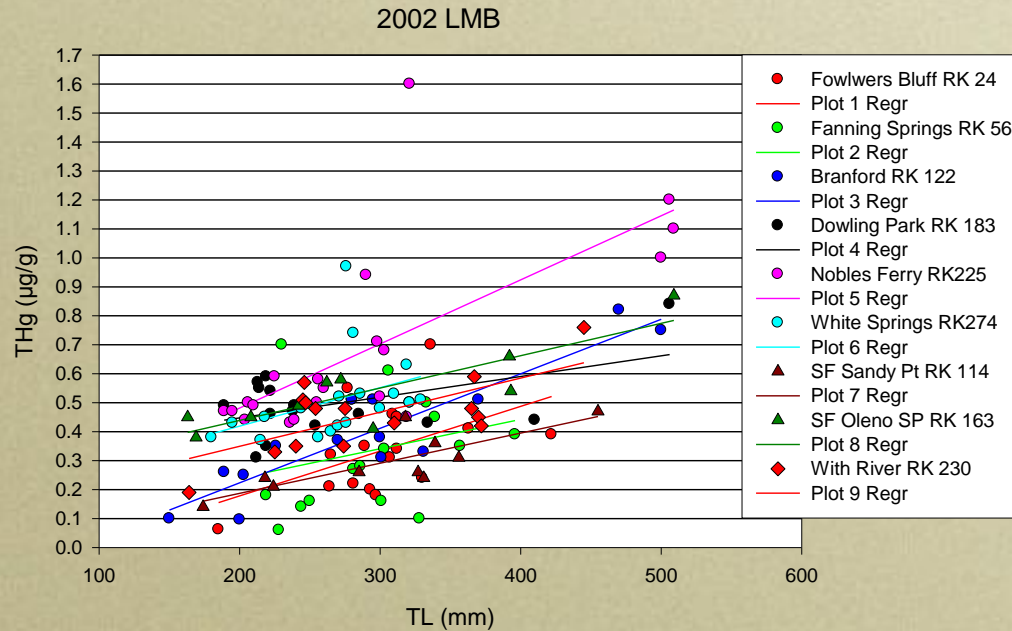
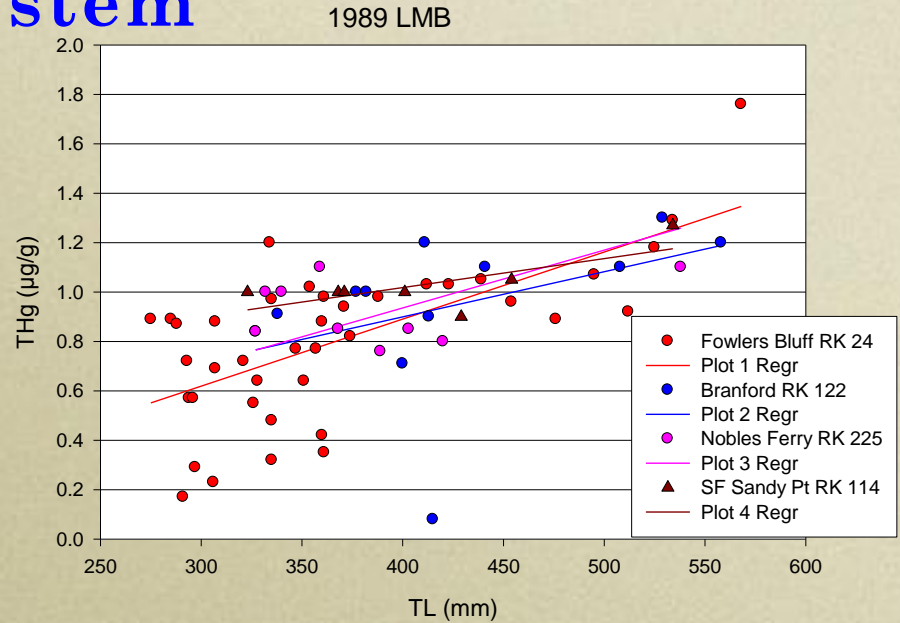
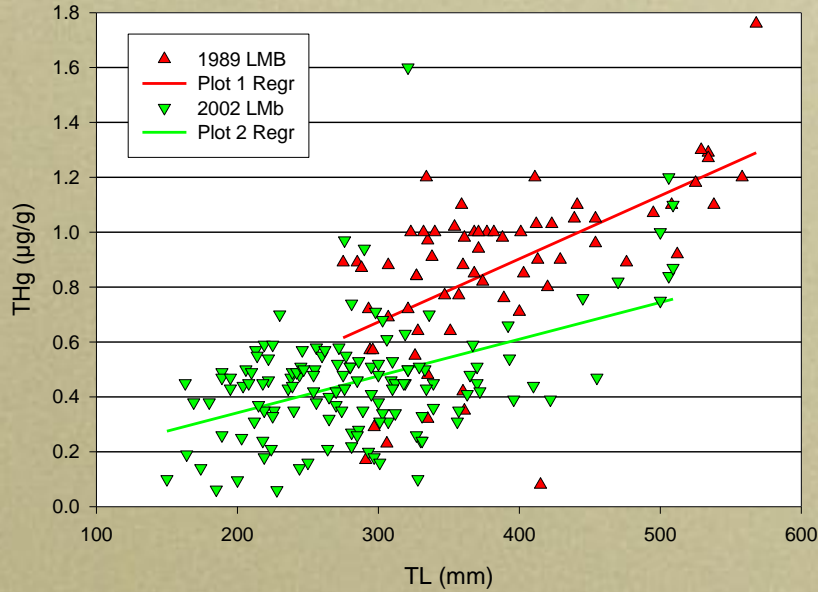
# Suwannee River System

- .....and Crayfish



# Suwannee River System

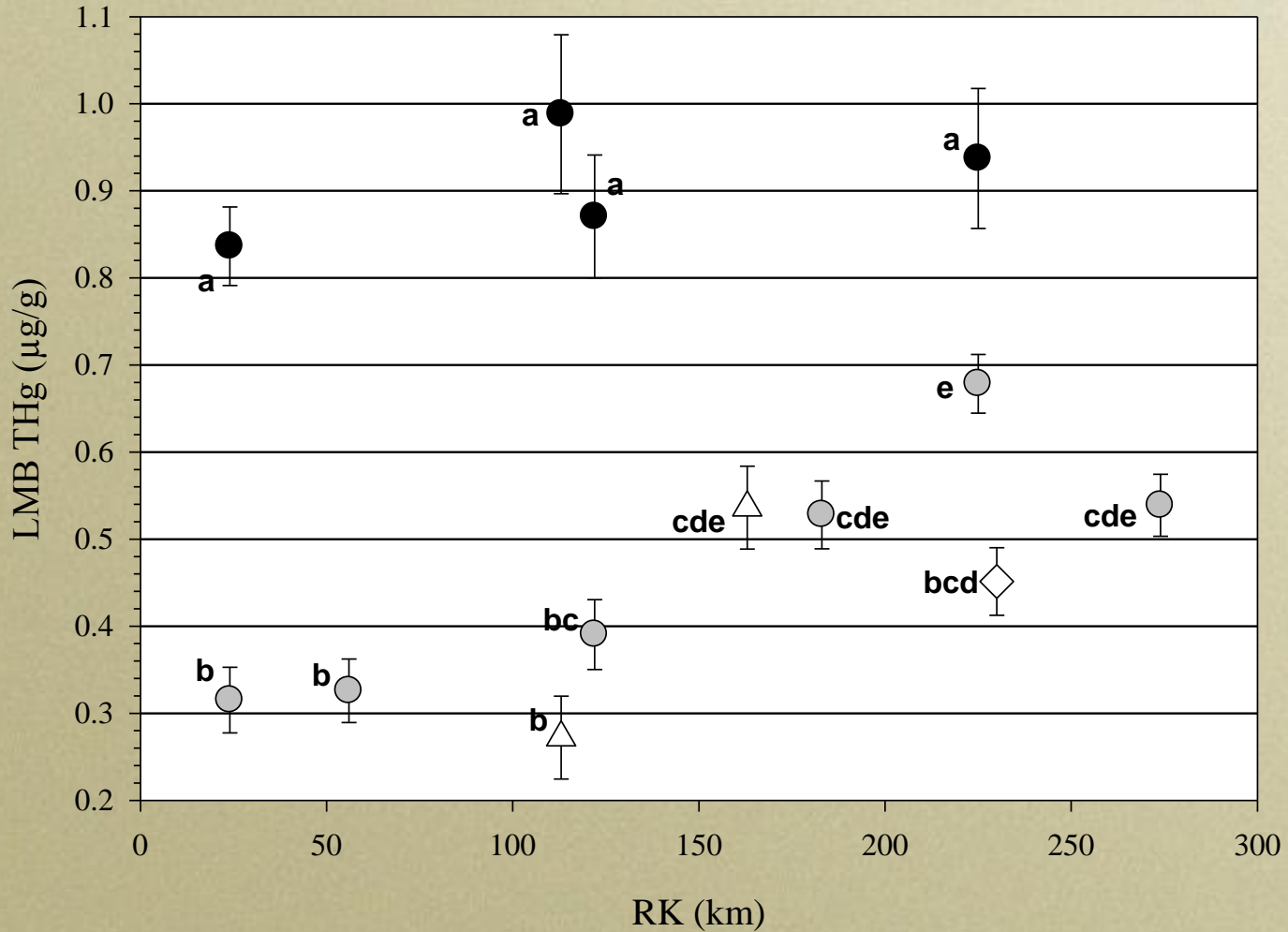
## LMB



# Suwannee River System

## ■ LMB

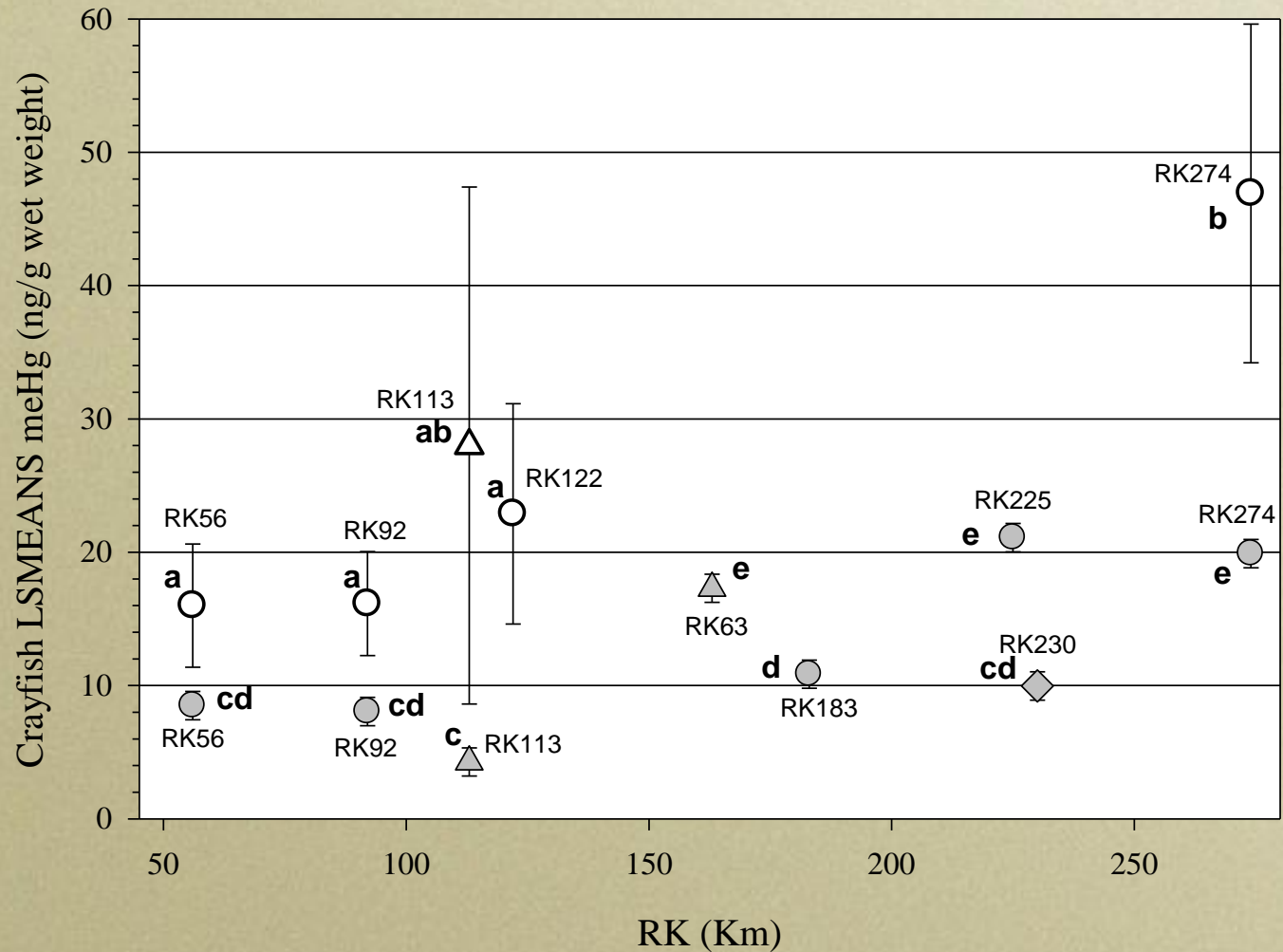
Adjusted least square means from ANCOVA with TL as covariate from Suwannee River 1989 and 2002. Error bars represent the SE.



# Suwannee River System

## ■ Crayfis

h



# Recommended Fish Consumption Rate: Methyl-Mercury, FLDOH

Meal Frequency (6 oz Cooked)	Sensitive Population (Women Childbearing Age and Children)	General Population (All Others)
2 meals per week	< 0.1 mg/kg meHg	< 0.3 mg/kg meHg
1 meal per week	< 0.2	< 0.6
1 meal per month	< 0.85	< 1.5
None	≥ 0.85	≥ 1.5

## Assumptions

Meal Size: 6 oz cooked fish

RfDs: General Pop: 0.3 µg/kg-bw/day for 70 Kg adult

Sensitive Pop: 0.1 µg/kg-bw/day for 64 kg individual



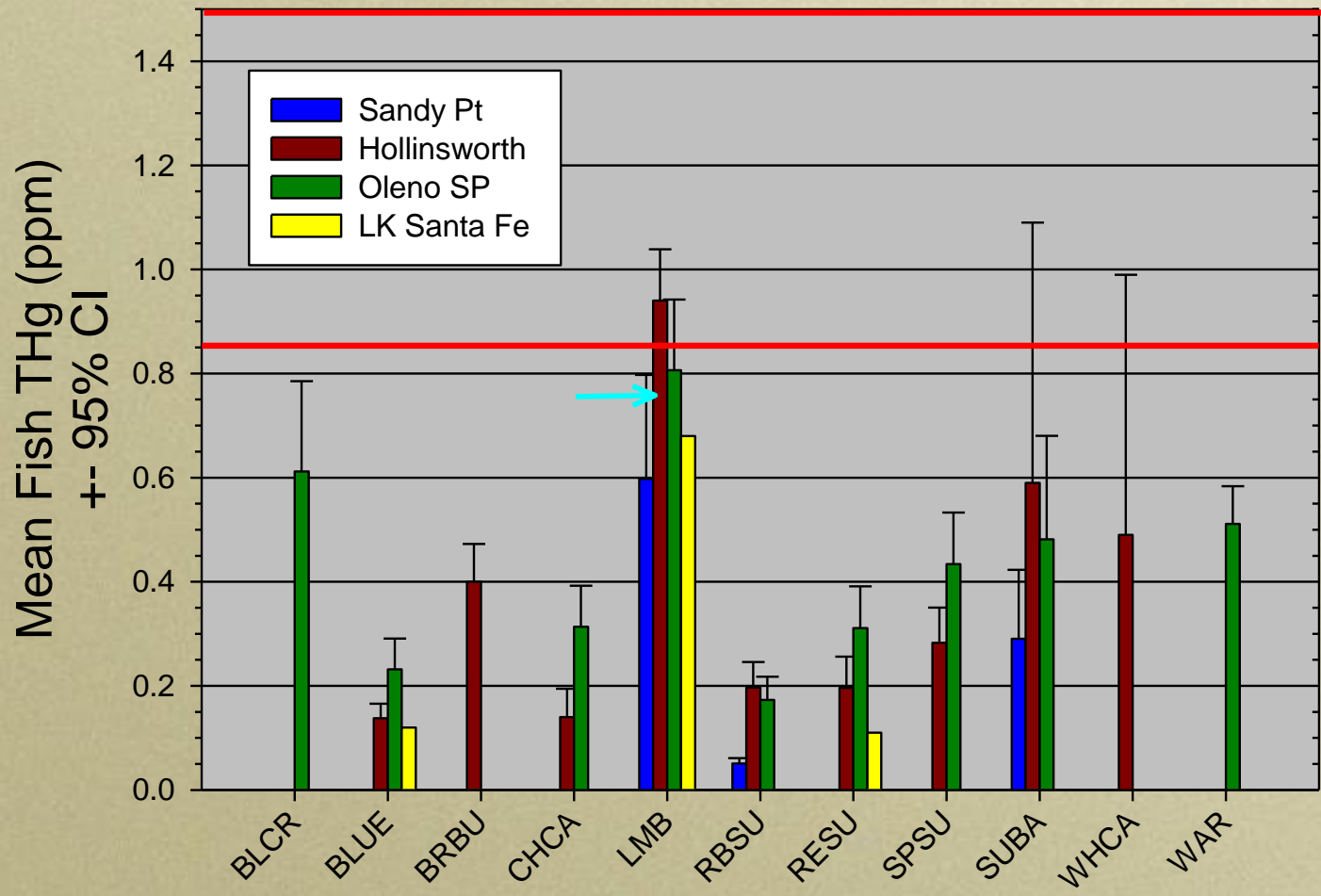
# 2008 “Guide to Eating Fish”

Table 1: Eating Guidelines for Fresh Water Fish from Florida Waters, 2008

LOCATION	COUNTY	SPECIES	Women of childbearing age, young children NUMBER OF MEALS*	All other individuals NUMBER OF MEALS*
Santa Fe River—Lower	Alachua, Columbia, Gilchrist, Suwannee	Bluegill, Chanel catfish, Redbreast sunfish, Redear sunfish	One per week	Two per week
		Spotted sunfish	One per month	Two per week
		Brown bullhead	One per month	One per week
		Largemouth bass, Bowfin, Gar	<b>DO NOT EAT</b>	One per month
Santa Fe River—Upper	Alachua, Bradford, Columbia, Union	Bluegill, Redbreast sunfish	One per month	Two per week
		Black crappie, Chanel catfish, Redear sunfish, Spotted sunfish, Warmouth	One per month	One per week
		Largemouth bass, Bowfin, Gar	<b>DO NOT EAT</b>	One per month
Lake Santa Fe	Alachua	Largemouth bass, Bowfin, Gar	One per month	One per week
Suwannee River system, (including Alapaha, Suwannee, and Withlacoochee Rivers) [See separate advisories for Santa Fe River above]	Alachua, Bradford, Columbia, Dixie, Gilchrist, Hamilton, Lafayette, Levy, Madison, Suwannee, Union	Spotted bullhead, White catfish	One per week	Two per week
		Redbreast sunfish, Redear sunfish	One per month	Two per week
		Bluegill, Brown bullhead, Channel catfish	One per month	One per week
		Black crappie, Largemouth bass, Bowfin, Gar, Spotted sunfish	One per month	One per month

\* All other individuals can eat one meal per week of Largemouth bass, Bowfin and Gar caught from Florida waters not listed in this brochure.





# LMB from Untested Waters Advice

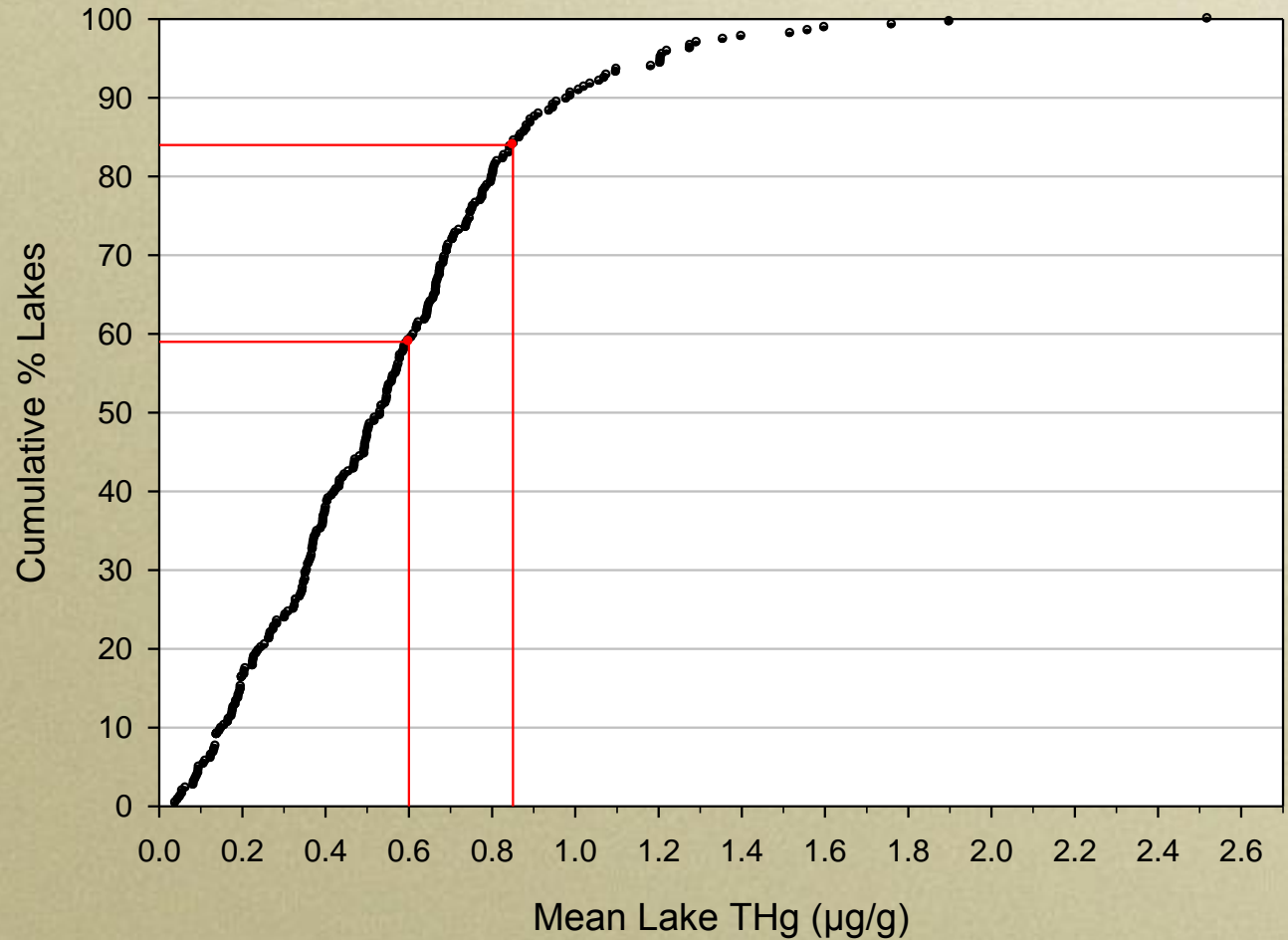
## LMB >355 mm Means Lakes and Rivers (n = 264)

Sensitive Pop:

1 meal/month – 84% waters < 0.85 ppm

General Pop:

1 meal/week – 59% waters < 0.6 ppm



# Proposed Statewide Guidance

## Bluegill Lake and River Site Means (n= 163)

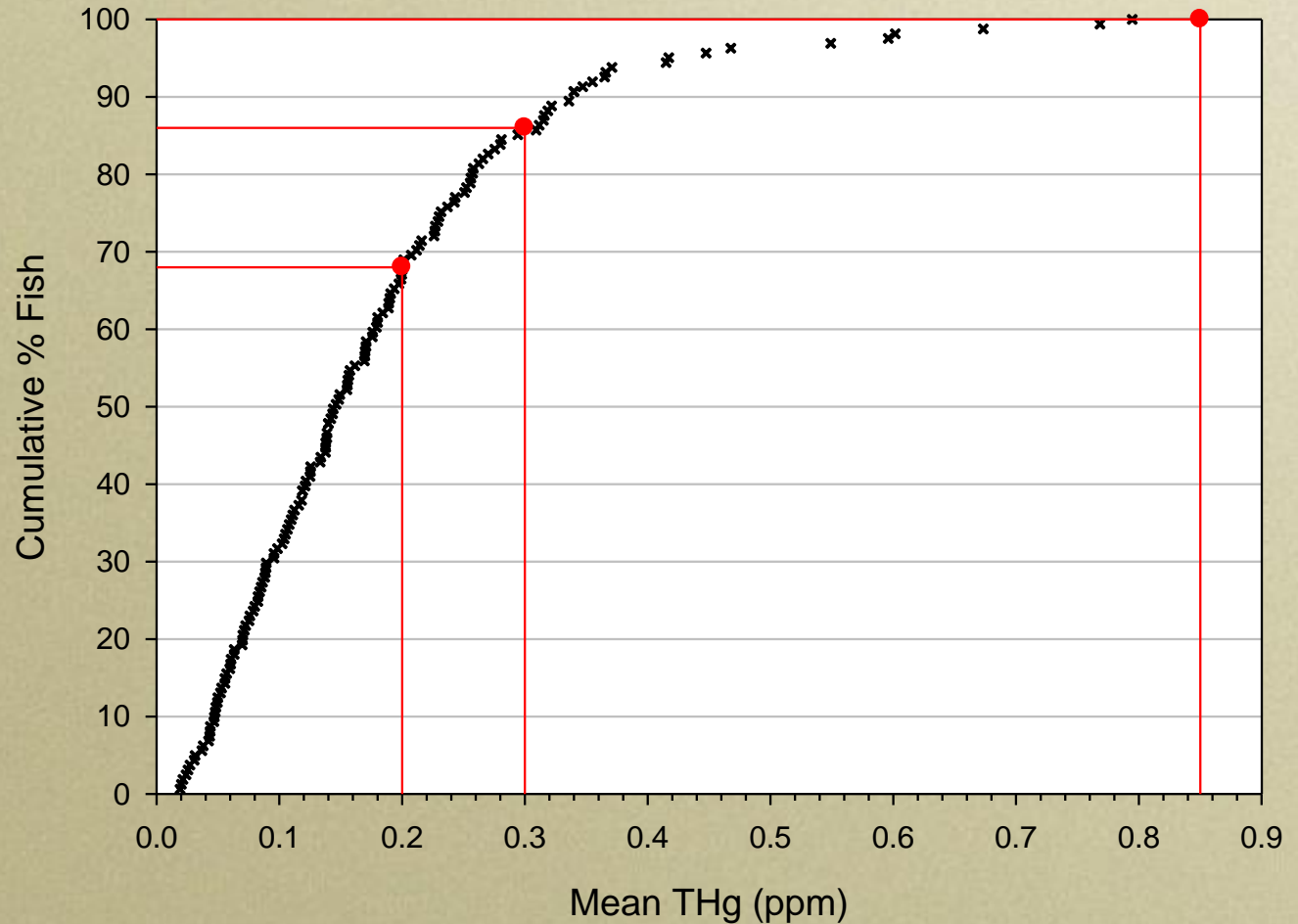
### Sensitive Pop:

1 meal/month – 100% waters < 0.85 ppm

1 meal/week – 68% waters < 0.2 ppm

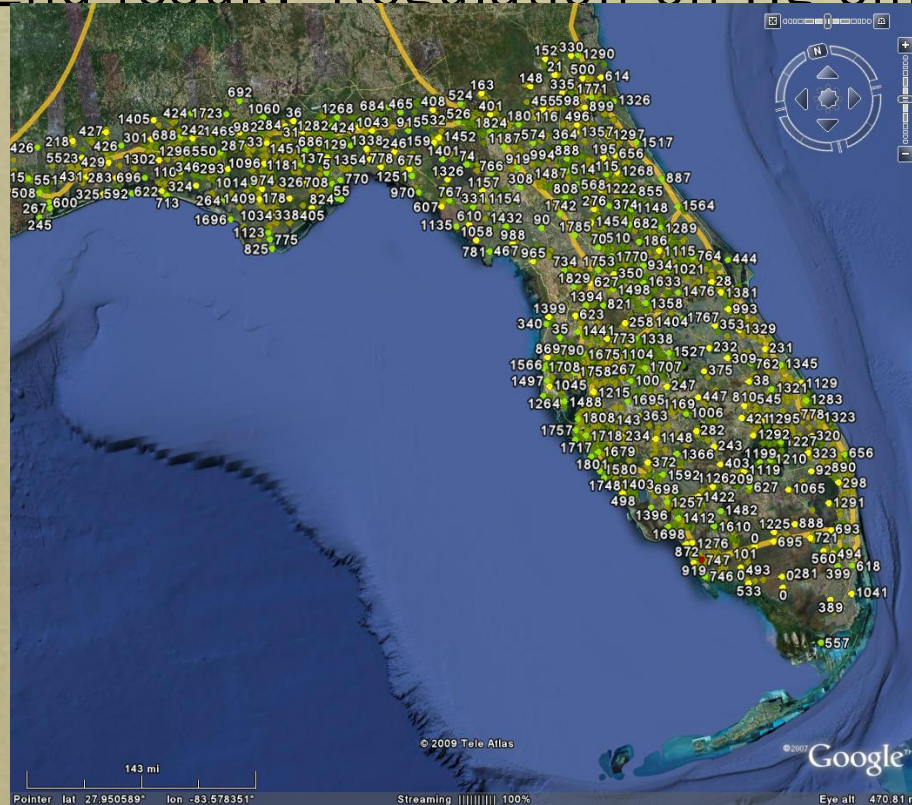
### General Pop:

2 meal/week – 85% waters < 0.3 ppm



# Mercury TMDLs

- FW: 128 Lakes & 128 River Segments
- GOM: Interstate approach or Florida alone?
- Everglades: further refinement
- End result: Regulation on Hg emissions



# FW Mercury TMDL

- Preliminary Work 2000-2003
- 80 Lakes only, no stream segments

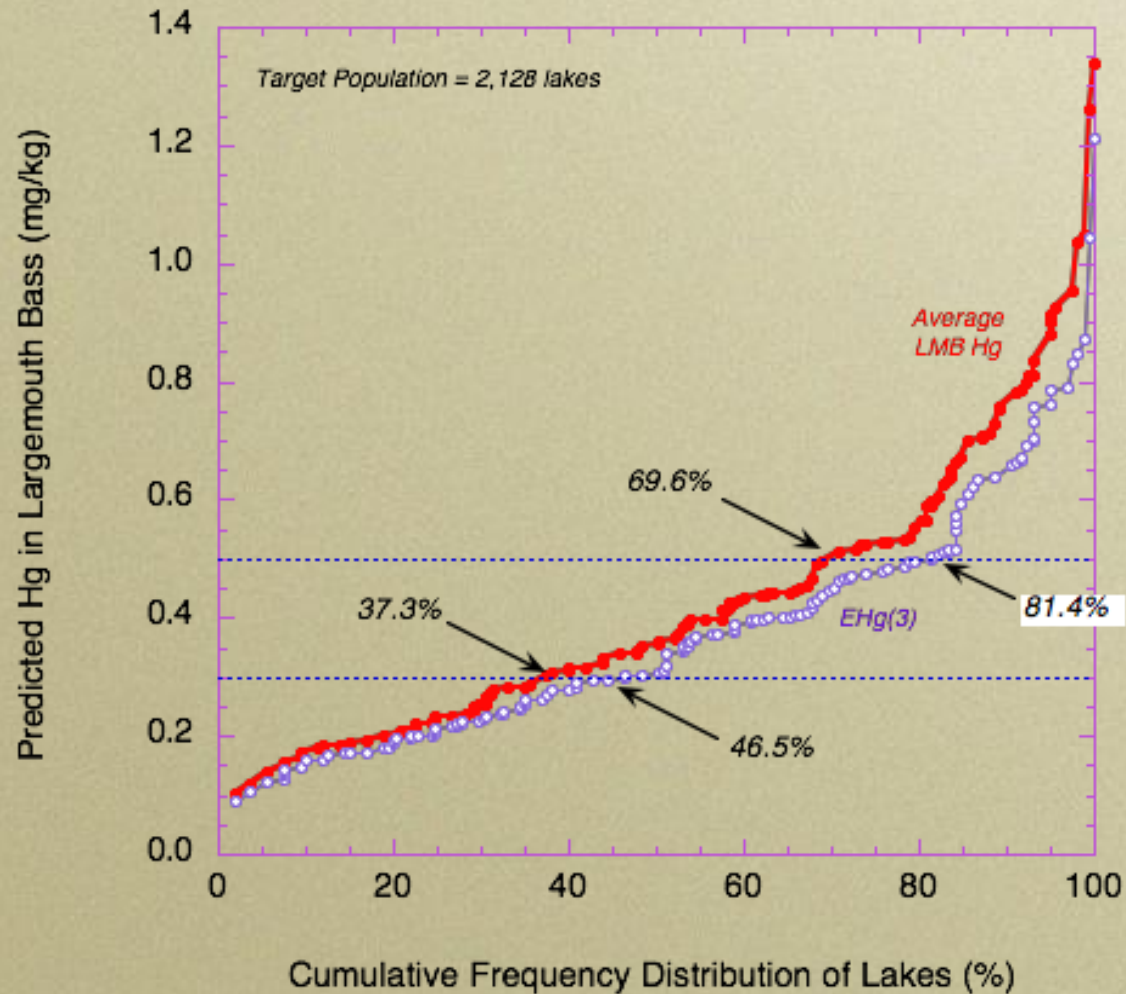
**Table 2. Predictive equations for EHg3 from the PCA, MLR, and ELS models**

Model	Equation	r <sup>2</sup>
PCA	$\ln \text{EHg3} = -.971 + 0.233 (\text{DOC}/\text{Hg}) - 0.302 (\text{Trophic State}) + 0.318 (\text{pH})$	0.629
MLR	$\ln \text{EHg3} = 1.134 - 0.241 (\text{pH}) - 0.203 (\ln \text{Chla}) + 0.14 (\ln \text{MeHg}_{\text{unfilt.}}) + 0.262 (\ln \text{THg}_{\text{unfilt.}})$	0.688
ELS	$\ln \text{EHg3} = 0.411 - (-0.498 (\text{pH})) + 0.311 (\ln \text{DOC}) + 0.280 (\ln \text{Secchi}) + 0.119 (\ln \text{SO}_4)$	0.558

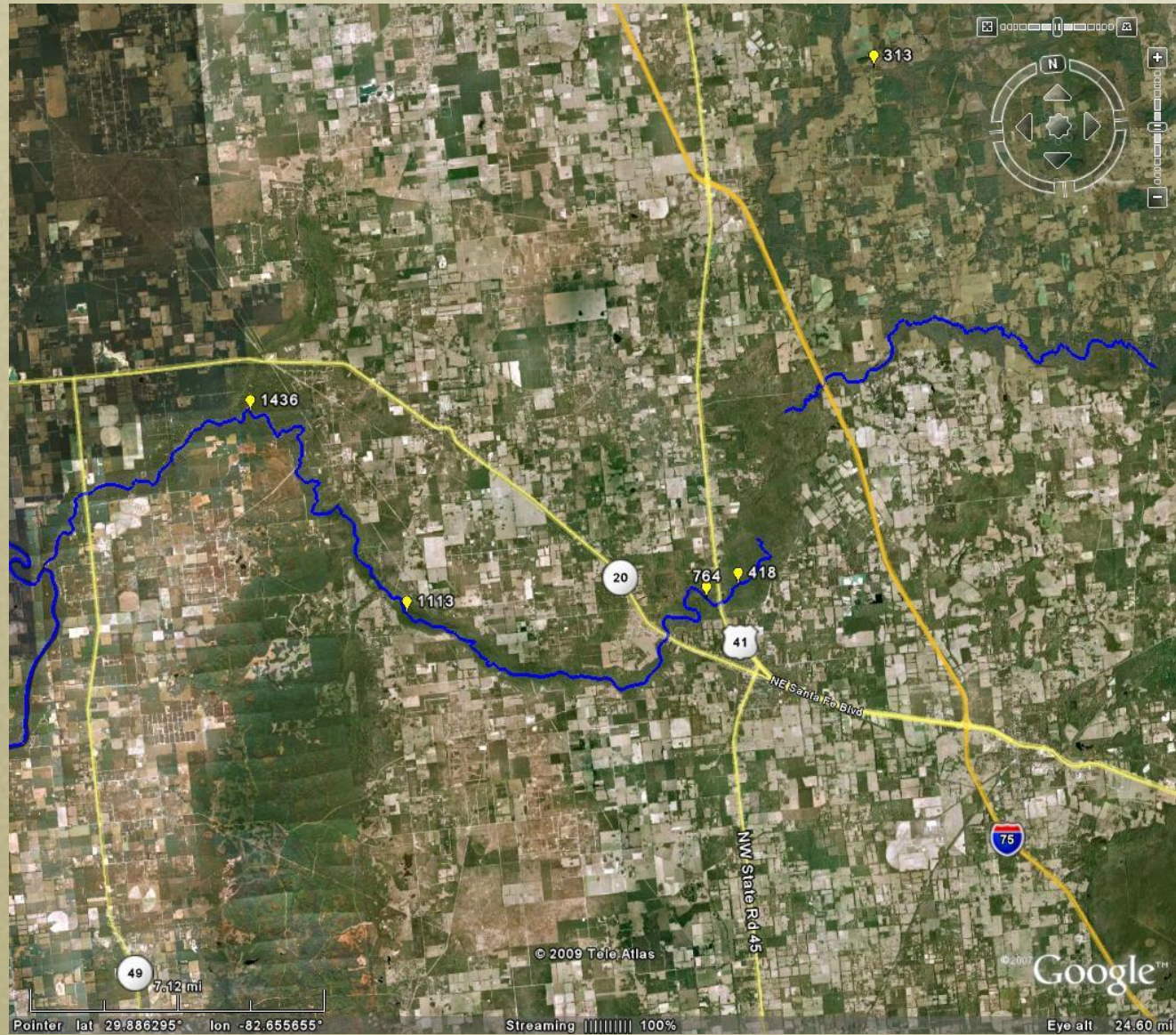


# ELS Model: Eastern Lake Survey (USEPA 600/4-86/007a)

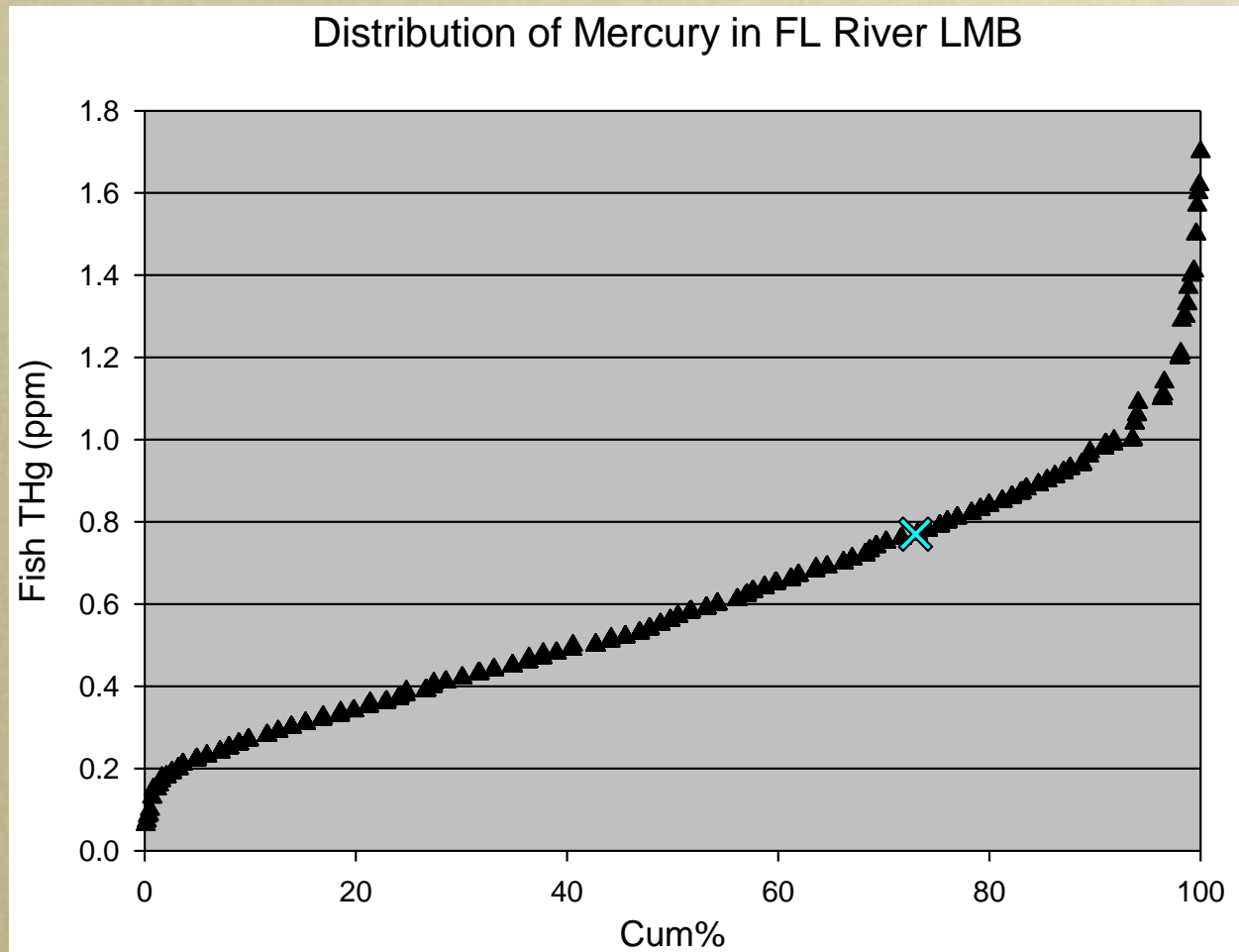
- pH, DOC, Secchi, and SO<sub>4</sub> explained 56% of fish Hg variability
- Predict distribution of EHg3 in 2,128 ELS study lakes.



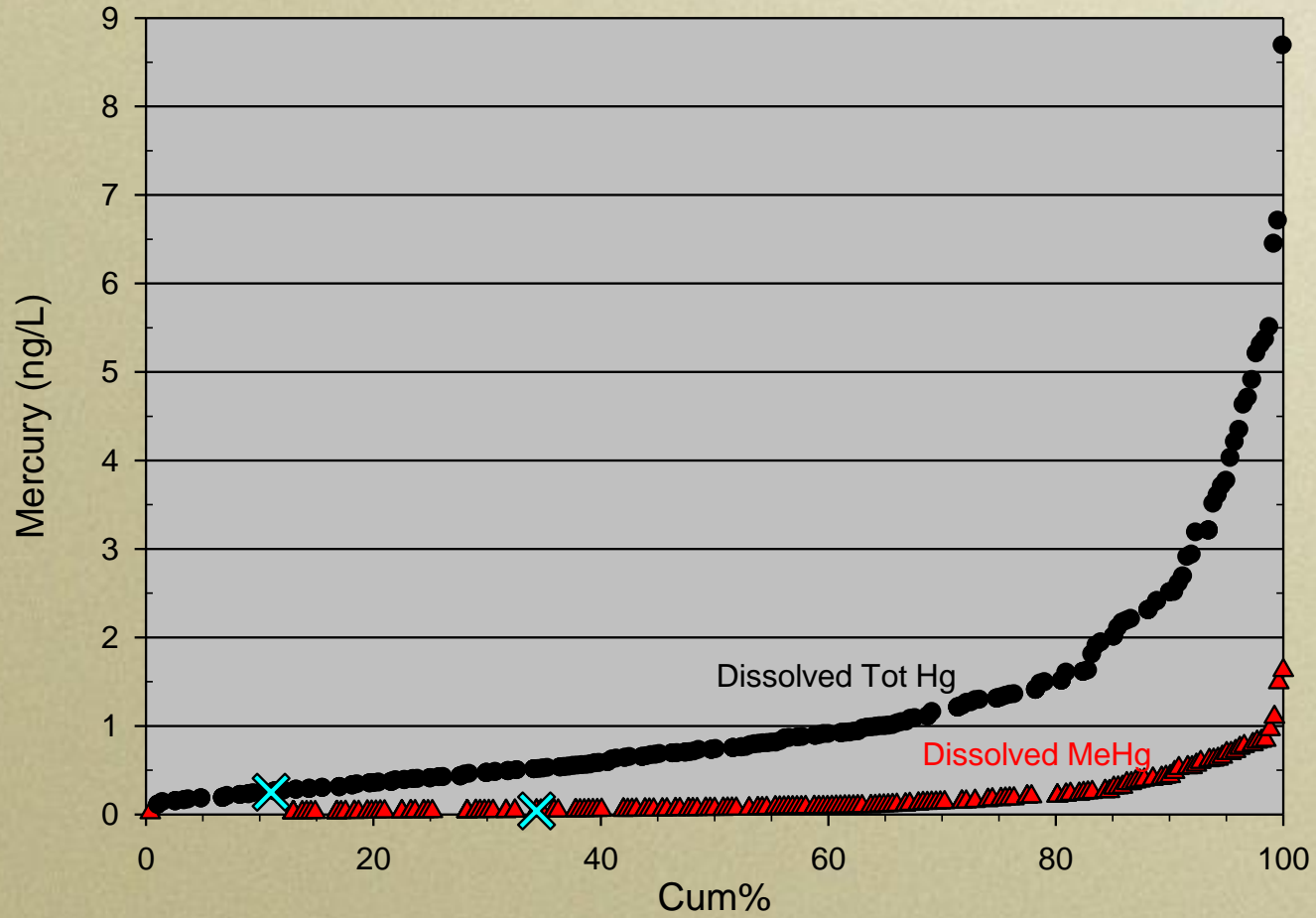
# FW Mercury TMDL – Lower Santa Fe Sites



# FW Mercury TMDL – Yr 1



# Distribution of Dissolved Mercury in FL Rivers and Streams



# Awareness & Outreach

Predominantly recreational listings which are complicated and burdensome

Table 1: Eating Guidelines for Fresh Water Fish from Florida Waters, 2007

LOCATION	COUNTY	SPECIES	Women of childbearing age, young children NUMBER OF MEALS*	All other individuals NUMBER OF MEALS*
Everglades National Park: Shark River Slough south of Tamiami Trail, including Hamey and Shark Rivers and Tarpon Bay and its tributaries (Squawk, Rookery, North Prong, & Otter Creeks)	Miami-Dade, Monroe	Redear sunfish	One per month	Two per week
		Bluegill	One per month	One per week
		Mayan cichlid	One per month	One per month
		Common snook, Largemouth bass less than 14 inches, Spotted sunfish, Yellow bullhead	<b>DO NOT EAT</b>	One per month
		Largemouth bass 14 inches or more, Bowfin, Gar	<b>DO NOT EAT</b>	<b>DO NOT EAT</b>
Everglades National Park: Nine Mile Pond	Miami-Dade	Mayan cichlid	One per month	One per week
		Largemouth bass less than 14 inches	One per month	One per month
		Largemouth bass 14 inches or more, Bowfin, Gar	<b>DO NOT EAT</b>	One per month
Everglades National Park: from Cape Sable to the northern boundary of the park (except Shark River Slough)	Monroe	Common snook, Largemouth bass less than 14 inches	One per month	One per week
		Largemouth bass 14 inches or more, Bowfin, Gar	<b>DO NOT EAT</b>	<b>DO NOT EAT</b>
Faka Union Canal	Collier	Redear sunfish	Two per week	Two per week
		Bluegill, Mayan cichlid, Warmouth	One per month	One per week
		Largemouth bass, Bowfin, Gar	One per month	One per month

## Shopper Wallet Cards: Sensitive population and consumers

### 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 a local fish consumption advisory and avoid eating highly contaminated fish.



### Learn More

For more information please visit our website:  
[fn.cfs.purdue.edu/fish+health/](http://fn.cfs.purdue.edu/fish+health/)

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Foods and Nutrition  
Purdue University  
santerre@purdue.edu

Supported by:



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Graphics: Sara Wikoski

### Fish for your Health™



Advice for Pregnant or Nursing Women, Women that will Become Pregnant & Young Children

### How Much Fish to Eat?

Health experts recommend that women eat 8 ounces per week (2 servings) and children (ages 2-6) eat 2 ounces per week. As a reference, 3 ounces of fish is about the size of a deck of cards.

### Do Not Eat Raw Fish

When pregnant, avoid eating raw oysters, raw fish (sushi) or refrigerated smoked fish. Do not feed raw fish to young children.

### High Mercury Never Eat



- swordfish
- shark
- king mackerel
- tilefish\*
- tuna (fresh or frozen)
- grouper
- Spanish mackerel\*
- Chilean sea bass
- golden snapper
- marlin
- walleye (Great Lakes)
- orange roughy

\*From Gulf of Mexico

### Moderate Mercury 4 ounces per week



- tuna (canned)
- halibut
- snapper
- bass (saltwater, black, striped)
- bluefish
- buffalo fish
- white croaker (Pacific)
- sea trout (weakfish)
- northern lobster
- sablefish
- mahi mahi
- carp
- freshwater perch
- Spanish mackerel (S. Atlantic)
- white croaker (Pacific)
- tilefish (Atlantic)

### Lowest Mercury 12 ounces per week



- shrimp
- halibut (wild or farmed)
- pollock
- catfish
- cod
- crab
- clams
- tilapia
- flounder, plaice, sole
- scallops
- haddock
- rainbow trout (farm raised)
- herring
- mackerel (Atlantic, jack, chub)
- squid
- sardines
- whitefish
- oysters
- spiny lobster

### Best Choices Lowest in Mercury & Highest in Healthy Fats



Eating only 6 ounces per week of these fish provides the recommended amount of omega-3 fatty acids.

- salmon
- rainbow trout
- herring
- mackerel (Atlantic, jack, chub)
- sardines
- whitefish



# Get Your Copy

- [www.doh.state.fl.us/floridafishadvice](http://www.doh.state.fl.us/floridafishadvice)

