

# Mercury in New Jersey

Presentation to Pompton Lake PRIDE

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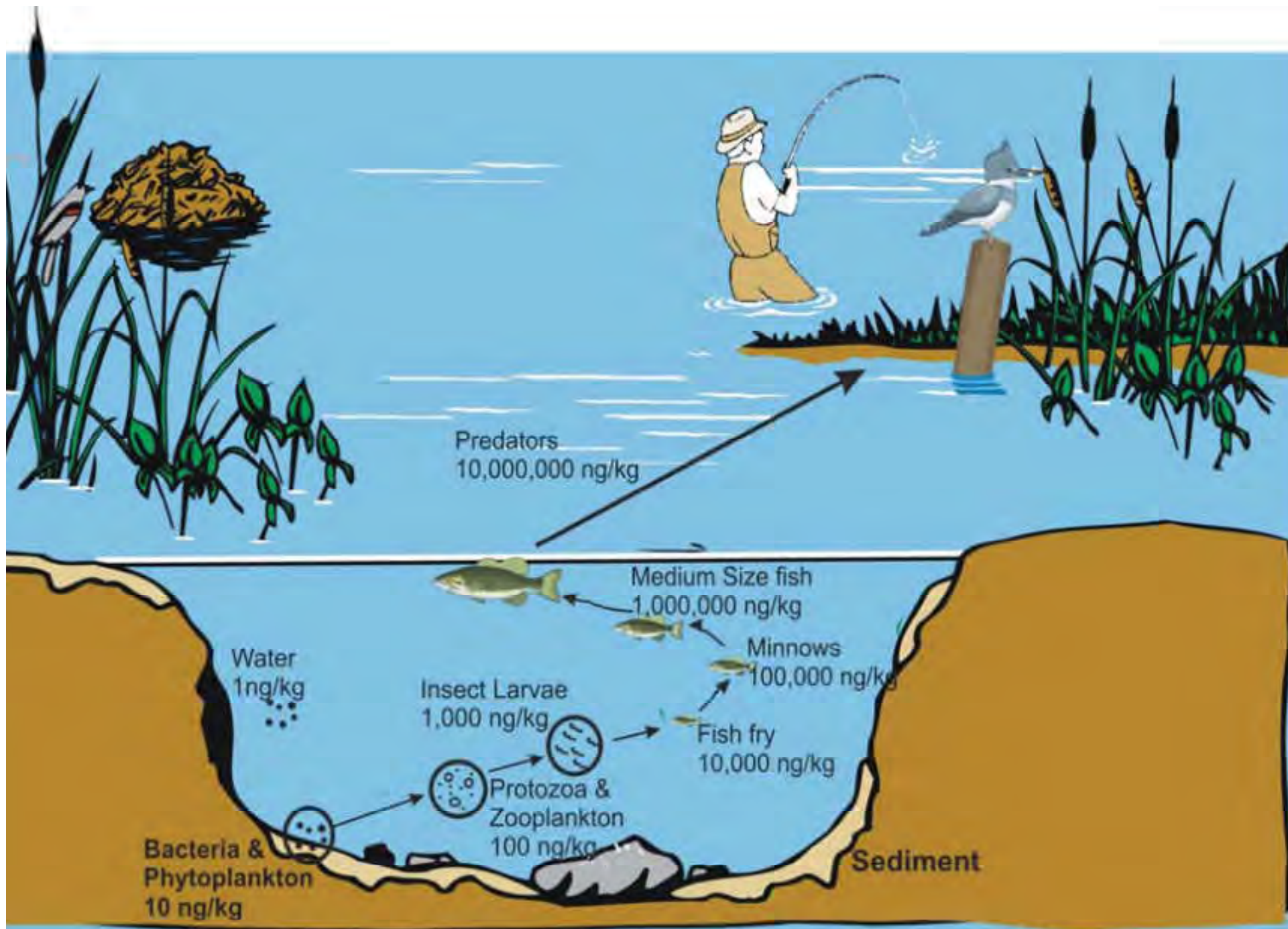
Office of Science

NJ Department of Environmental Protection

October 19, 2011

# Mercury - PBT

- Persistent
- Bioaccumulative
- Toxic
- Inorganic Hg  $\Rightarrow$  Methylmercury ( $\text{CH}_3\text{Hg}^+$ )
- Food Chain Biomagnification



*Biomagnification of Mercury*

# Bioaccumulation

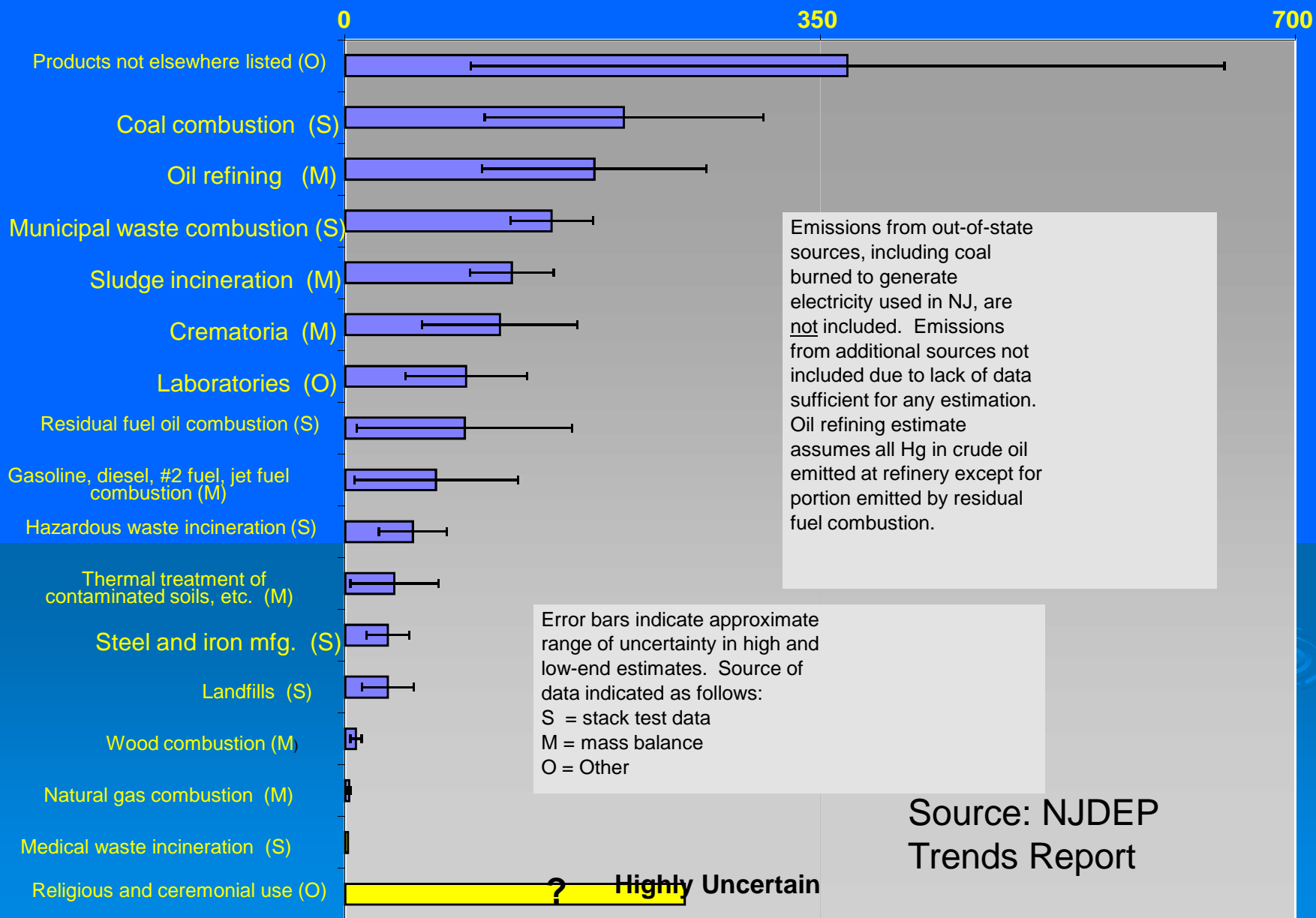
- Accumulation from food, water
- Bioaccumulation Factors (BAFs):
  - Total Hg (EPA, 1995)
    - TL 3 - 27,900 L/Kg
    - TL 4 - 140,000 L/Kg
  - Methyl Hg (EPA, 1997)
    - TL 3 -  $1.6 \times 10^6$  L/Kg
    - TL 4 -  $6.8 \times 10^6$  L/Kg

# Mercury

- Concerns with Impacts on Fish and Wildlife
- Concerns with Human Health
- Fish Advisories
- Are Control Efforts Reducing Hg?

# Estimated Mercury Emissions to Air NJ Sources, lbs/yr

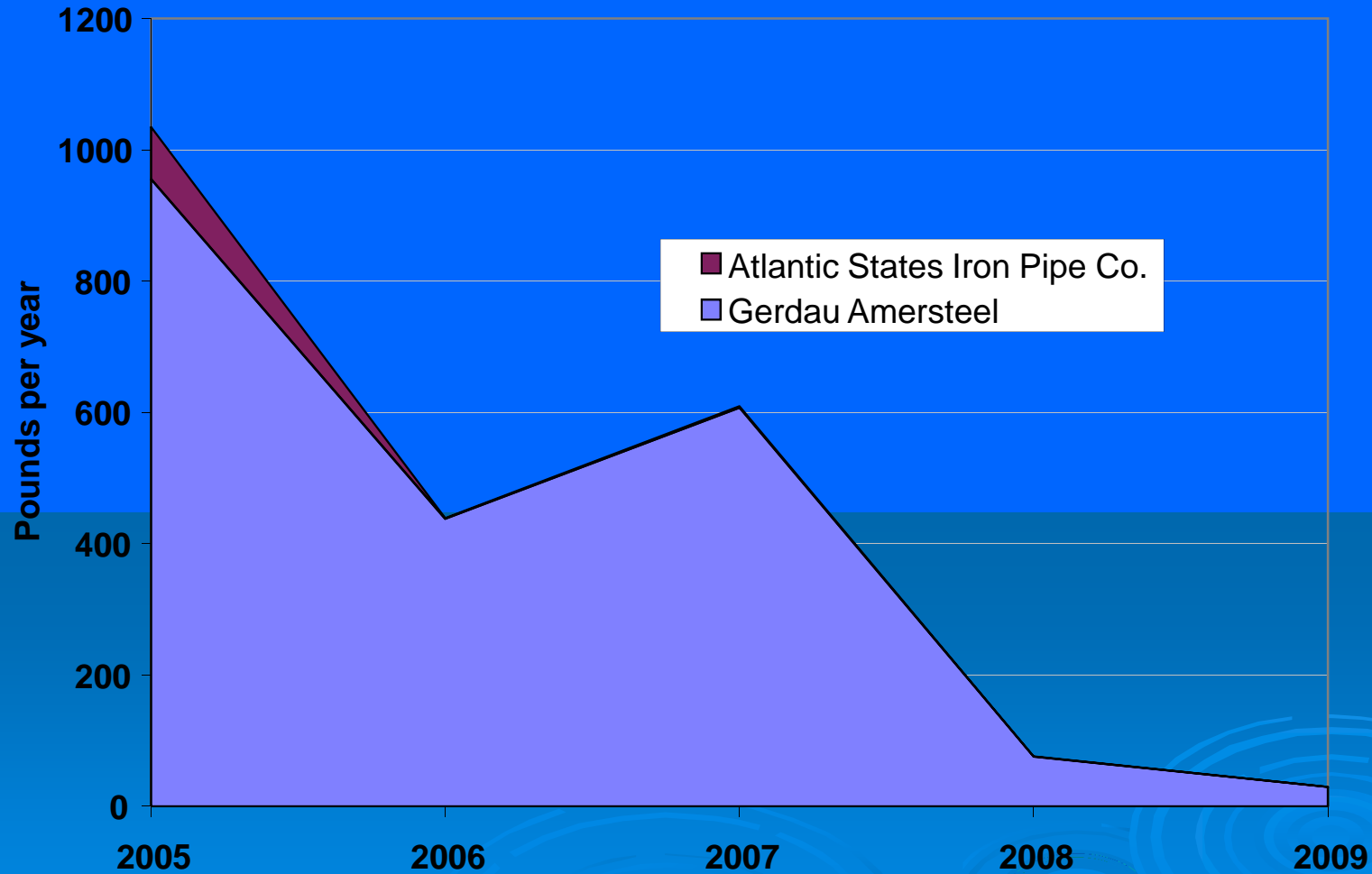
Based on most recent source-specific data & estimates as of 2009



Emissions from out-of-state sources, including coal burned to generate electricity used in NJ, are not included. Emissions from additional sources not included due to lack of data sufficient for any estimation. Oil refining estimate assumes all Hg in crude oil emitted at refinery except for portion emitted by residual fuel combustion.

Error bars indicate approximate range of uncertainty in high and low-end estimates. Source of data indicated as follows:  
S = stack test data  
M = mass balance  
O = Other

## Annual Mercury Emissions from Active New Jersey Iron & Steel Plants



Source: DRAFT NJDEP Trends Report

# Wildlife

- Top of the Food Chain - greatest exposure = Piscivorous avian and mammalian species
- Neurotoxicity
- Teratogen, mutagen
- Embryocidal, Cytochemical & Histopathological effects (Eisler, 1987)

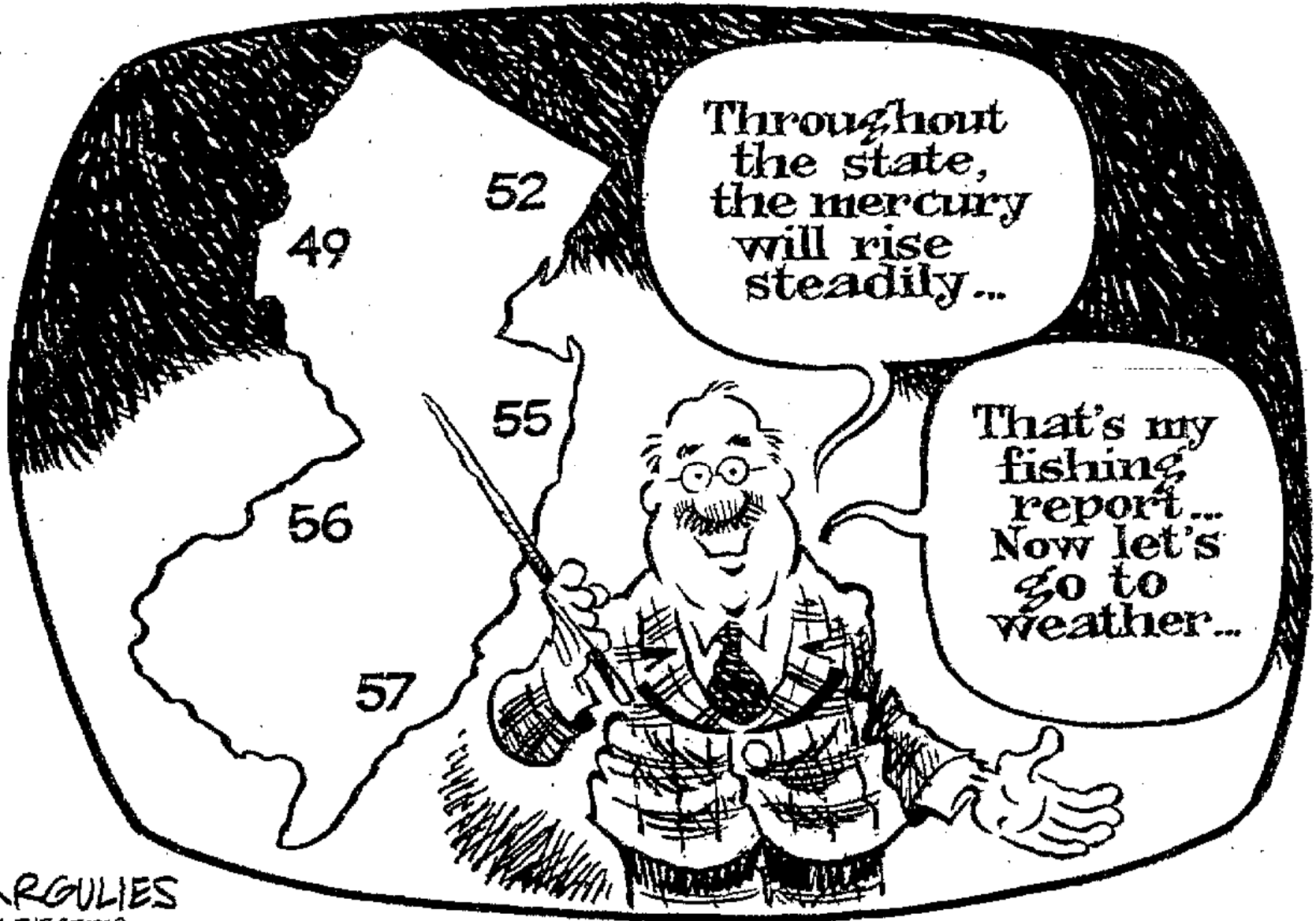


# Human Effects

- Exposure primarily through fish consumption
- Unborn and Young Children
  - Central Nervous System
    - Learning & Developmental Delays
- Older Children and Adults
  - Subtle neurological effects
  - Neurological damage

# Background

- Nationwide (EPA, 2010):
  - 50 States have Hg Advisories (3,711)
  - 39 have PCB Advisories (1,086)
  - 26 States have Statewide Hg Advisories for freshwaters
  - 16 with Coastal Hg Advisories



MARGULIES  
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[www.northjersey.com/margulies](http://www.northjersey.com/margulies)

# NJ Fish Consumption Advisories

- **First NJ Hg Advisories - 1994**
  - Largemouth Bass and Chain Pickerel
  - Statewide and Pinelands Advisories
  - 28 Water Body-Specific Advisories

# Statewide Mercury Advisory for Freshwater Recreational Fish (2011)

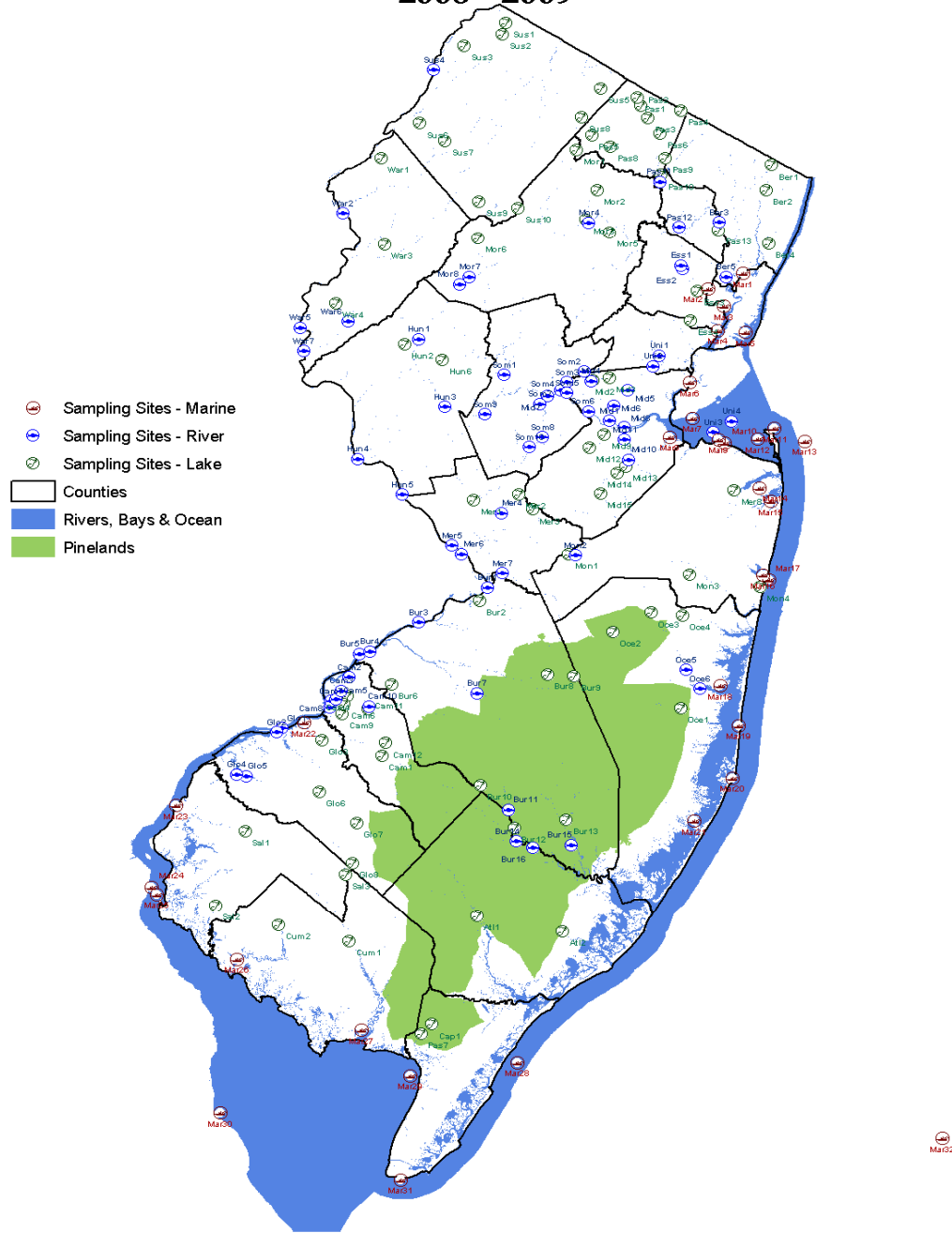
## ➤ **General Population**

- **Eat No More Than One Meal Per Week**

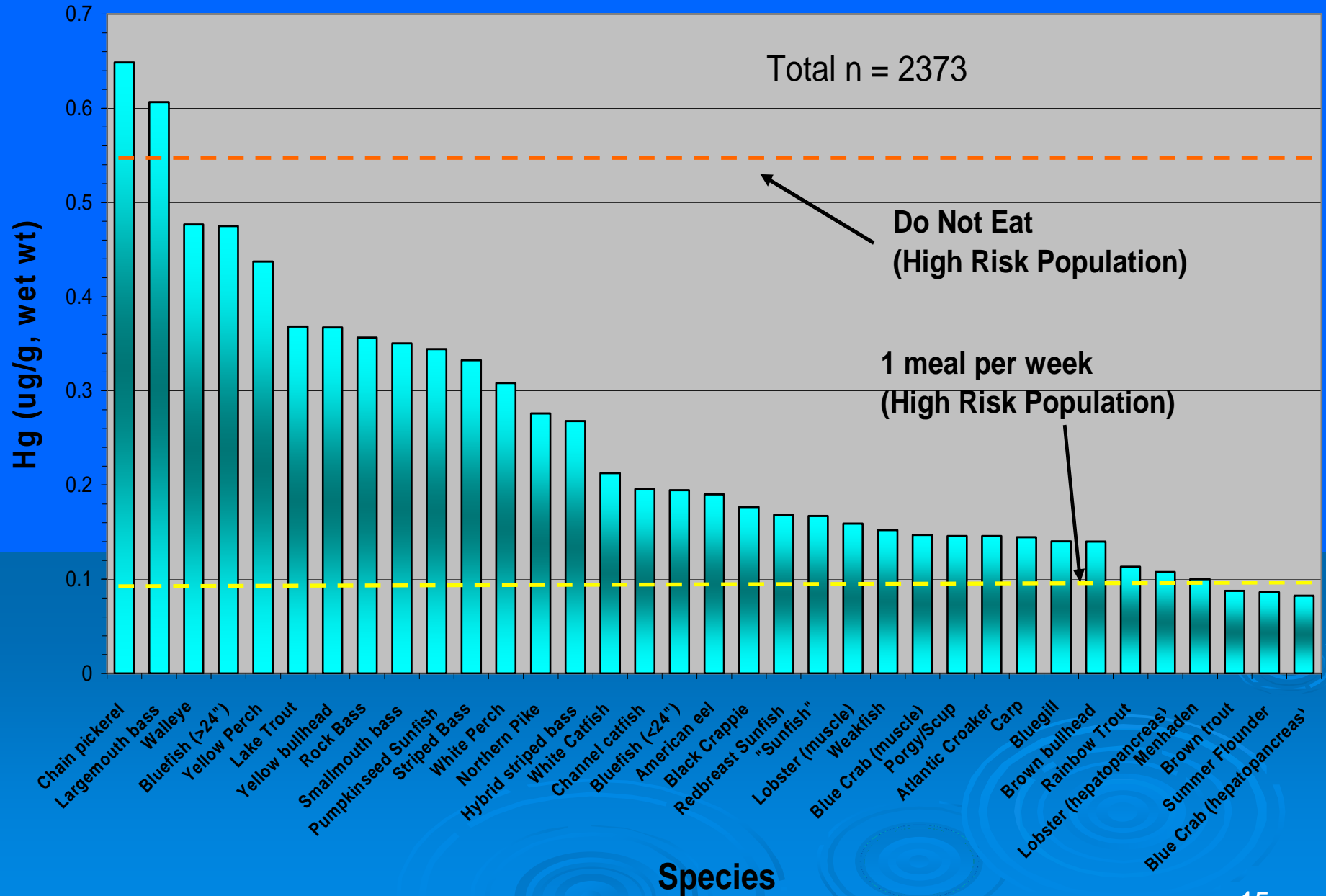
## ➤ **High-risk Individual**

- **Eat No More Than One Meal Per Month**

# New Jersey Fish Tissue Sampling Sites 2008 - 2009



# Average Mercury in NJ Fish



# Average Hg Concentrations in Freshwater Fish in NJ

- **Statewide:**
  - 0.36  $\mu\text{g/g}$  (26 Species; range ND - 8.9)
  - 0.35  $\mu\text{g/g}$  (14 freshwater species; n>20)
- **Pinelands: 0.80  $\mu\text{g/g}$  (5 species)**
  - Range 0.05-8.9  $\mu\text{g/g}$
- **Non-Pinelands: 0.23  $\mu\text{g/g}$  (5 species)**
  - Range 0.01-3.9  $\mu\text{g/g}$
- **Nationwide: All Fish: 0.26  $\mu\text{g/g}$**

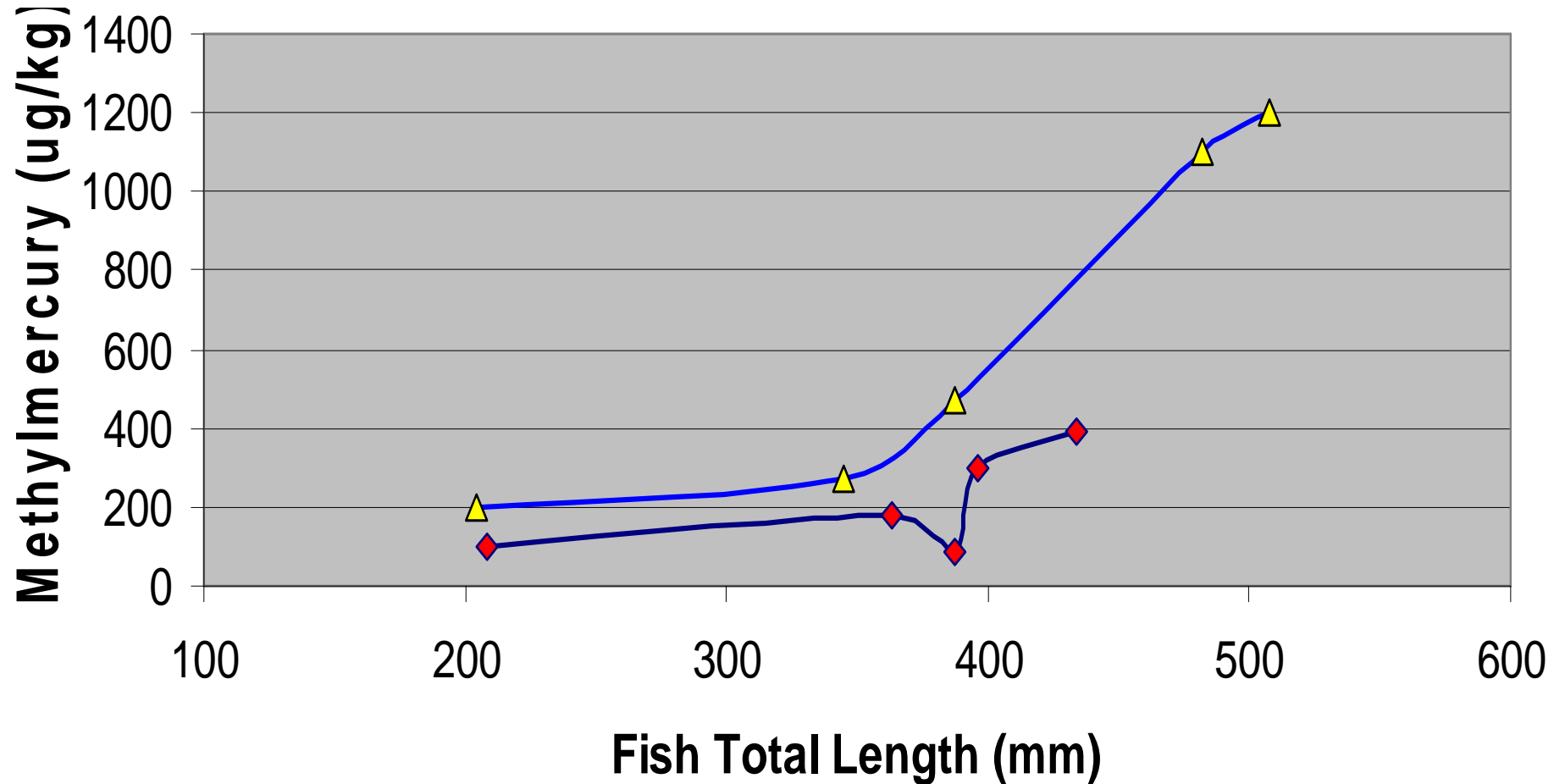


**Table 1. Mercury Concentrations in Largemouth Bass in Pompton Lake, Waters Downstream of Pompton Lake and the Passaic Region. (Data Collected in 2002 as part of the NJDEP Routine Monitoring Program for Toxics in Fish.)**

<b>Location</b>	<b>Average Total Length (cm)</b>	<b>Average Mercury (ug/g wet wt)</b>
<b>Pompton Lake (n=5)</b>	<b>41.5</b>	<b>0.86</b>
<b>Ramapo River at Pompton Feeder (n=3)</b>	<b>31.2</b>	<b>0.88</b>
<b>Pompton River at Lincoln Park (n=3)</b>	<b>36.3</b>	<b>0.53</b>
<b>Passaic Region Watershed (n=86)</b>	<b>40.2</b>	<b>0.46</b>

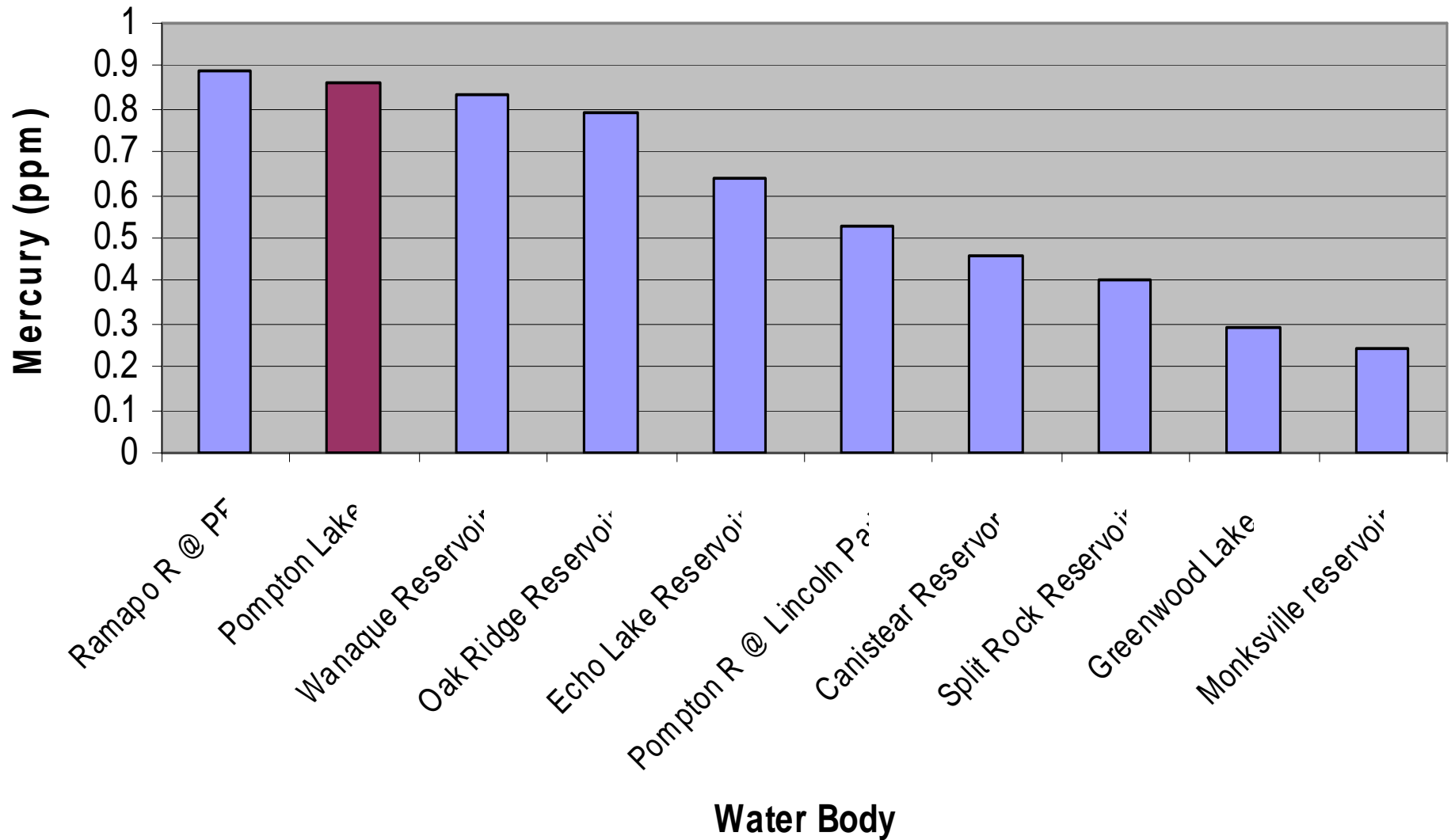
# Mercury in Pompton Lake Largemouth Bass

(Exponent, 1999)

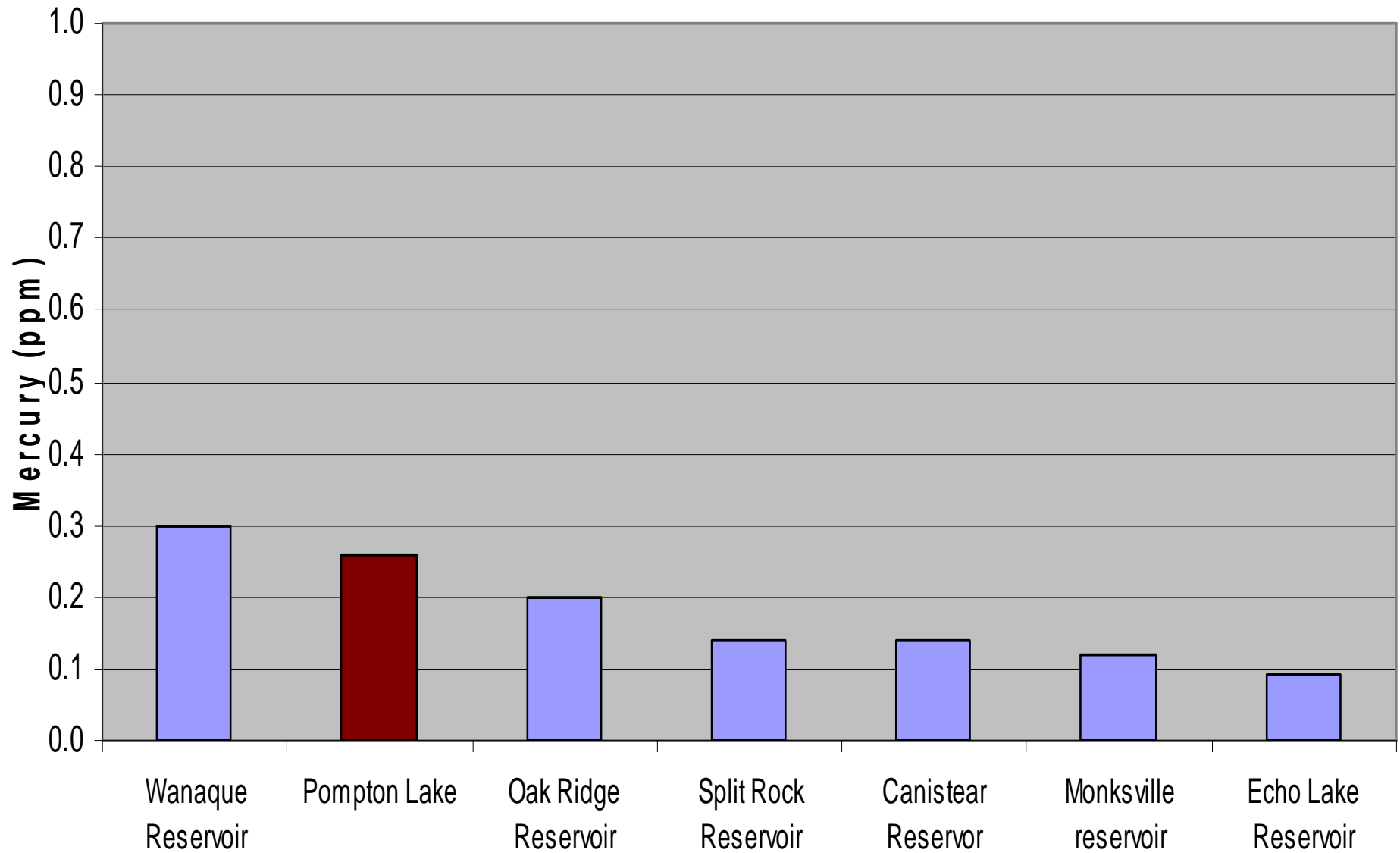


◆ Reference mHg (ug/kg) ▲ Delta mHg (ug/kg)

## Passaic Region - Largemouth Bass Mercury Data (ppm) (NJDEP, 2002)



## Passaic Region - Mercury in Bluegill (ppm)



# Current Pompton Lake Fish Consumption Advisories

Species	General Population Eat no more than:	High-Risk Individual Eat no more than:
Largemouth Bass	One meal per week	Do not eat
Common Carp	One meal per month	Do not eat

# Additional Information

➤ Office of Science:

<http://www.state.nj.us/dep/dsr/mercury/>

➤ New Jersey Fish Consumption Advisories:

- [www.FishSmartEatSmartNJ.org](http://www.FishSmartEatSmartNJ.org)

➤ NJ Mercury Task Force Report:

- [www.state.nj.us/dep/dsr/mercury\\_task\\_force.htm](http://www.state.nj.us/dep/dsr/mercury_task_force.htm)

