

South River Hg TMDL Updates

May 23, 2006

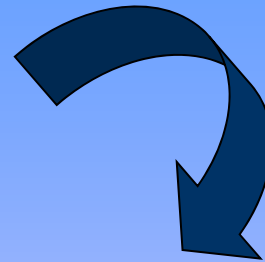


1st Public Meeting

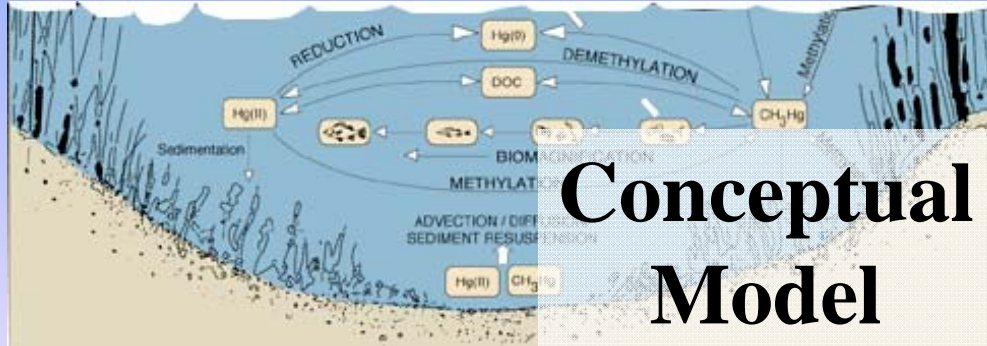
- Schedule around next SRST meeting
 - Day, time, place?
- Purpose
 - Inform community of the project
 - Allow all stakeholders to participate



Data Collection

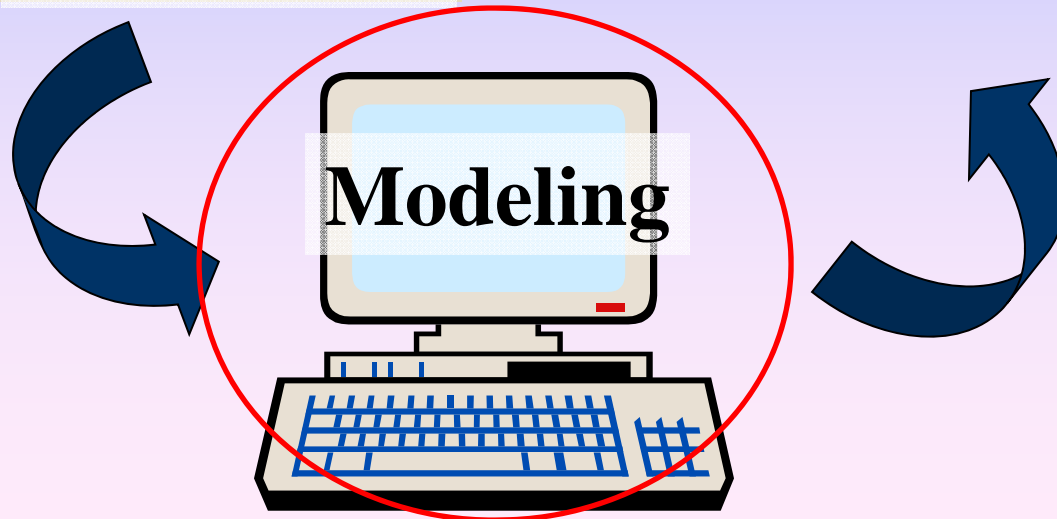


TMDL Project Steps



Conceptual Model

TMDL



Modeling Approach

HSPF

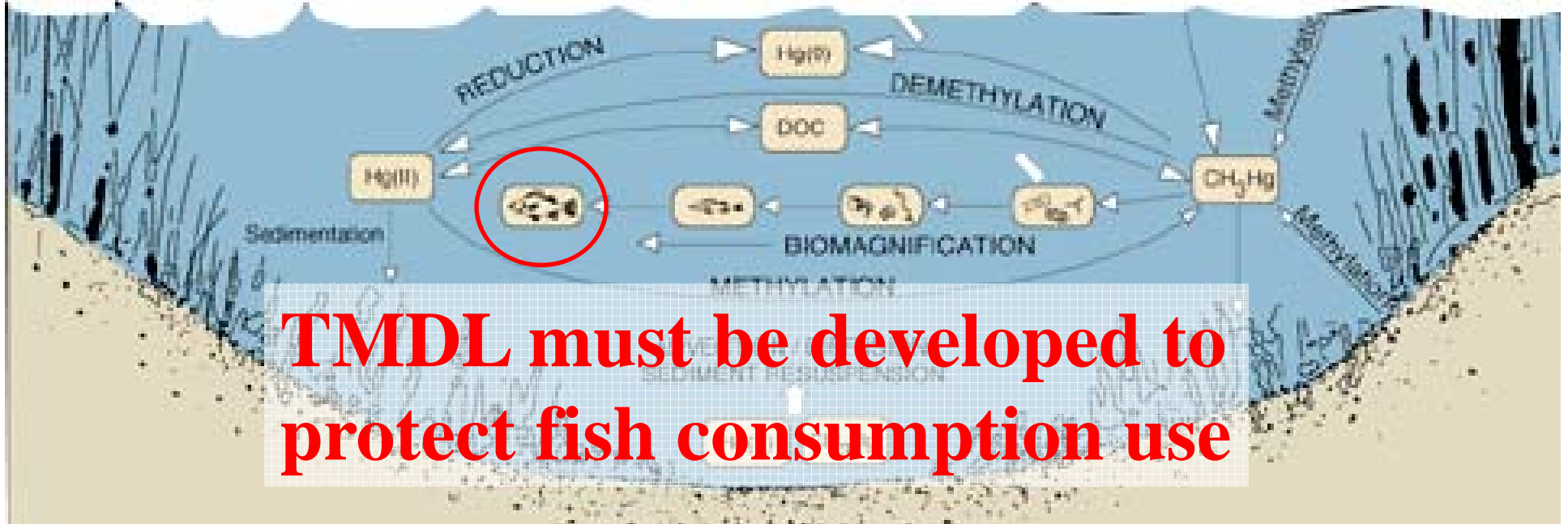
Inputs



Transport



Inputs



TMDL must be developed to protect fish consumption use

Relating Fish and Water Hg Levels

Option 1: Complex mercury speciation, uptake, and bioaccumulation models

Pros

- Incorporates all important transformations and interactions
- May increase our understanding of the processes

Cons

- Do we have the necessary information to parameterize and calibrate these models
- Increased complexity does not necessarily mean increased predictive ability



Relating Fish and Water Hg Levels

Option 2: Site-specific Bioaccumulation Factor (BAF) approach

Pros

- Greatly simplifies modeling
- Data are available
- Based on site-specific relationships, rather than parameters derived from various lab, field, and literature sources

Cons

- Treats important Hg cycling processes as a black box
- Limits predictive ability to investigate remediation options aimed at slowing methylation or uptake rates



Relating Fish and Water Hg Levels

- What about Virginia's water quality standard for Hg (51ng/L)
 - Developed to protect human health from effects through fish consumption

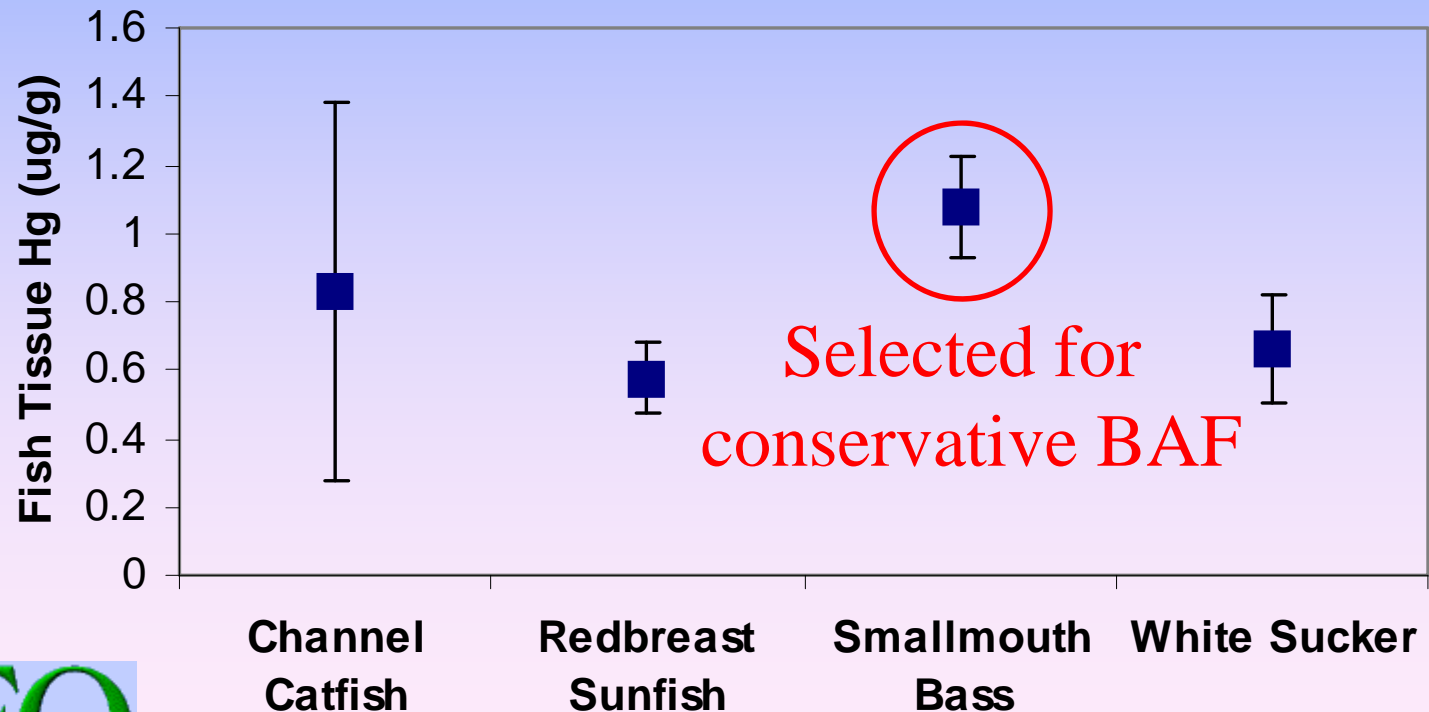
Of approximately 300 Diss Hg samples collected by DEQ on South River, 0 have exceeded 51 ng/L



Approach to Developing the BAF

- Must consider species differences

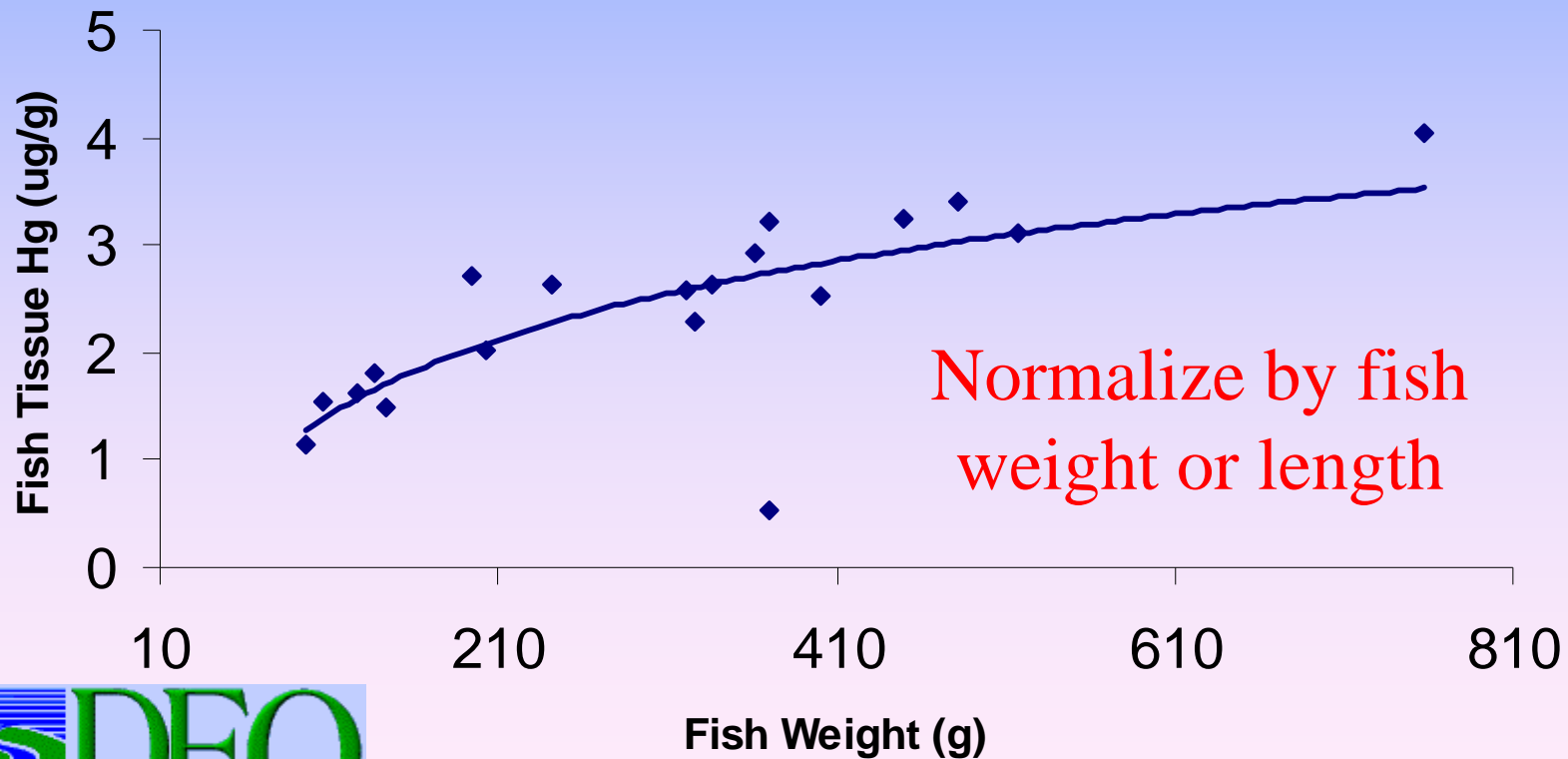
**Hg in Various Fish Species
(2005 data at 1BSSF054.20)**



Approach to Developing the BAF

- Must consider fish size

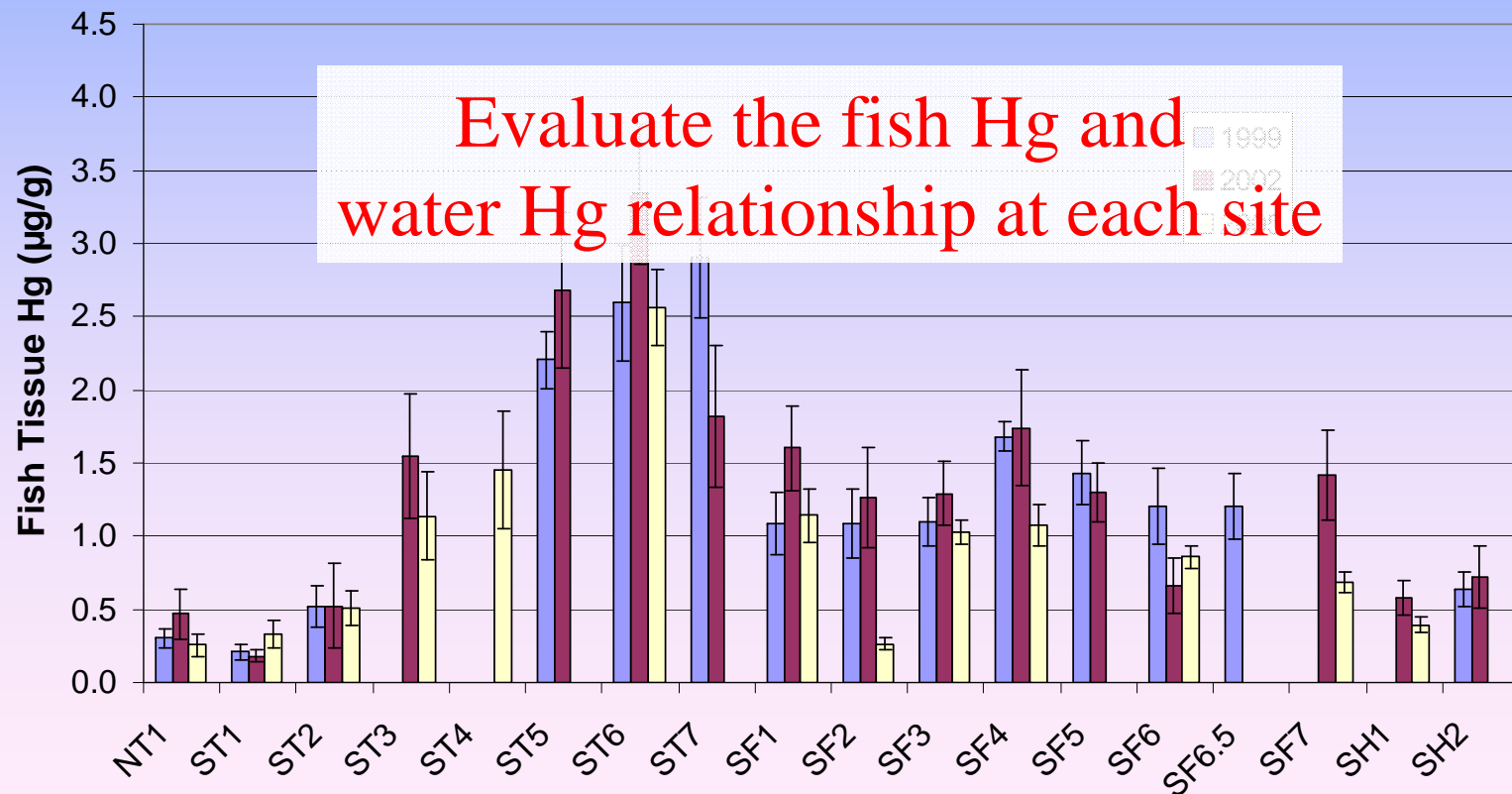
Effect of Fish Size on Hg Accumulation
(Smallmouth Bass data from Grottoes)



Approach to Developing the BAF

- Must consider location differences

Smallmouth Bass Hg Levels at Various Locations

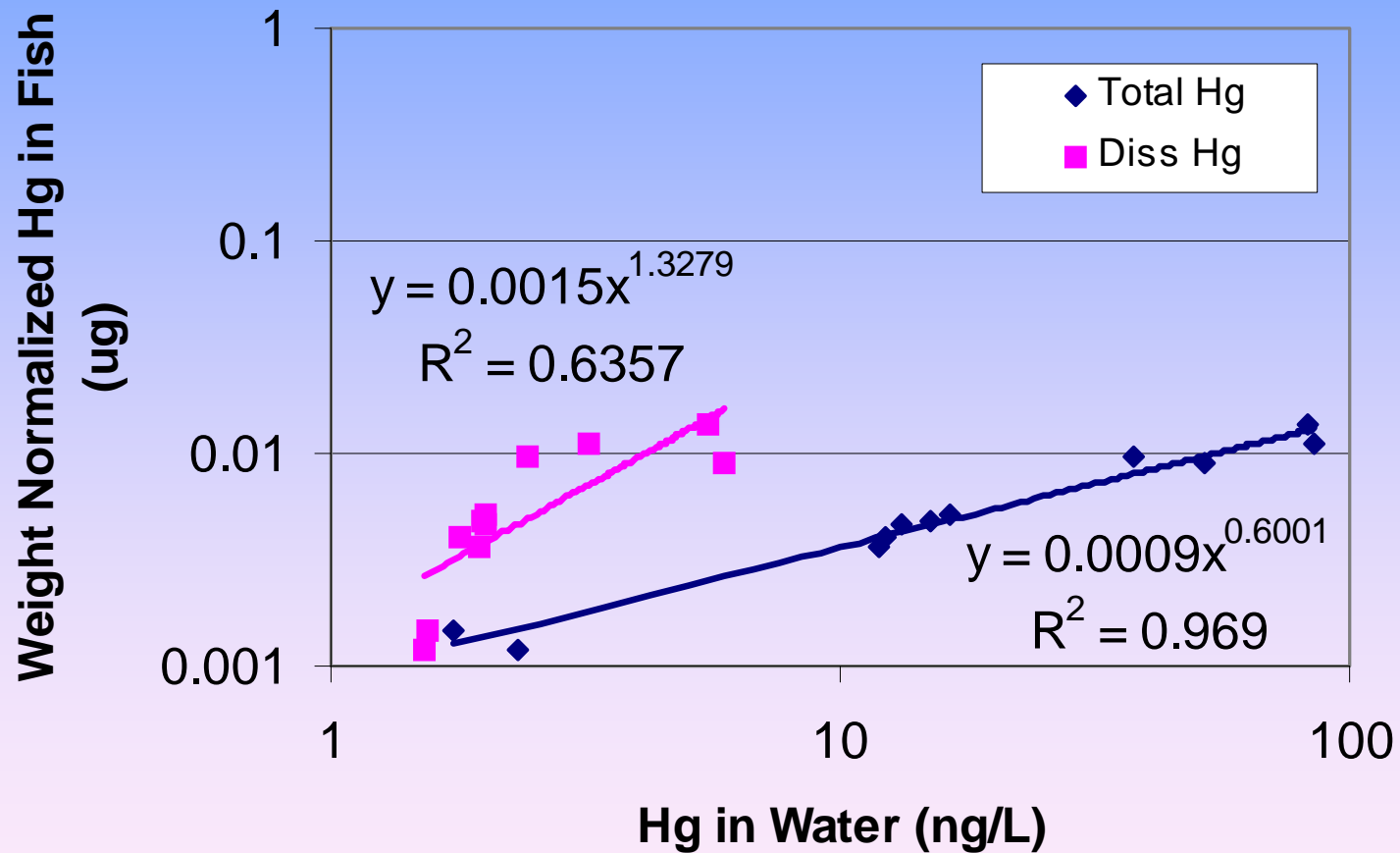


Available Data

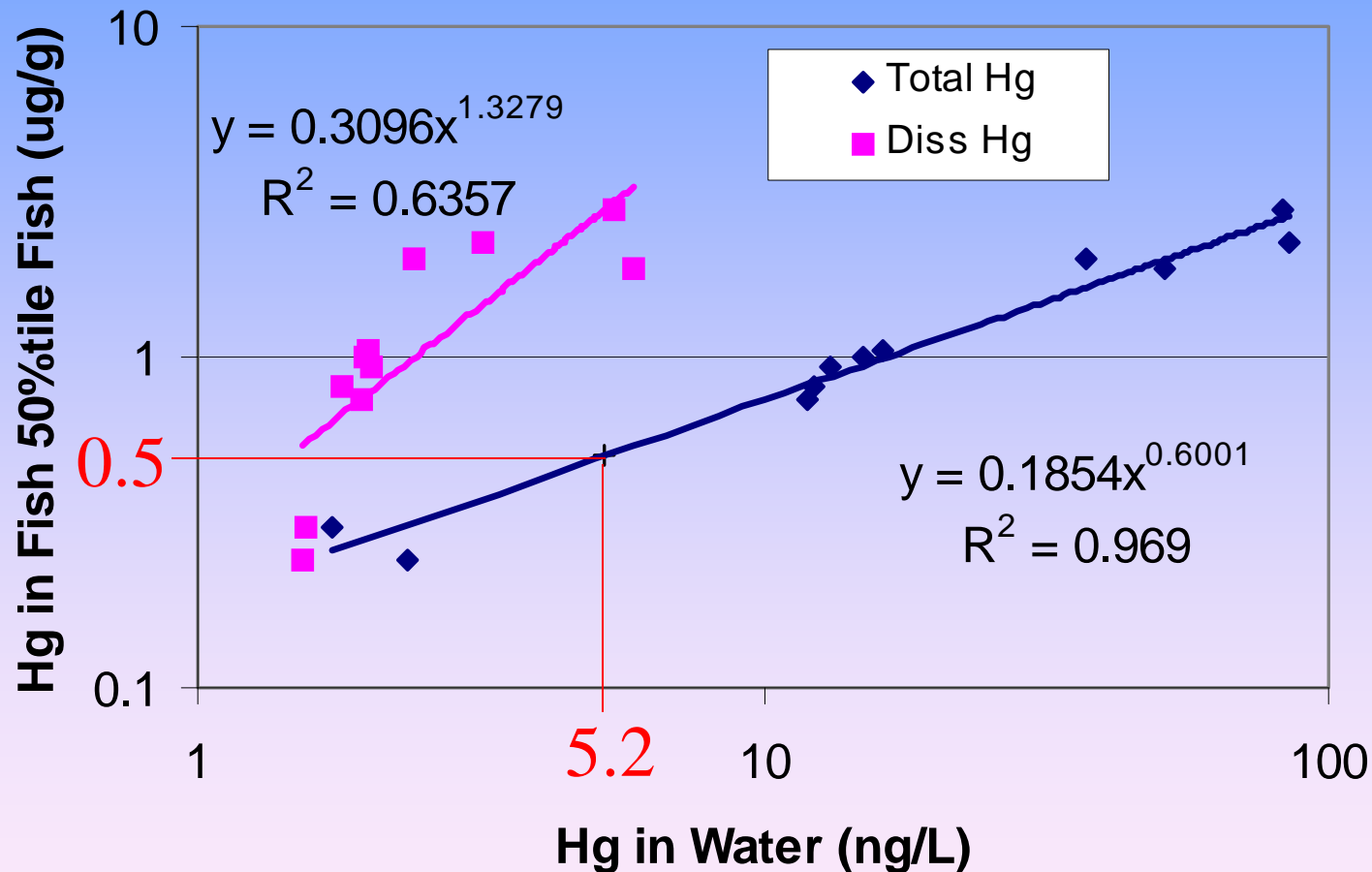
- 11 sites with collocated (or closely located) fish and water column Hg data
 - 6 on South River, 4 on South Fork Shenandoah, 1 on North River
- Size of data sets per site – (1999-2006 DEQ data)

	Avg	Min	Max
Smallmouth bass	28	16	70
Diss Hg	22	8	33
Total Hg	19	8	26

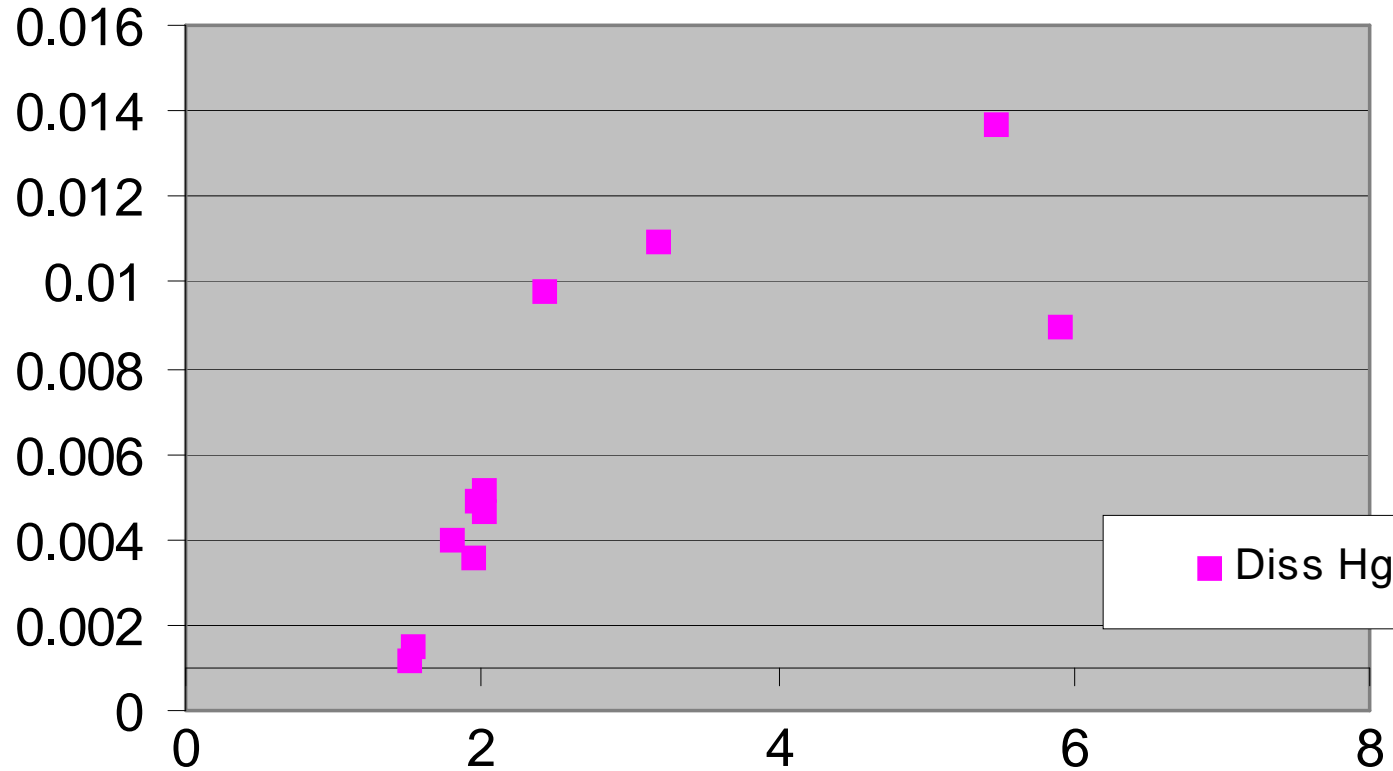
BAF Relationship



BAF Relationship for 50th %tile size smallmouth bass



**Weight Normalized Hg in Fish
(ug)**



■ Diss Hg

Hg in Water (ng/L)

