

# Mercury TMDL Update South River Basin, Virginia

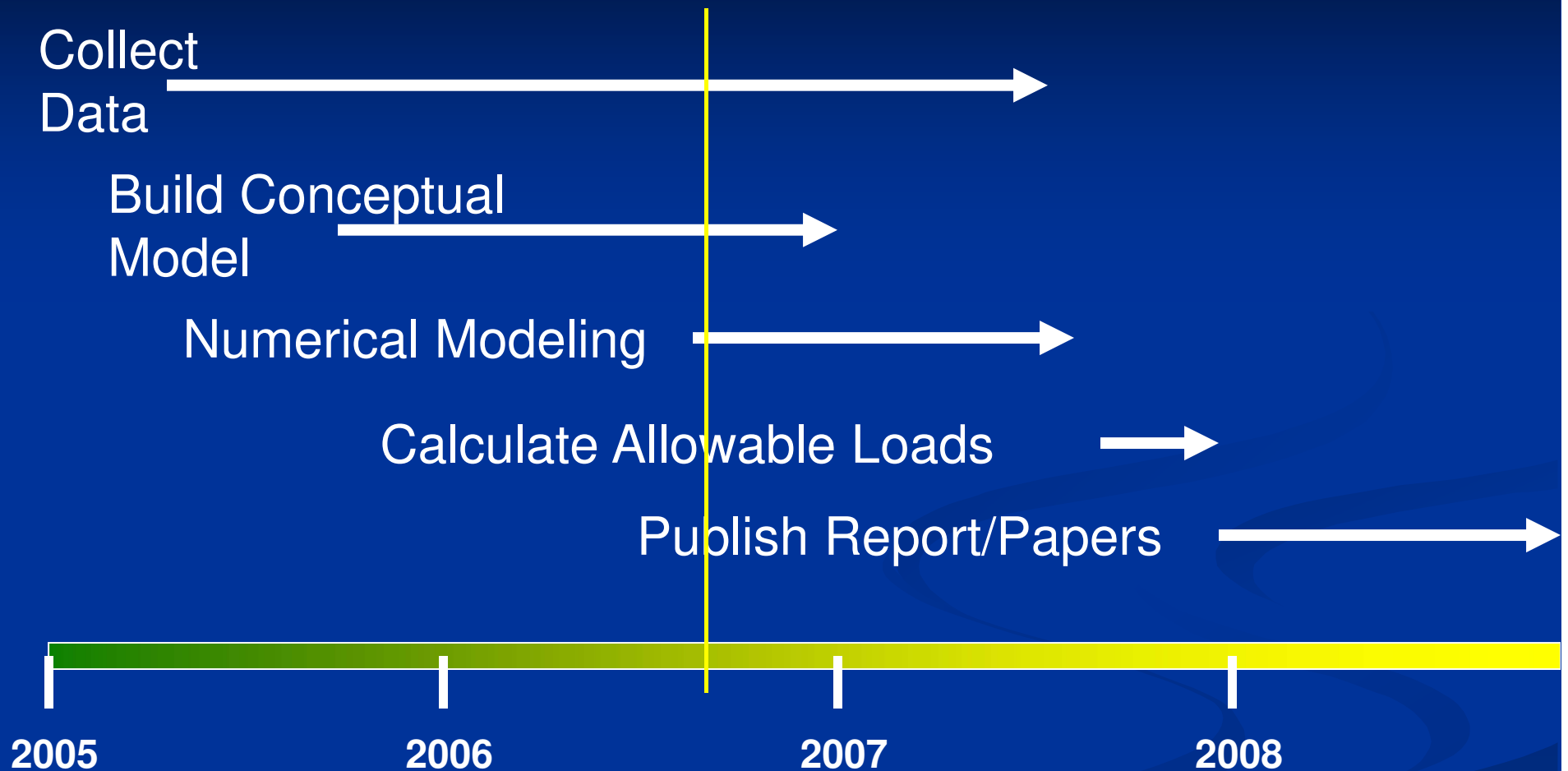
Jack Eggleston



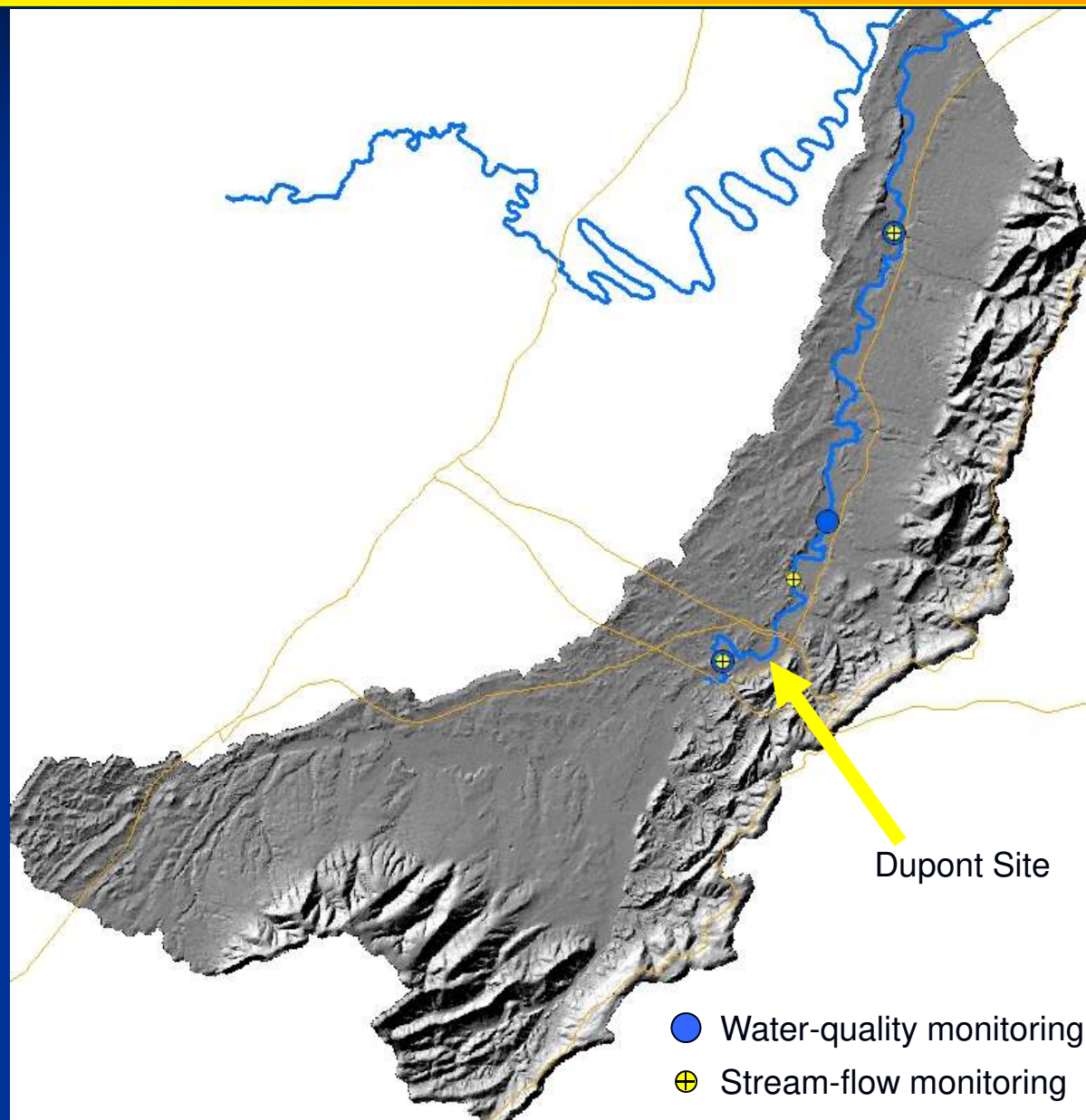
Cooperating Agencies



# S. River TMDL Project Schedule



# South River Monitoring Sites



# Water Quality Monitoring

## Continuous Monitoring

Flow, pH, Temp, SC, and Turbidity

- Ongoing at Waynesboro, Doms, and Harriston

## Periodic Monitoring

Tot Hg & MeHg (Diss. & Particulate)  
DOC, Sulfate, Chloride, TSS

- Monthly baseflow samplings
- Storm Events: Aug. 31
- Cross-stream sampling
- Interagency concurrent sampling

*South River at Harriston, VA*

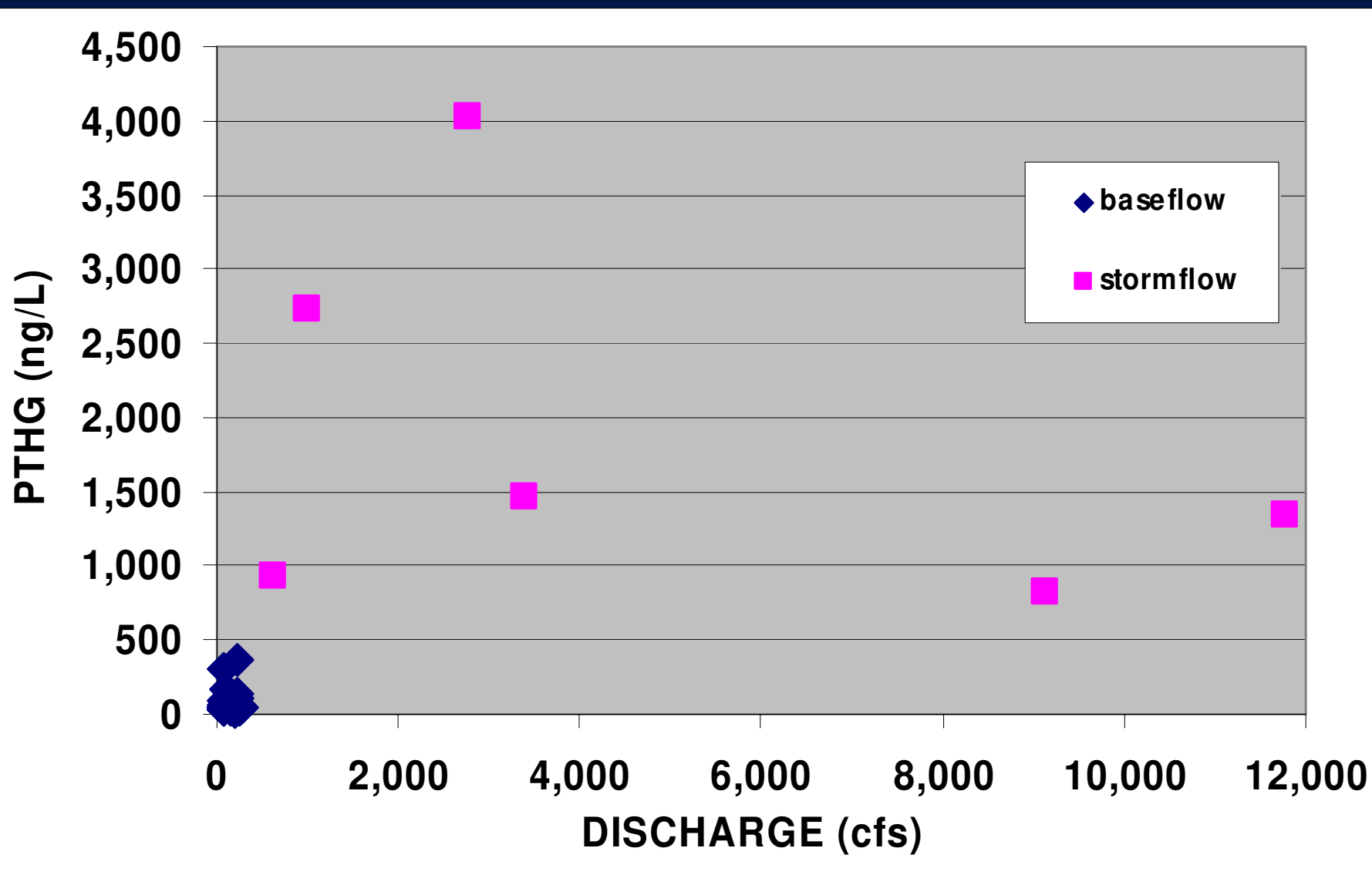


# Mercury Statistics, Sept. '06

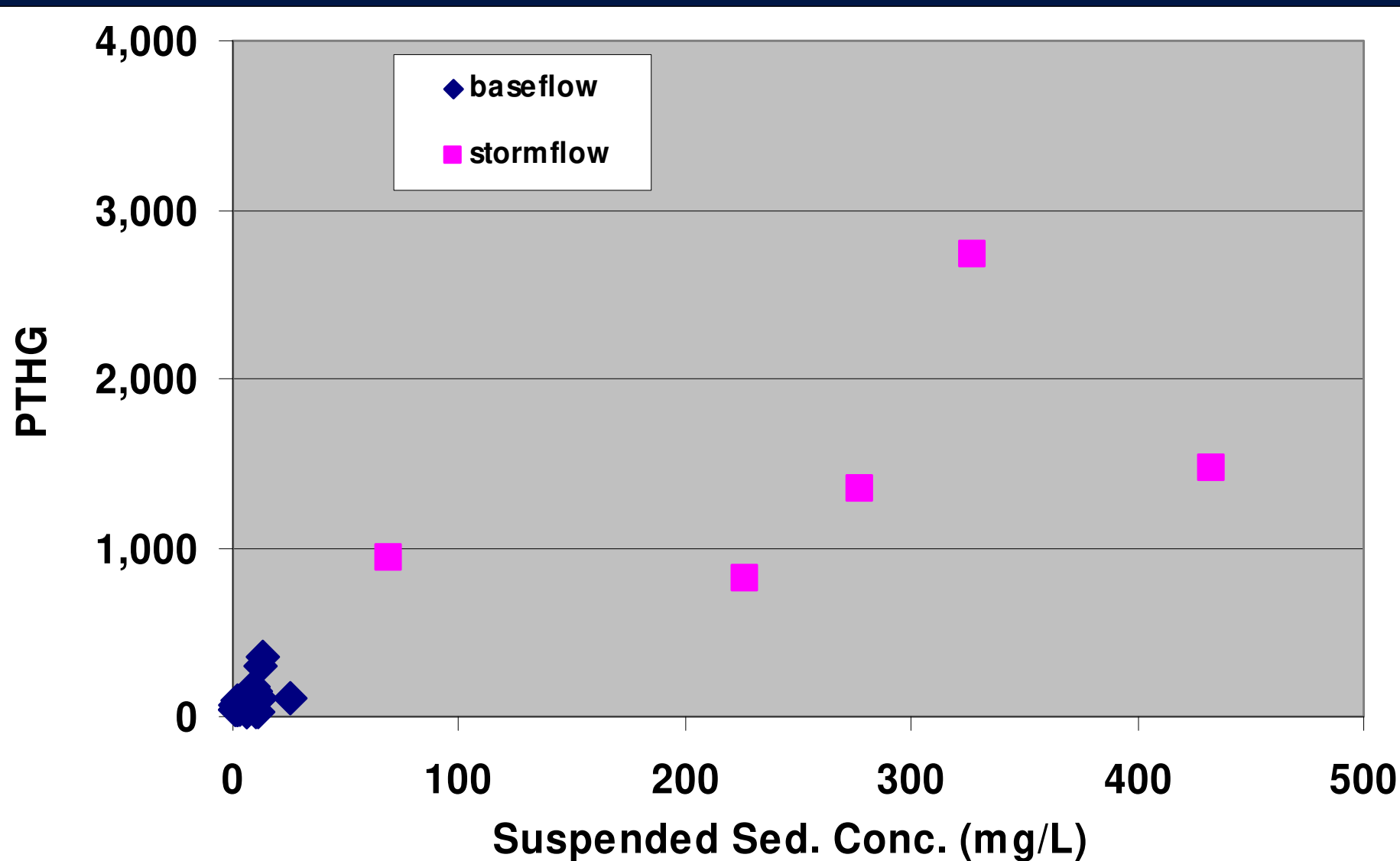
## South River stream water samples

|                                 |           | Waynesboro<br>01626000 |      | Dooms<br>01626920 |      | Harriston<br>01627500 |      |
|---------------------------------|-----------|------------------------|------|-------------------|------|-----------------------|------|
| Filtered Total Hg<br>(ng/L)     | Baseflow  | 0.3                    | (15) | 9.3               | (17) | 12.4                  | (28) |
|                                 | Stormflow | 2.0                    | (9)  | 10.8              | (6)  | 21.1                  | (8)  |
| Particulate Total<br>Hg (ng/L)  | Baseflow  | 1.0                    | (12) | 92.2              | (14) | 80.4                  | (25) |
|                                 | Stormflow | 12.4                   | (5)  | 1517.3            | (3)  | 1506.8                | (5)  |
| Filtered Methyl Hg<br>(ng/L)    | Baseflow  | 0.0                    | (12) | 0.4               | (15) | 1.5                   | (24) |
|                                 | Stormflow | 0.0                    | (7)  | 0.2               | (4)  | 0.4                   | (6)  |
| Particulate Methyl<br>Hg (ng/L) | Baseflow  | 0.0                    | (12) | 0.6               | (14) | 1.0                   | (25) |
|                                 | Stormflow | 0.1                    | (5)  | 4.6               | (3)  | 4.1                   | (5)  |
| Susp. Sed. Total<br>Hg (ppm)    | Baseflow  | 0.2                    | (10) | 21.7              | (10) | 18.9                  | (23) |
|                                 | Stormflow | 0.1                    | (5)  | 11.5              | (3)  | 7.0                   | (5)  |

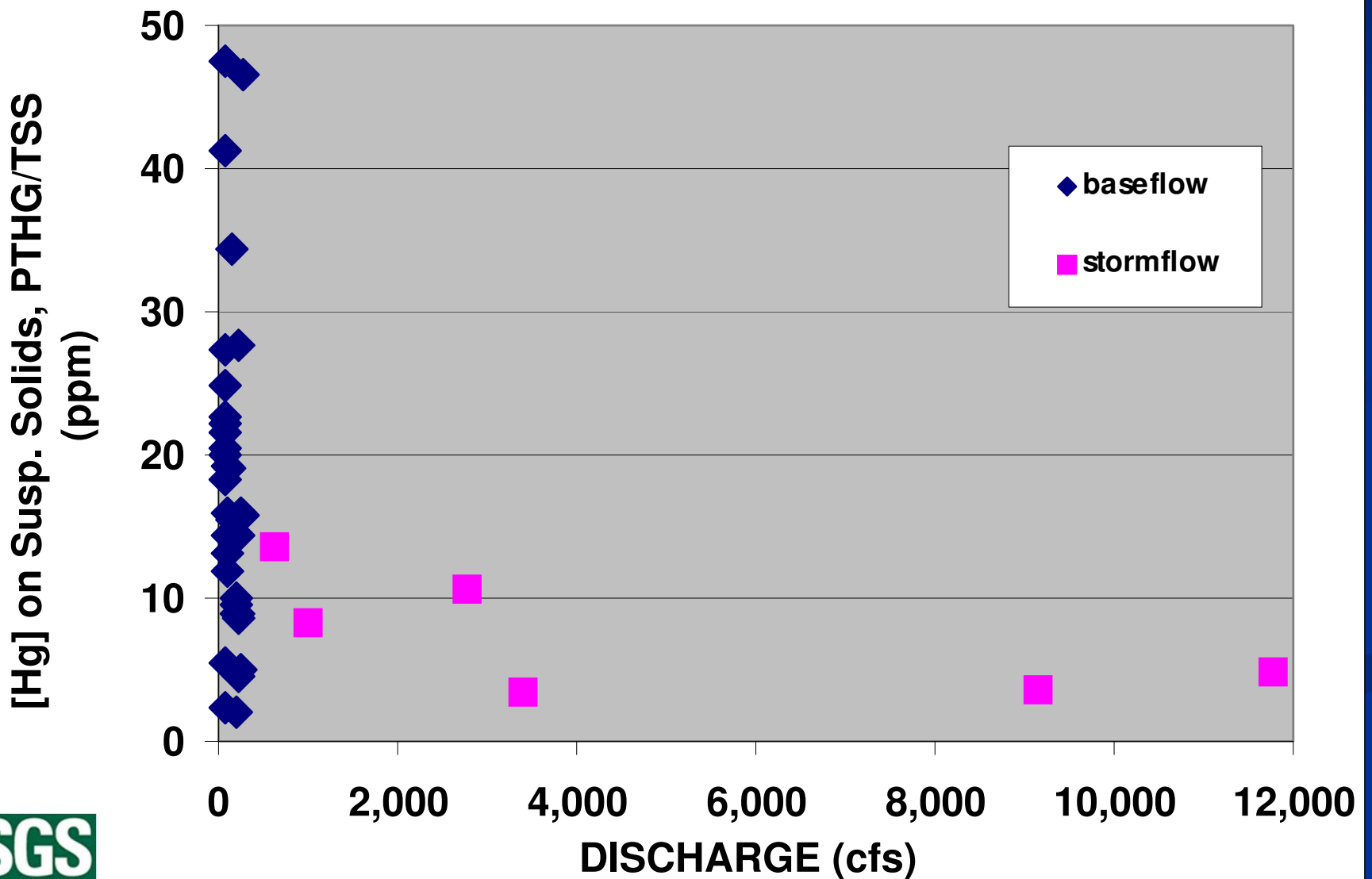
# PTHG vs. Flow – Dooms & Harriston



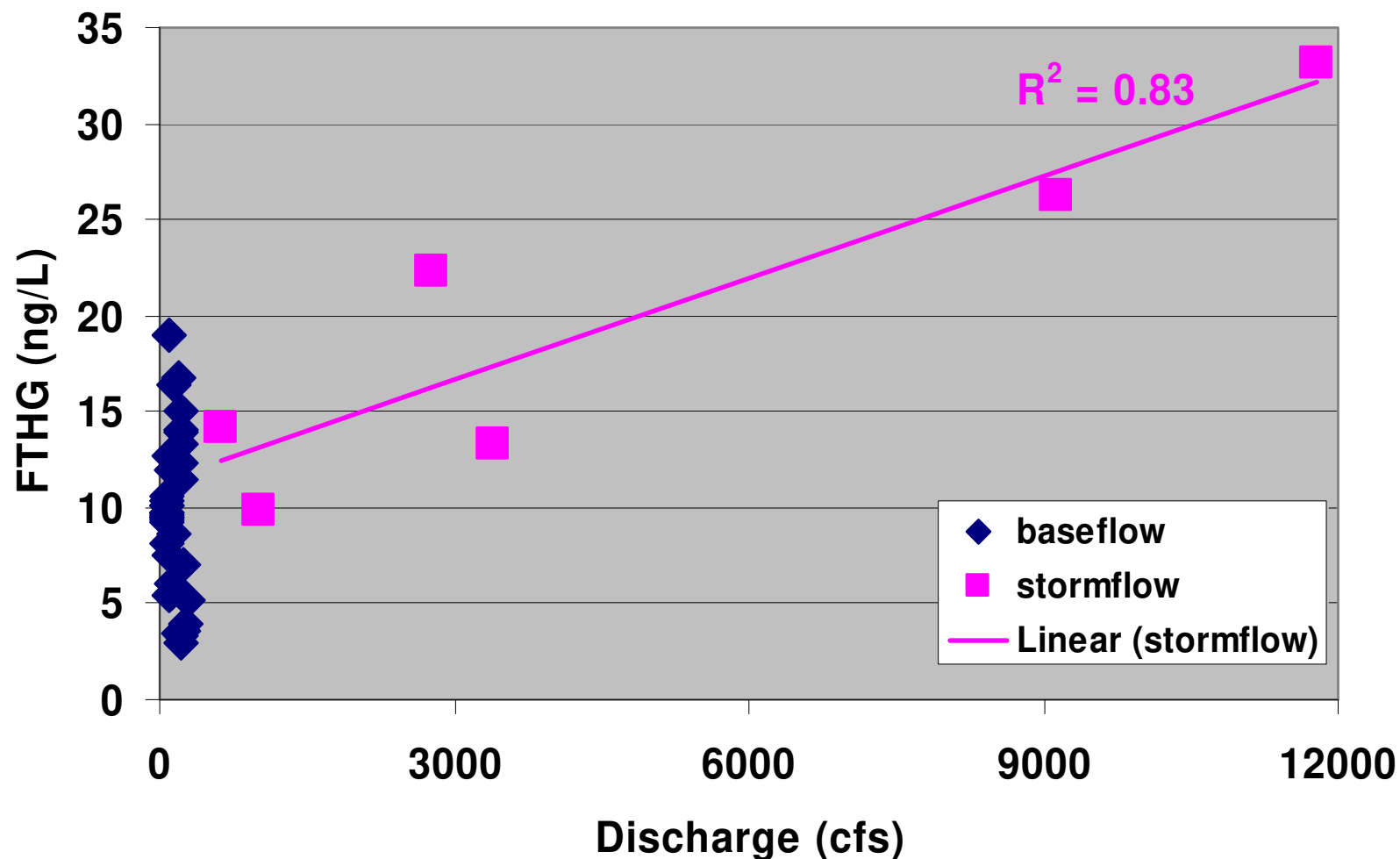
# PTHG vs. SSC – Dooms & Harriston



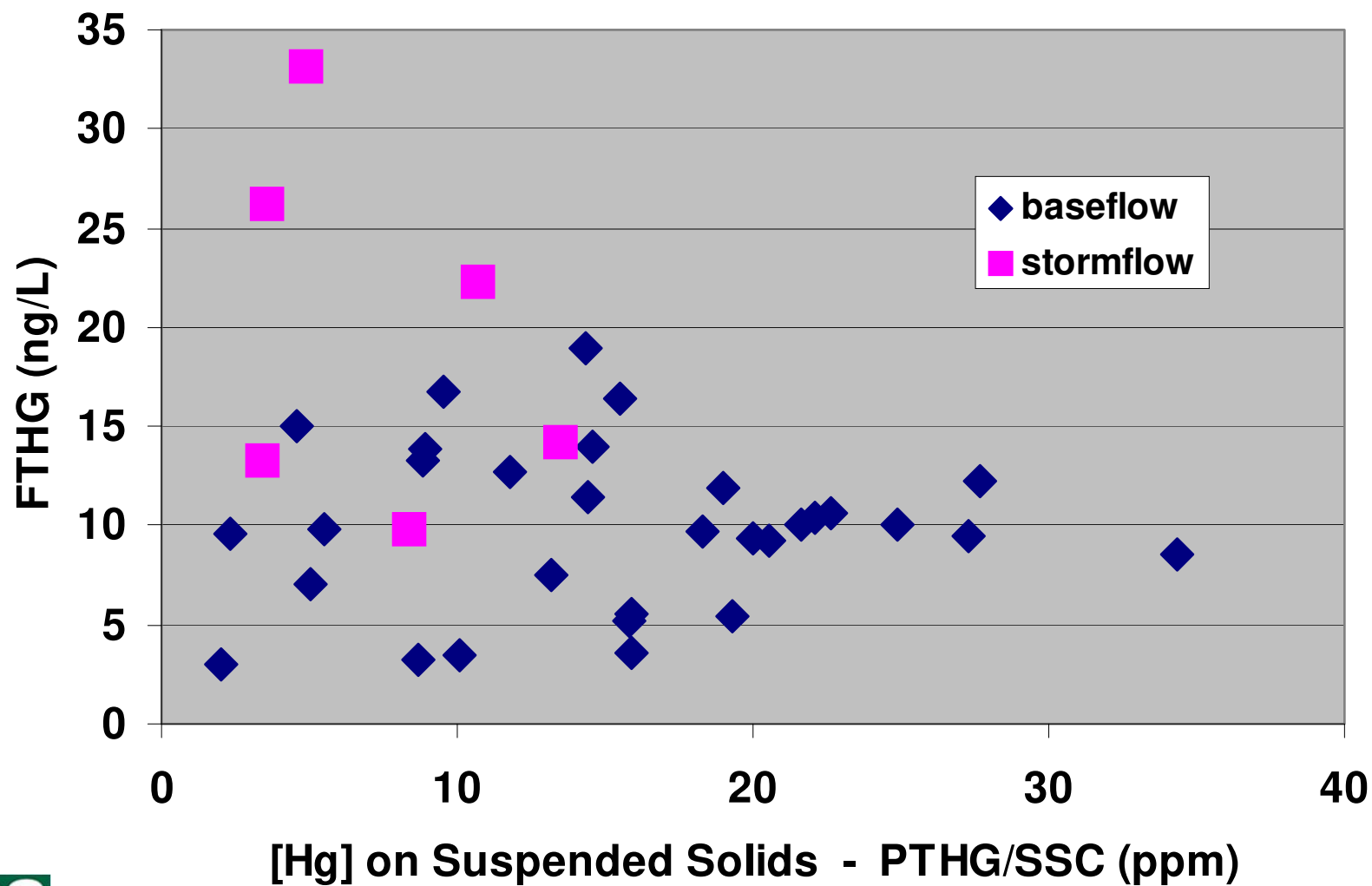
# [Hg] on Suspended Solids – Dooms & Harriston



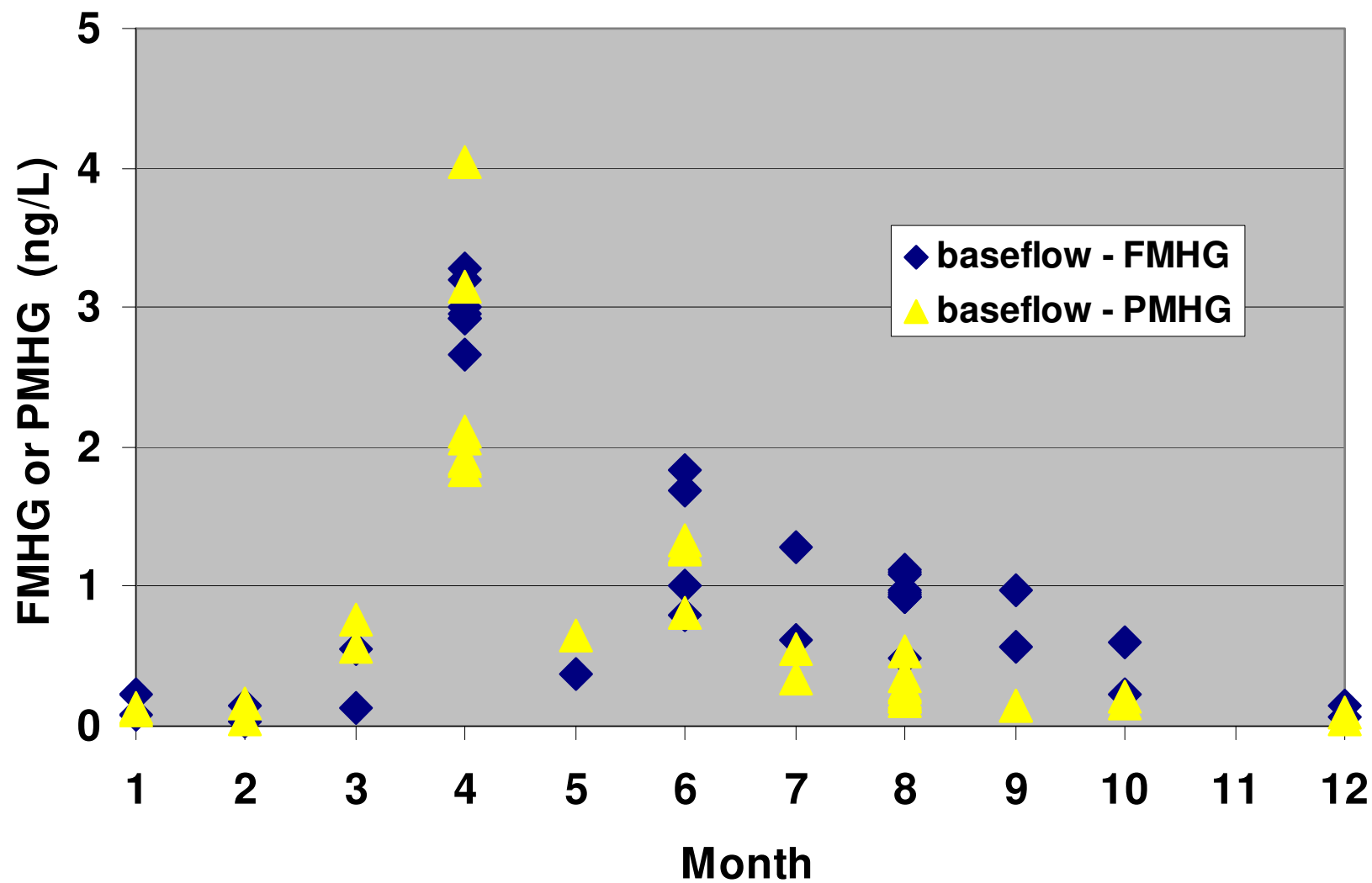
# FTHG vs Discharge – Dooms & Harriston



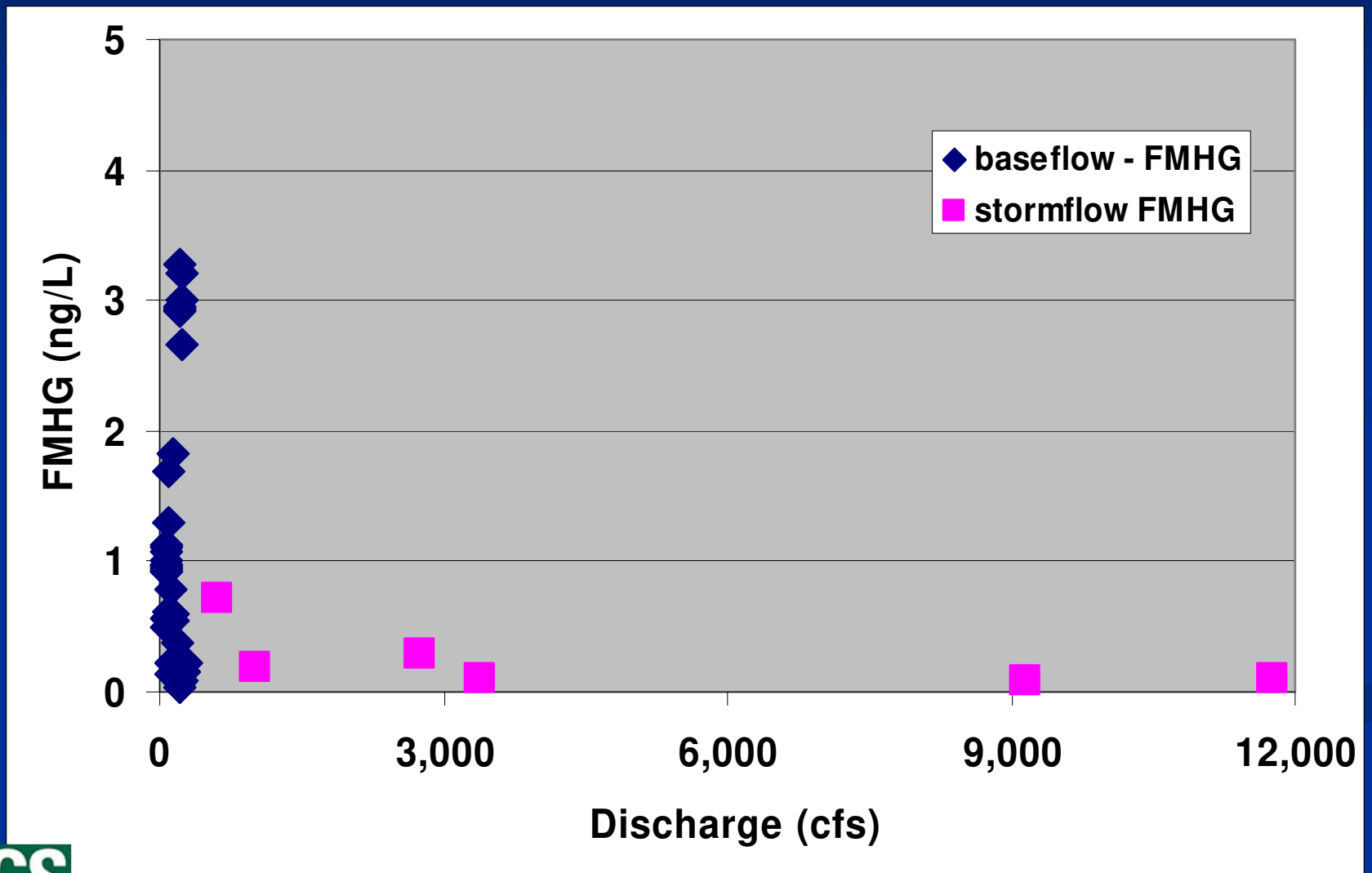
# Does [Hg] on Suspended Solids Control FTHG? - Dooms & Harriston



# Methyl-Hg - Dooms & Harriston

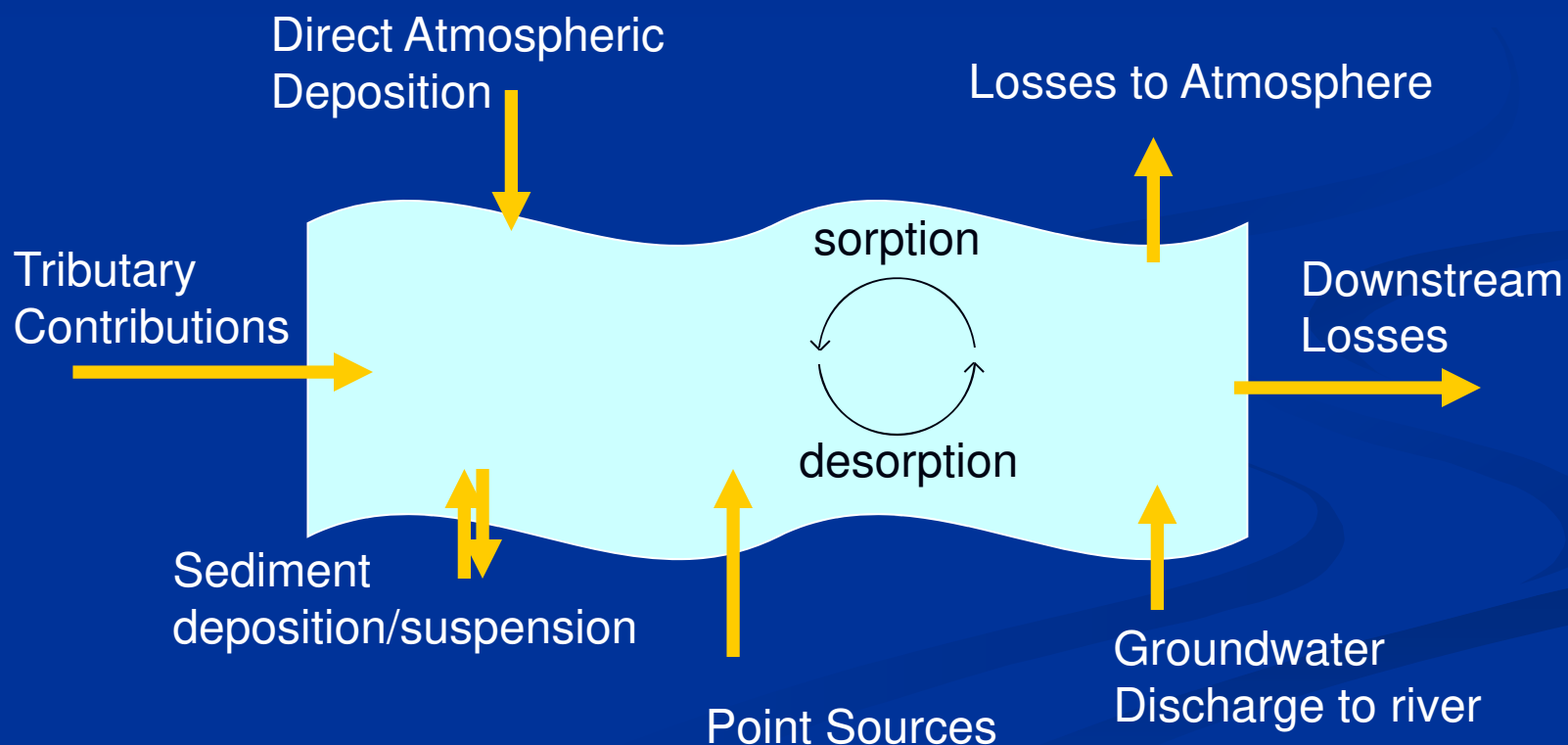


# FMHG vs. Discharge – Dooms & Harriston



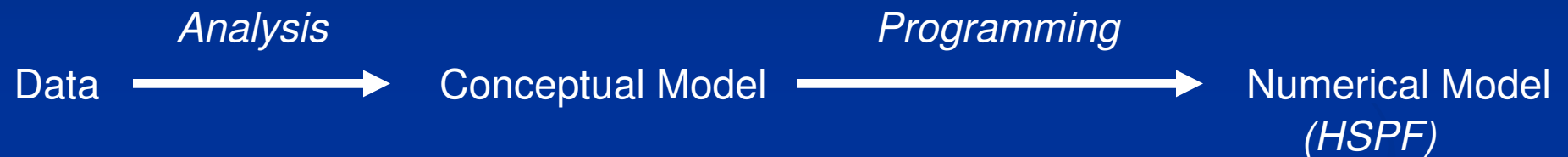
# Conceptual Model of Total Mercury

- South River water column is the control volume
- Water fluxes
- Sediment fluxes
- Mercury fluxes



# TMDL Approach to Determining Acceptable Loads of Mercury to the South River

## Build a Numerical Model



## Use the Numerical Model

Time Series &  
Other Data

Hg Concentrations  
Streamflow  
Partitioning Ks  
Sediment Parameters



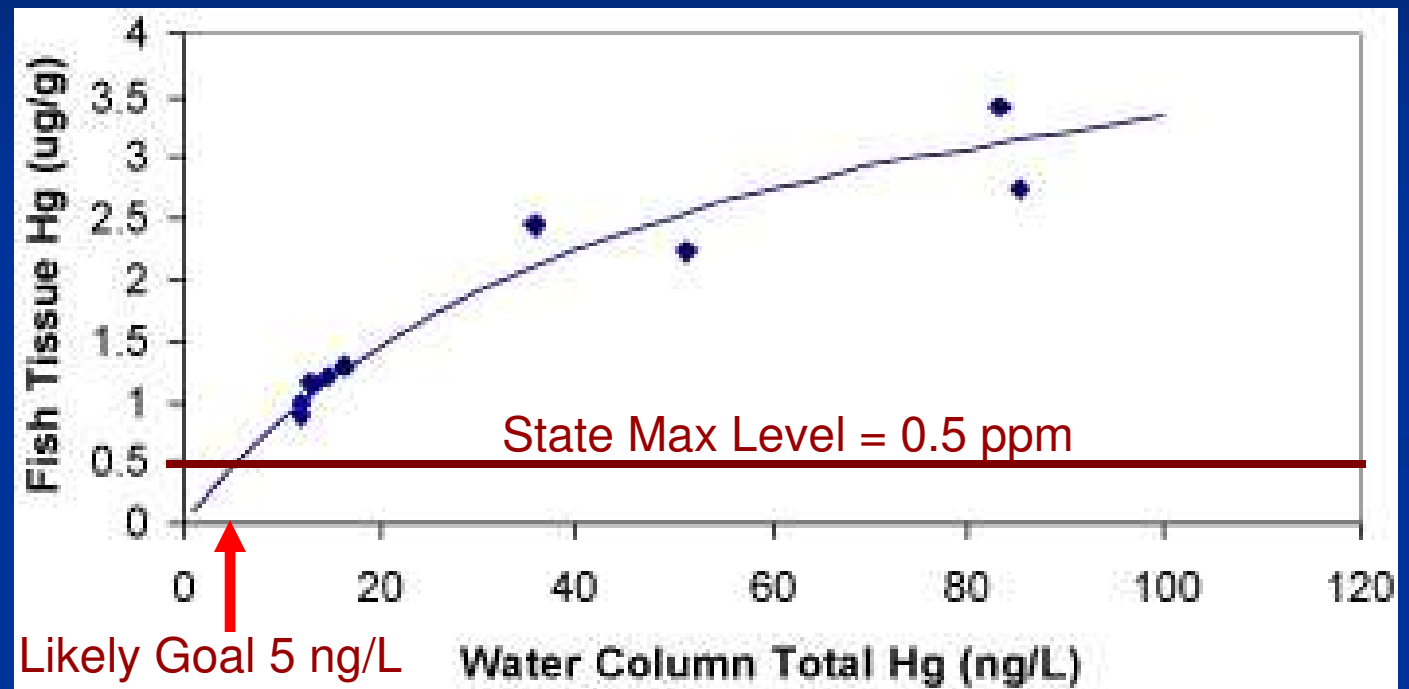
Numerical Model



South River Hg  
Concentrations

# Site-Specific BAF Approach

$$\text{BAF} = \text{Fish [Hg]} / \text{Water [Hg]}$$



$$\text{Target Water [Hg]} = \text{Target Fish [Hg]} / \text{BAF}$$