

Mercury TMDL Update South River, Virginia

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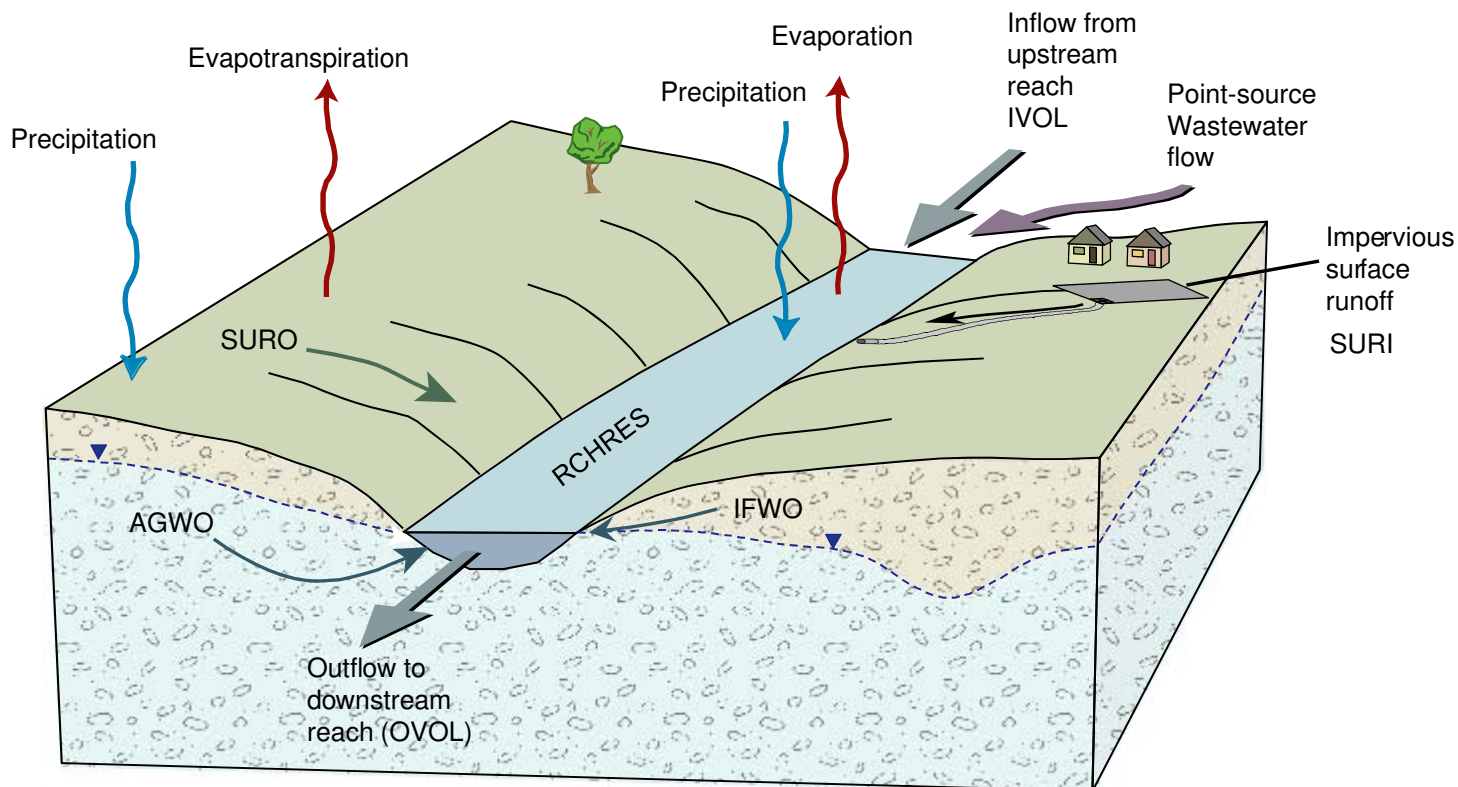
Cooperating Agencies



Goals of the TMDL Project

- ✓ • Collect data characterizing mercury (Hg) and methyl-mercury (MeHg) fluxes and production rates in the South River watershed.
- ➔ • Develop numerical models for simulating surface water flows and Hg cycling and transport.
- Using the surface water and contaminant transport models, calculate maximum allowable mercury loads (TMDL) from all point and non-point sources.

Hydrologic Modeling Framework - HSPF



EXPLANATION

SURI—Surface runoff from impervious areas

SURO—Surface runoff from pervious areas

IFWO—Interflow

AGWO—Active groundwater flow (base flow)

RCHRES—Stream reach or reservoir segment

IVOL—Inflow volume

OVO—Outflow volume

SURI—Surface runoff from impervious areas

SURO—Surface runoff from pervious areas

HSPF Data Flow

Basic Input : (by sub-basin)

- Land Use
- Basin geometry and Channel morphology
- Sediment erosion and Mercury source parameters

Time Series Input : (hourly)

- Precipitation
- Meteorology: air temp, dewpoint, windspeed, potential evapotranspiration, solar radiation, cloud cover

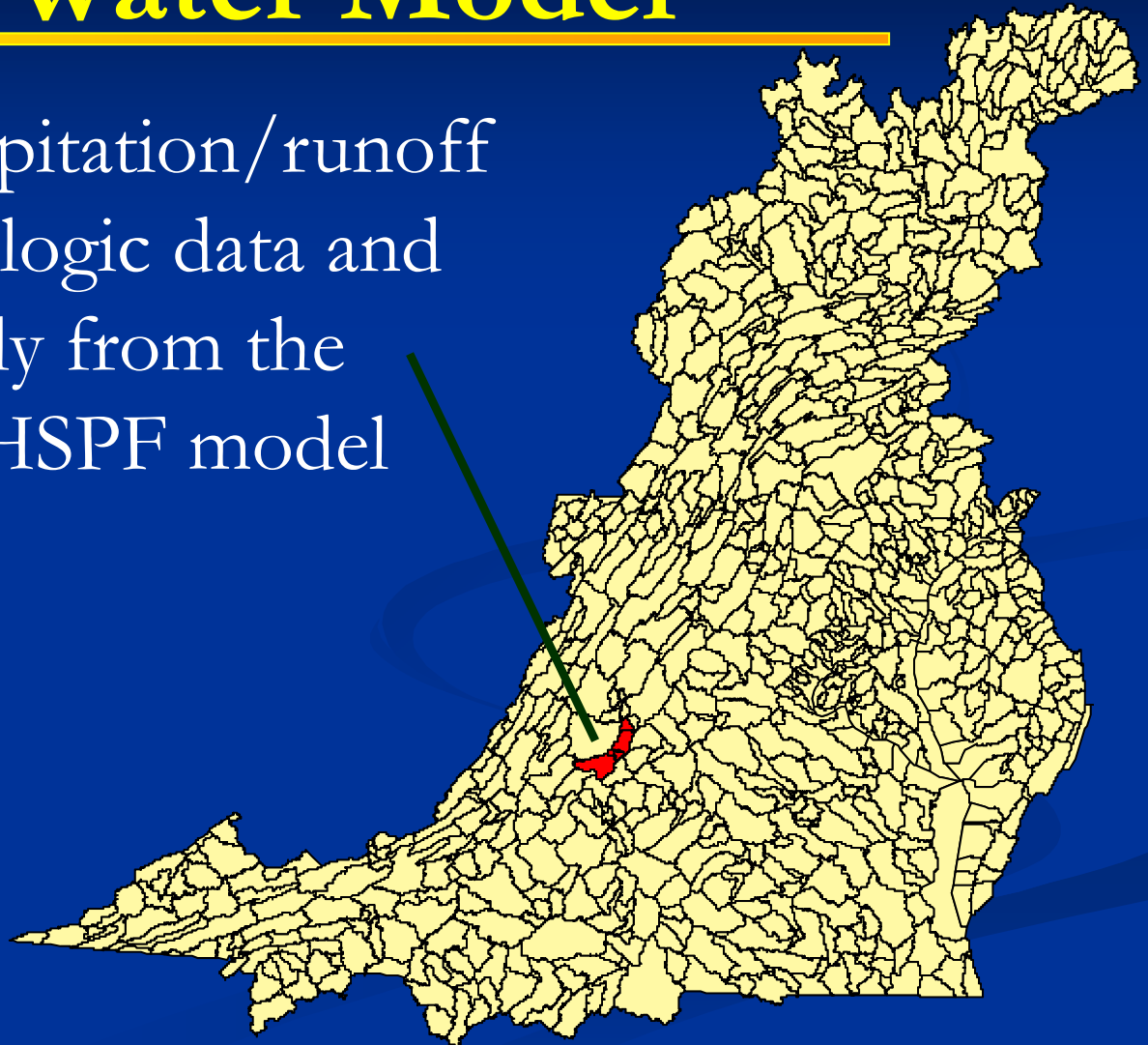
Time Series Output : (hourly)

- Discharge
- Suspended Sediment
- Dissolved Total Mercury
- Suspended sediment sorbed Mercury

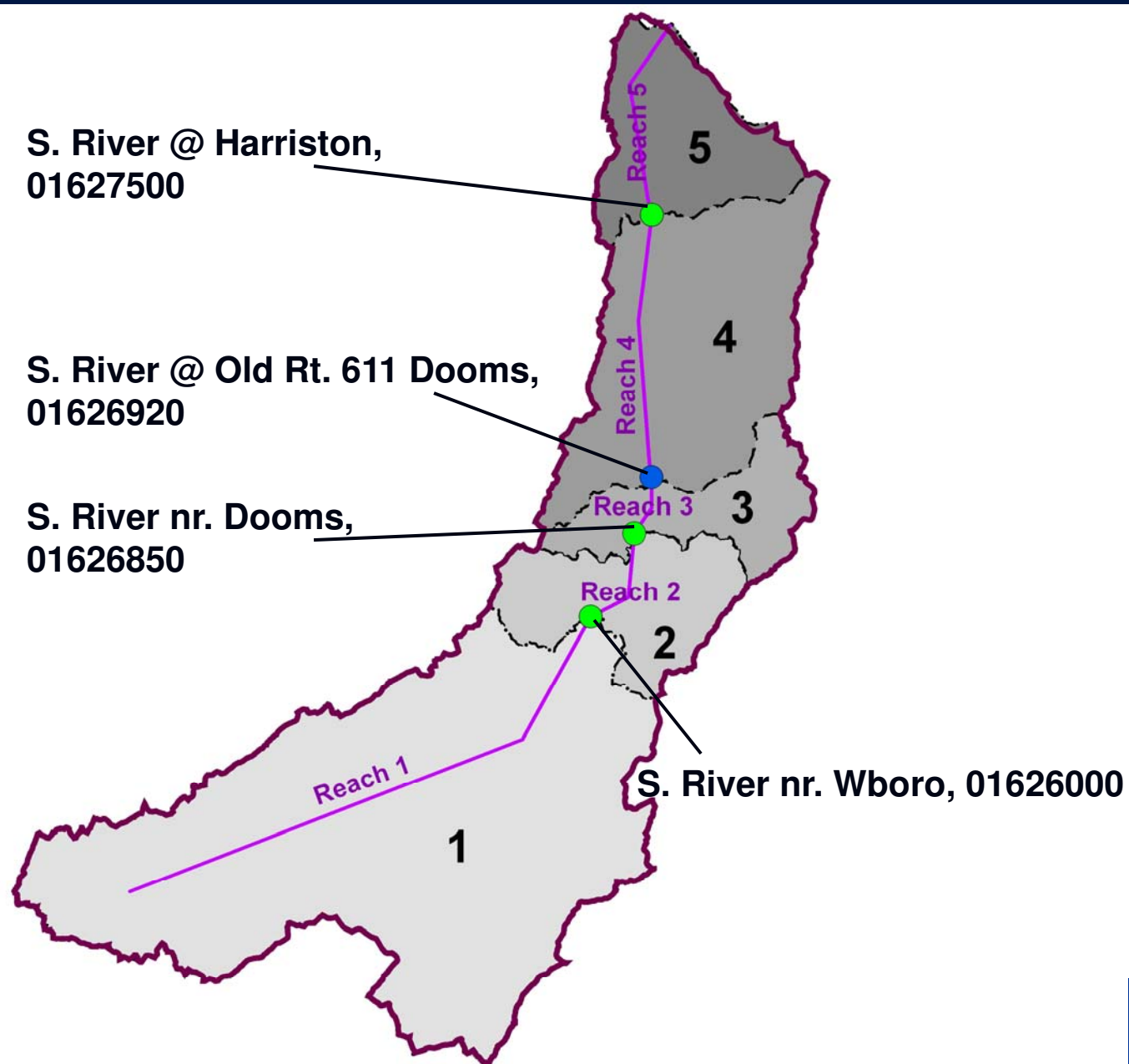
Chesapeake Bay Surface Water Model

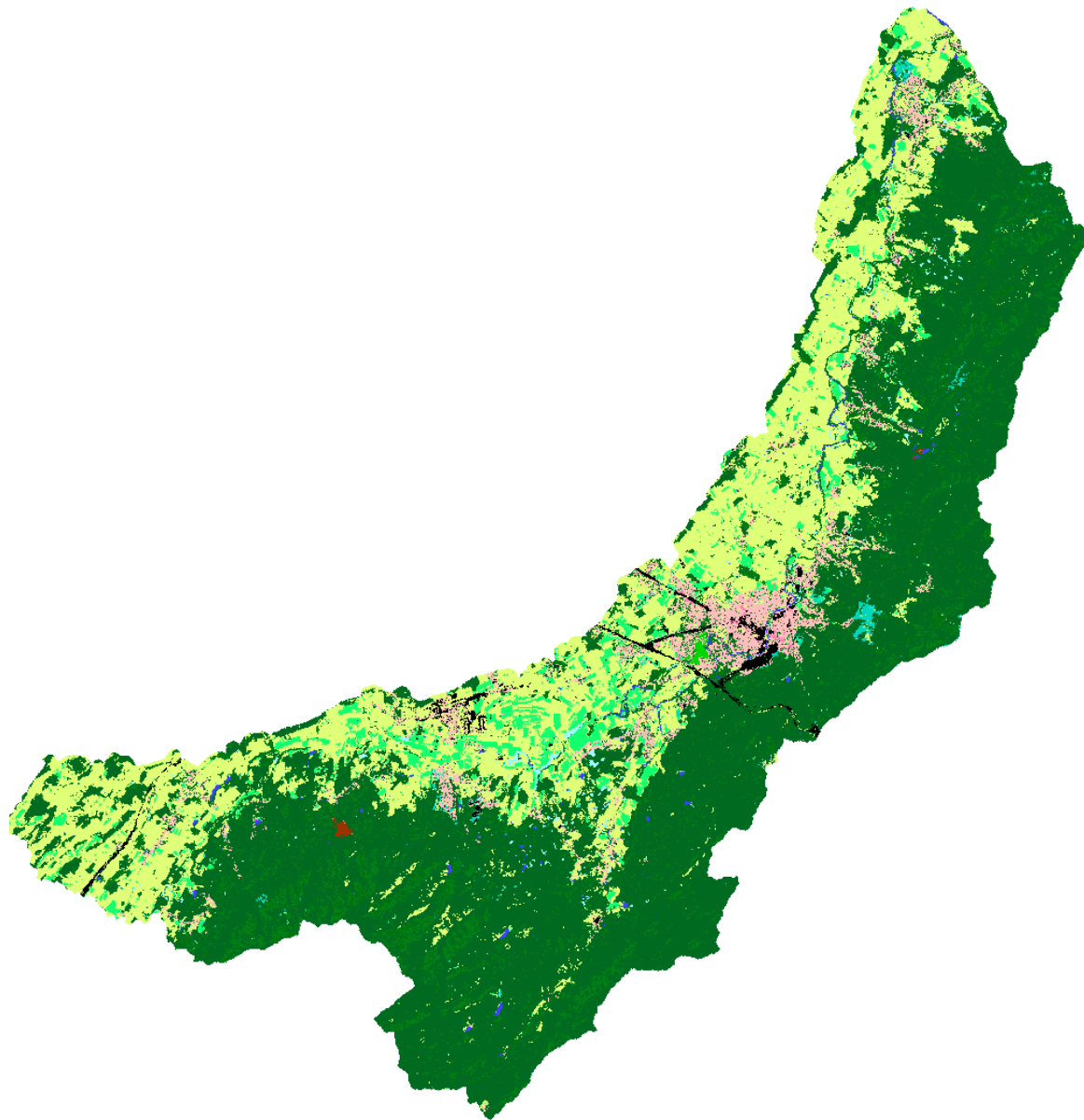
South River precipitation/runoff model uses hydrologic data and parameters directly from the Chesapeake Bay HSPF model

- Land use
- Slope
- Precipitation



Sub-Basin Delineation

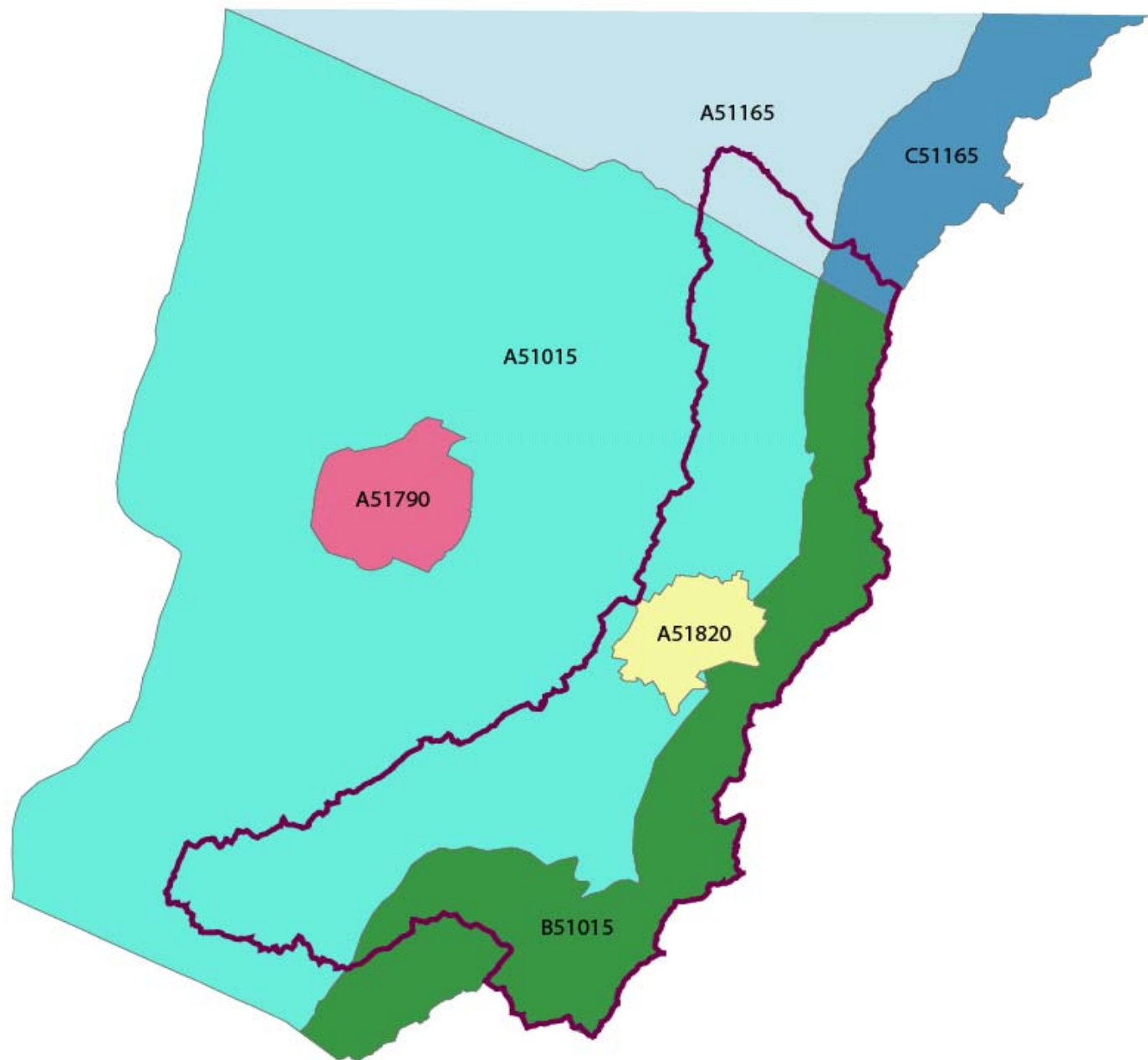




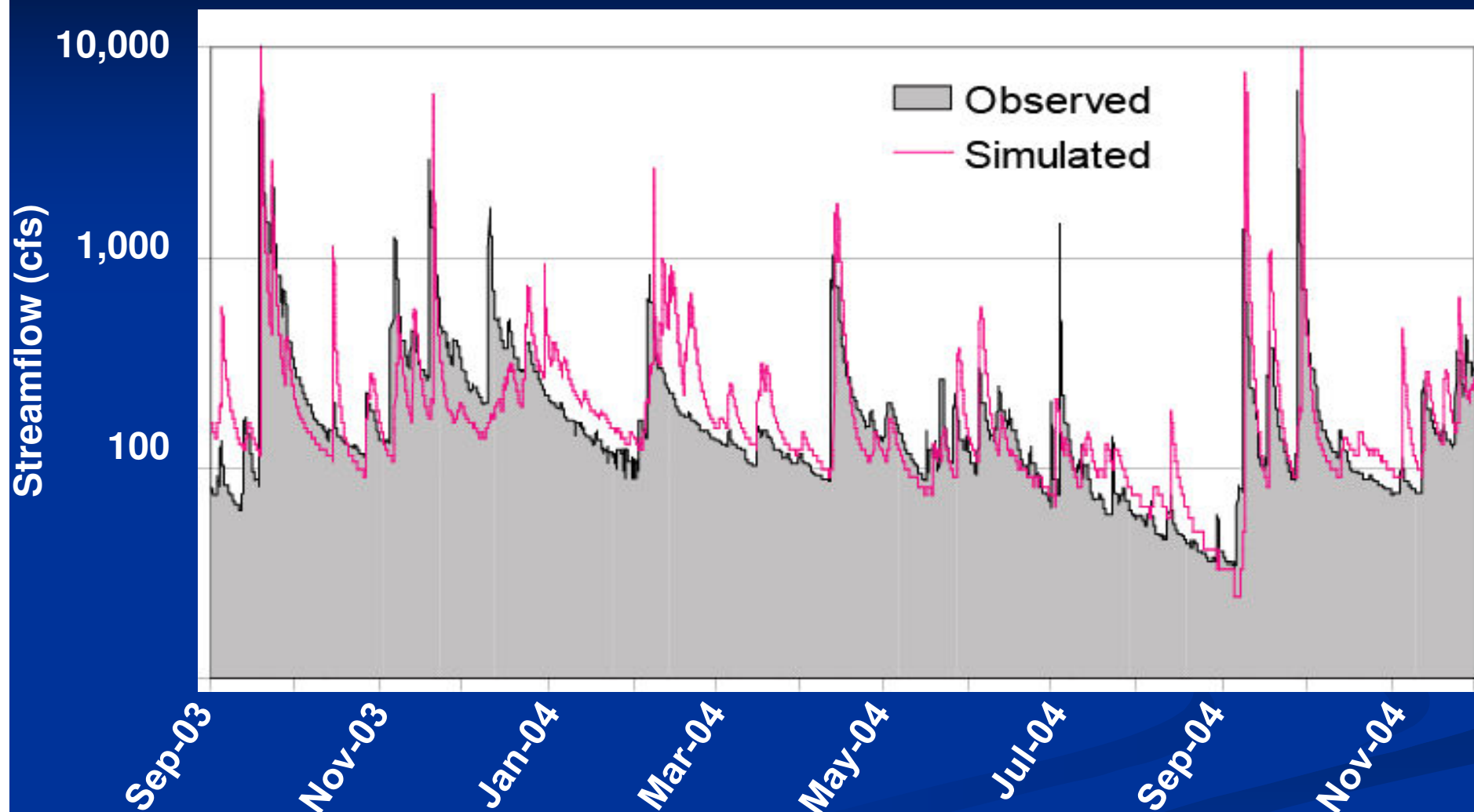
Land Use

- Open Water
- Low Intensity Residential
- High Intensity Residential
- Industrial Commercial Transportation
- Quarries Gravel Pits
- Transitional
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Pasture/Hay
- Row Crops
- Urban Recreational Grasses
- Wetlands

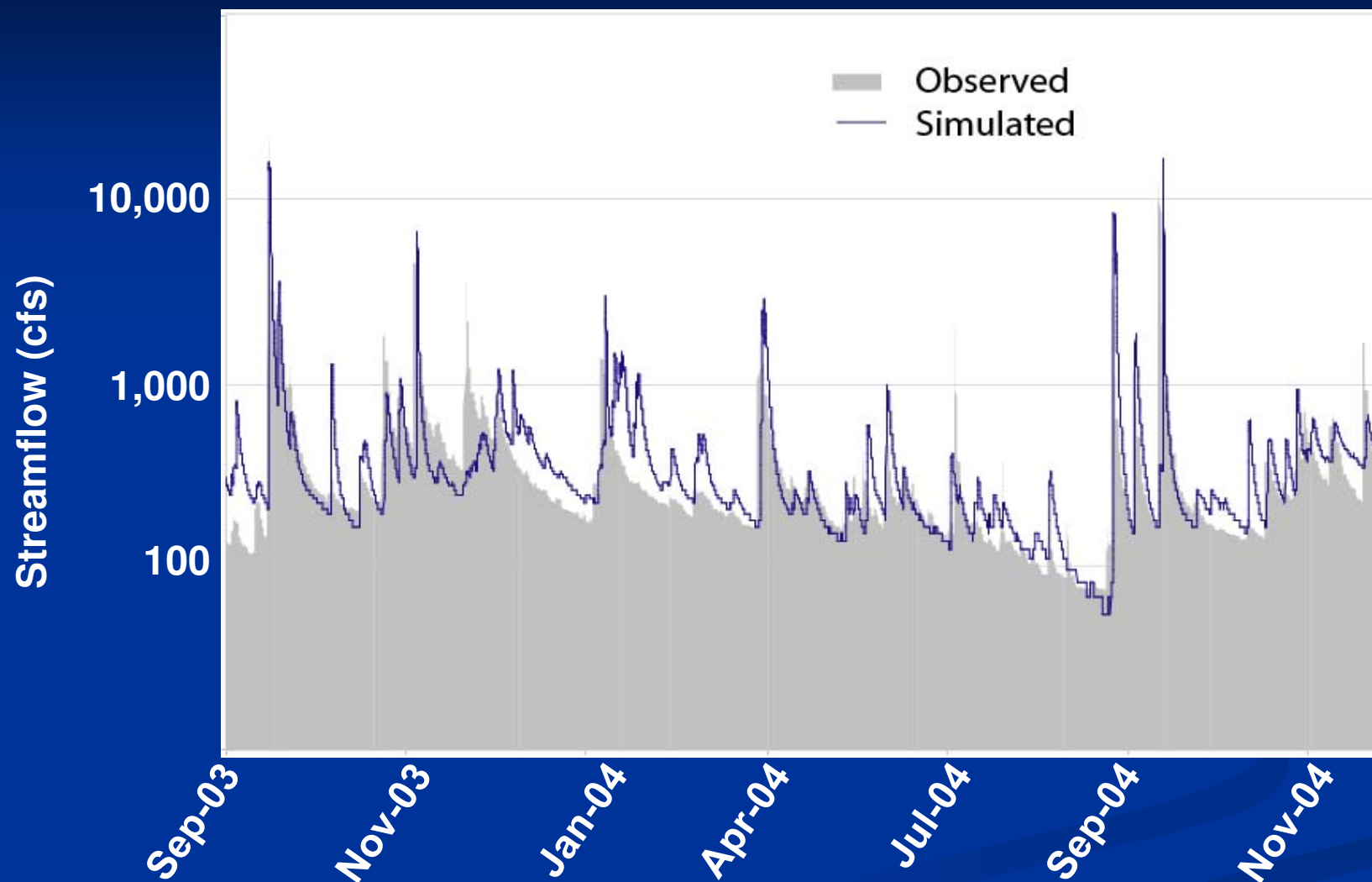
Land Use, Precipitation, Meteorology



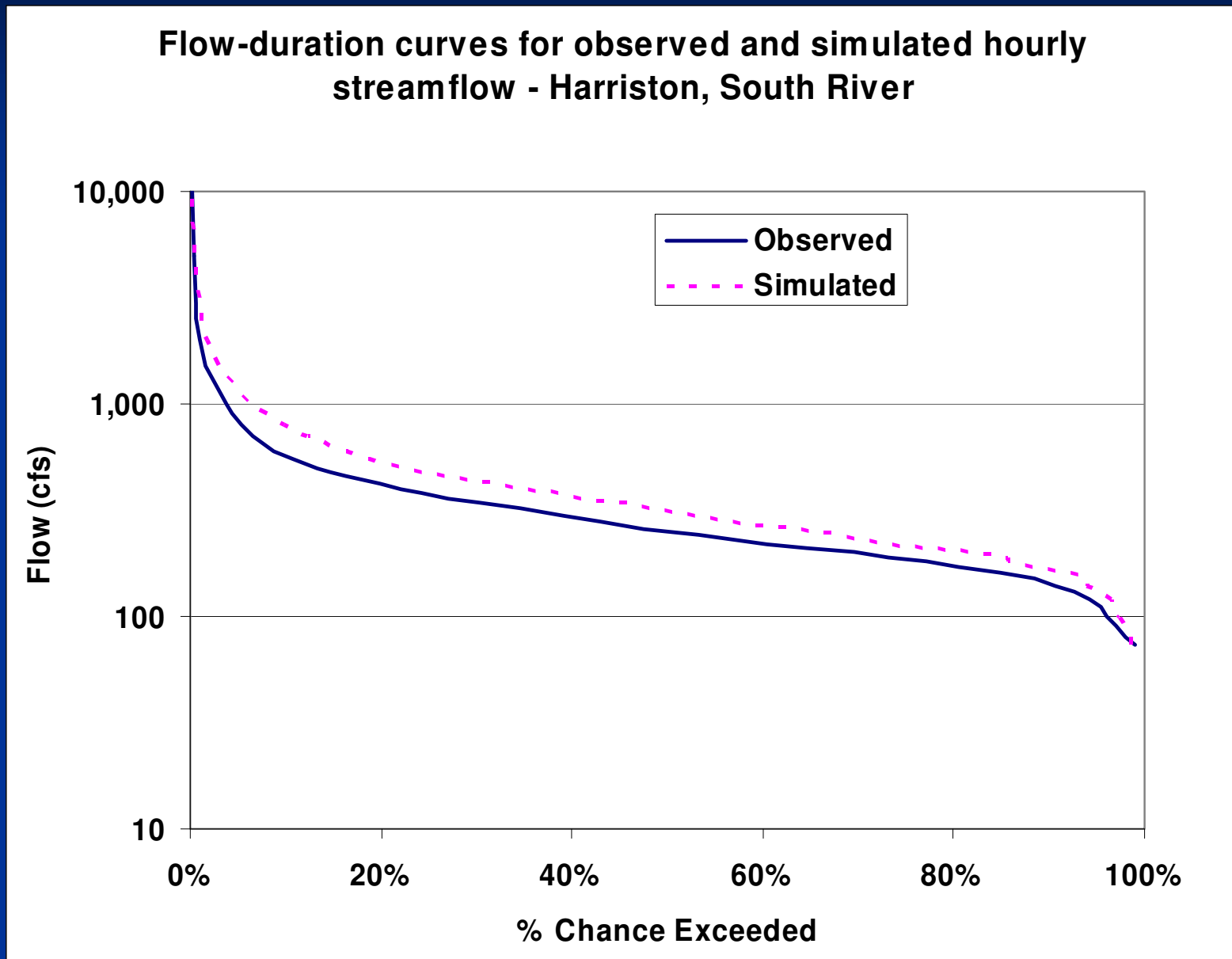
Hourly Streamflow (cfs) – Waynesboro



Hourly Streamflow (cfs) – Harriston



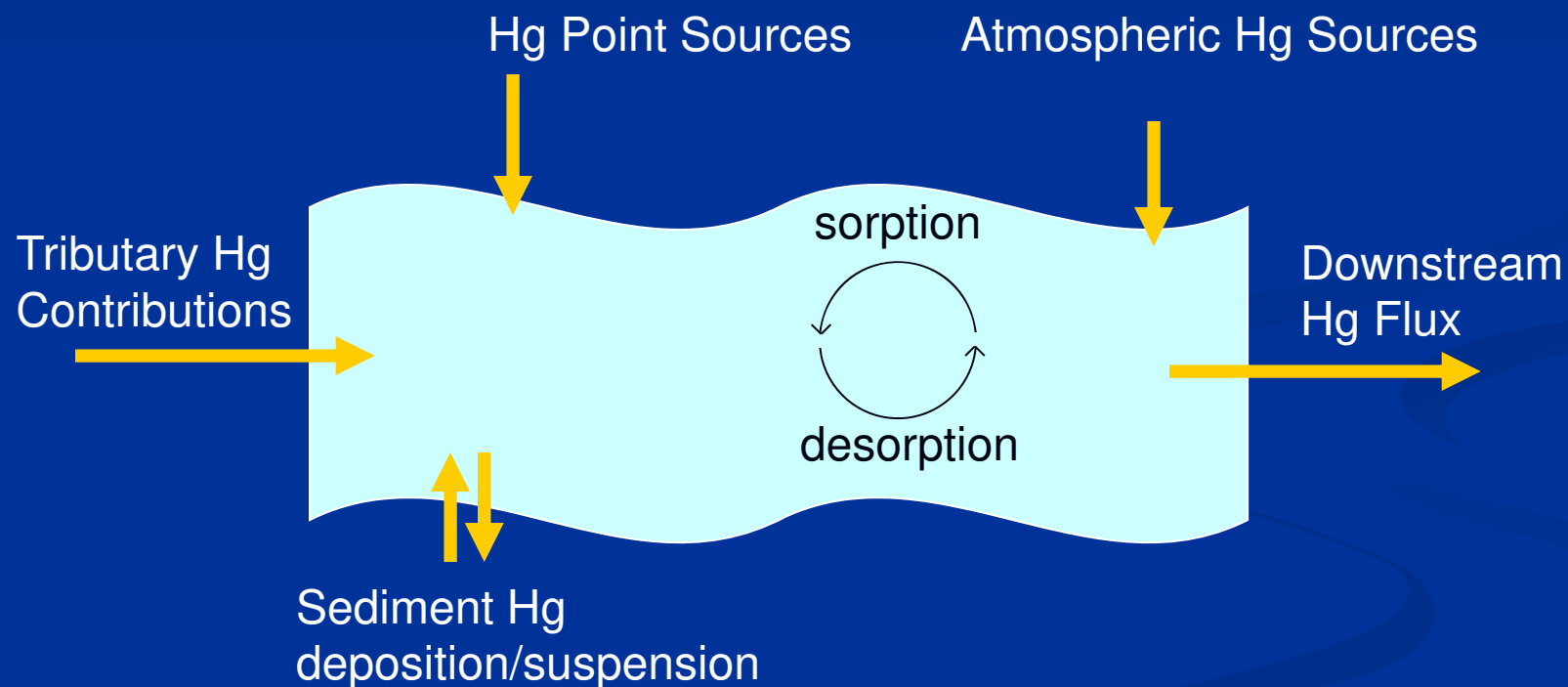
How good is the streamflow modeling?



Modeling of the South River

Next Up: Suspended Sediment
Mercury

Accounting of Total Mercury in the South River Water Column

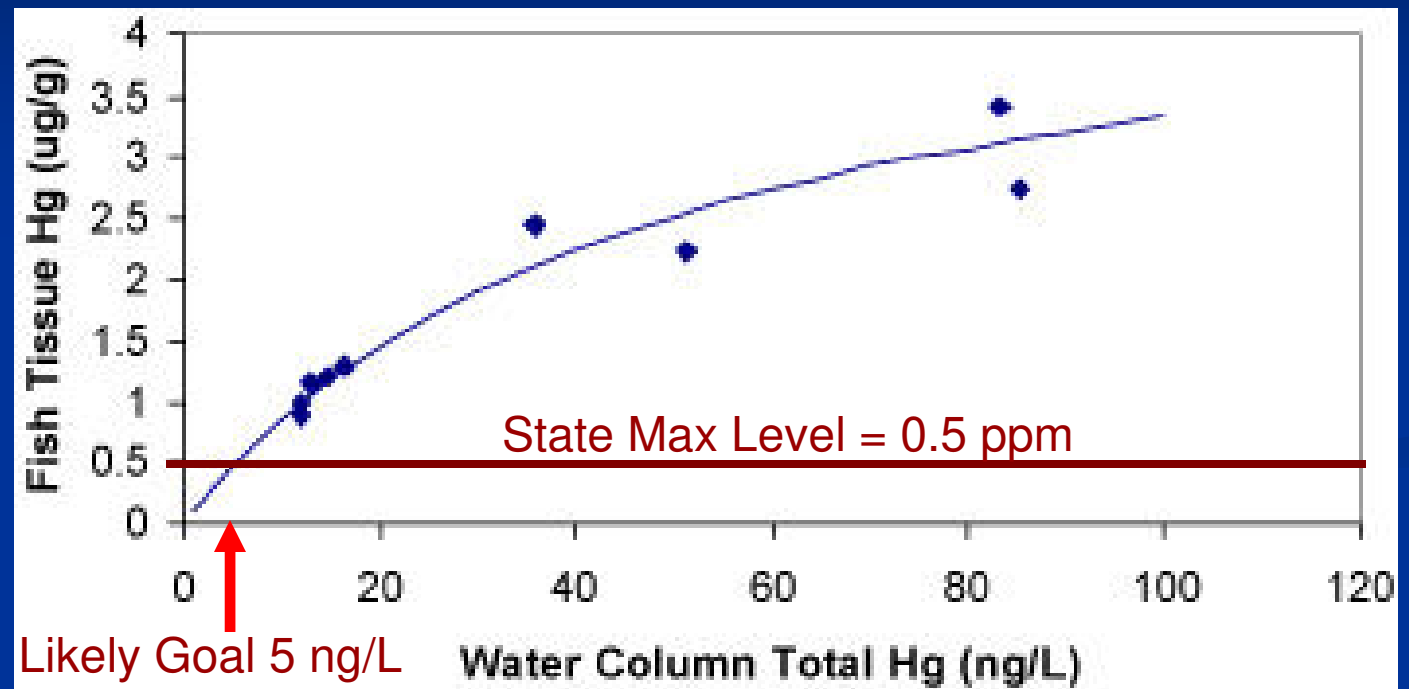




The End

Site-Specific BAF Approach

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



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

South River Monitoring Sites

