

# Hydraulics and Hydrology Scope of Work Overview

South River Science Team Meeting

May 23, 2006

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# Hydraulics and Hydrology within the Ecological Study - Phase 1 System Characterization

## 1. Conceptual System Model Refinement

- **Conduct Hydrologic and Hydraulic Analyses to define Inundation Areas on the Floodplain**

## 2. Studies to Determine Loading to the Aquatic System

### Year 1 Objectives

- Determine areal extent and location of physical and Geomorphic Features
- Develop GIS database for geospatial analysis
- **Conduct Hydrologic and Hydraulic Analyses to develop Rating Curves to calculate discharges for use in loading studies**
- Implement a data collection program during Episodic Flow Events and Baseline Flow Conditions for Loading Calculations

## 3. Physical and Biological Assessments

# 1. Indundation Areas In the Floodplain

Evaluate the correlation between distribution/concentration of Hg in floodplain soils and flood inundation frequency

## TASKS:

- Conduct a Flood Frequency Analysis: Define flood recurrence frequencies for 1, 2, 5, 10, 25, 50 and 100 years using existing records on the South River regression analysis and probability distributions.
- Field surveying at pertinent locations (bridges and between bridges) to supplement LiDAR data.
- Inundation analysis: Define the frequency and possibly the duration of flooding over the full spectrum of out of bank flow events to obtain best estimate predictions of inundation areas including the associated uncertainty

## 2. Rating Curves for Loading Studies

### Overall Loading Study Objective:

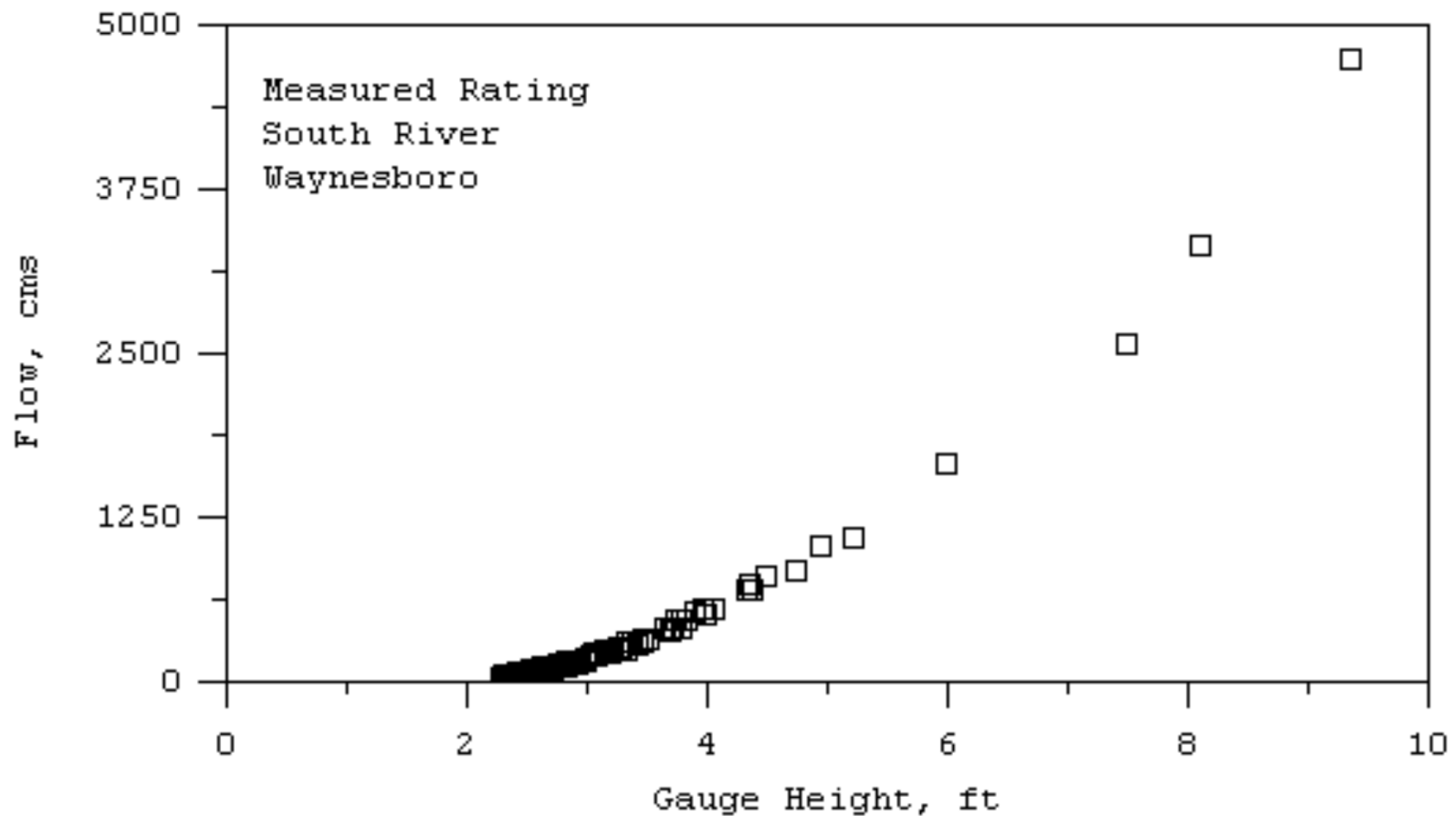
- Identify reaches of the river with high loading rates and use geospatial data to identify the elements within (or above) these reaches that may be contributing to the contaminant loading

### **Loading to the Aquatic System = Concentration X Discharge Rate**

**Concentration:** Episodic (storm flow) sampling over a complete hydrograph at select bridge locations and baseline flow sampling

**Discharge Rates:** to be determined at the bridge sampling locations by developing Rating curves for Discharge vs. River Stage using USGS historic data, field surveys and hydrologic modeling.

## USGS Rating Curve for South River near Waynesboro



## 2. Rating Curves at the Bridges

### Storm Event Sampling Locations

#### Sampling Goals:

- o One storm event of > 500-cfs flow each season at 7 bridge locations
- o Collection of discrete surface water samples over various intervals on the hydrograph
  - baseline conditions
  - 3-hr intervals during rising discharge
  - 1, 3, 5, and 7-days during falling discharge

