

Modeling Processes in the  
South River:  
Update from the Subteam

South River Science Team  
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# Sediment Transport Modeling Science Sub-team

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- Mike Sherrier
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# Dual Approach May Be Appropriate

- Fluvial Geomorphology
  - Study landforms and changes through erosion and sedimentation in response to forces and changing conditions
  - “Particle Tracking”
  - Qualitative predictive capabilities and empirical grounding for numerical modeling conclusions
- Numerical Sediment Modeling
  - Understand general water and sediment hydrodynamics and net sediment transport
  - Prediction capabilities to evaluate remedial alternatives including hybrid solutions
  - Option to add Hg fate, transport and transformation (cutting edge)

# Numerical Modeling Consultants

- Hydroqual, Inc.
  - PIs: Dom DiToro, Ferdy Hellweger
  - TMDL/WASP 5 Modeling for Delaware River PCBs (current)
  - Numerous water quality projects and TMDL models
- Limnotech (LTI, 1975)
  - PIs: Vic Bierman, Greg Peterson, Joe DePinto
  - Modeling of Hudson R., Fox R./Green Bay for Regulatory Agencies
  - Everglades Hg Research Program - Planning Support
  - Mercury Screening Model for Lake St. Clair
  - Waukegan Harbor PCB Modeling and Exposure Assessment

# Geomorphologists

- Panayiotis Diplas -Virginia Tech (Engr)
  - Statistical approach for sediment sampling accuracy
  - Turbulent shear stresses on pavement formation and bedload motion in gravel streams
- Andrew Miller - UMBC (Geo)
  - Surface water hydrology -large floods in mountain rivers
  - Fluvial geomorphology of bedrock-controlled channels
- James Pizzuto -University of Delaware (Geo)
  - Sediment pulses in mountain rivers
  - Dispersion of bed material in gravel bed rivers
  - Ontogeny of a floodplain
  - Morphology of graded rivers
  - Sediment diffusion during overbank flows

# General Geomorphology Approach

- Field Recon
  - Develop initial conceptual model of the river including
    - sediment movement
    - river - floodplain dynamics
    - channel characteristics
  - Develop specific approach
- Flesh out Conceptual Model (more detail in reaches of interest)
  - Sediment Budget
    - data collection: suspended solids - tributaries, upstream
    - map erosional faces, depositional areas, bedrock channel bottom
  - Evaluate Dynamics of river (spatial vs. temporal)
    - review historical data, maps and aerial photos
- Advanced Stages (optional) explore predictive modeling

# General Observations: Limnotech

- Much experience developing TMDLs
- Have worked with geomorphologists
- Suggest conceptual models can provide a framework for prioritizing investigations
- Because of the Hg challenge, recommends identifying significant sources before numerical modeling initiated
- Numerical Model would probably be a coupled watershed model (soil/sediment input significant parameters in model).

# Recommendations from the Sediment Transport Sub-team

- Dr. Pizzuto visits the river for a day's reconnaissance
- Prepares a report and download on general observations and possible approach
- Presents possible approach to Science team in a subsequent Science Team Meeting
- Geomorphology data collection plans and approaches reviewed by modeling consultants to ensure data can be applied to model development

# Discussion