

*Summary - WG 4 Water Quality Work Group Meeting August 8, 2007
Henry County Office Complex, Martinsville, VA
Philpott Lake, VA (Section 216) Feasibility Study*

1. UNDERSTANDING OUR OBJECTIVE

OBJECTIVE STATEMENT:

We envision that the Smith River will be managed so that conservation and enhancement of natural resources, water uses, recreation, flood control, economic development, and hydropower production are balanced in ecologically and economically sustainable ways.

Our specific task is to identify WQ problems due to the operation of Philpott and evaluate ways to change the operations to improve WQ conditions in an ecologically and economically sustainable manner.

2. WQ ISSUES

- a. Daily instability of flows
- b. Temperature
- c. Sediment
- d. Impairment for Bacteria and Benthos

Other WQ parameters are not expected to be significant issues. Collection of existing data records will be needed to document this determination.

3. APPROACHES

The approach of the SOW to be prepared will be to provide flow and water-quality modeling tools that can be used to assess the effects of changes in Philpott Dam operations on Smith River flows; duration, extent, velocities, and depth; and temperature distributions in the river. These predictive models will be applied to various project scenarios determined by the Philpott 261 Team and determine WQ effects on downstream conditions in the Smith River and make WQ recommendations regarding those scenarios.

4. MODELS

- a. Flow/Temperature Model

TVA River Modeling System (linage of ADYN hydrodynamic model and RQUAL water quality model. Previously used by VT group funded by VDGIF. Model has been applied down to Martinsville Dam. This model is available.

- b. Reservoir Thermal Dynamics Model

Model is needed to determine what is possible in terms of change to reservoir operations. Obviously the reservoir is the source of water for the downstream releases. Changes in

operations may change the thermal characteristics of the reservoir and change the inputs to the downstream flow/temperature model. Wilmington District will contact the Waterways Experiment Station (Vicksburg, MS) regarding appropriate models for this application.

c. Sediment Transport and Bank Erosion Model

The transport of sediment and the effects of flow on bank stability are important habitat and WQ factors. Dr. P. Diplas pdiplas@vt.edu (540)231-6069 of VT Civil Engineering has conducted bank erosion models. Additional information is needed regarding possible application of this model.

d. 3-D Hydrodynamic Model

A 3-D hydrodynamic model was employed over 2 (50-100 m) sites to assess water movements and habitat factors for fish. These are much more complex models than the 1-D flow/temperature model. Use of these models will be considered. If the information provided is useful then additional uses may be considered.

5. DATA NEEDS FOR MODELS

- a. Historic data for reservoir water temperature is available.
- b. Models have been calibrated. Some additional fine tuning and adjustment may be required.
- c. Data on sediment may be required for the models. Continuous sediment data for Smith River is possible and may have value.
- d. Data on bank topography and substrates may be required to implement the sedimentation and bank erosion model.

6. SCENARIOS POTENTIALLY TESTED

- a. Scenarios to be tested have not been developed.
- b. Significant coordination with other Work Groups will be needed