

# **Rivanna Watershed Sedimentation Threat Assessment Summary Scope of Work**

DRAFT 4/25/2007

Objective: To determine which management strategies most effectively address the threat of sedimentation in the Rivanna watershed and identify where in the watershed those strategies are best implemented.

To meet this objective, the following items should be considered in a sedimentation threat assessment. The threat assessment will consist of four phases. The first phase will be to complete a literature review of the work that has been done to date on the causes of and possible cures for the threat of sedimentation. Once the universe of what is known has been defined, Phases 2 – 4 will be carried out to fill the gaps in the knowledge base and apply that knowledge to local conditions. Phases 2, 3 and 4 may be completed concurrently. Peer reviews/workshops will be convened with scientists and local experts throughout the study to serve as decision points and to reach consensus on how to proceed with next steps.

## **Phase 1 – Literature Review**

1. Literature Review. Conduct a literature review of resources that appear useful in determining what is known about the sources and causes of sedimentation of streams and rivers, the effects of sedimentation on aquatic life, and management strategies for addressing the sedimentation problem.
2. Summary Report. Develop an integrated summary report of information compiled during the literature review. The summary report should have a national scope but should be applicable to the Rivanna watershed.

## **Phase 2 – Watershed Characterization**

1. Watershed Characterization. Characterize the Rivanna watershed to identify subwatersheds of the Rivanna for field and detailed investigations. The sample set of watersheds should represent the variability of physical characteristics and land use factors that are likely to explain the differences in sediment loads, and should enable extrapolation of results to the Rivanna watershed as a whole. The watershed characterization will also aid in determining which management strategies should be applied in various locations throughout the watershed.

## **PEER REVIEW/EXPERT PANEL #1**

Convene workshop with scientists and local experts to evaluate literature review and watershed characterization and determine how to proceed with field and detailed investigations.

## **Phase 3 – Field Assessment**

1. Determine Instream Sediment Targets for Habitat Protection. Assess effects of sedimentation on aquatic life and develop thresholds for sediment quantities above which biological integrity may be impaired.
2. Assess the Relative Contribution of Overland Versus Instream Sediment.

- a. Assess overland sediment sources through modeling of soil erosion from the landscape, with a subset of watersheds selected for sediment fingerprinting to validate the soil erosion model.
  - b. Assess instream sediment sources through measurement of streambank erosion.
  - c. Establish stream sampling stations at mouths of subwatersheds to quantify total sediment loads in the sample subwatersheds at various flow rates.
3. Determine the Cause of Sedimentation.
- a. Determine what is causing sediment to be transported and deposited from overland and/or instream sources.
  - b. If instream sediment is determined to be the major contributor, the following questions should be considered:
    - i. What proportion of sediment is contributed during various flow rates?
    - ii. What proportion of sediment is contributed from degraded versus stable channels during various flow rates?
    - iii. Of the sediment load derived from instream sources, what proportion consists of sediment eroded from the floodplain?
    - iv. What proportion of sediment is contributed from various stream types during various flow rates?
  - c. If overland sediment is determined to be the major contributor, the following questions should be considered:
    - i. What proportion of sediment comes from various geologic formations or land uses/management practices?
    - ii. What proportion of sediment comes during various storm events (e.g., is the 1-year, 2-year, or 10-year storm the major cause of landscape erosion and sediment delivery)?

#### **PEER REVIEW/EXPERT PANEL #2**

Convene workshop with scientists and local experts to review data and prioritize management strategies for further analysis.

#### **Phase 4 – Analysis of Management Strategies**

- 1. Assess and Prioritize Management Strategies.
  - a. The assessment should include an analysis and testing of various management strategies to determine effectiveness and economic feasibility. The analysis should consider the following general questions:
    - i. Which management strategies most effectively address the threat of sedimentation?
    - ii. Where in the watershed should which strategies be implemented?

#### **PEER REVIEW/EXPERT PANEL #3**

Convene workshop with scientists and local experts to review assessment of management strategies and make recommendation for implementation.