

Development of Modeling Protocols for Use in Determining Sediment Total Maximum Daily Load (TMDL)

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The Environmental Issue:

Excessive loads of sediments are being transported by overland drainage and riverine flow to many lakes, reservoirs and estuaries. Eroding banks, such as the one shown below, are also important nonpoint sources of sediment to water bodies.



The goal of sediment TMDL analysis is to protect natural resource systems in watersheds by:

- a. Characterizing watershed processes that affect the erosion, transport and storage of sediment;
- b. Evaluating the degree to which the current and expected future functioning of these processes is impaired as a result of excessive sediment loads to water bodies. The excess sediment loads are usually generated by changes in watershed processes that occur

naturally (e.g., wildfires) or as a result of man's activities (e.g., logging, agriculture);
 c. Identifying land and water management restoration actions to restore the proper functionality of the impacted processes.

The Approach:

Modeling protocols for use in determining sediment TMDLs are being developed. These protocols will assist the Regions and States in: 1) deciding when a modeling study should be performed, 2) applying the appropriate model, and 3) analyzing the results from the modeling study. The new modeling protocols and new models will be given to the Office of Water for review and distribution to the States and Regions.



Housatonic River – Upstream Reach

EPA Supported Sediment Transport and Fate Models being tested/updated:

The modeling protocols are being developed using, in part, the results from modeling of an 11 mile reach of the Housatonic River, MA, by new or updated sediment transport models:

EFDC¹ – 3D hydrodynamic and sediment transport model.

EFDC1D¹ – 1D hydrodynamic and sediment transport model.



Housatonic River – Middle Reach

GSTARS2c² – Quasi-2D hydraulic and sediment transport model.

HSCTM-2D³ – 2D hydrodynamic and sediment transport model.

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The Impact:

The goal of TMDL analysis is to provide a defensible, scientific approach that the States can use to establish water quality based controls for impaired waters. It is anticipated that the modeling protocols will provide needed technical assistance to the States and Regions, especially for impaired waters for which it is determined that a modeling study should be performed.



Housatonic River – Downstream Reach

Collaborators:

- 1) Dr. Ted Yang, U.S. Bureau of Reclamation, Denver, CO, and
- 2) Dr. Russell Kinerson, OW/OST

