Improved Simulation of Distributed Streambank Erosion and Sediment Generation in the Mad River Valley, Vermont

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Annual Retreat

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RACC
Research on Adaptation to Climate Change

Why Model Streambank Erosion?

- Sediment is one of primary ways nutrients are transported to receiving waters

- Large amounts of sediment mobilized by
  - Overland erosion
  - Road erosion
  - **Streambank erosion/failure**

J Stryker

B Wemple

(2012) State of the Lake Report, Lake Champlain Basin Program.

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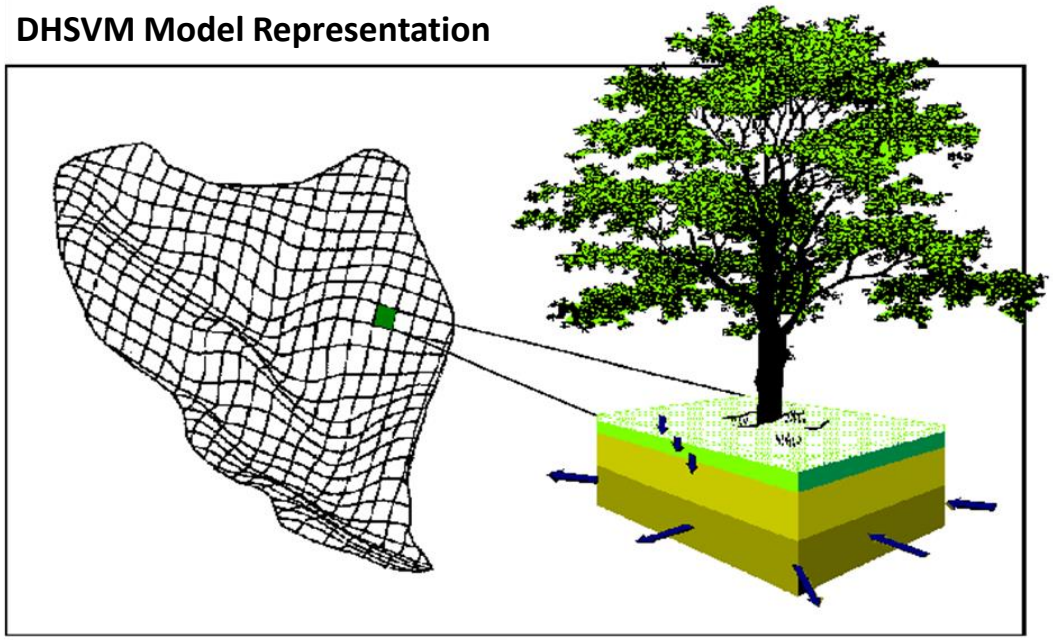
Models Used

Distributed Hydrology Soil Vegetation Model (DHSVM)

DHSVM Model Representation

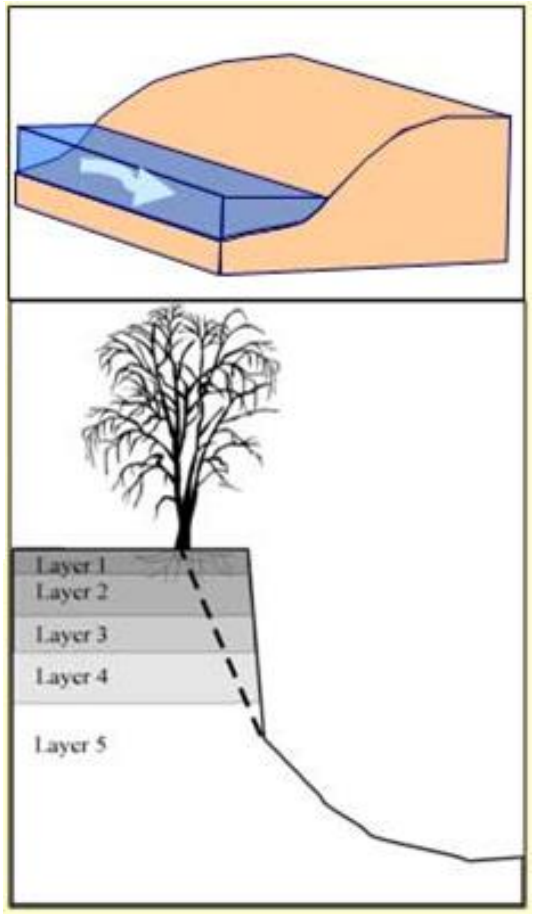


Source:
http://www.hydro.washington.edu/Lettenmaier/Models/DHSVM/overview.shtml

Surface Subsurface Flow Redistribution to from Neighboring Pixels

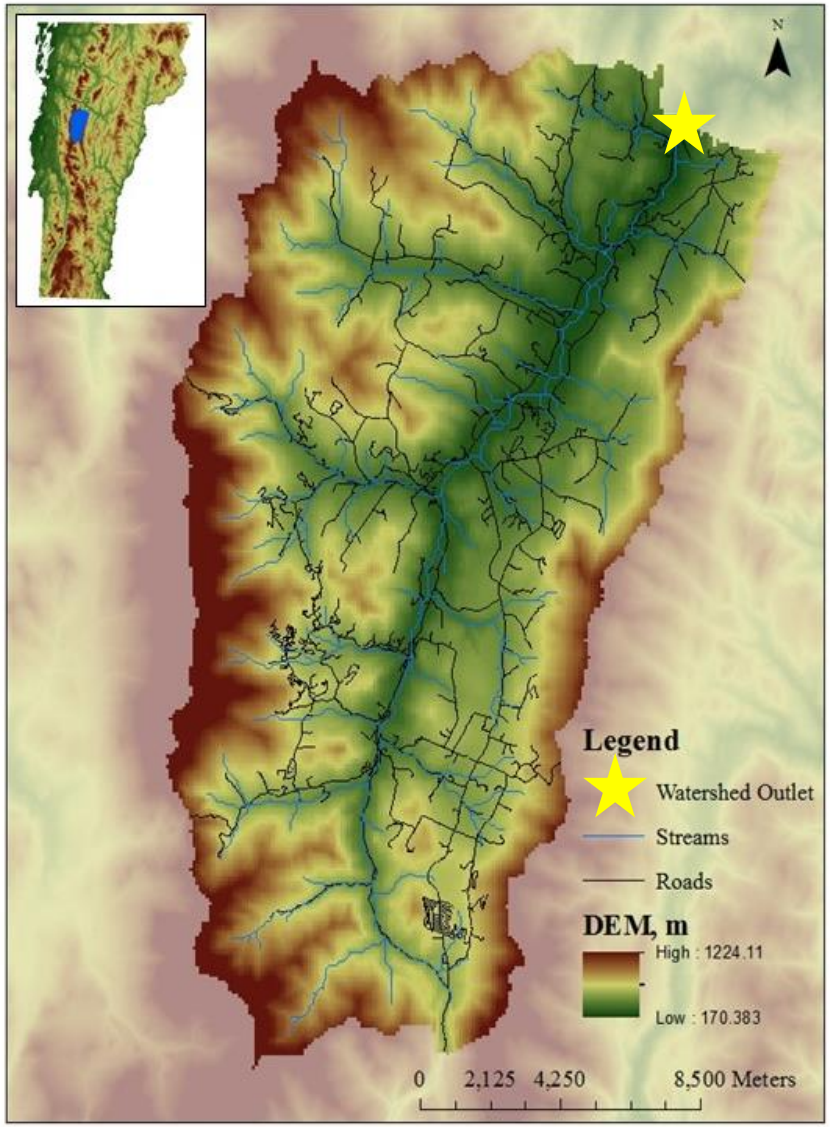
Bank Stability and Toe Erosion Model (BSTEM)

BSTEM Model Representation

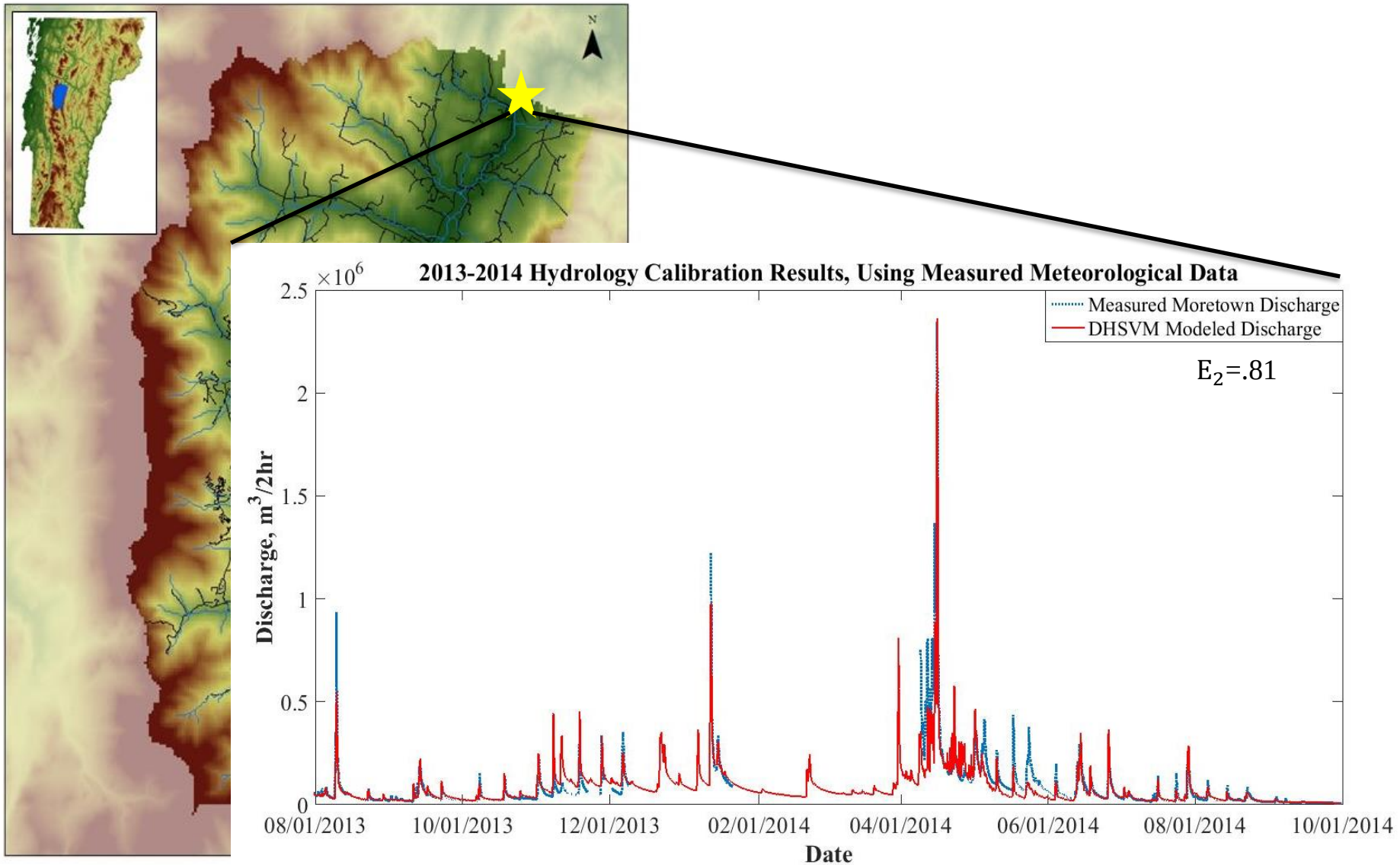


Source:
http://ars.usda.gov/Research/docs.htm?docid=5045

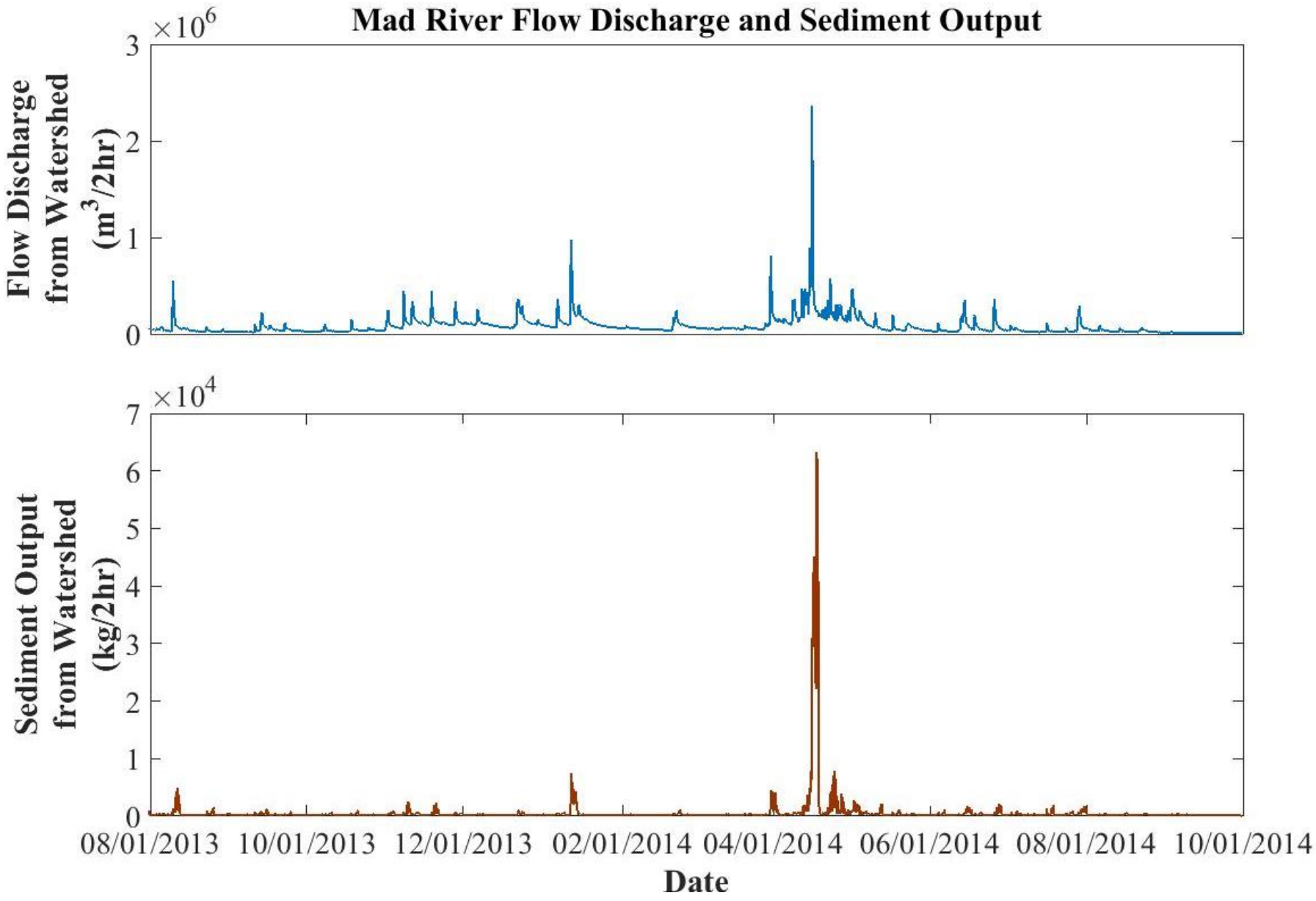
Flow Results Using Measured Meteorological Data



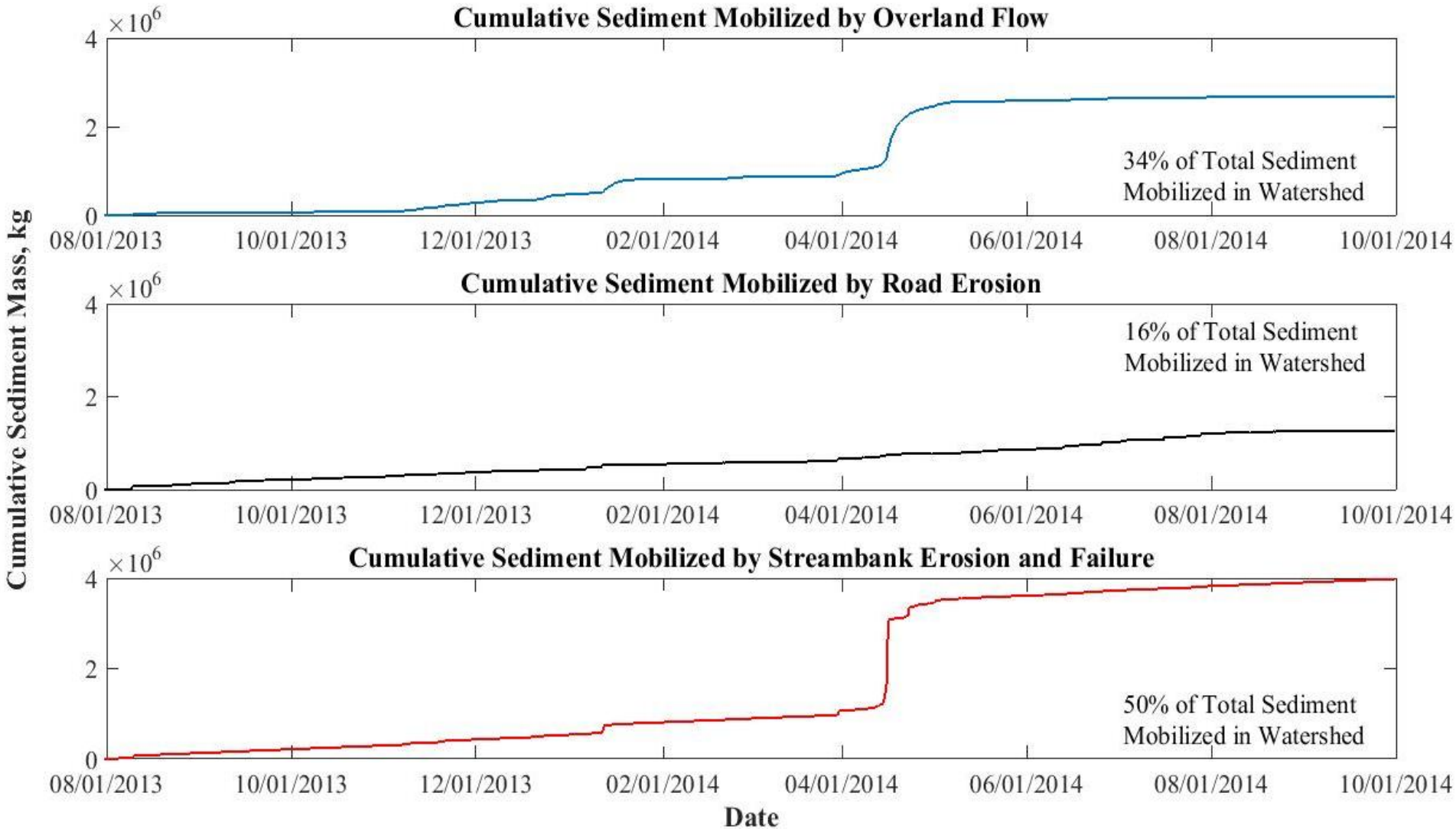
Flow Results Using Measured Meteorological Data



Sediment Mobilization and Flow



Relative Sediment Contributions from 3 Watershed Sources



Publications

- Borg, Jaron, Stryker, Jody, Bierman, Paul, Dewoolkar, Mandar M. (submitted 2015).“Streambank stability assessment using in situ monitoring and computer modeling.” Earth Surface Processes and Landforms.
  - Case study of bank failure using BSTEM in Winooski watershed.

- “A Coupled Model for improved Simulation of Distributed Streambank Erosion and Failure”
  - Presents model development and results of Mad River sediment modeling

- “The Impacts of Extreme Events of Sediment Generation and Transport in the Mad River Watershed”
  - Explores impacts on sediment generation from extreme events as predicted by temperature/precipitation scenarios created using statistical weather generator

- Potential for other papers in collaboration with Q2 and IAM researchers