Bank Stability and Toe Erosion Modeling (BSTEM) of the Missisquoi Watershed
VT ANR Clean and Clear / LCBP Supported Project conducted under a cooperative agreement with the USDA Agricultural Research Station (ARS), Oxford, Mississippi

Primary Research Project Objectives

1. Estimate of the percentage of the total suspended sediment yield/load entering Lake Champlain from the studied portion of the Missisquoi River watershed that is coming from stream channel erosion processes. (These results will be combined with total phosphorus data collected from the eroded soil strata to give insight into P loading into Lake Champlain as a result of stream erosion processes.)
2. Increase our understanding of the correlation between stream equilibrium and bank stability in Vermont. Study a range of geomorphic conditions (via careful site selection) to see if geomorphic condition can be used to explain the quantity and rate of bank erosion and planform adjustment. This information will help inform river corridor protection work and the selection of specific floodplain restoration projects.
3. Model the effectiveness of different best management practices in reducing fluvial process derived sediment and nutrient loading. BMPs modeled would include watershed, floodplain, and channel management practices consistent with the State's goal of managing river systems toward equilibrium conditions over time.

Secondary Research Project Objectives

1. Draw correlations between the Vermont RGA and the ARS peer-reviewed RGA methodology. This will strengthen the Vermont RGA methodology and allow the Program to more easily replicate the BSTEM model and extend its application to watersheds throughout the Lake Champlain basin and the state.
2. Develop pathways for information and technology exchange among ARS and technical programs within ANR, LCBP, and UVM. Expose regional scientists to the expertise Andrew Simon and the ARS team bring to the fluvial geomorphology and watershed modeling field. Ongoing training is critical to keeping Vermont scientists at the forefront of these methodologies.
3. Include biological monitoring at Missisquoi survey reaches to continue expanding our knowledge of the connection between geomorphic condition and aquatic life support.
4. Strengthen the ongoing partnership between VT River Management, BASS biologists, VT Geologic Survey, UVM, Lake Champlain Basin Program, NRCS, and the VT Agency of Agriculture.
5. Obtain the BSTEM model created during this project and house it both at ANR and UVM. Continue to add sites to the Missisquoi model or create new models for other systems (e.g., the Rock River, south Lake tributaries such as the Poultney River) as new data become available. Use these models to continue to inform the Lake Champlain and stormwater TMDL processes and other River Management Programs such as the Fluvial Erosion Hazards Program, i.e., the model should allow us to test the influence of slope (and therefore channel planform) on the stability of the reach and contribute to our assessment of hazards.
6. Increase Vermont River Management networking at the national level. The connections we have made with other states, federal agencies, and national organizations have already paid dividends, and networking with ARS people and other connections enhances our technical proficiency as well as our Program morale.