Testimony on the Lake Champlain Basin Program Report #72 to the House FVVWR Committee

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Mike Kline, ANR Rivers Program Manager

1. Studies prior to the LCBP Report #72 attributed sediment and nutrient loading into Lake Champlain by allocating load by the percentage of different land uses within the basin.

2. With grants from the Basin Program and support from NRCS, the DEC contracted with the USDA Agricultural Research Station (ARS) to conduct a study *"Quantifying Sediment Loadings from Stream bank Erosion in Selected Agricultural Watersheds Draining to Lake Champlain."* ARS Researcher Dr. Andrew Simon and his team had conducted similar studies in watersheds nationwide.

3. The study modeled flows acting on streambanks in the Missisquoi Watershed characterizing the gravitational forces acting on the bank and the geotechnical strength on the bank materials to determine bank retreat over a 30 year flow period. The quantities of different soils eroded from the banks of 27 sites were extrapolated along the length of the rivers, based on a rapid stream condition assessment methodology, to get an overall Total Suspended Sediment (TSS) loading value for the watershed. Total phosphorous (TP) was measured in a laboratory for each soil type allowing for a calculation of TP loading. This "Bank Stability and Toe-Erosion Model" (B STEM) was then used in combination with a USDA "Root-Reinforcement' model to test different bank treatments with the objective of learning more on the effectiveness of channel shape and vegetation on slowing bank erosion and reducing sediment/nutrient loading.

4. The researchers were not asked to make management recommendations, rather to conduct scientific studies and provide data in a form that would be useful to the State in developing water quality remediation plans based on a more accurate picture of sediment/nutrient loads.

5. The DEC has always known based on both published studies and practice that lower gradient bank profiles and the presence woody vegetation on the streambanks correlate with greater bank stability. The ARS study helped us empirically verify these correlations in a Vermont watershed. It was particularly helpful to see that the combination of bank grading and vegetation could significantly lower sediment and nutrient loading. Unfortunately, project funding and the departure of Simon's team from ARS before the end of the project cut short our investigation of other BMP combinations in the simulation models. The DEC was particularly hopeful to test the effect of floodplain formation of load reductions.

6. The ARS estimates of TSS and TP loading (-35% of Missisquoi loads) are high-end estimates due to the limitations of the models as listed in the report, chiefly that the model cannot account for the sediment routing and the effects that coarse sediment loads and channel evolution over the 30 year period. Changes in channel morphology would likely result in lower channel depths, slope, and velocities, thereby decreasing bank erosion and increasing TSS storage.

7. The data and findings of the LCBP Report #72 support the river stability components of Vermont's Phase 1 TMDL Implementation Plan. River reaches that are at or very near the channel evolution process (at or very near the quasi-equilibrium condition) may be stabilized with low cost, non-structural measures to do reduce the loading of TSS and TP into Lake Champlain.