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Proposal for Geomorphology project: Landslide History on the Upper Clyde River.

Background:

The Upper Clyde River has undergone many changes in the past seven years. The most significant is the removal of the Citizens Utilities Dam No. 11. This dam partially collapsed in the middle of the spring of 1994. Conservationists groups along with fishing clubs (including Trout Unlimited) fought to have the dam removed completely. Their efforts were successful, and in the spring of 1996 the removal process was underway. Gravel, riprap, and tons of boulders were trucked to reinforce the river bank (and to provide shelter for migrating salmon). Now there is a scar about 200 meters downstream from the existing Citizens Utilities Dam (above which is the Clyde Pond). About 20 meters downstream from the scar there is a section of the river which is very well vegetated (including many trees). Within this section of river there is a landslide.

Objective:

To determine the history of a landslide about 400 meters downstream of the Citizens Utility Dam on the Clyde River, Newport, Vermont. The landslide is directly on the banks of the river, and it is about 33.4 meters wide. We will determine the stratigraphy of the landslide and possible causes for failure. We will make a detailed analysis of the slide events, and present this with maps, a time line, and a power point presentation.

Methods:

We will use aerial photos to determine the age and slide patterns (growth) of the landslide. Some photographs have already been obtained from the program Arcview located in the library (photo dates are 1994, 1974 on CD's #170 and 157 photo # 180272, 176272, 172272, 180268, 176268, 172268). The data from the photographs will be correlated with flow data to determine if there is a connection between the river's flow and the landsliding. We will collect the photographs from as many different dates as possible and use flow data (from www.water.usgs.gov and other sources) at these dates as well. Contact for the collection of aerial photographs includes the Geography Department at UVM (Beverly Wemple and Leslie Ann Dupigny-Gioux), Bob Kort (Soil conservationist), The School of Natural Resources at UVM (Dave Capon), and Newport Town Hall (and other possible local contacts). Precipitation data will also be useful. This information will be useful in determining if the landsliding was due to an increase in pore pressure or river morphology. This will help us determine a correlation between landsliding, flow, and precipitation data.

Local contacts will be very important to our study, as they may help define the chronological events of the river and the landslide. Possible contacts include, USGS (as

h2oteam@usgs.gov), Trout Unlimited (including Maggie Lockwood, Dave Smith, and Sara Johnson), the Citizens Utility Hydrologic Dam, and Elizebeth Maclin at American River. We have phone numbers and e-mail addresses for the contacts previously listed. Additional background information may come from John Dillon's article, "Heroes of the Clyde River." (The Journal of Coldwater Fisheries Conservation), and The Final Environmental Impact Statement from the Federal Energy Regulatory Commissions.

Our field work will include determining measures of the slide. We will use a bubble level, stadia rod, tape measure to help survey the landslide and obtain it's dimensions. Slope, volume, and area will be calculated. The stratigraphic column will be used to determine the composition and strength of the different layers of the landslides. Relative cohesiveness and permeability will be determined for each layer. From this information instabilities will be assessed.

Hypothesis:

- * The landsliding is a result of a combination of effects from increased pore pressure AND increased flow (undercutting).
- * The landslide is controlled by river processes.
- * The landslide is a result of an increase in pore pressure which is related to the amount of precipitation.