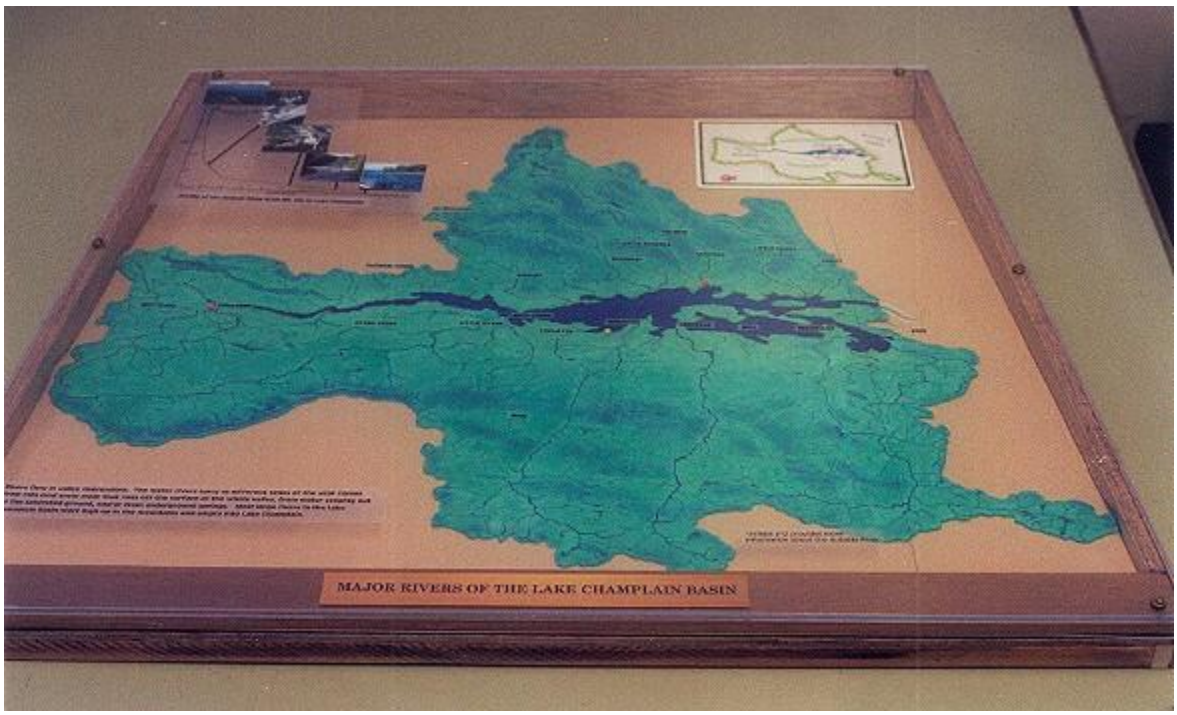
THE WORK AND BEHAVIOR OF RIVERS: PART I

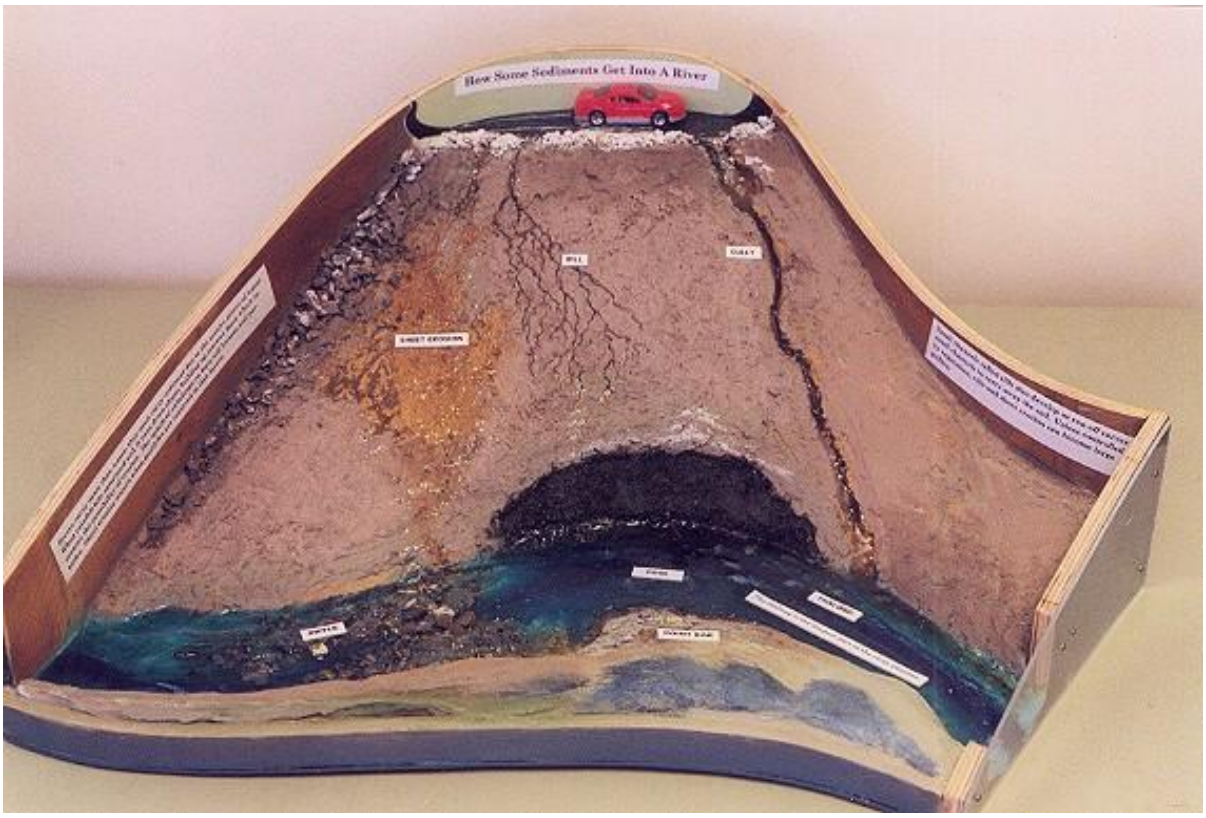
In this article, we begin a 4-part series on the work of rivers and how they behave. BRASS obtained a Lake Champlain Basin Program (LCBP) grant to develop portable 3-dimension models on this subject. There will be 13 models, with explanatory text, and once finished teachers and groups in the Basin can request the use of some or all of the models from the LCBP.

Rivers are in valley depressions. Rains and melting snow run off the surface of the whole valley. This, along with water seeping from the ground when it is saturated and the underground springs, make up the water the rivers carry at different times of the year. Most large rivers in the Lake Champlain Basin start high up in the mountains and empty into Lake Champlain.



The 1st model shows Lake Champlain and all the rivers in its basin. Photos of what the Boquet River looks like at different elevations are on the model's text panel.

Rivers carry more than water; they must carry sediment due to the erosive power of water. When rainfall hits saturated soil, water runs down the sloped ground building up tractive force and increasing the possibility of erosion. The splash of raindrops on bare soil loosens soil particles. Sheet erosion occurs when particles are removed in thin layers. Small channels called rills also happen as run-off carves small channels to carry away the soil. Unless controlled by vegetation, rills and sheet erosion can become large gullies.

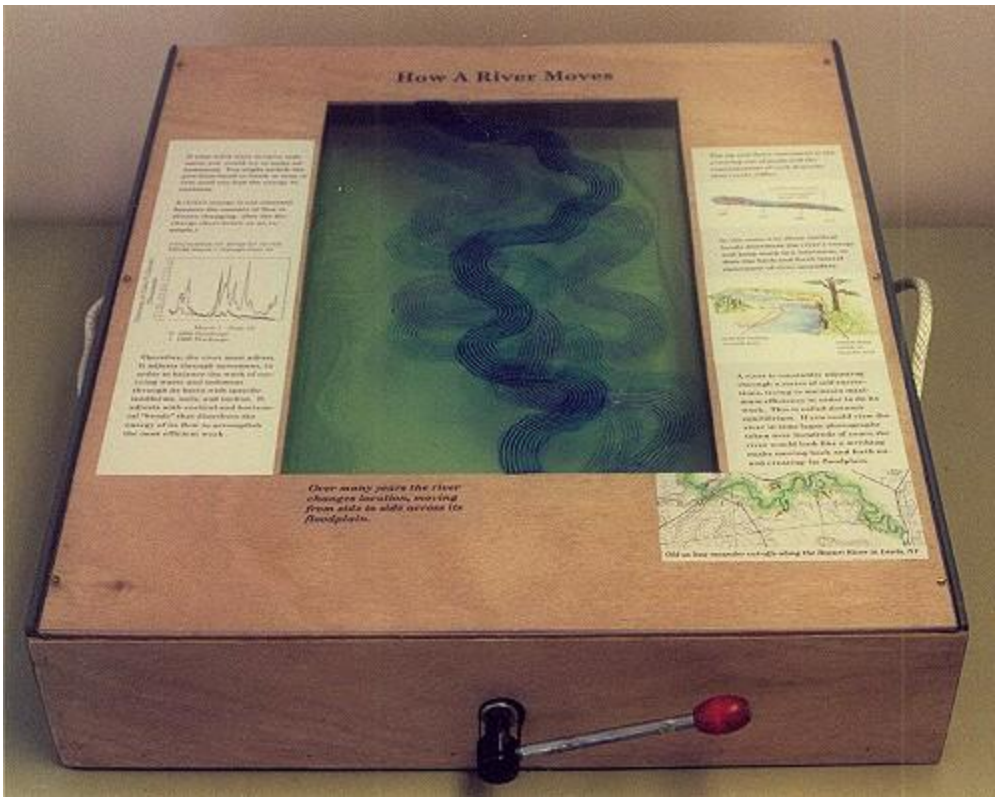


The collected sediment from run-off and erosion means the river must work to carry water and transport sediment. Carrying sediment is work (try it).

A sturdy wooden, sealed box with a handle invite participants to pick itup. Inside is a platypus water bag with water and sediment that can be seen through the porthole.

If your work were to carry sediment, you would try to make adjustments. You might switch the pail from hand to hand, or stop to rest until you had the energy to continue. A river's energy is not constant because the amount of flow is always changing. Therefore, the river must adjust. It adjusts through movement in order to balance the work of carrying water and sediment through its basin with specific landforms, soils, and incline. It adjusts with vertical and horizontal "bends" that distribute the energy of its flow to accomplish the most efficient work. The up and down movement is the scouring out of pools and the concentration of rock deposits that create riffles. In the same way these vertical bends distribute he river's energy and keep work to a minimum, so does the bank-and-forth lateral movement of river meanders.

A river is constantly adjusting through a series of self-corrections, trying to maintain maximum efficiency in order to do its work. This is called "dynamic equilibrium." If you could view the river in time-lapse photographs taken over hundreds of years, the river would look like a writhing snake moving back and forth on–and creating–its floodplain.



Three plexiglass panels will move when the handle is pushed from side to side, making the river appear to writhe like a snake.
