woody debris, man-introduced materials, and other debris that comes to rest on the streambed. A stream in dynamic equilibrium maintains the movement of water and sediment without sudden and wholesale areas of erosion and deposition. Flow rate governs both the initiation of sediment movement and its deposition. Flow moves material when the system has sufficient kinetic energy and deposits it when the kinetic energy is depleted. As described earlier, gravity, expressed here as hydraulic slope, is the driving force acting on the system. The movement of water transfers that force to dislodge and keep particles moving. **Figure 3.1.11** is a generic hydrograph and sedigraph relating the rate of flow to time. Note that there is a lag between the flow of water and the movement of sediment. The lag represents the flow necessary to exceed the critical shear stress. At the peak water flow, there is often a decrease in the transport of sediment as the hydraulic slope decreases. The falling leg of the hygrograph may coincide with the peak of the sedigraph with the particles already mobile and an increase in hydraulic slope.

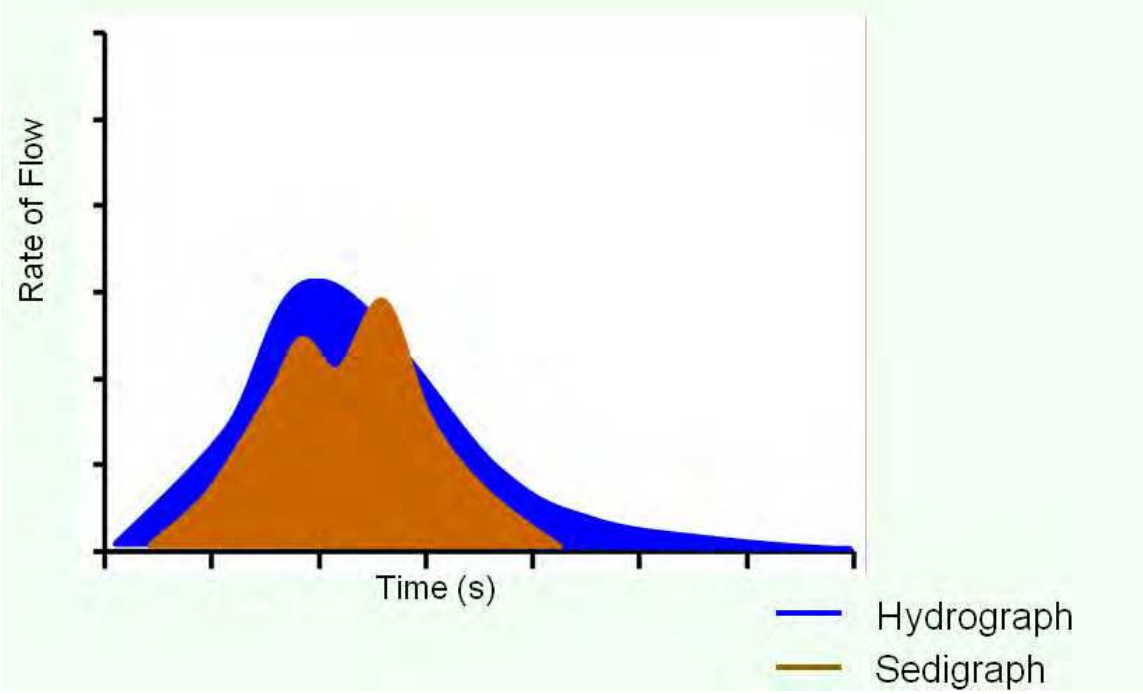

Figure 3.1.11. Influence of Hydrology on Sediment Transport

As the flow recedes and kinetic energy declines, the stream deposits particles of decreasing particle size. This process forms the riffles between pools. In Sugar Creek, this is most apparent where the woody debris jams morphologically behave as riffles. Issues of sediment transport are particularly relevant to stream managers at infrastructure crossings. Bridge, culvert, and pipeline crossings may interrupt the hydraulic slope with predictable, adverse consequences. A crossing backwatered under high flow conditions decreases the hydraulic slope and may induce deposition