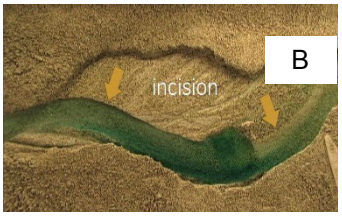
FOUR-HOUR LAB

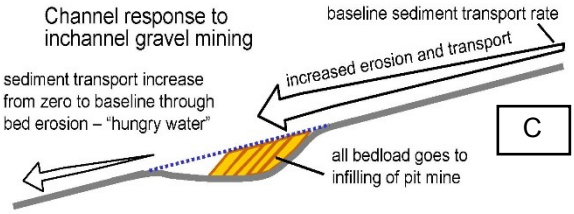
Introduction to applied fluvial geomorphology in stream ecology using the *Emriver* MBM

Concepts: Sediment transport process, continuity, river long profiles, adjustment to disturbance, influence on fish habitat

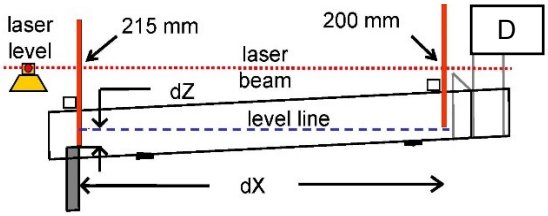
Instructor: Thirty-minute lecture; channels as products of water and sediment input; video **[A]** of river fish and MBM-sediment transport continuity, disruption by in-channel gravel mining **[B]** and resulting channel response **[C]**; influence on benthic habitat. Measurement of channel long profile (LP) with laser level; review math and methods



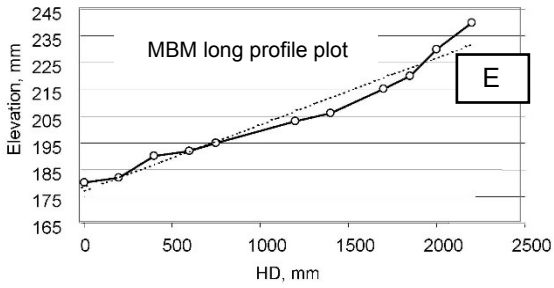
• Students gather at MBM, lecture/ demonstration: media density, slope and base-level adjustment, pump, flow measurement with notch gage. Self-formation of river channels; disruption and restoration of sediment transport and morphology continuity by gravel mining **[C]**; threshold sediment transport conditions (discharge and slope). Demonstrate LP and cross-sectional variability in bedload transport at small scales, uniformity at large scales. Tendency of rivers to restore equilibrium after disturbance; slope self-regulation through sinuosity adjustment.



● Students measure and plot channel long profile (LP) using laser level **[D,E]**. How do disruptions such as gravel mining **[C]** and straightening affect the LP and hydraulic variables such as slope? How does sinuosity affect channel slope and energy of flow?



● Students record observations of cross-sectional morphology. Point bars, scour at bends and cutbanks. Dye pulses (see **[B]**) show variability in flow depth and velocity in long profile and cross section. Establish an equilibrium channel and mark riffles, pools and other hydraulic habitat. Discuss aquatic organisms that use these varied habitats (as noted in lecture video).



Review concepts: 3D geometry; straight-line slope vs. sinuosity or thalweg slope and use of laser horizontal reference, which is important in field work; geometry of river long profiles; continuity in river water and sediment flux and response and adjustment to disturbance to re-establish continuity; effects of disturbance on habitat and hydraulic and benthic diversity; human alterations such as bridges, channelization, gravel mining. Students always enjoy exploring this, even after the lab is dismissed.