IMPROVED BEDLOAD MONITORING EQUIPMENT FOR DEVELOPING SEDIMENT TMDL'S

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Sediment is generally considered (a/the) major pollutant and impact to surface waters and aquatic habitats. The greatest biological and habitat impacts from sedimentation are related to the finest particle sizes (clay to medium sand). Clay usually travels in suspension, and the silts and fine sands have the greatest negative impact as bedload. These fines fill the interstitial spaces of the substrate; reduce subsurface pore space and water flows; reduce or deplete dissolved oxygen levels; decimate hyporheic and benthic invertebrate fauna; and negatively impact fish spawning success and native mussel survival.

Traditional bedload net samplers use coarse meshes (0.5 mm, 1.0 mm, or even 3.6 mm or greater) in the interest of hydraulic efficiency, and therefore may completely miss the bedload fines that are most responsible for habitat impacts. Alternatively, traditional net samplers that use fine mesh screens (0.06 to 0.25 mm) have extremely poor hydraulic efficiency; extremely high variability due to short sample periods before the net clogs; and high variability due to the small "sampler width to stream width" ratio. These traditional samplers also include a suspended sediment bias, by sampling a partial cross-section of the water column, at the bottom of the stream, where suspended sediment concentrations are the highest. Any sediment transport models that have been developed using data from these traditional samplers, or "validated" by such data, will share their limitations.

Improved bedload monitoring equipment from Streamside Systems, LLC, can selectively monitor the transport of fine bedload sediments for purposes of developing watershed sediment budgets, setting water quality and habitat standards, localizing NPS sediment source areas, and developing TMDL's for fine bedload sediments. The Streamside Systems collectors are scalable to any size stream, and can totally eliminate the normally extreme subsampling variability (re: space and time) by monitoring total bedload on a complete cross-section. Streamside collectors provide continuous sediment/sample removal, and further avoid the drawbacks of pit samplers (e.g., limited capacity; requirement to be dug out; removal of gravel and cobble habitat; and potential for resuspension and flushing loss). Streamside collectors avoid inclusion of nearly all leaf litter, invertebrates, fish eggs, and suspended sediment, and successfully target only the desired sizes of inorganic sediment moving as bedload. From a restoration perspective, Streamside Systems collectors can also be used to selectively remove fine sediments for the purpose of preventing downstream sediment impacts, and in facilitating the restoration of sediment-impacted substrates and interstitial habitat.

Keywords:

fluvial sediment, monitoring, bedload, sediment sampling, restoration, methods, TMDL, interstitial

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