Derek Berg

The Variable Nature of TSS Loads

Potential implications for guessing incorrectly

Total suspended solids (TSS) thus far have served as the keystone pollutant for the majority of storm water management programs, and a considerable amount of research has been conducted over the last several decades in an effort to characterize the TSS load transported in storm water runoff. Field monitoring data collected by municipal separate storm sewer system permittees as part of the National Urban Runoff Program and other monitoring efforts executed throughout North America has been analyzed and composited to generate assumed "normal" TSS concentrations for different types of urban land uses.

While the data does support the idea that different land uses (e.g., residential, commercial and industrial) are likely to produce varying TSS loads, the data tends to be less viable as a means of predicting what the TSS load will be for any given site. Because perceived normal TSS load values influence both storm water policy decisions and the design and implementation of various storm water best management practices (BMPs), there are a number of potential consequences if our assumptions fail to reflect reality.

After reviewing the TSS loads measured during different field monitoring efforts, the one thing that seems most clear is that TSS loading is highly dynamic not only from one site to the next, but also from one storm to the next at any given site. The range of TSS loads measured at a site during different storm events often spans several orders of magnitude.

I recently compared the median TSS load measured during 19 recent field studies that comply with the TARP, TAPE or ETV protocols to the expected normal TSS loads published in the National Stormwater Quality Database (NSQD) V1.1 Only six of the 19 studies had median TSS loads within ±20% of the NSQD values. Many of the median TSS values measured during the TARP, TAPE and ETV studies were less than half of or more than double what the NSQD considers normal.

Additionally, compelling evidence exists that as an analytical measure, TSS often fails to fully account for the entire solids load being transported by urban runoff. Both the TSS and suspended solids concentration (SSC) methods were used to assess the solids load in 14 of the TARP, TAPE and ETV studies, and the median SSC concentration exceeds the median TSS concentration—often substantially—in 12 of the 14 studies.

If we are relying on tools like the NSQD to determine whether the TSS load from a given site is typical, but the majority of individual studies deviate considerably from assumed typical values, perhaps we need to rethink our approach. Instead of assuming that all future results should mirror past trends and dismissing those that do not meet those trends as abnormal, we should be revisiting our assumptions as collective knowledge grows.

Additionally, as we deploy a growing number of BMPs that are highly sensitive to solids loading, perhaps we should strive to fully account for storm water solids loading by using more accurate analytical methods like SSC that do not underrepresent coarse solids. Consistently underestimating the actual solids load being delivered to a filtration or infiltration practice is likely to result in frequent clogging and excessive maintenance costs.

Storm water management remains a dynamic field, so we should not be surprised when what we once assumed to be normal proves to be anything but. SWS

Derek Berg is regional regulatory manager for Contech Stormwater Solutions. Berg can be reached at bergdm@contech-cpi.com.

For more information, write in 801 on this issue's Reader Service Card or visit www.estormwater.com/lm.cfm/st111101.