DIFFUSE URBAN POLLUTION AND SUSTAINABLE DRAINAGE SYSTEMS: ARE WE MEASURING THE RIGHT THING?

Ellis, J Bryan.

Urban Pollution Research Centre, Middlesex University, Bounds Green Road, London. N11 2NQ. UK

ABSTRACT

Considerable emphasis and effort is being placed on the implementation of alternative best practice approaches for the control and treatment of diffuse stormwater runoff within urban catchments. One prime purpose of such sustainable urban drainage systems (SUDS) for source control of impermeable surface runoff, is to protect and enhance receiving water quality. SUDS are intended to help ensure that diffuse urban discharges do not prejudice potential in-stream beneficial uses or cause/contribute to violation of receiving water quality objectives. However, there are few documented cases to conclusively demonstrate that urban stormwater associated contaminants do have a significant adverse impact upon designated beneficial uses or indeed proof that SUDS devices control those fractions of chemical contaminants that have potential to adversely impact upon receiving water quality, habitats and biota. The paper will review available data and information on diffuse urban runoff characteristics and the reported performance capabilities of various SUDS devices to assess whether they appropriately address real water quality problems encountered in urban receiving waters.

Aquatic life is likely to receive only limited exposures to toxic-available pollutant species during an intermittent storm event and there are many urban and highway runoff studies which have failed to find evidence for in-stream toxic impacts. Concentration exceedance of water quality criteria (or other standards), is not necessarily a reliable assessment of impaired receiving water quality for stormwater runoff. It is also unfortunate that most diffuse urban runoff monitoring schemes are largely concerned with determination of normally routine, non-toxic contaminants at the inlet and outlet of the SUDS structure. Such monitoring, whilst important to a knowledge of the system performance, provides little guidance on actual receiving water impacts or on SUDS cost-effectiveness in terms of improvements on downstream beneficial uses.

A more technically valid and reliable approach might involve site-specific investigations to determine if, when and where the persistent exceedance of a criterion or standard represents a real impairment or is simply an "administrative" exceedance related to how the criterion were developed and implemented i.e. extrapolated worst case chronic conditions from laboratory studies. A more robust and reliable approach might be to assess organism assemblage information, where the numbers, types and characteristics of the aquatic life present in the urban waterbody are evaluated relative to the habitat carrying capacity. This would assess if there was a real, significant impairment of the waterbody beneficial uses. Such knowledge and associated SUDS control costings are crucial when considered in the context of the requirement to achieve "*good*" ecological and chemical status under the forthcoming EU Water Framework Directive. Based on US EPA non-point NPDES experience, the minimum costs to achieve such "*good*" status for the UK surface water sewer system would yield a public bill of between £3 - £6 per head per day, excluding any required monitoring programmes.

KEYWORDS: Diffuse urban pollution; EU Water Framework Directive: Receiving water quality impairment; Stormwater runoff; Sustainable drainage systems (SUDS).