

# Moving upstream:

## Changing views of urban stormwater management

by Diane M. Cameron

The field of urban stormwater management is rapidly evolving in the 1990s, as urban areas struggle to comply with new regulations governing storm sewers and overflows from combined sanitary/storm sewers. As I look back over the more than 20 years since the passage of the 1972 Clean Water Act and the history of delays in urban stormwater regulation, the current crises and headaches that confront urban stormwater managers are not surprising at all -- rather, they are the inevitable result of two decades of neglect.

Thankfully, many urban stormwater managers have progressed in their thinking. They have shifted their attitudes away from "Let's ignore the problem and hope it will go away" to "How can we accomplish observable improvements in water quality at the least cost to urban residents?"

As municipalities seek out private engineering firms and government policymakers for guidance in stormwater management in the '90s, it is critical that they be conscious of the mindset -- the attitudes, beliefs and assumptions -- that they and their advisors are using to make decisions and create plans.

### Three schools of thought

I see three schools of thought in urban stormwater management -- mainstream thinkers, reformers, and "uplanders" at the cutting edge of the field. My observations are

based on a number of sources: a scan of the urban stormwater technical literature; my own studies and observations in the Chesapeake Bay region, Cleveland, and elsewhere; and conversations with a variety of stormwater researchers and practitioners.

■ **The mainstream.** Here are the bulk of government water quality and flood control officials, the bulk of the large engineering firms and even some environmentalists. Their philosophy is as follows:

"Both flood control and stormwater pollutant removal can be accomplished primarily through structural devices, like detention ponds, that collect runoff from large urban areas and settle and/or filter out pollutants. Non-structural devices -- such as planning and zoning controls for new development, public education and used oil recycling programs -- are also useful for pollutant reduction.

"The structural devices can be used for existing urban areas as retrofits, but only where open spaces permit construction of large, 'mega-systems' that can collect massive runoff volumes off-site and downstream of large shopping malls, office parks, and subdivision tracts. Because of the large land area requirements for these 'regional retrofits,' they are very expensive and thus not feasible for widespread use in existing urban watersheds.

"Accordingly," say the mainstream thinkers, "we cannot hope for, nor should our discharge permits require, meeting water quality standards or attaining ecosystem restoration goals for existing urban areas. If we can avoid massive fish kills, and our rivers no longer catch on fire, we have attained the maximum feasible standards."

■ **The reformers (or end-of-pipe devices and their discontents).** This group includes the more progressive engineers, government managers and environmentalists who believe in the necessity and

usefulness of large, structural, end-of-pipe treatment devices, but who caution that these devices may also create new problems that in turn deserve mitigation. This camp's philosophy goes like this:

"Large, downstream, downpipe, offsite stormwater ponds and constructed wetland-pond systems are the preferred, widely applicable technology for stemming the flow of urban stormwater and its pollutants. As long as the negative 'side effects' (loss of trees, warmer water, etc.) of these devices are recognized and mitigated, they will be the beneficial centerpiece of any municipal stormwater strategy.

Although we recognize that meeting water quality standards and habitat goals may be impossible in some urban drainage basins, in others we may be able to at least partially meet water quality goals and standards.

"Citizens should be encouraged to use on-site runoff reduction methods wherever possible. But such small-scale, multi-site, up-pipe strategies are usually not feasible for retrofitting already-urbanized areas. More commonly, they are feasible for use in site designs for new urban developments."

■ **The uplanders and up-pipers.** These are the progressive thinkers on the edge of the stormwater management field who are promoting a decentralist, on-site, property-owner-responsibility philosophy towards urban runoff. Their numbers are few but are growing as more and more municipalities are disappointed by expensive, pour-the-concrete, mainstream approaches that ultimately fail to meet their own

stated goals. Basically, they believe:

"Current thinking about urban stormwater management is far too compartmentalized, fragmented and defeatist, despite all the talk about 'integrated watershed approaches.' Municipalities are still taking a sledgehammer to their stormwater problems, when what they really need to apply is a scalpel.

"Ultimately, urban stormwater managers must follow the same pollution prevention hierarchy that has become second nature to solid waste managers: 1) eliminate/reduce, 2) reuse, 3) recycle, and 4) treat/dispose as the last resort. In other words, the very first priority is to design new urban developments and retrofit existing urban developments to reduce and eliminate runoff at the source. This means working on-site at the level of each parcel, building, single-family lot, parking lot, neighborhood, etc.

"Many of the decentralized, site-level techniques that are increasingly required for new developments -- such as perimeter infiltration trenches around parking lots, downspout disconnections, below-ground storage tanks, grass swales, reforestation -- are valid and necessary as retrofits for existing developments. In the short run, retrofitting will require more creativity and more work, and some times more maintenance and money, than work with new developments. In the long run, however, cities that apply these options as retrofits will save themselves both money and aquatic resources." □

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