Spray Irrigation and Urban Run-Off: The Looming Crisis in Landscape Irrigation

Abstract: Cities in the US are under pressure from the Federal government and citizen groups to reduce pollution of the nation's waterways through the National Pollutant Discharge Elimination System (NPDES), an element of the Clean Water Act. Cities that violate this mandate face fines of $10,000 per day, or more. 40% to 60% of this pollution results from dry-weather surface run-off, and in urban areas, a significant portion of this run-off is a result of excessive irrigation and/or poorly designed or maintained irrigation systems.

The City of Santa Monica in California has identified spray irrigation of residential landscapes as a primary contributor to this problem and is moving ahead with a program to limit its use. This paper describes the City's program and its importance for irrigation professionals.

BACKGROUND:
The Clean Water Act promulgated in Washington, D.C., in 1972 started a ball rolling which is coming to rest against sprayheads in San Monica, California in 2003. Here's the story:

The National Pollutant Discharge Elimination System (NPDES), an element of the Clean Water Act, limits the amount of pollutants in the nation's waterways. One of those waterways is Santa Monica Bay which forms one of the borders of the City of Santa Monica. Tourist dollars generated by water-related activities in Santa Monica Bay and on its beaches form the basis for a large percentage of Santa Monica's revenue.

In the early 1990's, when research determined that up to 60% of the pollutants in the Bay was the result of urban runoff, Santa Monica's first effort to deal with the runoff was to build the Santa Monica Urban Runoff Recycling Facility (SMURRF).

The SMURRF, built in 2000, is the first facility of its kind in the nation and perhaps the world! This state-of-the-art facility treats dry weather runoff water that formerly went directly into Santa Monica Bay through storm drains.

An average of 325,000 gallons per day of urban runoff is treated by the SMURRF. The runoff water is diverted from the City's two main storm drains and treated to remove pollutants such as trash, sediment, oil, grease, and pathogens. The treatment process includes:

Coarse and fine screening to remove trash and debris
Dissolved Air Flotation (DAF) to remove oil and grease
Degritting systems to remove sand and grit
Micro-filtration to remove turbidity
Ultra-violet (UV) radiation to kill pathogens

Once treated, the water is used for landscape irrigation and dual-plumbed systems (buildings plumbed to accept recycled water for the flushing of toilets). The treated water meets all of California's Title 22 requirements. Landscape irrigation customers include highway landscaping, the City's parks and cemetery and several school grounds. Dual-plumbed customers include the City of Santa Monica's Public Safety Facility and the Water Garden commercial development.

In 2001 another occurrence upped the ante. Seven of the City's eleven wells, the source of 85% of its drinking water, were found to be contaminated with MTBE and had to be shut down. Overnight, Santa Monica went from importing 15% of its water, to importing 95%, and the average price of the water went from $111 to $450 per acre foot.

So it wasn't long until the City began an intensified program to reduce waste of this expensive, imported water. One element of that program is enforcement of a landscape water waste ordinance* that has been on the books since the 1992 drought, but not recently enforced. Among other things, the ordinance prohibits watering between the hours of 10:00 a.m. and 4:00 p.m., hosing down of hardscapes, irrigation runoff into streets and gutters, fountains without recycling and unrepaired leaks.

The newly established enforcement program includes regular patrols by City Code Enforcement Officers. An unanticipated, but not surprising, result of the patrols was the documentation of the extent of the contribution by residential parkway and front-yard sprinklers to the dry-weather runoff flow.

In the first five months of patrols, we issued 500 citations. Approximately three-quarters of these involved irrigation runoff violations. Less than ten of these runoff situations involved drip, bubbler or rotor systems. What's left? You got it! . . . sprayheads.

THE PROGRAM:
So, for purposes of both water conservation and runoff reduction, the City has embarked on a relatively simple program designed to limit the use of sprayheads and / or change them into something more environmentally responsible.

The program does not ban the use of any specific equipment *per se* nor does it ban any form of plant material such as turf. The program is performance-based and simply requires that there be no overspray or runoff. Not limited or reduced runoff. Not no-runoff-except-when-the-wind-is-blowing. Zero runoff; any and all the time.

As part of the program, the City tests and demonstrates technologies and landscape designs that further the Zero Runoff goal. Technology examples that show promise include the MP Rotator and several subsurface watering techniques. Landscape design examples include turf areas surrounded by buffer strips of permeable paving and planting designs that can be efficiently watered by drip and bubbler systems.

The City's Environmental Programs Division also pays for the appropriate conversion of selected City-owned shrub plantings from spray systems to drip irrigation.

This program is put into action for existing landscapes through public outreach efforts and the effect of the citations which result from the enforcement patrols. The fine for violating the water-waste ordinance is $250 for the first occurrence and escalates for additional occurrences.

For new construction, final inspections include a test of the irrigation system which must result in zero runoff.**

THE FUTURE
Santa Monica is a very small, but innovative and influential city. While its specific programs are not going to result in vast water savings for Southern California, history shows they will result in other larger regions following Santa Monica's lead. Hopefully, the sprayhead industry will rise to this challenge.

Visit us at http://www.santa-monica.org/environment/policy/water/ for an update.

* See Attachment 1
** Pending City Council approval.

Attachment 1 – City of Santa Monica Water Waste Ordinance (7.16.020)

- No watering of lawns or landscapes between the hours of 10:00 a.m. and 4:00 p.m. on any day.
- No hosing down of sidewalks, driveways, patios, alleys, parking areas or other "hardscapes."
- No runoff is permitted from lawns and landscapes into streets, alleys, or gutters at any time.
- Water must not be used to fill or maintain levels in decorative fountains, ponds, lakes or displays unless a recycling system is used.
- Swimming pools must not be filled or emptied unless it is a first filling of a new pool, or necessary leak repair work is being performed.
- Water leaks from exterior or interior plumbing must be repaired immediately.
- Water must not be allowed to flow without reasonable use.
- No washing of vehicles of any kind except with a hand-held bucket or a hose equipped with a shut-off nozzle.
- Restaurants must serve water only upon request and post signage indicating this restriction.