

## Interview With Larry Coffman, the Low-Impact Development Innovator

By Laura Funkhouser

**L**arry Coffman will present a comprehensive two-day pre-conference workshop, *Low-Impact Development: Introduction, Applications, and Technical Implementation*, on Sunday, August 19, and Monday, August 20, 2007, in Phoenix, AZ, and on Thursday, October 4, and Friday, October 5, 2007, in Whippany, NJ. See [www.StormCon.com](http://www.StormCon.com) for more information.

### What is the history of low-impact development?

When I got into stormwater management in 1973, there had been little work on connecting ecology to stormwater. It was just flood control. It was about sizing pipes, channels, and levees. Today's stormwater programs also deal with the daunting task of protecting and restoring the biological integrity of our receiving waters. Although we do a pretty good job with controlling flooding, we still are struggling with how to protect aquatic ecosystems from the adverse impacts of urbanization.

It's been my goal to integrate ecosystem functions into stormwater management. The 1972 Clean Water Act established the goal of restoring the biological, chemical, and physical integrity of our waters. Thirty-five years later and we still aren't doing that. To date our protection strategy has been one of natural resources conservation and stormwater impact reduction with the use of stormwater BMPs [best management practices]—primarily detention ponds—the theory being that minimizing pollutant loads is good enough to protect the biological integrity of the aquatic habitat. The problem is nobody ever knew what was good enough in practice to ensure no further destruction of water quality. There has never been adequate science to understand how best to achieve the true intention of the Clean Water Act.

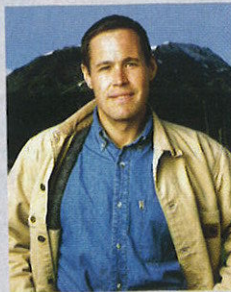
One of the things I did on the 350th

anniversary of Prince George's County incorporation was look at the history of agriculture and commerce. In the late 1600s and early 1700s one of the interesting things to note were the magnificent fisheries. Up until the 1800s there were thousands of commercial fisheries on the Potomac and Anacostia rivers, and now there are only a handful with widespread advisories restricting crabbing and shell fishing. We calculated that if those fisheries were at the same quality now as they were 200 years ago the industry would be generating tens of millions of dollars per year. The Port of Bladensburg on the Anacostia River in colonial days was one of the world's leading exporters of sturgeon caviar. Today there are no sturgeons in the river. We don't realize how significantly the quality of the ecosystem has changed over the years because it happens so slowly and we become acclimated to the deteriorated level of the river. What I know today won't be known 20 years from now, so there is a continual loss of local knowledge.

### StormCon '07 Keynote Speaker Announced

StormCon is pleased to announce Jeff Corwin, conservationist, outdoorsman, and TV host, as opening keynote speaker. Don't miss his adventure-packed presentation on Tuesday, August 21, at 8 a.m. in the Sonoran Ballroom.

An Emmy winner, Jeff Corwin hosts *The Jeff Corwin Experience* and *Corwin's Quest* TV shows. He authored *Living on the Edge: Amazing Relationships in the Natural World* and lectures on wildlife, ecology, and conservation to audiences across the United States.



The other thing we realized is that as we shifted from agriculture to urbanization after World War II we saw the problems change from sedimentation to the introduction of toxic substances—heavy metals, pesticides, polychlorinated biphenyls, etc. A recent study showed that 50% of catfish in the Anacostia River have cancerous tumors or lesions. Now US Geological Survey studies are finding all sorts of chemical pollutants including pharmaceuticals.

Back in the early 1990s, I was looking for better ways to control stormwater to address the limitations of conventional centralized pipe and pond control approaches. One approach was to treat runoff within the green space available on a site using it to filter runoff. We knew all about how septic drain fields treated wastewater. Why couldn't we use the same principles to treat stormwater? By transferring technology from wastewater, soil science, and forestry, the practice of bioretention was born. Bioretention removes pollutants using physical, chemical, and biological processes in the plant soil complex. In trying to filter water in depressed bioretention cells, we realized we also were changing the runoff characteristics. It taught us that we could use many small landscape features at the site level to treat, store, detain, retain, and change the timing of runoff. As we explored how much runoff we could manage onsite, we realized there really was no limit to the potential and possibilities. Today LID's [low-impact development's] decentralized techniques optimize resource conservation, minimize site impacts, change the runoff timing, treat runoff, and prevent pollution, allowing us to design a site to mimic a watershed's hydrological regime and pollutant cycling capacity.

There were big institutional barriers to gaining acceptance—for 20 years we had been telling officials that detention was the way. If we were going to sell a



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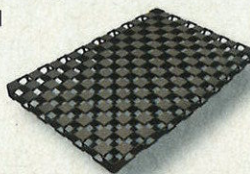
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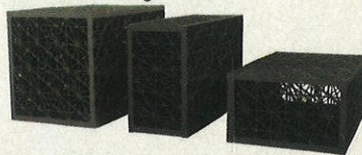


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new approach, we had to point out the deficiencies of the conventional system. When I first went out talking about the limitations of detention, that was very threatening to people invested in the current system.

So we had to demonstrate that it worked. We did complex modeling, continuous simulation studies, monitoring, and case studies. I hired Tetra Tech, which was also working for the EPA. By the time we put out the nation's first LID manual in 1997 for Prince George's County, we were convinced that it was very powerful. Tetra Tech spread the word to the EPA, and it led to a grant to nationalize LID through a manual developed in 1999.

It snowballed in a lot of directions. Everyone wanted to participate—state and federal wanted to work with us on LID retrofit programs. At the end of my tenure with Prince George's County in 2005 I was getting calls from the state and federal government to do more demonstration projects. I worked closely with EPA headquarters. Robert Goo and Rod Fredericks were very supportive and helped promote LID nationally.

The explosion in the interest in LID has come about for a number of reasons—first, the National Pollutant Discharge Elimination System program; second, the realization that conventional approaches don't protect sensitive habitat in coastal areas, lakes, and streams; and third, LID has proven to be more economically and environmentally sustainable.

A group of us developed the LID Center to do training, research, and development. The LID Center's first project was an EPA grant to explore the technical feasibility of using LID for combined sewer overflow [CSO] control. Under Neil Weinstein the LID Center is doing some very exciting projects around the country and has worked with the Department of Defense to develop LID design guidelines for base consolidation and rebuilding efforts now under way. Recently the center entered into a partnership with the EPA, the Natural Resources Defense Council, and the National Association of Clean

Water Agencies to promote "Green Infrastructure" to protect water supplies, control CSO, and treat runoff. The center is also working to promote LID through Leadership in Energy and Environmental Design.

So the LID Center has been one of the major factors in moving the technology forward. I've also done close to 500 workshops on LID principles all over the country and the world.

I've been exploring how far we can push stormwater technology. I believe that our technology should strive to replicate ecological processes and functions vital to the protection of the ecological integrity of our receiving waters. You look at the history of civilizations and the most successful are the ones that understood hydrology—Romans, Incas, Mayans. They integrated water into their architecture and art so that water was an organizing feature of their cities and societies. We've done it in a way that disconnects us from water. My grandfather who built his home in the late 1800s didn't have city water supply—only rainwater in a cistern. Thinking about rainwater as resource to be managed wisely is not a new idea but one we have to relearn to protect and restore our waters and quality of life.

#### **When were the terms *low-impact development* and *bioretention* coined?**

LID was coined around 1993-'94. I wanted to call it zero-impact development. I realized that wasn't a good term because it would be perceived as being irrational—but I was thinking of the fact that we can develop any site and maintain the natural water balance. So that didn't go. So I settled for low-impact, which seemed like a more achievable goal. The term *bioretention* came from the fact that many of the pollutants treated by the soil plant complex are retained in the biomass. I wanted a name that in some way explained the process of treatment.

#### **How do you think climate change will affect stormwater management?**

I don't know for sure. But here in the Chesapeake Bay watershed if climate change results in an increase in the volume and intensity of rainfall, that would

cause an increase in the pollutant and sediment loads to the bay. In years with high rainfall amounts or very intense tropical storms the bay's water quality declines. Of course flooding problems would increase. There would be nothing good about more rainfall, making it more important to improve our technology and to retrofit existing development. One of the things we can do to address the heat island effect is to put more vegetation in our cities. Green roofs and more urban trees and vegetation can make an impact on reducing energy consumption and moderating urban temperatures. If we green our cities, maybe we can slow down the process of climate change.

#### **What are you covering in your two-day workshop at StormCon?**

I'll be providing a comprehensive overview of LID's philosophy, principles, practices, and site design process. We'll cover a wide range of topics including site design techniques, LID design standards, maintenance and inspections, economic benefits, case studies on new development and urban retrofit, analytical methods, and development of LID codes and regulatory roadblocks. It's just about everything one needs to know in order to develop a LID program or design a LID site.

For more information or to register online visit [www.StormCon.com](http://www.StormCon.com).

### **StormCon Workshops in New Jersey and St. Louis**

Mark your calendar for these critical workshops near you:

- Four full-day workshops in Whippany, NJ, on Thursday, October 4, and Friday, October 5, 2007, at the Hanover Marriott. Visit [www.StormCon.com/newjersey](http://www.StormCon.com/newjersey) to register online or for more information.
- Four full-day workshops in St. Louis, MO, on Thursday, November 29, 2007, at the Renaissance St. Louis Airport Hotel. Visit [www.StormCon.com/stlouis](http://www.StormCon.com/stlouis) to register online or for more information.

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