

ALLIANCE FOR THE CHESAPEAKE BAY

# BAY JOURNAL

*The Chesapeake Bay Newspaper*

Vol 11 - Number 10

January-February 2002

## **Developing a better watershed / Executive Council agrees to lead by example with stormwater controls**

**By Karl Blankenship**

Of all the problems facing the Bay, the hardest one to deal with may be concrete.

Every day, streets, driveways, parking lots and other hard surfaces, such as rooftops, collect a massive dose of nutrients and chemicals. They include wastes from pets, air pollutants that fall from the sky, oils and antifreeze dripped from cars, wastes dumped by residents, fertilizers sloppily applied to lawns — and a nearly endless array of other substances.

And, every time it rains, those byproducts of everyday life are collected and swept down the storm drain, ultimately pouring into the local stream.



**More housing means more impervious surfaces, which in turn, almost always translates into more polluted runoff.**

The damage doesn't end there: Accelerating as gravity pulls it down through the pipes, the runoff often hits the streams at high velocity, gouging sediment from the banks and smothering any creature around.

Unlike other sources, pollution from development is on the rise around the Bay: More pavement almost always translates into more polluted runoff.

About 11 percent of all of the nitrogen, 16 percent of all phosphorus and 9 percent of sediment entering the Chesapeake Bay runs off developed land in the watershed, according to Bay Program estimates.

The amount of urban and suburban areas grew by 17 percent from 1985 through 2000. That trend that is expected to continue through the next decade.

“We know that stormwater is one of the fastest growing sources of pollution to the Bay,” said Kelly Shenk, who oversees stormwater issues for the EPA’s Bay Program Office. “If we don’t get a handle on the stormwater load, we won’t be able to sustain progress in meeting our water quality goals.”

Besides nutrients, the chemicals picked up in stormwater make it one of the biggest sources of toxic pollution in the watershed. In some of the region’s most polluted waterways, such as the Anacostia and Elizabeth rivers, stormwater is the largest source of toxic contaminants.

All of that adds up like this: More than 1,570 miles of streams within the Chesapeake watershed, and 44 square miles of estuarine water, don’t meet water quality standards primarily because of stormwater runoff, according to the Bay Program.

To start dealing with the problem, the Chesapeake Executive Council agreed in December to ratchet up stormwater control efforts on lands owned by the federal, state and District of Columbia governments.

Although more development has historically meant more pollution, Council members signed a new directive aimed at using their land as laboratories for new stormwater management techniques to prove that this doesn’t have to be the case.

The council includes the EPA administrator; the District of Columbia mayor; the governors of Maryland, Virginia and Pennsylvania; and the chairman of the Chesapeake Bay Commission, which represents state legislatures.



“Better stormwater management protects our investment in the Bay and its tributaries,” said District Mayor Anthony Williams, the council chair. He noted that during spring rains last year, “you

**It’s estimated that about two-thirds of the impervious surfaces in urban areas are roads.**

saw sloshing raw sewage” in the region’s storm systems. “Too many times, all of this is exactly what is flowing directly into our tributaries.”

To change that, the council is striving for a “no net increase” in runoff from development and redevelopment on their lands; improved stormwater management and maintenance on their highways; and 60 demonstration projects using emerging innovative technologies designed to yield no polluted runoff at all.

“People always say it can’t be done,” Shenk said. “Well, let’s see if government folks can show us how it can be done.” Historically, runoff has been managed to get water off paved surfaces as fast as possible to prevent flooding. Before the 1980s, most development lacked any stormwater quality controls at all.

Since then, stormwater management has typically focused on collecting runoff and piping it to centralized locations — usually dry detention ponds — to store runoff and then meter it out to streams over a slightly longer period of time.

Even the best designed ponds remove relatively few pollutants, and do nothing to restore natural hydrology, which is critical for a stream’s health.

Historically, the Bay’s watershed was covered with forests, which were very stingy about giving up water. Little ran off the land; most of it went into the ground or was taken up by trees and plants.

“As we urbanized, we completely reversed that,” said Larry Coffman, a stormwater expert with Prince George’s County in Maryland. “We changed that whole balance, and that is really what is putting stress on the streams: Increased runoff, increased pollutant loads and increased erosion and sedimentation.”

Pavement prevents rain from percolating through the soil — a process that also removes pollutants — and recharging groundwater. Instead, rainfall is collected and becomes surface runoff.

As a result, groundwater — the main source of water to streams during dry periods — declines, while surface runoff increases. Urban and suburban streams end up being whipsawed between unnaturally high flows when it rains, and unnaturally low flows when it is dry. That also causes wide swings in temperature and destabilizes streambanks.

Not surprisingly, the combination of nutrients, toxics, sediment and wildly fluctuating hydrology is more than most stream dwellers can take. The Maryland Biological Stream Survey, a multiyear study of the stream health in the state, found that sensitive species such as brook trout begin disappearing when as little as 2 percent of a watershed is covered by impervious surface. (For comparison, 2 percent is roughly equivalent to two, two-lane roads going through a square mile of land.)

Further, the study found that all streams with more than 15 percent impervious cover ranked either in fair or poor condition. When imperviousness reached 25 percent, only the most pollution-tolerant species could be found.

Coffman has become one of the nation's leading advocates of "low-impact development" which emphasizes the use of rain gardens, vegetated swales and other techniques to capture stormwater throughout a development site and allow it to infiltrate into the ground — as Mother Nature would have done.

Such techniques turns conventional stormwater management — which gathers runoff from far-flung areas and concentrates it — on its head. Those ideas, radical only a few years ago, are slowly gaining converts. All of the Bay states have taken action in recent years to begin allowing — and even promoting — stormwater infiltration rather than runoff.

Still, Coffman and others readily acknowledge it will take years for developers and local government planners to become comfortable with such techniques. "It will take about 10 years for these techniques to become commonplace," he predicted. The Bay Program's stormwater directive seeks to speed up that process by having federal, state and district governments lead by example. It calls for establishing 60 demonstration projects on state, federal and district lands, all aimed at having a no-net-increase in runoff from the site.

"One of the biggest challenges that we face is to convince people that these approaches and technologies work and work well," Shenk said

Under the directive, Shenk said, it's expected that the Bay jurisdictions will take a holistic view of their projects when they undertake new development — or redevelopment projects — on their land.

That means they start by looking at the project's overall design for ways that impervious surfaces can be reduced, thereby reducing the amount of runoff. And then, they will use innovative technologies, from rain gardens to "pervious pavement" which allows water to seep through, in an effort to prevent any polluted runoff.

In addition to the demonstration projects, the directive also calls for Bay jurisdictions to do a better job of managing stormwater on their other lands as well — collectively, they own 13 percent of the watershed. By 2003, the jurisdictions are to have plans to manage both the quantity and quality of stormwater on all of the land they own.

In addition, the directive calls for transportation departments in the states to develop programs by 2005 that ensure that stormwater systems along 177,000 miles of roadways in the watershed are designed to not just get runoff off the road, but also to protect water quality.

"This is the first time that we've had the departments of transportation at the table talking about how to manage stormwater on roadways," Shenk said. "Highways and streets make up a large portion of our impervious surfaces in the watershed."

In fact, she said, it's estimated that about two-thirds of the impervious surfaces in urban areas are roads and parking lots. "So if we really want to see a reduction in pollution loads and flooding, we have to tackle roadways," she said.

The directive goes even further. In addition to improving stormwater management on state lands and roadways, it calls for agencies to "ensure proper maintenance and inspections of stormwater management practices." Right now, even when stormwater management is required as part of construction permits, the maintenance of stormwater systems is usually not mandated.

"A lot of people say that maintenance is the Achilles heel of stormwater management," Shenk said. Maintenance often happens only when systems fail and flood or cause other problems. "A lot of the reasons why we have stormwater problems now in the Chesapeake Bay region is failed management practices and failed infrastructure."

The directive also calls on the state, federal and district governments to "show leadership" on retrofitting stormwater controls in areas that are

already built up. That's often difficult because concrete infrastructure is already in place.

But some innovative practices can help. Tree boxes, square concrete boxes designed to hold a tree and fit into a curb, can collect normal rainfall from a quarter-acre of pavement. The tree's roots not only absorb the water, but remove large amounts of pollution as well.

The directive calls on Bay jurisdictions to reduce chemical runoff by 30 percent by 2008 by using such techniques on land they own in the Bay's three regions of concern. Those areas, the Anacostia River, Baltimore Harbor and Elizabeth River, are the three tidal Chesapeake areas with the most serious toxic pollution problems. Even if all of those goals are met, they would affect only a fraction of the developed land in the watershed. Shopping malls, subdivisions and other private land, as well as those owned by local governments, are not affected.

So, part of the directive is aimed at encouraging others to ratchet up their stormwater management activities.

Local officials, who are on the front line when it comes to approving new projects, are often slow to adopt techniques they may consider unproved. Sometimes, for good reason: If they fail, and someone's home or business floods as a result, local officials are the ones who will get the blame.

"Local staff can barely keep up processing development plans, much less do innovative work," said Tom Schueler, director of the Center for Watershed Protection, a nonprofit group that works at the local level to promote better project designs and runoff management. "Sometimes, policy makers in the Bay Program think they can snap their fingers and the world will change. But there's an enormous culture of people who need education."

One of the ideas behind the stormwater directive is to provide a showcase — especially with the demonstration projects — so developers, local officials and the public can see firsthand how such innovative stormwater management techniques work. The directive calls for information about the design, cost and performance of stormwater management techniques featured at the demonstration sites to be made public.

"The more examples that people can see of how new approaches can work — and work better and be cost effective — the better chance we will have in effecting a change in the way we think about stormwater," Shenk said.

Reaching even further into the educational realm, the directive calls for the Bay jurisdictions to work with universities to teach future engineers

landscape architects and others about alternative stormwater management approaches — and to develop demonstration sites on campuses.

“These are new concepts to these students,” Shenk said. “If engineering programs keep doing the same thing decade after decade, we are not going to get the changes in the way of thinking, and the innovation, that we are trying to push. And that takes a long time.”

Business as usual, when it comes to cleaning up the Bay, is destined to fail — more concrete is on the way. Right now, the Bay Program estimates there are about 1.2 million acres of impervious surface in the watershed. That’s expected to grow by nearly 100,000 acres — roughly pavement and roads the size of two District of Columbias — by 2010. If left untreated, nutrient loads from just those hard surfaces would increase about 25 percent, according to Bay Program estimates.

“When we think about 2 million to 3 million more people in the watershed by 2020, we need to think about how to better design our development and manage stormwater,” Shenk said. “It has to be dealt with.”



Last Modified: 01/10/02

