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Clean Water Solution

One thing is missing from the peninsula's plan to take toxics out of its runoff: money.

By RYAN MASTERS

A hard rain pours off the steep, Victorian roofs of Pacific Grove. It rushes into and over the gutters and down the drainpipes. It pools in the gardens and floods down the stairways. It rushes across the sidewalks. It overwhelms the sewer lines and gurgles up out of the stormwater grates. It flows down the streets toward the ocean. Always towards the ocean.

And as it flows downhill, the rain collects nitrogen and phosphorous off the roof, heavy metals from the gutters, cat feces from the garden, raccoon and human feces from the storm drains and sewers, and motor oil from the street. Encountering concrete and asphalt at every turn, this toxic brew flows downhill, gathering speed and mass until it and a thousand little rivers like it drain into the ever-receiving sea.

The principle hasn't changed much since the Roman aqueduct. For millenia, the urban development of civilization has adhered to a simple strategy when it comes to stormwater runoff. Capture the water, shunt the water, put it in a trough or pipe, increase its velocity and send it away. "Away," in most cases, means the nearest large body of water. Here on the Monterey Peninsula, that means the ocean.

Yet with increasing development and population density come a higher concentration of pollutants for the runoff to carry into the ocean. Considering that the population of the Monterey Peninsula is projected to grow by over 20 percent by the end of the decade, the time for solutions is now.

A July 24 advisory sent out by the Monterey County Health Department to warn residents of yet another beach closure is appended with a fitting quote from billionaire-philanthropist Warren Buffet: "The Noah rule: Predicting rain doesn't count; building arks does."

-Jane Morba

There are solutions to urban runoff, even on the Peninsula, which sheds water off its back like a duck. But before politicians can argue how they're going to engineer a Model Urban Runoff Program (MURP), they have to find a way to pay for it.

Problem is there's a big argument over regulation. Back in 2004, the responsibility to deal with urban runoff rained down upon the heads of city leaders from a great height. Some stormwater pollution solutions are extremely inexpensive, like screens and filters, but others require financial investments in the millions of dollars.

City managers say their jurisdictions can't afford to solve the urban runoff problem if state

politicians keep the current ocean plan standards in place. Conservationists like the Natural Resource Defense Council's Anjeli Jaiswal argue that communities with bigger populations and smaller budgets than Monterey (pop.: 29,674; 2003-2004 budget: $41,919,878) manage to create an acceptable Stormwater Management Program. Furthermore, her organization contends that low-cost and practical pollution-prevention programs exist to help communities implement effective stormwater management plans, even on a tight budget. According to the NRDC, the Environmental Protection Agency averages the cost of a stormwater management plan at $8.93 per household per year.

But Monterey County is anything but ordinary. City leaders must contend with added Monterey Bay Sanctuary restrictions. Since 1982, Monterey, Pacific Grove, Pebble Beach and Carmel have been charged with finding a way to stop 100 percent of the runoff into the hyper-sensitive Areas of Special Biological Significance (ASBS) within their city limits. In 2004, the California Water Board filed a cease and desist order and their demand suddenly sprouted teeth. But the cities say they simply can't be asked to shoulder the entire burden themselves.

There is limited funding available. A variety of Prop 40- and Prop 50-sourced grants are available for projects (the Consolidated Non-Point Source Pollution Control Program, the Non-Point Source Pollution Control Source Program, the Urban Stormwater Grant Programs, the Integrated Watershed Management Grant Program, the Federal 319(h) Grant Program and the Clean Beaches Initiative), but what the Monterey region needs is something along the lines of Prop O.

Last year over 76 percent of voters in the city of Los Angeles voted for Prop O, a $500 million bond measure that will be used to finance capital improvements to prevent pollution. But Monterey County's entire population is only 401,762 compared to the city of LA's 3.8 million. Consequently, politicians like Rep. Sam Farr (Carmel-D) are considering the possibility of spreading financial responsibility over an entire region.

"You cannot leave it up to the local communities to have to solve the problem," Farr says. "There's no free lunch and yet the last totally free thing to do in California is visit the beach."

Local city managers also worry that new municipal restrictions such as a ban on car washing or lawn fertilizers will be a hard sell to their citizens without data showing that the best management practices are effective.

"I don't want to spend all this money telling our citizens that they can't do all these things that they've become accustomed to doing and that we're going to change our building practices in all these different ways and then say, 'Does it really have a meaningful impact on the ocean? I don't know at the end of the day if it makes a difference or not,'" says Pacific Grove City Manager Jim Colangelo.

Ideally, Colangelo hopes that Pacific Grove and the Monterey Peninsula can become a pilot model for stormwater management technologies.

"[We could] see what works and what doesn't work so when we go out to the voters we can say, 'This is what it's going to cost to fix it, these are the solutions we like, these are the ones that really make a difference in the ocean,' so they have some confidence that we know what we're talking about," he says.

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The rule of managing stormwater runoff is three-fold: slow it, sink it, spread it. The most effective runoff technologies reduce the speed at which polluted water travels, then filter it by dispersing the runoff across a surface, moving it through vegetation and underground.

These technologies fall under four headings: detention practices which temporarily store runoff in ponds or similar basins; infiltration practices which temporarily store runoff in basins from which the water percolates slowly into the soil below; filtration practices which address water quality problems rather than water quantity by passing stormwater through a filter medium; and finally biofiltration and bioretention practices which filter stormwater to reduce contaminant loadings using plants as an additional filter medium.

Since the mid-1990s, knowledge and information about the threat of stormwater pollution and how to control it has in

creased dramatically. In places like Fort Ord, where the sandy substratum provides a vast means of water retention, infiltration practices have proven to be tremendously effective. Studies have shown that effective infiltration can bury 98 percent of stormwater in the earth, remove up to 83 percent of nitrogen, and remove up to 98 percent of copper. In addition, infiltration can cool stormwater down to 55 degrees as it flows though the ground, thereby reducing the detrimental thermal effects that runoff has on aquatic ecosystems.

Unfortunately, cities like Monterey and Pacific Grove are "built out"—meaning they have no room for growth—and have to deal with controlling and cleansing dense developments on steep slopes of solid granite. Nonetheless, there are still elements of infiltration practices which could be effectively implemented.

For example, studies have shown that the widespread use of "French drains," small infiltration trenches placed at the bottom of the discharge pipe from roof gutters that disperse water below the surface on site rather than passing into the storm sewer system, can significantly reduce and cool runoff.

Slightly more practical for our area are detention practices which temporarily store the runoff before discharging it into the ocean. While dry ponds hold then release all of their water in as little as 48 hours after a storm event, wet ponds keep some water at all times and retain excess water for a longer period.

The fundamental purpose of detention ponds is to reduce peak flows. They also allow some sediment and other contaminants to settle out before the water drains. Wet ponds, by virtue of the longer detention times and frequent presence of aquatic plants and other life, can provide additional water quality treatment through biofiltration and chemical processes.

There are possibilities for larger water detention sites on the Peninsula, but their holding volume is generally limited. Even if they were renovated to receive and hold stormwater runoff, it's a practice that would have to be implemented in conjunction with other practices.

"We've got that little reservoir up by [Pacific Grove] Middle School and we've tried to talk to Cal Am about the possibilities of trying to use that, but still in a big storm event we can't stop it all," says Colangelo. "We can divert some of it up there and hold it for a while. It would be great to have a non-potable water source up there, we could use it to irrigate the golf course and get the potable water away from the golf course, which it shouldn't be used on anyway."

Another detention practice that's on the same, individual scale as French drains is the use of cisterns. In 2004, a City Council candidate named Jeffrey Flathers proposed a Comprehensive Cistern Management Plan (CCMP), which he claimed would cut PG's reliance on the Cal Am Water Company nearly in half, saving consumers hundreds of thousands of dollars in annual water bills.

The plan called for one-time property tax credits to a maximum of $500 per household for those residents who installed four or more gutter downspout cisterns on their properties. For a typical dwelling with a roof size of 2,500 square feet, such systems could catch up to 4,000 gallons per year in rain and/or dew runoff.

Finally, if the water can be captured and controlled through detention, then it can be filtered. There are two primary filtration techniques for managing stormwater. The first includes chambers containing a filter medium buried at ground level through which stormwater flows; the other includes filter inserts for catchbasins in the storm sewer system. As stormwater flows pass through the filter medium, it removes particulates and other contaminants. The filtering materials most frequently used are sand, peat, or compost, although some municipalities now use synthetic filter media.

Of course, the downside of catchbasin inserts and filtration devices is their proclivity to clog or structurally fail over time. To remain effective, these systems must be carefully selected, monitored and maintained.

With all this in mind, the most promising technologies for our region are Low Impact Development (LID) solutions like green roofs, living walls, swales, and other biofiltration and bioretention practices.

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There's no substitute for open, undeveloped land to filter pollutants out of runoff. If a city can't restore large tract of its land back to a pristine state, it can mimic the environmental cleansers in architectural design.

Thirty percent of all nitrate and phosphorous pollution settles on the roof in the form of particulate matter. Within one hour of a storm, most of these pollutants and toxins enter the groundwater. According to Paul Kephart of Carmel Valley's Rana Creek Habitat Restoraton and Living Architecture, a green roof like the ones he designs and constructs can absorb and purify 70 percent of that rainfall.

Integrated with bioswales and other elements of living architecture, a building can capture and cleanse 100 percent of its stormwater. Today, thanks to Kephart, structures like Casa Feliz—a 59-unit low income housing development on Main Street in San Jose—and the nearby police station capture 100 percent of their stormwater.

Developers like Casa Feliz's First Community Housing are discovering that green roofs only increase the project's total cost by one-half to one percent and actually cost less long-term than installing off-site stormwater-management improvements that would be required otherwise.

Of further interest to our drought-prone area is the fact that many of Kephart's designs re-use what they capture. The grandest example is the Vancouver Convention Center, which provides 3 million more gallons of water than it even needs from its 6.5-acre living roof.

Plus, there's no need to completely rebuild our communities. Elements of living architecture can be incorporated into existing structures. Some simple LID techniques include biorentention cells or rain gardens, strategically placed depressions that contain soil amendments which promote the absorption of stormwater; amended soil, soil enriched with sand and organic materials to increase its capacity to filter water; porous pavement, concrete that allows rain to infiltrate, thereby reducing runoff; and replacing hardscape with grassy swales, preserved native vegetation and natural drainage in mind.

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So the technology exists and there's a great deal of hope that, if properly implemented, a visionary stormwater management plan can not only significantly reduce the amount of runoff pollution that reaches the ocean, but also be beneficial to the Peninsula's perennial water shortage problem.

As a population, our priorities are defined by our age and our interests. The elderly are concerned with healthcare. Parents are concerned with education. Developers are interested in more growth and profits. But we are all concerned with clean water—whether it be for recreation, commercial fishing, habitat preservation or the pure, wild beauty that attracts dollars.

Before we can save the ocean, two-thirds of us must first agree that the ocean is worth saving. To paraphrase Buffet—it's no use waiting for the rain, it's time to start building the ark.