

Bioswales and Rain Gardens the Right Way



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Some landscape features just need to look nice and others need to perform. Rain gardens and bioswales fit into the latter category. Many times they add aesthetic appeal to an area, but their real purpose is to direct, absorb and filter runoff. To do this they must be properly designed and maintained correctly.

Bob Grover, president of Pacific Landscape Management, Portland, Oregon, observes that oftentimes landscapers are put in a difficult position when it comes to maintaining features like bioswales and rain gardens because, "sometimes, they are designed in a way that's just inherently difficult to maintain." This tends to be more of a problem with bioswales than with rain gardens, which typically get more attention, he adds.

"Rain gardens take roof water that is relatively clean and they try to get as much of it back into the ground as possible to make up for the fact that there's an impervious surface (the roof)," he explains. "So, rain gardens are usually right next to a building and need to look good, so there's usually more of a focus on that." They often are integrated into the landscape, and resemble other planting beds, so maintenance is pretty standard, says Grover. "They're not out of sight, out of mind. There are some spectacular rain gardens out there."

Bioswales, on the other hand, are larger, often set on the perimeter of a property, and must deal with water that's picked up petroleum and fertilizer and other pollutants from roadways, parking lots and open turf. "Bioswales are designed to slow the water down before it goes into a storm drain or creek system, and maybe pull out some of the pollutant particulate levels," says Grover.

Typically, the bottom of a bioswale is planted with sedges and rushes and

water-loving plants, and the sloping sides, which tend to be drier for longer periods of time, have native shrubs or trees. Sometimes a designer will include low-growing grasses in and around these plantings. "The problem is that low-growing grasses don't stay low, and can grow up into and out-compete the shrubs and kills them," Grover explains. "Or, in the effort to maintain that grass, you end up cutting the shrubs down, too."

Grasses may be good in absorbing some of the nutrients, but their inclusion adds tremendously to the maintenance challenge, he states. "We don't have grass around shrubs in the rest of the landscape," Grover points out.



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Another problem can come when landscapers are prohibited from applying fertilizer or herbicides to the bioswale, because of the larger goal of cleaning the water. "'Plant them and just let them return to nature' is the idea that the municipality or architect has," says Grover. But it's difficult to maintain plant health or control weeds without some of these treatments, so the result can be an unsightly landscape feature, he notes. "A lot of times the property owner will say that it's a natural environment and doesn't need to be maintained, because it's planted with all native materials," Grover explains.

Grover says that, as a landscaper, he tries to explain that the minor use of innocuous chemicals will, for example, control the grass immediately around shrubs so those plants are damaged when crews are trying to weed wack the rest of the grass. "I believe, as a responsible landscaper, I need to tell them that, 'If we leave that area alone and don't budget any money to maintain it, it's going to be ugly and the desired plant material will die, and it will become a weed patch.'"

Too often, people see bioswales and rain gardens as maintenance-free features, agrees Mark Sierschula, president of Envision-Works, Inc., a landscape architecture firm based in Dayton, Ohio. "To say that you're just going to establish some sustainable system and never have to maintain it is absurd," he states.

For starters, Sierschula notes, "The purpose of a bioswale is to cleanse stormwater ... and when water goes through plant material, it's much more effective than just going straight into a storm system." He designs these features using plants chosen because they are favorable to biodiversity, and it's important that these plants get established in order to ensure they survive and can perform as intended.

Establishment is critical

Sierschula says that the first couple of years after a bioswale or rain garden has been installed are the most critical in terms of maintenance. "I don't call it maintenance then; I call it the 'mandatory required establishment period,'" he explains. That's when those responsible for performing the maintenance need to be sure the desirable plants aren't out-

competed by weeds. “The idea is that you’re establishing plants for complete coverage. And that takes time,” he explains. If the intended plants aren’t cared for and allowed to establish themselves, “weeds can find a spot to grow,” Sierschula emphasizes. “At that point, people look at it and say it’s unsightly and they might give up and eliminate it.”

He says that one of the biggest reasons that some rain gardens or bioswales aren’t successful is a lack of education about the type of plants that should be used there. “People don’t understand why a specifier—a landscape architect—is putting those particular plants in there,” says Sierschula.

“It really starts with the plant palette that you choose, and that goes back to good design principles,” seconds Germaine Ross, owner of [St. Croix Valley Landscaping](#) in Wisconsin, which designs, installs and maintains rain gardens. For example, she sometimes sees prairie plants used in woodland settings. “And that sets you up for failure right from the start,” says Ross.



Other times, people make the mistake of choosing plants that thrive in wet conditions, which aren’t always present in rain gardens. “With rain gardens, the berm is extremely dry and the lower part that is wetter. Typically, you don’t need to choose plants that only like wet, unless it’s not draining well. Usually you can choose plants that will tolerate both wet and dry conditions,” she explains, noting that she likes to use a lot of shrubs in her rain garden designs.

“We like to integrate the rain garden into the existing beds that are already there, so it’s not a little [stand-alone feature] sitting out in the middle of someone’s yard,” adds Ross. She sees many cases where rain gardens look out of place because they haven’t been integrated into the overall landscape.

If the design is done correctly so that drainage is occurring (St. Croix Valley Landscaping typically runs perc tests prior to installation) and plant selection is done properly, “the maintenance isn’t too much different than maintaining any other type of garden,” says Ross. “There might be inlet areas that need maintenance, if there’s some sediment or there’s been some erosion.” During springtime, in particular, it’s important to check that these areas are clear, she adds.

Keep inlets clear

The inlet is really a key area, she emphasizes. If sediment or trash or other material collects there, proper function (i.e. drainage) can be prevented. Especially in larger commercial installations, she likes to use either [Rain Guardian pre-treatment chambers](#) or sediment strainers to ensure good performance and reduce maintenance. “If [the water is] coming off a parking lot, where there would be a lot of sediment, for example, it’s an easy clean out,” Ross explains. “Sometimes people use sod or small aggregate [to screen the inlet], but aggregate tends to be a little higher maintenance because it fills up with sediment.”

Another important maintenance step is to check to see if remulching is necessary following a big rain event, she adds. While the mulch serves an important role during the establishment of the rain garden, “the long-term goal is to have vegetation coverage,” Ross emphasizes. “The vegetation is part of the function, as well as the overall look of the design. As those roots grow and the rain garden matures, the roots turn into little rivers that go down into the soil and create a pathway for water to go. So as the rain garden matures, it becomes higher functioning and drains faster.”



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Pacific Landscape Management, Portland, Oregon, populates bioswales with sedges, rushes, plants that tolerate wet and dry. PHOTO COURTESY OF PACIFIC LANDSCAPE MANAGEMENT.

For that reason, the selection of plant material goes beyond aesthetics, she reiterates. “Native plants typically have the longer root systems,” Ross notes, pointing out that a daylily might have a 6-inch root structure, while ornamental grasses might have a 15-foot root length. “That’s a big difference in terms of absorbing water, as well as creating a channel.”

That’s not to say that rain gardens have to be designed and maintained to achieve “that native look,” says Ross. “There are many styles you can use and still get the function; really it shouldn’t look too much different than a perennial garden or a shrub garden.”

Some large-scale applications call for stormwater solutions that extend beyond the capability of a basic bioswale or rain garden. In these cases, engineering expertise is required to create an advanced system. As one example, Ceres H2O Global Technologies, Sarasota, Florida., offers patent-pending bioretention basins, what Co-owner Grant Beatt describes as “bioswales with an under-drain.”

Beatt also operates Grant’s Gardens, a landscape maintenance firm, and from these dual roles knows how critical maintenance is to these high-tech stormwater solutions. Unfortunately, he says that’s not always the case with all projects he’s seen around the country; many times bioswales are designed and engineered, but that is not always translated correctly to the installers, and then there’s even less of a likelihood that maintenance guidelines are passed on to those who will be in charge of upkeep.

“There’s often a total disconnect,” says Beatt. “The most successful bioretention swales are when you’ve got to have your design team, your operations team and your maintenance team all involved right from the beginning. ... That way the maintenance is done in accordance to the design.”

To help facilitate that sharing of knowledge with its installations, Ceres has developed a comprehensive maintenance manual to help guide those who will be maintaining the features after they are installed. These guidelines touch on the importance of plant establishment, particularly in the period immediately after installation. Beatt says that means controlling weeds in

order to get the desirable plants established—but it also involves much more.

“An inspector is going in and methodically going through the system from A to Z, and there are locations within the system that need to be inspected on a regular basis,” says Beatt. These checks and related maintenance need to be done to ensure water quality; that the bioswale is doing its job of filtering pollution from the stormwater, as intended by the design, he says. “Your whole maintenance protocol needs to be based on this. You’re looking at areas where there’s failure to the sides of the slope of the swale; failure of plant material; failure of the soil profile; visible pollution such as beer cans and plastic; dog feces and other feces that might be coming into the system. You’re methodically going through the entire system.”

These checks and maintenance have to be done on a regular basis, but also after flooding events, he stresses. “It’s largely dictated by the weather,” says Beatt. And, in cases of drought, it might mean irrigating to help those plants. While irrigating a bioswale might seem counter-intuitive, Beatt says it’s an essential component of the overall system.

Ceres even uses irrigation systems to deploy and inoculate its bioretention systems with microbes. “The big trick moving forward with bioretention swales is the relationship of microbes with roots. If you have a very healthy rooting environment, then you’ll have very healthy microbe populations, and then you’ll be able to meet your water quality criteria for the design,” Beatt explains. “That’s what we call phytoremediation.” In this regard, he notes, maintenance of high-tech bioswales is right up the alley of landscapers because, at its core, it involves issues of plant health care and root health.