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LOW IMPACT DEVELOPMENT (LID) TECHNIQUES

Gardens for Seven Generations

TEXT BY KATE EASTON

The differences between high and low maintenance and the ultimate longevity of the garden are the choices that support sustainable ecosystems, Earth friendly implementation and maintenance techniques, and garden design principles (see *WestSound Home and Garden*, Fall 2006 issue). Aboriginal cultures around the world have a practice of considering the impact of decisions and actions on the generations to come and involve the younger group's leaders in those decisions. "Precious intangible values" (a term coined in the 1950s by biologist Olaus Murie) can inform today's decisions and choices to achieve gardens for seven generations.

For the most part, establishing a home landscape is a matter of rehabilitating the landscape from the ravages of the current construction process. Biodynamic soils

"It is tremendously worrisome that we don't talk about nature anymore. We talk about natural resources as if everything had a price tag. You can't buy spiritual values at a shopping mall. The things that uplift the spirit — an old growth forest, a clear river, the flight of a golden eagle, the howl of a wolf, space and quiet without motors — are intangibles. Those are the values that people do look for and that everyone needs."

— George Schaller,
National Geographic, October 2006

need to be rebuilt, compaction alleviated, and plant cover replaced to approximate the natural water flow that recharges the natural water flow that recharges aquifers, streams, lakes and rivers. Using sustainable conservation techniques in design, implementation and maintenance can minimize the impact of humans on

the larger ecosystem and enhance your garden ecology. Existing garden techniques have been adapted by the low-impact development movement and modified with new technology to mitigate changes to native soils and ecosystems as a result of development.

DESIGN CHOICES

Creating a garden begins with assessment and planning to make appropriate design decisions based on needs informed by values. Design intent such as protecting nature while meeting the homeowner's needs is more than a philosophical statement. Practical choices consistent with both principles are a reflection of the value the garden creator places on nature and humans' place in the environment.

Creating a nature refuge in the garden is a design choice that has positive implications for both human and wild visitors. Designs that include variety in plant material, bioretention cells and vegetated (green) roofs provide habitat and food sources that can entice wild visitors to become permanent residents of the garden. Many of these visitors prey on the "bad actors": Lady Bugs eat aphids; rabbits love dandelion greens; birds eat tent caterpillars. Designing gardens for biodiversity (many different types of plants — genera and species) is not only good

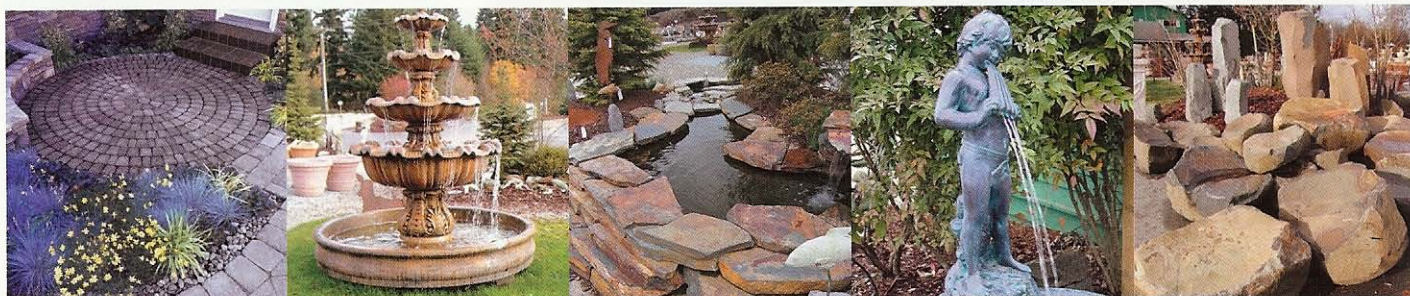
for nature; it results in colors, textures, and interest that span the seasons and feeds our souls.

IMPLEMENTATION CHOICES

Technology can make many things possible. Lancelot "Capability" Brown (1716-1783) pioneered the notion of radical change in landforms to create bucolic "natural" landscapes for Britain's landed families. Most of these designs include rolling grass fields with strategic groupings of trees and serpentine lakes. (See http://en.wikipedia.org/wiki/Capability_Brown and www.capability-brown.org.uk for more about surviving works and his life.) The Olmsted parks (i.e., Central Park in New York City, Golden Gate Park in San Francisco, and Washington Park Arboretum in Seattle) applied technology and Brown's ideas to create oases in the city. Today's gardens are derivatives of this history. Gardeners now have the opportunity to apply Low Impact Development (LID) techniques to their garden and property to contribute to the overall improvement of interception,

infiltration and interflow of water on their property. LID techniques such as minimal grading and clearing practices, use of pervious surfaces (permeable paving), water collection methods (e.g., cisterns), rain gardens, roof gardens, protecting and restoring vegetation, building good soil and a regular maintenance program are as useful in the garden as in community development plans.

Working with the existing topography instead of bulldozing it not only decreases the cost of the project, it preserves native soils rich in microorganisms and nutrients that support plant life. For example, placing a gazebo in an area that is relatively level or a stream cascade on an existing slope are sustainable conservation choices. Alternatively, a deck can be terraced to follow the natural terrain and minimize landform changes. Distance between retaining walls can be increased and sloped runs (less than 1 foot height in a run of 2 feet) can minimize the height of the wall, the number of terraces, and the cost. ➤



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To reduce water runoff from flat, impervious surfaces (i.e., roofs, concrete, asphalt), controlled infiltration techniques can be used for a more hydrologically functional landscape. Driveways, patios and walkways can be built with pavers or flagstone laid in coarse sand or gravel. Interflow can be increased under these areas, with some additional preparation to build temporary water storage.

During construction of permeable paving areas that include temporary water storage, it is important to prevent sediment from entering areas excavated for water infiltration and avoid soil compaction by minimizing use of heavy equipment (use only those with tracks, low weight profiles) and limiting the area of travel. Some work can also be done manually. Protect and preserve existing native plants during construction with clearly marked boundaries. The boundaries around trees should be placed at the drip line plus 3 feet.

Removing plant material only in the area for the structure and access leaves the most plant material and disturbs the soil the least.

Using construction materials from sustainable sources is another way to support sustainable conservation values. Choose from an array of eco-friendly materials: lumber from sustainably managed forests, composites made from recycled materials, locally manufactured/harvested products (minimizes shipping costs and pollution). Some structures and garden creation actions may require a permit. Consult your county community development agency for permit requirements, setbacks, and other ordinances concerning structures and

changes to landforms. Structures that will support heavy loads require construction drawings certified by an architect and/or soils analysis report by a geo-engineer.

Choosing native plants and those adapted to the climate (temperature, soil condition and nutrients, light) increases the survivability rate while enhancing the evapotranspiration and absorption of precipitation. In practice, a mix of natives and adapted plants in a ratio of one to three meets the more ordered aesthetic needs of many homeowners. Others may prefer the wild exuberance of a higher native portion and have a higher tolerance for volunteer genera (e.g., weeds). Overall, a biodiverse selection is more advantageous for ecosystems and aesthetically pleasing than a monoculture (everything the same). Monocultures are prone to disease and pests. Kitsap County publishes brochures and a CD with recommended native plants for different habitats (see www.kitsapgov.com). "Low Impact Development Technical Guidance Manual for Puget Sound," published by the Puget Sound Action Team and Washington State University, also contains appendices with plant recommendations. (Electronic version online at www.psat.wa.gov/Programs/LID.htm.) For plants adapted to Puget Sound climate, Great Plant Picks (www.greatplantpicks.org) is a list prepared by horticulturists, designers, nursery owners and other

LOW IMPACT DEVELOPMENT DEFINED

"Low Impact Development (LID) is a storm water management and land development strategy applied at the parcel and subdivision scale that emphasizes conservation and use of on-site natural features integrated with engineered, small scale hydrologic controls to more closely mimic pre-development hydrologic functions."

— Curtis Hinman,

"Low Impact Development Technical Guidance Manual for Puget Sound"

Like garden design, the first step of LID implementation is completing a site assessment and needs inventory. Both collect data on climate (temperature, precipitation, wind); topography (slopes, gradients, and existing water collection); soils (texture, hydrology, depth); existing plant material and habitat; structures; utilities and existing uses; owner needs and budget. Where LID considers surrounding land use, zoning, community access and utility availability, garden design considers ways to screen, or frame of views beyond the property line, accessibility for lists of all the owner must-haves, the desires and wants-if-it-fits-in-the-budget.

Resources:

Hinman, C (May 2005) "Low Impact Development Technical Guidance Manual for Puget Sound," Puget Sound Action Team and Washington State University. Electronic version available at www.psat.wa.gov/Programs/LID.htm.

Sample garden site assessment and needs inventory worksheets can be found at www.gardenvisioninc.com/HomeownersGardenInventory.htm.

IF IT'S CERTIFIED, IT MUST BE GOOD, RIGHT?

There are two major forest sustainability certification bodies active in the United States: the Forest Stewardship Council and the Sustainable Forest Initiative. The former is a multidiscipline, internationally represented organization while the latter is comprised of U.S. businesses in the industry.

Forest Stewardship Council

Loggers, foresters, environmentalists, and sociologists formed the FSC, a global organization, in 1993 to answer the question, "What is sustainable forestry?" This body defined standards and practices to answer the question. Certification occurs through "accredited, independent, 'third-party' certification bodies, or 'certifiers' certify forests. They assess forest management using the FSC principles, criteria, and standards, [while] each certifier uses their own evaluative process." See www.fsc.org.

Sustainable Forest Initiative

Established in 1995 by the American Forest & Paper Association (a trade organization), the Sustainable Forest Initiative (SFI) defines labeling requirements and business practices for companies that manufacture and/or sell forest products. Currently there are four certifications: Certified Participant, Participating Manufacturer, Participating Publisher and Participating Retailer. Each certification has its own application process and requirements based on the SFI Principles. "These principles call upon SFI program participants to meet market demands while using environmentally responsible practices that promote the protection of wildlife, plants, soil, air and water quality to ensure the future of our nation's forests." Applicants are approved by the board only when the standards for the certification are met. In addition, "the program must meet or exceed the Federal Trade Commission's (FTC) green marketing guidelines. These guidelines require that the claims associated with product labeling are truthful and do not deceive the consumer." See www.aboutsfi.org.

[Note: The author has not reviewed the specific standards and guidelines of either organization. Readers are encouraged to research via the online resources listed.]

- <http://research.yale.edu/gisf/>
- www.yale.edu/forestcertification/faq.html — certification FAQ
- www.sustainableforests.net
- <http://certificationwatch.org> — subscription newsletter website that tracks and informs on forest sustainability certification and more. Cost of regular subscription is for the most devoted researcher, while a two-week trial may be of interest to others.

green industry professionals with the urban garden in mind. Also, Certified Professional Horticulturists (see www.wsna.org) are knowledgeable about which plants will thrive in specific environments.

Plants grow well when there are sufficient nutrients, water, and light for their requirements. Good soil should provide all the nutrients needed for plant growth. Renovating urban soils begins prior to planting and occurs over time.

The latest research shows that addition of 5 percent to 15 percent (by volume) of composted organic material to planting holes increases the soil's ability to hold water, introduces microorganisms that facilitate plant uptake of nutrients, and reduces the amount of time for the plant to become established. In addition to amendments in the soil itself, a top dressing of 2 to 3 inches of composted organic material reduces surface runoff, increases soil moisture levels and reduces ►

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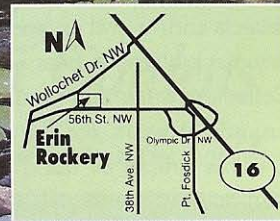




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soil temperatures. The decomposition of this top dressing continues to improve soil texture and provide nutrients for the plants. Some urban soils have little to no nutrients in them, so an initial application of slow-release, low-dose, and balanced organic fertilizer may also be needed. Mycorrhiza fungus also helps roots of new plants to become established. It is important to apply only as much nutrients (fertilizer) as the plant can use while it is in the root zone and to apply it only when the plant is actively growing. Test soil for nutrients and pH before adding any amendments, and apply organic fertilizer according to the manufacturer's directions. Overapplication of organic material or fertilizer negates its value and causes other problems.

Incorporating water management techniques, such as bioretention cells, vegetated roofs, and rainwater collection systems into the garden also contributes to restoring soil interflow and infiltration. Bioretention cells are depressed areas containing plants that collect runoff from impervious surfaces (i.e., roofs, drive ways, walkways). The plants in the area are adapted to periods of inundation and drought. The depression is specifically constructed to allow water to infiltrate over time.

Vegetated, or green, roofs are specially constructed areas on the roof of the building containing plant material in a shallow growing medium to absorb precipitation. An overview of the origins and current practice were discussed in an article in *WestSound Home and Garden*, Fall 2006 issue. Technical details for implementation are included in "Low Impact Development Technical Manual." Because additional weight is being added to a structure, it is very important that the existing structure can support the addition. Architects and/or civil engineers may be needed to determine the ability of a building to bear additional weight.

Collecting water and storing it for future use has been done for thousands of years. For the suburban homeowner, the practice can be as simple as using rain barrels, a large scale storage cistern or a more intensive system of cisterns. The storage vessel should have filters: for larger debris, sediment and suspended



PHOTO COURTESY LARRY COFFMAN



PHOTO COURTESY MURPHEE ENGINEERING

particles. Gravity release of water for landscape use is a low-tech approach for some applications. Landscapes without changes in elevation may need pumps to direct the water into the garden.

Collecting and storing water is under the jurisdiction of Washington state's Department of Health, Department of Ecology and local agencies. Technically, roof water collection systems are classified as a surface water system by the U.S. Environmental Protection Agency. Ecology requires all systems collecting surface water for consumption to apply for a water right; however, that practice is not currently being enforced for small systems (e.g., individual homes). Most local agencies do require special permits for water collection systems.

MAINTENANCE PRACTICES

A good design and the latest implementation practices are for naught, if the garden is not monitored and maintained. All the LID techniques specify regular monitoring and maintenance programs to ensure the life span of the device. Develop a regular maintenance plan for all the elements of the garden. Annual pruning to remove dead and diseased plant material, inspection and repair of permeable paving systems, quarterly or bi-annual replacement of water collection system filters, and annual testing of water infiltration can prevent more costly repairs.

Bioretention areas need to be weeded and top dressed mulch replaced at least annually. Vegetated roofs must be inspected to ensure drains are working properly and plants are healthy. Plants need to be monitored for nutrition deficiencies, disease, damage and pests. Aesthetics notwithstanding, dead plants must be replaced in bioretention cells to work properly. If pests are noted,

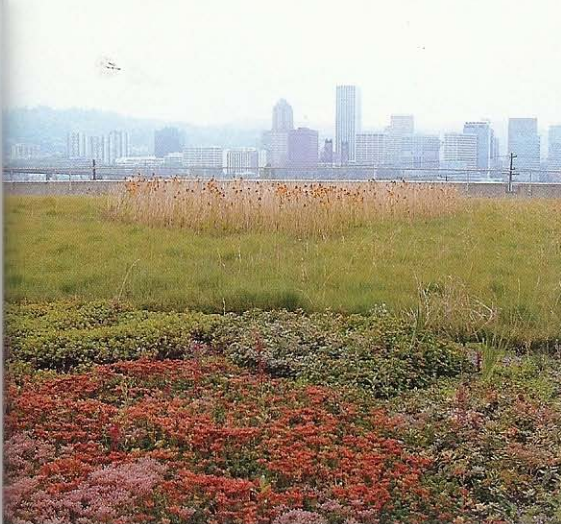


PHOTO COURTESY ERICA GUTTMAN



PHOTO COURTESY TIM POPE

integrated pest management (IPM) techniques are recommended to minimize the impact to the ecosystem. IPM practices use the method of least cost for control. For example, if aphids are on a few buds, manual removal is used. If an entire greenhouse is affected, then the least toxic chemical controls may be warranted. Poor nutrition and water imbalances have similar symptoms, so check both before taking action. Yellow leaves (for those normally green) can be a

sign of too much water or a lack of nitrogen, iron, or calcium.

REASONED CHOICES

Design and garden practices that maximize aesthetics and minimize disturbance to the natural habitat are a result of conscious, reasoned choices. American gardens evolved from country pleasure gardens with full-time staff to maintain them and monetary resources to accomplish anything the owner wished —

even moving mountains. In this age where the media encourages us to feed our obsessions, consider the long-term implications of your actions. The emotional response to the garden is a uniquely personal one; it also is one way to influence others to adopt conservation and sustainable practices.

With 300 million people living in the United States, the decisions and choices made regarding the home landscape just might end up being the fulcrum of success for sustainability and conservation — and the livability of our world. ♦

"All our landscapes, from the city park to the mountain hike, are imprinted with our tenacious, inescapable obsessions."

— Simon Schama,
social historian, in
"Landscape and Memory"

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