SUSTAINABLE LANDSCAPING PRACTICES

A well-designed yard can be a beautiful extension of your house, a place to relax and entertain, a place to play, a place to grow food, and a worthwhile investment.

While you may not be able to see it, your yard can also help protect drinking-water supplies, streams, lakes, and Puget Sound, as well as the salmon, shellfish, birds, other wildlife, and people that depend on clean water. You will be able to enjoy visits from birds and butterflies—and a healthier yard for your family—as you create habitat right outside your windows.

Keys to sustainable landscaping:

- Building Healthy soils
- Planting in layers—like a forest
- Smart plant choices
- Safe pesticide practices
- “Just enough” lawn & healthy lawn care
- Pervious decks, patios and walkways
- Managing drainage on site

Building Healthy Soils
Healthy soil grows healthier plants, allows stormwater to infiltrate, stores water for plants in the summer, and reduces the need for chemicals—such as fertilizers and pesticides—that are bad for streams and our families’ health.

Healthy topsoil has 50 percent pore space (half its volume is available for stormwater storage!). But construction-compacted and stripped soils may have only 5 percent. Because it covers your whole yard, improving your soil is the easiest way to slow and infiltrate stormwater, and healthier soil makes your yard beautiful, too!

You’ll know if you have healthy soils if:

- You can dig in a few feet without needing a pickaxe.
- Your soil is loose and open, and absorbs water easily.
- Plants are growing robustly, showing signs of having water and nutrients readily available.
- The top 6 to 12 inches shows signs of organic matter, with a rich brown color like decomposed leaves or compost.
- Your soil feels smooth and crumbly, and it smells sweet and earthy.
- You have lots of earthworms (they live on decaying organic matter, and keep the soil loose and fertile).

Some rocks and bits of clay are a natural reflection of your soil, but if your soil is consistently as hard as a rock, or mostly clay, you’ll benefit by improving it with compost and mulch. If your soil has been removed or compacted by machinery during construction, you’ll need to break up the compaction and mix in compost, or add a compost-amended topsoil, to get off to a good start.

Benefits of Compost
Compost is the earthy-smelling material that is produced from decaying matter. You can buy compost or make your own from yard trimmings and food scraps. Compost is an essential part of healthy soil, as it supports a complex web of hard-working soil organisms that regulate soil moisture, aerate the soil, and maintain soil fertility. Compost increases the soil’s ability to absorb rainwater, and it filters pollutants.

There are billions of organisms in just a spoonful of healthy soil, including earthworms, insects, bacteria, fungi, and protozoa. Where natural organic matter is lacking in soil, compost reinvigorates soil with these hard-working

How to Recognize Good Compost

When buying compost, always visit the supplier to see and feel the product first hand. Note these features:

- **Texture** should be loose, fibrous (not clumpy or gooey).
- **Color** should be dark brown or black.
- **Smell** should be sweet and “earthy.”
- **Check** for weeds, such as white runner-grass roots.
- **Check** for poor screening, such as big chunks of material.
- **Check** for signs of unfinished decomposition, which can tie up nutrients in your soil until it finishes composting.
- **Buy** compost produced at a permitted composting facility—they have to meet stringent quality standards.

The Washington State Department of Ecology lists permitted composting facilities; see the resources section for details.
organisms. What this means for you is a more beautiful yard and reduced water bills. For your whole community, it means cleaner groundwater, streams, and Puget Sound.

- Soil organisms recycle and store nutrients, making them readily available to plants.
- Soil organisms help keep disease-causing organisms in check, resulting in healthier plants.
- Compost keeps soils more open so plants' roots can penetrate farther into the soil.
- Compost is the solution to help clay soils drain better and support more plants.
- Compost soaks up rainfall and stores it for plants' use over time.
- Compost-amended soils slow down and soak up excess stormwater runoff, protecting streams by reducing flooding and allowing time for rainwater to recharge groundwater aquifers.
- Compost-amended soils filter pollution, including oil, pesticides, and heavy metals.
- Some of the soil organisms in compost-amended soils bind up, break down, or convert harmful pollutants to keep water resources cleaner.

When & How to Add Compost

- On new construction sites, till two to four inches of compost in to an eight- to twelve-inch depth to get a good start for lawns or landscapes, and to absorb stormwater.
- In new garden beds, dig in or till in one to four inches of compost.
- Continue to amend garden beds over time by adding up to two inches each year—especially if you have clay soils.
- To increase the health and drainage of your lawn, rake in one-quarter to one-half of an inch of compost in the spring or fall after aerating.
- Add compost to an entire planting area, not just in the planting hole.

For more details on building good soils with compost and mulch, see "Growing Healthy Soil," listed in the resources section.

Mulch: Applying mulch is another way to build healthy soils and reduce your maintenance hassles. Mulch is a layer of coarse organic material (although there are non-organic mulches available for certain applications) that is spread on the surface of the soil.

Why use mulch? Mulch:

- Conserves water by reducing evaporation.
- Regulates soil temperatures, so your plants are warmer in winter and cooler in summer.
- Provides a barrier that prevents some new weed seeds from getting established in bare soil, can suppress some weeds already in the soil, and makes it easier to pull many weeds.
- Breaks down over time, further nourishing your soil with new organic matter.
- Prevents compaction and surface erosion of bare soil, and allows for more rainfall to absorb into the soil.

When and how to mulch?

- Mulch right away after planting.
- Mulch about two inches deep around new plants.
- Apply mulch more thickly between plants—up to three or four inches deep.
- Keep mulch about an inch away from the stems or trunks of your new plantings—it could cause rot.
- Re-apply mulch every year or so as it breaks down.
- Remove weeds before you apply mulch.

What makes a good mulch?

The best mulches are coarse organic material, such as wood chips. Here are some tips:

- Request wood chips from local arborists, who will generally deliver them for free when working in your area. (Check to be sure their wood chips are well ground, with just a few larger, unchipped pieces that you can pull out.)
- Allow wood chips to compost in a pile for a while before applying them.
- Heavier mulches, such as wood chips, prevent more weed growth, and stay in place better than light materials, such as raked leaves.
- Coarse wood chips should be chipped or shredded finely enough that they will decompose within a few years and will not be unsightly when applied.
- Large sticks or unchipped branches provide too many openings for weeds while also inhibiting the growth of your desired plantings. Avoid mulching with these.
You can buy mulches, including dark bark (black) and beauty bark (red). Dark bark is coarser and therefore makes a better weed barrier than beauty bark. Take care if applying beauty bark, as it has tiny slivers that are difficult to remove from hands and arms.

Annual flowers and vegetables do best with a lighter mulch, such as compost, grass clippings and shredded leaves.

Mulch rings made from recycled tires are another option for mulching around trees in a lawn—the water and nutrients can penetrate through the open weave.

Avoid using landscaping fabrics in planting beds. The fabric eventually becomes clogged with weed roots, binds up good soil, and must be painstakingly removed and disposed to address the weed problem.

Finely ground fresh sawdust (such as from alders), although widely available and inexpensive, can form a crust on top that resists water penetration—use coarser chips or bark instead.

**Planting in Layers—Like the Forest**

Once you’ve enriched your soils, it’s time to think about your plantings. You should aim to plant layers—or different heights—of vegetation wherever possible. Layers mimic the structure of our native forests, with trees, mid-sized shrubs, low shrubs, and groundcovers, providing lots of benefits in your yard:

- **Planting in layers creates an aesthetically appealing structure for your landscape.**
- **Layered plantings offer more seasons of interest, with varying flowers, fruit, foliage, and bark all in one scene.**
- **Layered plantings do more to slow down stormwater and allow it to evaporate, transpire, and slowly trickle back into the ground instead of running off to storm drains.**
- **Layered plantings offer more habitat potential for animals you might want to attract to your yard, especially songbirds and butterflies.**
- **Layered plantings will reduce your maintenance requirements over time, as the plants will grow more closely together to crowd out weeds.**
- **Trees are especially important. They soak up more rainfall, stabilize slopes, buffer winter winds, and provide summer shade.**

In open areas of your yard, you might have just a few layers, such as low shrubs with groundcovers and perennials. In another part of your yard, you can create a little “wildlife zone” with a tree or two and several plant layers below.

If you’re on a small lot, choose trees that are well suited to small spaces (see resources section for tips).

**Good planning:** You can make your own landscape plan or hire a professional.

- Educate yourself about landscaping options and costs through publications and web sites (see resources section). Take free or low-cost classes offered by your local planning and conservation agencies, extension service, or conservation district.
- Even if you hire a landscape designer to help you develop a plan, you can save a lot of time and money by educating yourself so you are clear about your goals and aesthetic preferences.
- Becoming acquainted with some of the beautiful water-wise plants available will help you develop a list of plants best suited to your yard so you can shop wisely.

**Smart Plant Choices to Protect Water**

Choosing the right plants for your yard will save you time and money, and will protect and conserve water.

**Water-wise plants:** In our region, we’re lucky to have a wide range of beautiful plants that are adapted to our climate, soils, pests, and diseases. Water-wise plants help protect water because they are:

- Resistant to drought, so they can thrive in our wet winters and dry summers without supplemental water once they’re established.
- Resistant to diseases and pests, so they won’t require extra fussing or the use of chemical treatments that can harm groundwater and local waterways.
- Tough and hardy, so they won’t require frequent replacement. Replacing plants uses more water as you repeat the process of getting them well established for the first two summers.

See the resources section for lists of beautiful water-wise plants for a variety of conditions.

**Right plant, right place:** Once you choose your favorite water-wise plants, make sure you understand their requirements. Some plants are versatile, and can thrive equally well in sun or shade, but many have specific requirements. A shade-loving plant will never be water-wise if it’s placed in the sun, and a sun-loving plant will never thrive in the shade.
Group plants by water needs: Sometimes it’s hard to resist a few thirsty plants, even for a water-wise gardener. Plant water-loving plants in their own bed so you can manage their water needs, with either drip irrigation or soaker hoses, or with careful hand watering. Placing these high-need plants closer to your house helps you keep track of when they need a drink.

See the resources section for more tips on conserving water.

Safe Alternatives to Pesticides & Fertilizers
Giving up on or even reducing your use of chemical pesticides and fertilizers in favor of organic alternatives may be one of the easiest LID strategies to embrace!

Benefits:
- Improved health for your family and pets.
- Improved soil function and healthier plants.
- Improved health for your whole watershed!

We know that chemical pesticides, herbicides, and fertilizers are running off our yards and contaminating Puget Sound streams—researchers found 23 pesticides in a number of King County streams. The most frequently found pesticide is the chemical found in weed-and-feed products.

Toxic products also impact your family’s health. Children absorb chemicals when they play in the yard, and the chemicals come into your house on shoes and clothing. Once inside, chemicals attach to house dust and persist much longer than they do outside where sunlight and rain help them break down.

Here are some tips to get started:
- Prevent problems: Select disease-resistant plants. Keep your plants healthy with good soil and mulch to make them less vulnerable to pests or diseases. Pull weeds before they can spread. Plant closely to crowd out weeds. Use mulch and groundcovers.
- Investigate: Most bugs are good bugs! Before resorting to a chemical spray, find out what the real problem is. Some plant damage suggests insects are the problem, but it could be from too much sun or other causes. Take part of your problem plant or insect of concern to your local Master Gardener clinic or conservation district office for help identifying the culprit.
- Let nature work: Some insect infestations need to get big enough to attract predatory insects, such as ladybugs or green lacewings. Once the predators arrive, they’ll wipe out the pests, and your plants should recover.

Watershed-friendly Lawn

Reducing your lawn size and replacing part of it with water-wise plants will help protect local water resources and cut down on mowing chores.

Fertilizers: Chemical fertilizers come into our houses on our feet and wash into local waterways when it rains. Fortunately, lawns can be beautiful and functional without adding fertilizers. Create a healthy lawn with natural lawn-care recommendations such as establishing lawn on compost-amended soils; “cutting it high and letting it lie” when mowing; and occasionally aerating and top-dressing with compost. This approach is healthier for local waterways and for your family.

If you do need to fertilize your lawn, organic, slow-release fertilizers will do the most to make your lawn healthy and are less likely to leach or flow off to local waters. Follow natural lawn-care recommendations for when and how to fertilize.

Nitrogen in fertilizers can run off your yard and cause algae blooms, particularly in marine waters. If you fertilize, make sure you use “just enough” nitrogen from a slow-release source. Too much can actually encourage unhealthy lawn growth.

Phosphorus is an important nutrient for gardens. It primarily benefits flower and fruit production, so not every plant needs it.

Phosphorus is found in fallen leaves and grass clippings, and is a common ingredient in fertilizers.

Phosphorus is a troublesome pollutant in stormwater runoff. Excess phosphorus in lakes and streams causes algae blooms that block sunlight and prevent other plants from growing. Then the algae mass dies and decays, robbing the water of oxygen needed by fish and other aquatic animals.

You can help prevent these problems.
- Only apply as much nitrogen and phosphorus as your lawn actually needs. A soil test will tell you how much—if any—is necessary. (See resources section.)
- Keep grass clippings and leaves off sidewalks and streets. Sweep them up and place in compost bins or use as mulch.

For sources with more details about making your lawn watershed friendly, refer to the resources section.
These guides offer more help:

- Common Sense Gardening Guides, Thurston County Environmental Health
  [http://www.co.thurston.wa.us/health/ehcsp/index.html](http://www.co.thurston.wa.us/health/ehcsp/index.html)
- Natural Lawn & Garden Care, Seattle Public Utilities
- Natural Yard Care, King County

“Just Enough” Lawn

Only you can decide what size lawn is just right for your family. Some families play sports regularly that require a big lawn; some families enjoy a tiny patch of lawn for summer lounging; and some families have given up all their lawn! Consider these questions when deciding how much lawn area you need:
- How do you use your lawn space?
- Are there parts that are never used?
- Are there parts that are hard to mow (such as beneath trees or on slopes)?
- Do you and your family regularly play sports that require lawn at home, or do you go to public playfields and parks?
- How much time do you have to mow, water, and weed your lawn?

When you transform lawn space to another use, you eliminate the hassle and expense of regular mowing, watering, and weed care. For your watershed, that means saving water, cutting down on pollution from lawn-care products, and less stormwater running off lawns. For your neighborhood, that means less noise pollution, less air pollution, and more green spaces to provide homes for songbirds, butterflies, and other small animals.

**Former lawn space can become:**
- New garden beds, providing year-round beauty and wildlife habitat
- Pervious patio or walkways
- Spaces to grow fresh vegetables and fruit
- Rain gardens to manage stormwater on your property.

**Shrinking Your Lawn**

There are several methods for reducing your lawn when you’re ready. Converting a little lawn at a time is one way to ease in to lawn removal.

**Sheet-mulching method:** Sheet mulching is a smothering method. Lay down four to six layers of cardboard (or burlap sacks, if on a hillside). Next, apply a thick layer of wood chips over the top. Then wait nine months to a year before planting. If you sheet mulch in early spring, you avoid mowing all season and can often plant by late fall. The wood chips prevent erosion and give your yard an acceptable appearance while you wait for your grass to die.

Sheet mulching helps retain soil and adds organic matter as the grass and cardboard decompose beneath the wood chips.

**Spot-sheet mulching:** This method can be used if you want to get a few plants—such as trees and large shrubs—planted right way, but are willing to wait until later to add more layers of plants, such as smaller shrubs, groundcovers, and perennials.

In this method, fully clear large circles of grass with a shovel or pick-axe where you intend to plant trees. After planting, apply cardboard layers and wood chips all around the new plantings to kill the remaining grass over the next nine months to a year.

Detailed instructions on sheet mulching can be found in links noted in the resources section.

**Sod-cutting method:** Renting a sod-cutting machine is another option for shrinking your lawn. Advantages and disadvantages include:
- Very fast results! No need to wait for the grass to die before replanting.
- Sod-cutting decreases organic matter as you remove the top layer of soil. More compost will be required to restore soil.
- You'll make a lot of cut sod! Sod can be turned into rich planting soil if allowed to decompose (see box, "Making the Most of Your Sod").
- Sod cutters are heavy and require a strong hand to guide them.
- It is very difficult to use a sod cutter on a slope. Sheet mulching with old burlap sacks is recommended instead.

Outdoor-living Spaces

A sustainable landscape will be beautiful and inviting. Once your plants are flourishing, and your yard is alive with birds, butterflies, and other beneficial insects, you’ll want to enjoy it whenever possible.

Traditional concrete or mortared patios and walkways contribute to stormwater runoff. But you can create stunning outdoor-living spaces with these LID techniques:

- Raised decks, including those built with long-lasting decking made from recycled plastics. Decks are a great place to use a minimal-excavation foundation to build a sturdy deck without disrupting your existing soils and landscaping.
- Pervious concrete and permeable pavers.
- Grading your yard so that mortared or tightly built stone patios drain into an on-site stormwater feature, such as a rain garden or dry streambed.
- Free-draining walkways and patios.

Free-draining walkways and patios: You can create walkways and patio spaces in which the hard surfaces—such as stones or broken concrete—are separated by free-draining spaces in between.

- Many groundcovers, such as spreading thymes, can handle foot traffic. These can fill the spaces between a woven pathway of stepping stones, flagstones, pavers, or other hard material that offers secure footing. Building such walkways is less exacting than building a mortared patio. [photo]
- Loose materials, such as wood chips, nut hulls (from processors), or crushed rock, allow water to drain through and provide a uniform look for pathways or children's toy areas. Loose materials have to be refreshed every few years to look their best, and crushed rock can become compacted, reducing its ability to absorb water over time. [photo]
- Pervious systems, including stone pavers and interlocking plastic grids that contain crushed stone, can be a great alternative to an impervious patio or walkway. These systems are commonly used for parking lots and driveways, and they provide substantial water absorption (generally less than three percent runoff). These systems are also more effective than loose materials for people with physical disabilities who require the use of a wheelchair or other mechanical assistance.

Managing Drainage—Beautifully

For many homeowners in our rainy region, keeping stormwater away from building foundations is a headache every winter. LID techniques can help you eliminate this hassle by creating a beautiful landscape feature!

There are many ways to effectively manage drainage on your property—keeping it away from your house and out of the stormwater system.

Rain Gardens: Building a rain garden or two to collect water from roof downspouts and other hard surfaces is a popular technique for managing drainage. Rain gardens mimic nature, with a mix of plants and soils working together to process and clean stormwater. The water going into a well-designed rain garden will soak back into the ground and recharge groundwater aquifers.

Rain gardens are attractive, and can be a stand-alone garden bed, or can be integrated into your larger landscape. They can be designed and shaped to look like a natural pond, or be narrow and meandering like a stream. Because they are so effective at treating pollution, placing a rain garden to receive runoff from your driveway can be especially beneficial to protecting your local water.
Rain gardens are dug out 12 to 24 inches, depending on the type of soil. Removed soils are usually mixed with compost and then replaced, leaving at least six inches below the original grade for stormwater to pond for a day or so after a heavy rain. The extra soil can be used to make a berm or for other landscaping. Many wonderful drought-tolerant plants will enhance the beauty of a rain garden in all seasons.

To learn about how to design and build a rain garden, including a list of recommended plants, read Rain Garden Handbook for Western Washington Homeowners: Designing your landscape to protect our streams, lakes, bays, and wetlands, which is listed in the resources section.

**Dry “water” features:** You can create a different aesthetic that still handles your stormwater by creating dry streams or dry ponds. These are rock-lined features that store and slowly infiltrate stormwater—they only contain water after a heavy rainstorm.

Although rock-lined dry features don’t contain plants like rain gardens do, you can still create an attractive garden amenity by planting ornamental grasses and perennial flowers along their borders to mimic the aesthetic of a natural stream or pond. The plant list in the Rain Garden Handbook offers suggestions to guide you.

You can use some of the same guidelines in the Rain Garden Handbook to design a dry feature. However, since dry features don’t depend on a specialized soil mix or plants to process water, they usually need to be dug much deeper than rain gardens. To handle heavy winter storms, typical dry features may be as deep as three feet or more and then be partially refilled with drain rock.

Whether you’re building a rain garden or a dry feature, keep these tips in mind:

- You’ll need to safely convey your stormwater away from your house and into your stormwater feature. This can be done underground with secure pipes, or above ground with a feature such as a dry stream, a modest trench, or vegetated berm. Place your stormwater feature so that you can take advantage of gravity with as little digging as possible.
- During big storms that last many days, you may have more stormwater than your feature can handle. To prevent it drainage or erosion worries, design a controlled overflow system that will take excess rainwater to another site—either to the local stormwater system or another on-site stormwater feature—if the amount of rainwater becomes too great to be processed.
- If you have a perched ground water or a high water table, you may be limited in the depth of your stormwater feature (and you may not be able to build one at all). You must have at least one foot of separation between the bottom of your feature and the highest level of your groundwater.
- Call 800-424-5555 for utilities to be located before you dig on your property, and make sure that all utilities have been marked before you dig.
- Don’t place a stormwater feature:
  - within 10 feet of a building foundation.
  - within 50 feet of a steep slope (over 15 percent).
  - on a marine bluff without consulting a specialist, such as a geotechnical engineer or geological consultant specializing in marine sites.
  - over shallow utilities.
  - over a septic drain field or tank.
  - over major tree roots, or anywhere where digging will disrupt your trees’ roots.
- Do place your stormwater feature where you can enjoy its beauty!

These guidelines were prepared by Erica Guttman, Native Plant Salvage Project, WSU Thurston County Extension, with support from the Puget Sound Action Team. For more information, please see [www.nativeplantsalvage.org](http://www.nativeplantsalvage.org).
1. **Determine inflow elevation drop** (or gain)
   Subtract ending pipe/swale elevation (at RG entrance) from starting pipe elevation (downspout, etc.)

   \[
   \text{in} - \text{in} = \text{in} \quad \text{Inflow elevation drop}
   \]

   (Example: 49” - 52” = -3” – this number is negative because of the drop; it tells you that your natural topography is 3 inches lower at the point you intend to bring the inflow into the garden than at the point where the water is being collected)

   **Do you have positive flow into the garden?** Your inflow needs to drop at ¼-inch per foot of inflow run. Therefore, if you already have a natural 3-inch drop in elevation, as in the example above, the distance between your starting elevation (e.g., downspout) and the entrance to the garden could be up to 12 feet away. Of course, you will also create a swale or bury a pipe, which will lower the elevation as the water flows towards the garden, but you must always keep track of the elevation of the starting point at which water could back up.

2. **Next, determine elevation drop** (or gain) at middle
   Subtract elevation (at middle of RG) from starting inflow elevation

   \[
   \text{in} - \text{in} = \text{in} \quad \text{Elevation drop at middle}
   \]

   (Example: 49” - 53” = -4”, an inch lower than the inlet location, and 4 inches lower than the start of the inflow)

3. **Determine elevation drop at planned outflow location**
   Subtract ending overflow location elevation from starting inflow elevation

   \[
   \text{in} - \text{in} = \text{in} \quad \text{Total elevation drop}
   \]

   (Example: 49” - 54.5” = -5.5”in. lower than starting inflow, and 2.5” lower than the inlet location)

   If your elevation calculations result in a positive number, there is no existing slope and you will have to excavate more deeply to achieve the appropriate balance between ponding depth and safe overflow.

**Now, let’s calculate how deeply we want to excavate.** In the example above, our topography naturally drops, so we do not have to do extra excavation ensure that our overflow point is the lowest point. In this case, we want to excavate enough to refill with 18 inches of rain garden mix and leave 6