A QUICK REFERENCE GUIDE TO

Earth-Friendly Home Landscaping

1 LANDSCAPE DESIGN ...........................................2
On the path to an environmentally-friendly landscape

2 PLANT SELECTION ...........................................7
A critical step in creating a successful landscape

3 PRACTICES TO IMPROVE WATER QUALITY ........15

4 RAIN GARDENS .............................................19
Designed to collect and filter rainwater

5 HOME COMPOSTING .......................................23
Turn waste into a material to improve your soil

6 MANAGING YARDWASTE ................................28
Ideas for the reuse of yard waste

7 MULCHING ...................................................30
Mulches hold moisture, deter weeds, and protect the environment

8 WATERING & RAIN BARRELS ..........................33
Efficient watering reduces maintenance costs and conserves water

9 LILAC: LOW INPUT LAWN CARE .........................37
A strategy of lawn care that reduces water, fertilizer and labor inputs necessary to maintain a healthy lawn

10 COMMON MISTAKES TO AVOID ......................40
The basic principles to earth-friendly landscaping

11 RESOURCES ..................................................43
Great places to start for more information

Look for TO DO Actions throughout this Guide. They indicate things you can do now to make your landscape more earth-friendly.
This resource was produced by Hennepin County Environmental Services in partnership with the University of Minnesota Extension Service of Hennepin County. Portions were reproduced with permission from Dakota County Environmental Management and the Dakota County Soil and Water Conservation District.

Acknowledgements

Julie Weisenhorn  
University of Minnesota

Diane Riggs  
Vermillion River Watershed Handbook

Robert Mugaas  
Extension Educator  
University of Minnesota Extension Service of Hennepin County

Michael Zins  
Associate Professor & Extension Educator  
University of Minnesota

Dr. Mary Meyer  
Professor and Extension Specialist  
University of Minnesota

Anoka Soil and Water Conservation District

Dakota County Soil & Water Conservation District

Minnesota Department of Natural Resources/Metro Watershed Initiative

Hennepin County  
Environmental Services  
612-348-3777

www.hennepin.us/sustainablelandscaping

Attention . . . . If you want help translating this information, call 612-348-3777

Atención . . . . Si desea recibir asistencia gratuita para traducir esta información, llama 612-348-3777

Ogow . . . . . Haddii aad dooneyso in lagaa kaalmeyo tarjamadda macluumaadkani oo laceg la’ aan wac 612-348-3777

Ceeb toom . . Yog koj xav tau kev pab txhais cov xov no rau koj dawnb, hu 612-348-3777

TDD/TTY 612-596-6985
Visit an Eco-Yard

SEE A DEMONSTRATION OF EARTH-FRIENDLY HOME LANDSCAPING

The Eco-Yards demonstrate an approach to home landscaping in which plants thrive with minimal inputs of pesticides, fertilizer, water and time.

PLANTINGS HIGHLIGHTED AT THE ECO-YARDS

- Prairie and wildflowers
- Rainwater garden
- Fescue lawn
- Backyard composting
- Small and tall shrub massings
- Tree groves with plantings beneath
- Swale planting with sweet grass (Midtown)
- Permeable paver plaza (Midtown)

ECO-YARD TOURS

The Eco-Yards are open throughout the growing season for self-guided tours. Guided tours with a landscaping professional can be arranged. Call 612-348-3777 to schedule a tour.

Check out our website at www.hennepin.us/ecoyardtours for more information on eco-yard tours.

Eco-Yard in Brooklyn Park
8100 Jefferson Highway, Brooklyn Park
Adjacent to the Recycling Center

Hours:  Tu, Th, Fri . . . . . .10 am - 6 pm
        Wed . . . . . . . . . .10 am - 8 pm
        Sat . . . . . . . . . .8 am - 5 pm

Eco-Yard Midtown
2801 21st Ave S, Minneapolis
Adjacent to the Green Institute

Hours:  Open every day until sunset
In Minnesota, we only have a short time to enjoy our yards. As a result, we take advantage of them as play areas, gardens and as places to gather with friends and family. We also spend a great deal of time and money making sure our shrubs, trees, flowers and lawns look great. Traditionally, this high-maintenance type of yard care may have included large quantities of inputs – water, fertilizers, pesticides, weed control and money; not to mention our own sweat and time.

Enter environmentally-friendly landscaping, otherwise known as sustainable landscaping. This type of landscaping employs some basic principles that can reduce the impact we have on the environment and the amount of time and labor while still creating a functional, aesthetically pleasing landscape that can be easily maintained in the years to come. These principles include such practices as improving your soil, choosing the right plant according to conditions, replacing lawn areas that are difficult to maintain with better adapted shrubs and trees and reducing inputs into the environment.

A sustainable landscape is not a “no-maintenance” landscape and some of these changes will take time to get established. Your landscape will still require some level of care, but not as much because you are working with the environment instead of against it.
Look at your yard. Wouldn’t it be great to spend more time enjoying it rather than working on it? You’d no doubt have a lower water bill, while minimizing the use of pesticides and fertilizers. To learn how you can do all this and more, take a look at the following tactics for turning your yard into an environmentally-friendly and sustainable landscape. It’s your chance to make a positive impact on the environment.

GETTING STARTED: CREATE A BASE MAP
The first step to creating a new landscape design is to assess what you have and consider how you would like to use your yard.

TO DO/What are your current conditions?
• How much sun does the area receive each day? Keep track of how many hours of sun different parts of your yard receive during spring and summer days. Is it morning sun or afternoon sun?
• What is the soil like? Heavier, sticky clay? Lighter, more porous sand? Or is your soil rich, black loam? (see Improving Soil, pg 4)
• What is the moisture level of the area? Does it remain damp after a rainstorm or watering, or does it dry quickly? Are there low areas that may make for great rain garden locations? (see Rain Gardens, pg 19)
• Are there plants or other features that you would like to keep?
• Where are your utility lines (above and below ground)? What planting restrictions apply to these areas? (see TO DO/Call before you dig, pg 4)
• Do you have an underground irrigation system? If so, where are the lines/sprinkler heads?

TO DO/How would you like to use your space? (What are your needs?)
• Where are your high traffic areas?
• How much open space do you need for yard activities? (play areas)
• Which views would you like to enhance?
• Would you like to create areas for wildlife? A butterfly garden, a bird feeding station?
• Would you like more privacy?
• Would you like to add features to improve water quality? (see Practices to Improve Water Quality, pg 15)

TO DO/Drawing the Base Map:
Now that you have answered the basic questions, create a map to build from. First measure the dimensions of any permanent structures (home, shed, fence, etc.) and your lot. Include locations for major doors and windows. This will help as you develop views from inside your home, and determine available plant space. Then measure from a fixed location, the corner of the house, to the street, to the property line, to the driveway etc. Plot these measurements on a large sheet of graph paper. Next draw in the features
that you would like to remain or that cannot be moved (utility fixtures, large trees, sandbox). Use a piece of tracing paper to overlay the base map. Draw your new designs and ideas on the tracing paper. Using multiple sheets of tracing paper will allow you to create different landscape options without damaging or redrawing your base map.

WORK FROM THE GROUND UP: IMPROVING SOIL
The soil is the basis of your entire yard and garden. Consider it the foundation of your landscape similar to the foundation of your house. If you have a weak foundation, your house will have maintenance problems in the future. If you have a strong foundation, your house will endure.

Poor soil may be compacted, lacking in nutrients and organic matter and may have poor water-holding capacity. Healthy soil is loose, contains organic matter and holds water easily, yet allows it to easily drain excess water. We tend to pay more attention to our plants and lawns, forgetting that plant care begins with the soil. Here are some basic steps you can take to start improving your soil:

TO DO/Call before you dig:
Before you dig, call Gopher State One at 800-252-1166 statewide or 651-454-0002. Gopher State One will notify your local utilities and they will mark their electric, gas lines, and cable lines that are buried in your yard. Always be careful of lines installed by previous homeowners (e.g., from the house to an external garage), Gopher State One does not mark these lines.

TO DO/Do a soil test:
Find out the condition of your soil before you do anything. Your local county extension service can provide you with the proper instructions and bags used to collect soil samples. Be sure to collect samples from various parts of your lawn. The University of Minnesota Soil Laboratory (soiltest.cfans.umn.edu, 612-625-3101) will be able to give you valuable information on the current condition of your soil – nutrient levels, soil structure, and pH – and make recommendations for improvement.

TO DO/Aerify your soil:
Maintaining a healthy soil will improve short and long term lawn health. Where soils are hard and compacted, core aerifying can be used to improve plant health, increase rooting volume and improve infiltration. Aerification is done using a machine that can usually be rented from dealers in your area. The machine pulls 2-3" cores of soil from your yard, enabling air to be incorporated into the soil. Aerification will also allow greater access to soil water and nutrients, as well as improving plant stress tolerance.
TO DO/Add organic matter:
Organic matter is an important component of soil health. It increases the soil’s capacity to absorb and release nutrients. It improves moisture-holding capacity of sandy soils and the drainage capability of heavy clay soils. It also improves the structure of soil by providing a good environment for root growth and by encouraging earthworms and microorganisms that are beneficial to plant health. You can easily add organic matter by using compost as a mulch on your garden soil and around shrubs and trees. To do this, mix 1-2 inches of well-decomposed compost into the top 6-8 inches of soil around your plants. You can also improve the health of your lawn by top-dressing. This means lightly spreading compost (about 1/4” maximum) over your lawn and gently raking it into the lawn.

TO DO/Amend soils:
Many lawns, especially those where the soil has been compacted by heavy machinery during housing construction are impervious and provide little infiltration of water. Tilling the soil to at least 4 to 6 inches with a garden tiller and incorporating 1 to 2 inches of well-decomposed compost will increase infiltration. Remember to lightly compact the soils before planting or seeding. A good rule of thumb is to measure how deep an impression your foot makes when stepping on the soil. Your foot impression should not be more than 1/4 inch deep. Choosing plants that develop a deep root structure (>4-6") will further increase the potential for water to infiltrate. (see Plant Selection, pg 7)

PLANT THE RIGHT PLANT
Choosing the right plant material for your yard is an important step in creating a landscape that is sustainable. It’s easy to get caught up in the beauty of a plant you discover at the garden center, only to find it requires conditions that don’t match your yard.

By selecting plants that are suited to the conditions of your location, you will reduce the work required to establish and maintain the plants and they will survive longer and look better in your landscape. Be sure to consider the location’s soil, moisture, available light, and mature size when selecting plants.

The same goes for your lawn. The fine-leaved fescues as well as the older, common types of Kentucky Bluegrasses are better suited to lower inputs than turf-type perennial ryegrasses and many of the newer, improved types of Kentucky Bluegrasses.
LESS IS MORE: ALTERNATIVES TO GRASS
Let’s make it clear up front: there is nothing wrong with having a lawn. Grass is one of the toughest, most successful ground covers available. It is easy to grow, reduces dust, cools the surrounding air, and it prevents wind and soil erosion.

However, sometimes we establish grass in areas that we don’t actively use or in areas that grass doesn’t grow well, or are difficult to mow and maintain. These are the areas where less is more. It is often better to utilize other plant materials for these areas: flower beds, shrubs, no-mow ground covers, or mulch, such as wood chips. This makes the area functional, maintainable, and environmentally-friendly. Part of a sustainable landscape is analyzing how you use your lawn and the areas in which a different type of ground cover would be better.

REDUCE INPUTS, REDUCE IMPACT
Inputs are anything you put into a landscape. This would include: pesticides, fertilizers, water, money and labor. At times, we will need to rely on these inputs to help our plants through weather, disease, insect infestation, or we may have to replace a plant altogether. The goal of sustainable landscaping is to reduce the need for these inputs as much as possible, by working with basics – soil, plant selection, lawn use – and by thinking ahead.

FOR MORE INFORMATION:
– Visit the University of Minnesota Extension Service’s Sustainable Urban Landscape Information Series at www.sustland.umn.edu
– Visit the University of Metro Watershed Partner’s “Tips for Keeping Minnesota Water Clean” at www.cleanwatermn.org
Selecting plants that fit the moisture and light conditions of a location is a critical part to a successful landscape. (see Landscape Design, pg 2) The following lists offer some suggestions for plants that fit various conditions. These lists are by no means all-inclusive. Homeowners should consult books, magazine articles, and web sites. County extension services and master gardeners are also good resources.

The plant materials below are listed by their italicized botanical names (genus, species and cultivar, if applicable) followed by the common name. Whenever possible, use the botanical name when purchasing a plant, as it is the most accurate and will ensure you are buying the right species.

**NATIVE vs. NON-NATIVE SPECIES:**
Native plants are defined as plants originating in a particular location, such as Minnesota or the North Central United States. Non-native species have been brought into an area and naturalized. The Norway maple is a good example of a tree that has been naturalized in Minnesota, yet originated in Europe. Native species may be hardier, less invasive and less prone to disease and insect problems. However, there are many non-native species that have become adapted to climate as well as resistant to pests and diseases, which make good choices.

Native vs non-native species, con't next page
Some native plants develop deeper root structures, allowing for better water infiltration. A deeper root structure also provides stabilization along lake or stream banks which help us to improve the quality of our lakes, streams and wetlands. Native prairie plants often times develop roots that penetrate to a depth 2-3 times that of the plant’s height.

A NATIVE PLANT THAT IS 2 FT TALL, LIKELY HAS A ROOT STRUCTURE AT LEAST 6 FT DEEP. TYPICAL LAWN GRASS HAS A ROOT STRUCTURE THAT REACHES ONLY 4-6 INCHES.

**TREES & SHRUBS**

Choosing a shrub that physically fits into a location is important. Pay attention to its mature size as noted on the plant information tag. You may also want to double check with the nursery staff as sometimes cultural influences such as light, moisture, soil condition and pruning will have an effect on the mature size a shrub can reach.

**Deciduous Trees & Shrubs under 25 feet tall**

- *Acer spicatum* .............................................. Mountain Maple
- *Amelanchier laevis* ............................................ Allegheny Serviceberry
- *Amelanchier canadensis* ................................. Serviceberry (clump form)
- *Amelanchier x grandiflora ‘Autumn Brilliance’* .................. Autumn Brilliance Serviceberry
- *Carpinus caroliniana* ........................................... Blue Beech
- *Chionanthus virginicus* ..................................... White Fringe Tree
- *Crataegus crus-galli inermis* ............................. Thornless Cockspur Hawthorn
- *Cornus sericea* ............................................... Pagoda Dogwood
- *Cornus alternifolia* ............................................ Redosier Dogwood
- *Hydrangea paniculata ‘Grandiflora’* .................... Pee Gee Hydrangea Tree
- *Prunus americana* ............................................. Wild Plum
- *Syringa reticulata amurensis japonica* .................. Japanese Tree Lilac
- *Viburnum lentago* ............................................. Nannyberry
- *Viburnum dentatum* ........................................... Arrowwood Viburnum
- *Viburnum trilobum* ............................................. American High Bush Cranberry

**Evergreen Trees & Shrubs under 25 feet tall**

- *Juniperus scopularum* ....................................... Rocky Mountain Juniper
- *Juniperus virginiana* ........................................... Eastern Red Cedar
  (height can be taller than 25 ft)
- *Thuja occidentalis ‘Techny’* .............................. Techny Arborvitae
SHRUBS THREE TO FOUR FEET TALL

Deciduous shrubs for SUNNY & DRY Areas

Amorpha canescens .......................... Lead Plant
Ceanothus americanus ..................... New Jersey Tea
Diervilla lonicera .......................... Dwarf Bush Honeysuckle
Physocarpus opulifolius ‘Dart’s Gold’ .......................... Dart’s Gold
(height can be > 3-4 ft)
Prunus pumila .............................. Dwarf Sandcherry
Rosa arkansana ............................ Prairie Rose
Symphoricarpos orbiculatus .......................... Coralberry
Vaccinium angustifolium .................. Lowbush Blueberry
Note: Requires acidic soil for best results.

Evergreen shrubs for SUNNY & DRY Areas

Juniperus communis depressa .......................... Oldfield Common Juniper
Juniperus horizontalis .......................... Creeping Juniper

Deciduous shrubs for SUNNY & MOIST Areas

Aronia melanocarpa .......................... Black Chokeberry
(height can be > 3-4 ft)
Ilex verticillata cultivars .......................... Winterberry
(height can be > 3-4 ft)
Note: Requires male and female plants for berries
Salix purpurea ‘Nana’ .......................... Purpleosier Willow
Symphoricarpos albus .......................... Snowberry

Deciduous shrubs for SHADY & DRY Areas

Amelanchier stolonifera .......................... Running Serviceberry
Hydrangea arborescens ‘Annabelle’ .......................... Annabelle Hydrangea
Symphoricarpos orbiculatus .......................... Coralberry
Ribes alpinum .............................. Alpine Currant

Deciduous shrubs for SHADY & MOIST Areas

Clethra alnifolia cultivars .......................... Summersweet
Dirca palustris .............................. Leatherwood
Ledum groenlandicum .......................... Labrador Tea
Symphoricarpos albus .......................... Snowberry

Evergreen shrubs for SHADY & MOIST Areas

Thuja occidentalis ‘Hertz Midget’ .......................... Hertz Midget
Tsuga canadensis ‘Gracilis’ .......................... Gracilis Hemlock
Tsuga canadensis ‘Coles Prostrate’ .......................... Coles Prostrate Hemlock
GROUND COVERS

Ground covers are plants that spread rapidly and grow close to the soil level. They are good choices for areas that need erosion control and/or are difficult sites for other types of plants. Ground covers can also replace turf grass in areas that are difficult to maintain, eliminating the need to mow. It is important to note that some can be very invasive—a characteristic that may or may not be desirable in a ground cover.

Ground Covers for SHADY Areas

Asarum canadensis .......................... Wild Ginger
Aster macrophyllus .......................... Big Leaf Aster
Cornus canadensis .......................... Bunch Berry
Note: Needs acid soil
Galium odoratum .......................... Sweet Woodruff
Hosta species and cultivars ................. Hosta or Plantain Lily
Lamiastrum galeobdolon ...................... Lamiastrum
Mitchella repens .......................... Partridgeberry
Note: Needs acid soil

Ground Covers for SUNNY Areas

Arctostaphylos uva-ursi ...................... Bearberry
Note: A broadleaf evergreen; prefers acid soil
Gaultheria procumbens ...................... Wintergreen
Note: A broadleaf evergreen; prefers acid soil, grows in partial shade
Sedum ........................................ Sedum
Waldsteinia fragarioides ...................... Barren Strawberry
Note: A broadleaf evergreen
ORNAMENTAL & NATIVE GRASSES

There has been a surge of interest in the use of ornamental and native prairie grasses in home landscapes and it’s easy to see why. They are easy to care for, have almost no disease or pest problems, have low nutrient requirements and grow quickly. Grasses can also add winter interest to landscapes with their persistent seed heads, varied colors, and textured leaves and stems.

Grasses for SHADY & DRY Areas

*Bromus ciliatus* ...................... Fringed Brome
*Bromus kalmii* ....................... Kalm’s Brome
*Carex pennsylvanica* .............. Pennsylvania Sedge
*Carex sprengellii* ................. Long Beaked Sedge
*Deschampsia caespitosa* .......... Tufted Hairgrass
*Elymus hystrix* ..................... Bottlebrush Grass
*Hakonechloa macra* ............... Hakonechloagrass
*Luzula multiflora* ................. Woodrush
*Luzula parviflora* ................. Greater Woodrush

Grasses for WATER GARDENS & MOIST Areas

*Acorus calamus* ...................... Sweet Flag
*Calamagrostis acutiflora* ........ Feather Reed Grass
*Carex crinita* ....................... Fringed Sedge
*Carex comosa* ...................... Bottlebrush Sedge
*Carex vulpinoidea* ............... Fox Sedge
*Hierochloe odorata* ................ Sweet Grass
*Juncus effusus* ...................... Soft Rush
*Molinea caerulea* .................. Moorgrass
*Panicum virgatum* .................. Switchgrass
Note: Aggressive

*Scirpus cyperinus* .................. Woolgrass
*Scirpus atrovirens* ............... Dark Green Bulrush
*Spartina pectinata* ............... Cordgrass

Grasses, continued next page
GRASSES for EROSION CONTROL  
(may be invasive)

Calamagrostis canadensis  .Canada Bluejoint Grass
Hierochloe odorata  .Sweet Grass
Panicum virgatum  .Switchgrass
Note: Aggressive
Spartina pectinata  .Cordgrass
Note: Performs best in moist soils in full sun; invasive especially in sandy soils.

Grasses for SUNNY & DRY Areas
(Also excellent choices for erosion control)

Andropogon gerardii  .Big Blue Stem
Bouteloua curtipendula  .Sideoats Grama
Bouteloua gracilis  .Blue Grama
Koeleria brevis  .Blue Hairgrass
Koeleria macrantha  .Junegrass
Schizachyrium scoparium  .Little Blue Stem Grass
Sorghastrum nutans  .Indiangrass
Sporobolus heterolepis  .Prairie Dropseed Grass

Grasses for SHADY & MOIST Areas
(Also excellent choices for erosion control)

Bromus ciliatus  .Fringed Brome
Carex stipata  .Awl Fruited Sedge
Carex comosa  .Bottlebrush Sedge
Elymus hystrix  .Bottlebrush Grass
Glyceria striata  .Fowl Manna Grass
Juncus effusus  .Soft Rush
Deschampsia caespitosa  .Tufted Hairgrass
Luzula parviflora  .Greater Woodrush

Schizachyrium scoparium
Little Blue Stem Grass
NATIVE WILDFLOWERS

Planting tough, vigorous perennial wildflowers can make for an attractive, fairly low-maintenance garden. They add color and attract birds and butterflies.

Wildflowers for SHADY & DRY Areas
Anemone cylindrica . . . . . . . . . .Thimbleweed
Aster macrophyllum . . . . . . . . . .Big Leaf Aster
Astragalus canadense . . . . . . . . . .Canada Milk Vetch
Campanula rotundifolia . . . . . . . . .Harebells
Galium boreale . . . . . . . . . . . . . .Northern Bedstraw
Geranium maculatum . . . . . . . . . .Wild Geranium
Helianthus strumosus . . . . . . . . . .Woodland Sunflower
Heuchera richardsonii . . . . . . . . . .Alum Root
Polemonium reptans . . . . . . . . . .Jacob’s Ladder
Thalictrum dioicum . . . . . . . . . . .Early Meadow Rue

Wildflowers for WATER GARDENS & MOIST Areas
Anemone canadensis . . . . . . . . . .Canada Anemone
Asclepias incarnata . . . . . . . . . .Swamp Milkweed
Aster umbellatus . . . . . . . . . . . . . .Flat-Topped Aster
Caltha palustris . . . . . . . . . . . . . .Marsh Marigold
Chelone glabra . . . . . . . . . . . . . .Turtlehead
Eupatorium maculatum . . . . . . . . . .Joe Pye
Helenium autumnale . . . . . . . . . . .Sneezeweed
Liatris pycnostachya . . . . . . . . . . .Prairie Blazingstar
Mimulus ringens . . . . . . . . . . . . . .Monkeyflower
Pycnanthemum virginianum . . . . . . . . .Virginia Mountain Mint

Wildflowers, continued next page
### Wildflowers for SUNNY & DRY Areas

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agastache foeniculum</td>
<td>Anise Hyssop</td>
</tr>
<tr>
<td>Asclepias tuberosa</td>
<td>Butterflyweed</td>
</tr>
<tr>
<td>Dalea purpurea</td>
<td>Purple Prairie Clover</td>
</tr>
<tr>
<td>Echinacea angustifolia</td>
<td>Narrow-Leaf Coneflower</td>
</tr>
<tr>
<td>Lupinus perennis</td>
<td>Wild Lupine</td>
</tr>
<tr>
<td>Penstemon grandiflorus</td>
<td>Large Flowered Beardtongue</td>
</tr>
<tr>
<td>Ratibida pinnata</td>
<td>Yellow Coneflower</td>
</tr>
<tr>
<td>Rudbeckia hirta</td>
<td>Black Eyed Susan</td>
</tr>
<tr>
<td>Solidago rigida</td>
<td>Stiff Goldenrod</td>
</tr>
<tr>
<td>Tradescantia bracteata</td>
<td>Spiderwort</td>
</tr>
</tbody>
</table>

### Wildflowers for SHADY & MOIST Areas

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adiantum pedatum</td>
<td>Maidenhair Fern</td>
</tr>
<tr>
<td>Aquilegia canadensis</td>
<td>Wild Columbine</td>
</tr>
<tr>
<td>Arisaema triphyllum</td>
<td>Jack-in-the-Pulpit</td>
</tr>
<tr>
<td>Aster umbellatus</td>
<td>Flat-Topped Aster</td>
</tr>
<tr>
<td>Caltha palustris</td>
<td>Marsh Marigold</td>
</tr>
<tr>
<td>Lobelia cardinalis</td>
<td>Cardinal Flower</td>
</tr>
<tr>
<td>Lobelia siphilitica</td>
<td>Great Blue Lobelia</td>
</tr>
<tr>
<td>Matteuccia struthiopteris</td>
<td>Ostrich Fern</td>
</tr>
<tr>
<td>Osmunda spp</td>
<td>Ferns</td>
</tr>
<tr>
<td>Solidago flexicaulis</td>
<td>Zig Zag Goldenrod</td>
</tr>
</tbody>
</table>

**FOR MORE INFORMATION AND TO VIEW PLANT PHOTOS:**
- Visit the University of Minnesota Extension Service’s Sustainable Urban Landscape Information Series at [www.sustland.umn.edu](http://www.sustland.umn.edu)
STORMWATER RUNOFF MANAGEMENT

Much of the rainwater that falls in urban areas, runs off rooftops and driveways to streets; through the storm sewers; and finally, to lakes, streams, or rivers without filtration or treatment. As it travels, water picks up a variety of pollutants, including sediment. The goal of runoff management is to keep excess water and pollutants from reaching the storm drains in your neighborhood streets.

KEEP WATER IN YOUR YARD

Increase the opportunity for water to soak in or infiltrate into your soil. Many of our flooding and erosion problems exist because we move water too quickly off of our landscape. Water that once took days to filter through to the nearest lake, wetland or stream, has been channeled and moved off the landscape quickly through a series of impervious surfaces and pipes.

TO DO/Divert roof top water runoff by:

- Moving or extending the downspouts to flow onto a vegetated area.
- Creating a rainwater garden. (see Rain Gardens, pg 19)
- Creating a water retention area with a shallow, grass-covered turf depression in the lawn.
- Stationing a rain barrel at the end of one or more shortened downspouts. (see Rain Barrels, pg 36)
TO DO/Reduce runoff from your driveway, patio or sidewalk:

If you need to replace an existing hard surfaced area or would like to add an extra parking spot, patio, etc. install a porous surface that will allow water to seep through.

- Use cement or gravel tracks with a strip of vegetation in the middle for your driveway.
- Use reinforced soil products so that you can create a grass or gravel driveway.
- Place a drywell filter box of sand and crushed rock at the end of the driveway’s down slope.
- Create a channel or gentle berm that diverts water running down the driveway into a rainwater garden or turf depression.
- Reduce unneeded impervious areas and replace it with vegetation.
- Slope one side of the patio toward a vegetated area.

TO DO/Reduce runoff from your lawn:

Many lawns allow for little infiltration because the soil has become compacted during house construction. The following practices can increase infiltration.

- Amend and aerate your soils. (see Improving Soil, pg 4)
- Replace shallow rooted turf grass with deep rooted alternatives. (see Plant Selection, pg 7)
- Create a rainwater garden (see Rain Gardens, pg 19)

POLLUTION PREVENTION

TO DO/Reduce pollution from impervious surfaces:

- Clean up oil, gas, radiator fluid, and other leaks and spills on your driveway with absorbent cat litter, and then place in the garbage. Fix persistent leaks.
- Sweep any fertilizer from the driveway into the grass.
- Sweep up any grass clippings, leaves, and dirt (including those on the street).
- Avoid using salt and chemical products for ice control.
- Take your car to a commercial car wash facility, where wastewaters is treated.

TO DO/Reduce use of pesticides and fertilizers:

The U.S. Environmental Protection Agency estimates that homeowners and lawn care services apply nearly 70 million pounds of active pesticide ingredients (herbicides and insecticides) to urban lawns every year. Fertilizers are even more popular.
• Test your soil to determine how much fertilizer, if any, your lawn and garden needs (see Improving Soils, pg 4).
• Topdress with compost as an organic matter amendment to soil and/or lawn surface.
• Use fertilizers containing zero phosphorus if you must fertilize your lawn. Minnesota State Law prohibits the use of phosphorus containing fertilizers on existing lawns unless a soil test indicates a phosphorus deficiency. It’s best to fertilize only in the fall.
• Instead of applying herbicides over the entire yard, spot treat weeds.
• Never use pesticides more than 10 years old. Bring them to a Hennepin County Drop-Off Facility (see Resources, pg 43).
• Never apply pesticides or fertilizer if rain is forecasted within the next day or two.
• Use low maintenance plants and grass varieties to reduce the need for pesticides and fertilizers.

TO DO/Properly dispose of pet waste throughout the year:
During spring snowmelt and during summer storms, pet waste that is left on the ground travels with runoff directly to water resources and contributes to elevated bacteria and nutrient levels. Keep pet waste from polluting:
• Flush pet waste down the toilet, so your septic system or the sewage treatment plant can treat it.
• Seal the waste in a plastic bag and throw it into your garbage.

TO DO/Compost yard waste:
It is a Minnesota state law that property owners cannot throw yard and tree waste (grass clippings, leaves, trees, stumps wood chips, garden debris, weeds) in with their household garbage. It is against some cities’ ordinances to rake or blow leaves and grass clippings into the street, because they clog storm sewers and overload streams, lakes and rivers with nutrients and sediment. Here is what you can do:
• Leave grass clippings on your lawn when you mow. Decomposing grass clippings offer the same benefits as one application of fertilizer each year.
• Compost excess grass clippings and other yard waste. Yard debris will decompose into a soil amendment for your yard and garden (see Home Composting, pg 23).
• Use curbside collection or drop-off facilities for yard waste. Contact your waste hauler or city recycling coordinator.
CONSERVE WATER

TO DO/Water efficiently to conserve water:

• Be sure to water properly:
  • Choose the right size and type of sprinkler. Those that mist lose a lot to evaporation.
  • Water from 4-8 am (Cooler, less windy, reduced sunlight-all reduce evaporation loss.)
  • Do not water when it is windy or extremely hot. Water evaporates before it reaches the roots.
  • Sprinkle only plants – not pavement – to prevent unnecessary runoff.
  • Water thoroughly to a depth of 5-6 inches. (see Watering, pg 33)

• Rake in some compost to improve moisture retention and reduce the need for fertilizer.
• Let your grass grow longer to create a healthier root system. (see LiLaC: Low Input Lawn Care, pg 37)
• Spread mulch around the base of flowers, shrubs, vegetables, and trees. It keeps plants from losing water to evaporation and promotes plant growth. (see Mulching, pg 30)
• Replace some of your thirsty lawn with other attractive landscape plants that require less water. (see Landscape Design, pg 2)

FOR MORE INFORMATION:
– Visit the Metro WaterShed Partner’s tips for keeping Minnesota Water Clean at www.cleanwatermn.org
Traditionally, rainwater has been directed from our rooftops and sidewalks into storm sewers. On its way to the road, this water picks up pollutants such as oil from our cars and lawnmowers, fertilizer, and grass clippings. Storm sewers are often allowed to empty directly into our lakes and rivers, where the extra nutrients can cause algae blooms and other pollutants can harm wildlife. These are the very same lakes and streams we use for drinking water and recreation.

Rain gardens are depressional areas planted with a diverse mix of native wildflowers and grasses. Rainwater, from your roof, driveway, or other impervious surfaces, collects in a shallow pool and slowly filters into the ground instead of into storm sewers. There are many benefits to rain gardens including:

- Stormwater retention reduces runoff of pollutants and nutrients into our lakes and streams. Reduced run-off into sewers can help with flooding problems as well.
- Deep-rooted native plants stabilize soil to prevent erosion during large storm events.
- Diverse plantings with many species are more resistant to drought, flood, insects and disease than a single type or low diversity planting.
- Once established, on-going maintenance is usually very minimal.
• The deep-rooting nature of many native species encourages infiltration of stormwater runoff.
• Native plantings are adapted to local conditions and, in some cases, are more tolerant of flooding, drought and disease than non-native plantings.
• A diverse native mix with wildflowers attracts a variety of wildlife including butterflies and birds.
• In the winter, vegetation collects snow and provides interesting texture as well as habitat.

GETTING STARTED

Site Design: Map your property, including property lines, buildings, utility lines and existing vegetation. Determine areas which will catch water from downspouts, driveways, or other impervious surfaces. The rain garden should be about 7-10% of the size it receives run-off from and at least 10 feet from your home. Choose local, native species based on your site conditions and personal preference.

Site Preparation: If a depressional area is not already present, dig a shallow bowl to a depth of 3-4” with sides gently sloping up towards the lawn. If soil is heavy and does not drain well it may be necessary to dig down further and back-fill with a lighter soil. Remove unwanted vegetation through smothering, through the use of herbicides, or a combination of these. Line the site with 2-3” of shredded mulch, which is useful in retaining moisture for the young seedlings and discouraging weed seeds from germinating.

Planting: Seedlings can be planted from late May to mid September, however, summer planting may need frequent watering. Seedlings should be planted 12-18” apart with flood tolerant species towards the bottom and drought tolerant species towards the edge.

Maintenance: Make sure your plantings receive at least one inch of water a week for the first two months. Your garden will also require light weeding the first few years.
SUITEABLE PLANT LIST

UPLAND – MESIC ZONE  (SOIL IS MOIST, BUT NOT WET)

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achillea millefolium</td>
<td>Yarrow</td>
</tr>
<tr>
<td>Agastache foeniculum</td>
<td>Anise Hyssop</td>
</tr>
<tr>
<td>Allium stellatum</td>
<td>Prairie Onion</td>
</tr>
<tr>
<td>Andropogon gerardii</td>
<td>Big Bluestem</td>
</tr>
<tr>
<td>Anemone cylindrica</td>
<td>Thimbleweed</td>
</tr>
<tr>
<td>Aquilegia canadensis</td>
<td>Columbine</td>
</tr>
<tr>
<td>Amorpha canescens</td>
<td>Lead Plant</td>
</tr>
<tr>
<td>Asclepias tuberosa</td>
<td>Butterfly Milkweed</td>
</tr>
<tr>
<td>Aster species</td>
<td>Aster</td>
</tr>
<tr>
<td>Dalea candida</td>
<td>White Prairie Clover</td>
</tr>
<tr>
<td>Dalea purpurea</td>
<td>Purple Prairie Clover</td>
</tr>
<tr>
<td>Echinacea purpurea</td>
<td>Purple Coneflower</td>
</tr>
<tr>
<td>Geum triflorum</td>
<td>Prairie Smoke</td>
</tr>
<tr>
<td>Heliopsis helianthoides</td>
<td>Common Ox-eye</td>
</tr>
<tr>
<td>Heuchera richardsonii</td>
<td>Alum Root</td>
</tr>
<tr>
<td>Liatris species</td>
<td>Blazing Star</td>
</tr>
<tr>
<td>Lupinus perennis</td>
<td>Wild Lupine</td>
</tr>
<tr>
<td>Monarda fistulosa</td>
<td>Bergamot</td>
</tr>
<tr>
<td>Rudbeckia hirta</td>
<td>Black-eye Susan</td>
</tr>
<tr>
<td>Schizachyrium scoparium</td>
<td>Little Bluestem</td>
</tr>
<tr>
<td>Solidago species</td>
<td>Goldenrod</td>
</tr>
<tr>
<td>Sorgastrum nutans</td>
<td>Indian Grass</td>
</tr>
<tr>
<td>Sporobolus heterolepis</td>
<td>Prairie Dropseed</td>
</tr>
<tr>
<td>Verbena stricta</td>
<td>Hoary Vervain</td>
</tr>
<tr>
<td>Veronicastrum virg.</td>
<td>Culver’s Root</td>
</tr>
<tr>
<td>Zizia aptera</td>
<td>Heartleaf Alexanders</td>
</tr>
</tbody>
</table>

Wet Meadow Zone, continued next page
WET MEADOW ZONE (SOIL IS WET, RARELY STANDING WATER)

Acorus calamus ...........................................Sweetflag
Asclepias incarnata ........................................Swamp Milkweed
Aster novae-angliae ..............................New England Aster
Carex bebbii ..................................................Bebb's Sedge
Carex comosa ..................................................Bottlebrush Sedge
Carex stricta ....................................................Tussock Sedge
Chelone glabra .............................................Turtlehead
Eleocharis species .................................Spike Rush
Eupatorium maculatum .........................Joe-pye Weed
Eupatorium perfoliatum .......................Boneset
Gentiana andrewsii ....................................Bottle Gentian
Helenium autumnale .........................Sneezeweed
Iris versicolor ............................................Blue Flag Iris
Liatris species ............................................Blazing Star
Lilium michiganense .......................Turk's Cap Lily
Lobelia cardinalis ......................................Cardinal Flower
Lobelia siphilitica .....................................Great Blue Lobelia
Pycnanthemum virginianum .............Virginia Mountain Mint
Scirpus atrovirens ...................................Green Bulrush
Scirpus cyperinus ....................................Wool Grass
Spartina pectinata ..................................Prairie Cord Grass
Verbena hastata .........................................Blue Vervain
Vernonia fasciculate ................................Ironweed

FOR MORE INFORMATION:
‘Lakescaping for Wildlife and Water Quality’-DNR Publication
‘Restore Your Shore’ Interactive CD-ROM MN-DNR Publication
University of Wisconsin Extension Service – Rain Garden Publication
http://clean-water.uwex.edu/pubs/home.htm#rain
Wisconsin Department of Natural Resources – Resources on Rain Gardens
www.dnr.wi.gov/runoff/rg/links.htm

ACKNOWLEDGEMENT:
Information, graphics and photographs displayed in this section were generously provided by the Anoka Soil and Water Conservation District.
Composting is a microbial process that converts waste from your kitchen and yard, such as fruit and vegetable peelings, grass clippings and leaves, into a more usable organic soil amendment or mulch. Gardeners have used compost for centuries to increase soil organic matter, to improve soil’s physical properties, and to supply some of essential nutrients for plant growth.

**THE BENEFITS OF USING COMPOST**

**As a soil amendment:** Compost loosens and aerates soil, and improves water and nutrient retention. By adding 1-2" of compost to the top 6-8" of garden, you can improve structure over time, making it easier to work while creating a better environment for plant growth. Compost also improves drainage and aeration in heavy clay soils. Sandy soils benefit from compost as well, it improves moisture-holding capacity.

Adding compost to your soil will attract beneficial organisms such as earthworms and microorganisms, that break down organic matter naturally. Compost can also improve seedling emergence and water infiltration by reducing the potential for soil crusting.

**As a mulch:** Adding 6-8" of compost to garden beds can suppress weeds by blocking light to the soil surface. The mulch will decompose, adding organic matter to the soil. Compost also reduces the potential for erosion by protecting the soil surface from wind and the impact of hard rain.
Using compost as mulch can reduce moisture loss. Top dressing your lawn with compost to conserve moisture and add organic matter. Use compost in window boxes and container gardens where rapid moisture loss is a factor. Compost may also keep soils cooler in the summer and warmer in the winter.

**MATERIALS TO COMPOST**

Many of us understand what we should compost, but we sometimes get confusing information about what we should NOT compost. Composting is a microbial process and microbes – also called microorganisms – will not decompose synthetic products such as plastics or glass. Meat, dairy, grease and oil can attract critters to your compost bin and, in an urban setting where homes are close together, can cause foul odors (and possibly complaints from your neighbors). Feces from pets may carry pathogens that could cause health problems and therefore should not be included in your compost. Weeds with seeds should be composted separately to reduce the potential for the weed seeds in your compost. Large pieces of wood do not compost quickly and require a lot of energy to decompose, so wood should be chipped or shredded and used minimally.

Other organic materials that can be added to enhance the nutritive value of compost are blood and bone meal, cotton seed meal, livestock manure, and aquatic plants.

### What to Compost

- **Yard waste**: grass clippings, plant trimmings, leaves, weeds without seeds, pine needles;
- **Kitchen waste**: fruit and vegetable scraps, coffee grounds, tea bags, egg shells, potato peelings;
- **Small amounts of sawdust, wood chips, and small sticks**;
- **Wood ashes**: use no more than 1 cup per bushel of compost. Ashes act as a lime source and affect the pH of your compost.

### What NOT to Compost

- **Meat and dairy**: meat pieces, dairy products, bones, fish scraps, raw eggs;
- **Fats**: cooking oil, drippings and grease;
- **Synthetics**: motor oil, glass, plastic, Styrofoam, polyester;
- **Feces from dogs, cats and humans**;
- **Weeds with seeds**;
- **Large pieces of wood**.

### What about cuttings treated with herbicides?

Studies have shown that low levels of herbicides are detectable even in well-decomposed yard trimmings, but these levels are less than 1% of the level found in trimmings prior to composting and is not considered a risk for using in the garden. Ideally, grass clippings from lawns treated with herbicides should be left on the lawn to decompose, also allowing the herbicides to degrade.
BUILDING YOUR OWN COMPOST PILE

TO DO/Choose a compost bin design:
You can find dozens of different styles of compost bins on the Internet and in garden supply catalogs, as well as many plans for building your own bin. Your bin can be as simple as a few stakes and chicken wire or as advanced as a tumbler-style bin. Choosing a bin can be a bit overwhelming, so here are some points to remember:

- The bin should be sturdy and have slits or spaces on the sides for air circulation. It should be made of a rot-resistant material such as cedar, plastic, concrete block or wire. The bin can be square or round.
- The lid or cover should fit or lock firmly to keep out critters and not be blown off by strong wind.
- The opening from which you retrieve the finished compost should be large and easily accessible with a spade or garden fork.
- Your bin should be no smaller than 3’ x 3’ x 3’ and no larger than 5’ x 5’ x 5’. Smaller bins do not allow for enough material and larger bins are too big to manage successfully.

TO DO/Find a place for your compost bin:
Location, location, location! Choose a place in your yard where your bin is easily accessible, but not an eyesore for your neighbors. Some people incorporate a bin into the design of their landscape, sometimes planting their garden right around the bin! Select a spot where your bin gets some sun and heats up your pile. Locating your bin in full sun will heat up the compost pile faster, but it will dry out more often, requiring periodic watering. Some shade will prevent this.

Good drainage is important for your compost bin as is accessibility. You should have enough room around the bin to allow you to turn the compost, and a water source nearby in case you need to add moisture.

Each city has its own ordinances about composting. Check with your city recycling coordinator for details concerning your local laws.

THE RECIPE FOR A SUCCESSFUL COMPOST PILE:
There are four basic ingredients for good compost: carbon, nitrogen, oxygen and moisture.

In the composting process, microorganisms use carbon for energy and nitrogen to make proteins. For home composting, this translates to a proportion of three parts carbon (brown materials) and to one part nitrogen (green materials). Given this “diet,” microorganisms can make short work of your compost.

Successful Compost Pile, continued next page
Oxygen and moisture are important for the health and activity of the microorganisms. An active compost pile – one in which microorganisms are actively converting organic materials to compost – has good air circulation and moisture consistency of a wrung-out sponge. If a pile is compacted, or too wet or too dry, the microorganisms will cease their work, making the pile passive.

Air circulation can be accomplished through turning your pile with a garden fork or – in the case of the tumbler bin models – turning the whole bin! Do not allow the pile to become soggy. This causes anaerobic conditions (meaning no air) and usually will produce a foul smell. A pile that is too wet can be due to excess water from rain or from too much green material. This condition can be corrected by adding carbon material and turning the pile to increase the oxygen level.

**TO DO/Layer your materials:**

Start your pile with a six-inch layer of brown materials, such as twigs and/or cornstalks. This will help elevate your pile and allow air to circulate at the base of the pile. Then alternate layers of brown materials with green materials, adding layers of garden soil or finished compost. This layer will provide the microorganisms required to speed up the decomposition. Add a little water to dampen the pile and you are on your way!

**TO DO/Maintain your compost pile:**

As your compost pile begins the decomposition process, the temperature of the pile will begin to rise, especially in the center of the pile. A well-built pile may reach temperatures from 130°–160° F in just a few days. The pile will begin to cool in four to five days and a depression may appear in the middle of the pile. At this point, it is time to turn the pile. Use a garden fork and turn the outside of the pile inward. Steam may rise form the pile – this is a sign that the decomposition process is working. If the pile is dry, add a small amount of water. If is too wet, add some dry material such as dry leaves or cornstalks. Cover the pile and it will start to re-heat.

*Turn your pile on a regular basis* – about once a week. Doing so will speed up the decomposition process and you will have compost sooner.

<table>
<thead>
<tr>
<th>Browns (carbon)</th>
<th>3 TO 1</th>
<th>Greens (nitrogen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>straw, sawdust, twigs, dried grasses, leaves</td>
<td></td>
<td>grass clippings, green leaves, plant trimmings, fruit and vegetable peelings, coffee grounds</td>
</tr>
</tbody>
</table>
**TO DO/Identify when your compost is finished:**

Under warm conditions, a well-tended compost pile will be finished and ready for use in about 2-4 months. Left untended, a bin may take a year to decompose. A finished compost pile is about half its original size, is loose, dark and crumbly, and it smells good – like fresh soil. None of the materials should be identifiable. You can also tell your pile is composted when it is no longer heating up. This is a good indication the composting process is complete and the finished product is ready for use.

**TIPS FOR HOME COMPOSTING**

- Keep your compost pile at the right moisture level.
  - If your compost pile has a bad odor, it lacks air circulation or it may be too wet.
  - Try turning the pile and/or adding dry material to the pile.
- If your compost pile is not heating up, it may need more nitrogen or “green” material. Add grass clippings or a nitrogen fertilizer to the pile.
- Bury kitchen scraps at least 8” deep in the compost pile to discourage critters.
- You can keep adding to your compost pile as it is composting.
  - However, you may want to start a second pile if you have enough materials.
- Add a layer of straw or hay to the top of your compost pile in the winter to keep it warm and keep on composting!
  - The best pile is made up of a variety of materials.
  - The smaller the pieces of compost material, the faster the pile will decompose.

**FOR MORE INFORMATION:**

–The University of Minnesota Extension Service offers extensive composting resources, available in print or online at [www.extension.umn.edu](http://www.extension.umn.edu)

Leave grass clippings on the lawn. A growing season’s worth of clippings is equal to one fertilizer application.

Compost in your backyard. Home composting is an easy way to turn much of the waste from your yard and kitchen into a rich material that you can use to improve your soil. To learn how to get started, visit [www.hennepin.us](http://www.hennepin.us), search: backyard composting.

Use curbside collection or municipal drop-off facilities. Contact your waste hauler or city recycling coordinator for options in your community. Hennepin County maintains a list of yard waste drop-off locations. Call 612-348-3777, or visit [www.hennepin.us](http://www.hennepin.us), search: yardwaste.

**CREATIVE USES**

Fences and trellises made from branches leftover from pruning can enhance your landscape by adding structure and vertical focal points, as well as provide great support for you plants. These kinds of supports are very popular and you can purchase them through gardening and landscape catalogs. However, they are expensive, and here you have all the materials to make your own while “reducing, reusing and recycling” your yard waste!
**TO DO/Create fences and trellises:**

To make them, lay out the pieces of wood on your driveway or sidewalk, arranging them in a pattern you like (see Figures 1 and 2). Sometimes the wood is hard to work with and difficult to nail into easily. An alternative is to tie the branches together using wire from a floral or craft store (#16 or #18 gauge). To make them look more finished, tie raffia or twine over the wire. This will hide the wire (in case it rusts!) and still keep that rustic look. These creations will last several years. The wooden footings will begin to decompose from being in direct contact with the soil, so it’s a good idea to lengthen the life of the fence or trellis by protecting them with a plastic pipe, such as PVC. Drill 3 or 4 small drain holes in an endcap and glue it to a piece of pipe. Sink it into the ground so the top of the pipe is just above the soil line. Then just insert the wooden footing of the fence or trellis into the pipe. The plastic pipe will protect the wooden footing and make it last much longer (see Figure 3).

**FIGURE 2: Rustic Fence**

**FIGURE 1: An attractive trellis can be made from woody yard waste.**

**FIGURE 3: Wooden footings can be protected from rotting in the soil by using capped PVC pipe.**

**TO DO/Use small branches for plant support:**

Small to medium branches (about 1/2”–1 1/2” in diameter) can be used as plant supports. This works well for holding up taller perennials. Take four similar sized branches and secure them into the ground in the shape of a square around a plant (see Figure 3). Fasten smaller branches in a criss-cross pattern across the four supports. These should be 6-8 inches above the soil line. As the plant grows, continue adding small, criss-cross branches at 6-10 inch intervals until the plant reaches mature height. At maturity, the plant should hide the supports.
Mulching

Holds moisture, deters weeds, protects the environment.

Mulch can serve several functions in your garden and landscape. For example, mulches can accent plants and give your landscape a finished look. Also, they have beneficial effects on plant growth and help reduce the time and effort you will have to spend on routine garden maintenance. Mulches also:

- **Provide a more uniform soil temperature** throughout the growing season.
- **Reduce soil erosion, compaction, and moisture loss.**

For example, mulches improve soil water properties by reducing the impact of rain drops on the soil surface and permitting water to soak into the soil; helps prevent run-off into our storm sewers and gutters and, ultimately, our lakes, streams and rivers.

By definition, mulch is an insulating substance or material spread over the ground and around plant material. Usually it is organic material, and its primary purpose is to prevent loss of soil moisture by evaporation. It also will deter weeds and maintain an even soil temperature. *Mulch materials include*: wood chips, shredded bark and wood, leaves, pine needles, straw, grass clippings, compost, and a variety of other organic materials.
• **Improve soil structure** by adding organic matter to the soil as the mulch decomposes; increase earthworm activity which is valuable for soil aeration and decomposition of future organic matter.

• **Reduce or eliminate weeds**, making hand-removal more efficient, thus reducing the need for chemical control.

• **Reduce soil-borne disease** caused by water splashing onto lower plant foliage.

• **Reduce chance of injury to trees** by keeping weed whips, lawn mowers and other garden tools away from tree trunks and roots.

• Provide a way for you to **recycle** your woody yard wastes as a garden resource.

• **Reduce mud and weeds** in areas of heavy foot traffic and utility. Some examples include the area around firewood piles, paths, children's play areas, pet areas, trash can storage and tool sheds. Wood chips can easily be turned into the soil or a lawn area if the use of that area changes.

• **Create an environmentally-friendly and attractive finish** to your landscape.

• **Cover unsightly areas where grass and groundcovers will not grow** such as under fences.

• **Eliminate need for tilling**, lessens root injury, and reduce bruising of fruits and vegetables.

**TYPES OF MULCHES**

There is a large selection of mulches available commercially and locally to homeowners, which range from expensive to free of charge. Commercially, exotic mulches such as cypress, coco beans, cedar, and redwood chips can be purchased at garden centers and home improvement stores, and will certainly give you benefits listed above. **However, in sustainable landscapes, we are striving to reuse local and nearby materials.** Therefore, it is recommended that one take advantage of the municipal wood chip piles located in our area. These mulches are made of ground or chipped trees that have fallen in storms, been removed by the city or homeowners, or are the result of pruning by utility companies. They are easily accessible and usually free of charge to citizens.

**Wood Chips:** Wood chips are made by propelling pieces of logs and larger branches through a chipper, reducing them to chips of varying sizes. For mulch, chips 1 to 4 inches in diameter will give you the best results. They are less likely to be washed or blown away, and the large pieces will slow the decomposition rate, making replacement of mulch less frequent. Commercially, some chips are screened to give buyers a consistent size which creates a more finished and formal look to your landscape.

You can produce your own wood chips if you own a wood chipper. Be sure to follow all safety precautions and wear safety goggles when using a chipper. Sometimes you may have green leaves and smaller branches in your finished product if you have been chipping branches that were actively growing. While this may affect the appearance of your mulch, it will ultimately add more organic matter into your soil.
Shredded wood: Shredded wood mulch is made by running branches and wood pieces through a machine called a tub grinder. The finished product is irregular and usually elongated. It is also usually uneven and rough, causing the wood pieces to bind together well. This helps keep them in place on the soil surface, making shredded wood mulch an excellent choice for slopes and hillsides where wind and water erosion is a factor. Even though the pieces differ in size, the finished look of shredded mulch is more uniform and natural looking than wood chips, making it a popular choice for landscapes.

TO DO/Apply fresh wood chips:
Application of fresh wood chips can cause a temporary reduction of nitrogen in your soil. This is due to the large amount of nitrogen needed by the soil bacteria responsible for decomposition of organic matter to do their jobs. Because they are more efficient users of nitrogen than plants, these microorganisms may cause plants to suffer from a temporary nitrogen deficiency. To counteract this, supply additional nitrogen to your plants at the time you apply the mulch. This will help meet the demands of both the plants and the microorganisms. Ammonium Sulfate and Ammonium Nitrate are examples of nitrogen fertilizers you could use. Work into the soil one or two cups per bushel of chips prior to applying your mulch.

Concerns about wood chips and disease
Wood infected by Dutch Elm Disease and Oak Wilt is chipped by some municipalities and may be in the wood chips or shredded wood mulch you get from these sites. However, according to forestry personnel, you do not need to be concerned about the potential of these diseases being transmitted to your plant materials. The heat from the chipping process, subsequent drying out, and the small particle size of the finished product does not allow for the transmission of these diseases through wood chips or shredded bark. Do not use shredded or chipped wood from Buckthorn.
Watering practices affect all areas of yard care: lawns, gardens, trees, shrubs and soil conditions. Efficient watering practices are important to all homeowners who want to conserve water, maintain a sustainable, healthy landscape as well as reduce maintenance costs.

**PLANT WATER USE**

Understanding how plants use water and their ability to tolerate dry conditions is the first step to placing the right plant in the right place to perform the right function. Water is an essential ingredient of all living cells. Plants absorb and take up water primarily through their roots. Nutrients from the soil are dissolved in the water and this solution is transported throughout the plant, nourishing all areas and supporting plant development. When the plant experiences water stress (usually meaning a lack of water) the first sign is wilting caused by reduced water pressure in its cells. Plants also use water to maintain their own temperature and the temperature of their immediate surroundings. Water vapor eventually diffuses out of the plant leaf through small pores called stomata. These small pores are spaced close together on upper and lower leaf surfaces. This evaporation process helps cool the plant and its surrounding microenvironment.
HOW TO WATER
It is best to keep watering to a minimum without stressing your plants. Thorough, infrequent watering will force your plants to develop deep, strong root systems that will be able to absorb water from soil better than shallow roots that develop from light watering. With the exception of the warm summer months of June, July and August our climate and weather in Minnesota usually supply enough moisture to support our plant life without supplemental watering. Water in the landscape is lost back into the atmosphere through evaporation and is used by the plant for cooling purposes (a process known as transpiration). Together these two phenomena are known as “evapotranspiration.”

Watering time and frequency is affected by plant type, soil type, the weather, and the amount of sun and wind your plant or lawn is receiving. During hot, dry weather, the time between watering should be shorter. Cooler, dryer conditions enable you to water less often. Our cool-season turf grasses do a majority of their growing during cool spring and fall months. During the hottest parts of the summer months some of our older lawn grasses will actually go into a dormant state or slow their growth considerably in order to survive these periods. While they may not look their best at this time, it is actually a natural part of their lifecycle. Other plants, such as prairie grasses and flowers will actually suffer if watered as frequently as other plants, such as many garden perennials. Some plants will require more watering than others due to their size, placement, amount of sun and general physiology. Hand watering these plants and areas may be a more efficient use of your water than just turning on the sprinkler and watering areas that don’t need watering. So understanding the needs and climate of your particular plants, shrubs, turfgrass, etc. is important to knowing how often you need to water.

A very light application of water is called syringing. Essentially, you are wetting the leaves of grasses and plants to reduce heat stress and cool plant and soil surfaces along with the surrounding air. Syringing is useful after seeding a lawn or lawns recovering from certain root diseases.

The amount of water you apply will depend on your type of soil and its moisture level. The best method is to thoroughly dampen the soil to a depth of five or six inches. Applying too much water will saturate the soil. Any additional water applied may be lost via run-off or it may move too deeply into the soil where plant roots cannot utilize it. Also, water needs will vary considerably from one type of plant to the next. For example, tree roots are much wider spreading and grow deeper in the soil than a shrub. Thus, adequately watering a mature tree will require watering a much larger area than a mature shrub.
**TO DO/Measure when you water:**

*Determine the amount of water you are applying* by putting several containers (coffee cans work!) under your sprinkler or drip irrigation hose. After an hour measure the amount of water collected in the container. This will tell you how much water has been applied in an hour. Note: When determining when and how much to water, be sure to consider any rainfall that has fallen recently.

**WHEN TO WATER**

You never want to tell it's time to water by seeing your plants wilting. This means they are under severe water stress.

**TO DO/Check before you water:**

Check your garden by feeling the soil a few inches below the surface. Squeeze a handful into a ball and poke it with your finger. If the soil ball holds its shape but breaks apart easily when poked, the moisture level is just right. If the soil ball holds its shape and doesn’t break apart easily the soil is too damp. If the soil doesn’t even form a ball, it’s definitely time to water. Lastly, if you cannot easily dig down a few inches because the soil is too hard, you have bigger problems than watering! Generally, this condition is the result of severe soil compaction and will need to be modified to improve soil conditions.

*The best time of day to water is early in the morning, from about 4 to 8 a.m.* when cooler temperatures, lower wind velocity, and reduced sunlight will lower water losses due to evaporation. In addition, water demand on municipal systems is usually less at that time. While it will cool plants and reduce heat stress, watering in the middle of the day is not as efficient because some of the water will evaporate before it can be absorbed by the soil or used by the plant. Watering at night may result in plants and grass staying too wet most of the night thereby increasing the chances of disease development.

*Watering too much is as detrimental as watering too little.* Knowing your plants’ requirements is important to good plant health. Plant roots that are growing in soil that is constantly wet become susceptible to many soil-borne pathogens such as fungi and bacteria. Root rots caused by fungi and bacteria will turn plant roots to mush and can weaken or even cause the death of those plants.

*You can reduce the amount of watering required by using mulches* (see Mulching, pg 30). Mulch will hold a significant amount of moisture in the soil, reducing evaporation and the need for water.

**FOR MORE INFORMATION:**

– More information and details about watering can be found on the Sustainable Urban Landscape Information Series website: [www.sustland.umn.edu](http://www.sustland.umn.edu)
RAIN BARRELS
Rain is naturally soft water and is devoid of minerals, chlorine, fluoride and other chemicals found in the water that comes from your home’s faucet.

TO DO/ Install a rain barrel:
A rain barrel system placed under a shortened downspout collects the rooftop rainwater runoff and stores it for watering your lawn and gardens. A rain barrel system varies from the simple use of a 55-gallon drum, to a high tech system with flow controls.

BENEFITS OF RAIN BARRELS
• Help lower water costs (a rain barrel can save approximately 1,300 gallons of water during peak summer months.)
• Store rainwater for garden and lawn use- conserving municipal water.
• Reduce roof top water runoff to storm sewers.
• Soft water is good for plants.
• Easy to build and install and can be inexpensive.

LILaC is a strategy of lawn care that focuses on low maintenance grass varieties and reduced use of pesticides and fertilizers as well as water, time and labor traditionally thought to be necessary for maintaining a healthy lawn.

WHY CHOOSE LILAC?
Because it focuses on less inputs, LILaC helps homeowners to conserve water by watering less frequently. LILaC also reduces the application of fertilizers and weed control products by improving soil and selecting the right plant material for the site conditions. All this helps to contribute positively to water quality and the health of our environment.

If you are considering converting your high maintenance lawn to a LILaC lawn, you should first think about how much use your lawn gets. LILaC lawns are best suited for low to medium use areas. Also, converting a high maintenance lawn to a LILaC lawn will take time, so you’ll need to be patient – it will pay off in the long run.

Practicing LILaC strategies means thinking differently about how a healthy lawn looks. In the world of LILaC lawn care, it’s OK to have a weed here and there – your lawn is still healthy. Controlling weeds and pests means assessing the severity of the problem and then targeting just the areas that need pesticide use or weed control, rather than applying to the entire lawn. LILaC is a more focused effort.
FEATURES OF LILAC | BENEFITS OF LILAC
--- | ---
• Utilizes low-maintenance grasses like fine leaved fescue and common types of Kentucky Bluegrass including varieties such as ‘Park’ and ‘Kenblue’ | • Low maintenance grasses thrive with less care
• Improve the condition of your soil | • Provides nutrients and a good root growing environment
• Mow your grass higher and less often | • Produces less noise, fewer emissions, and reduces time and labor
• Leave grass clippings on your lawn | • Recycles nutrients to your lawn
• Minimize use of fertilizers and pesticides | • Less potential for pollution

FREQUENTLY ASKED QUESTIONS

Can I use some of the LILaC techniques without totally converting my existing lawn to a LILaC lawn?
Yes. Improving your soil is a good place to start. You can also gradually reduce your use of nitrogen fertilizers and water. Start mowing your grass higher, maintaining it at approximately 2-3 inches high, and leaving the grass clippings on the lawn. Remember not to mow more than 1/3 of your grass height at one time. If you have very long grass, set your mower as high as possible or weed whip it first. Then wait about a week and cut it again, gradually bringing it back to the desired height.

How long will it take to convert my lawn to a LILaC lawn?
Successfully converting a lawn takes time – about 2-3 growing seasons. Be patient! It is worth it in the end.

What can I do now to start improving my soil for the future?
Have a soil test done first to determine the overall condition of your soil and any specific needs. You can obtain a soil test kit from your county extension service or the University of Minnesota Soil Laboratory. You should also aerate your soil to reduce compaction. This should be done about every two years. Top-dress your soil with compost by lightly spreading a high-quality compost over your lawn about 1/4” thick. Lastly, leave those grass clippings on your lawn. They won’t contribute to thatch build-up. If clumps of clippings are left behind, just rake and compost them.
How should I treat for weeds in a low input lawn?
First, determine the severity of the problem and why an area is weedy. Are the weeds in one area? What kind of weeds are growing there? Many of our annoying weeds in our home landscapes are warm weather plants, meaning that they grow most in the warmer months of mid-summer. Sometimes altering the growing environment helps by encouraging grass to grow. For example, pruning evergreen branches to increase sunlight in shady areas.

Spot treat for weeds vs. broadcasting or spraying weed control over the entire landscape. This will save money in herbicides, will keep any negative impact on the environment to a minimum, and will still manage your weed population.

FOR MORE INFO:
The University of Minnesota Extension Service offers extensive lawn care resources, available in print or online at www.extension.umn.edu
“Low Input Lawn Care” (Extension Publication FO-07552-GO) available online at www.extension.umn.edu/distribution/horticulture/DG7552.html
We often make mistakes when planting and caring for landscapes. The good news is most of these errors can be easily avoided by practicing some basic principles of sustainable landscaping and doing your homework before problems arise.

**TO DO/Avoid cutting lawns too short:**
Lawns should be mowed at a minimum height of 2.5 – 3” with a sharp blade, and you should never remove more than 1/3 of the blade at a time. Cutting your lawn too short will make the grass more vulnerable to weeds. Higher blade height will encourage deeper root systems, better absorption of moisture and nutrients, and better stress tolerance during heat and dry conditions.

*For more information on lawn care, see “LILaC.”*

**TO DO/Water less frequently:**
Most landscape plants and turf require just one inch of water per week. By watering landscape plants and lawns too often, you are encouraging the grass roots to remain near the surface. By watering less, you are actually forcing the grass roots to search more deeply into the soil for moisture, resulting in deep, healthy root systems that can tolerate the hot summer months.

*For more information, see “Watering & Rain Barrels.”*
TO DO/Minimize fertilizing:
Lawns in Minnesota are made up of cool season grasses, meaning their heaviest growth period is during the cool months – spring and fall. Such grasses need only be fertilized each fall for a healthy lawn, and possibly in the spring for a lawn that needs a boost.
For more information, see “LILaC.”

TO DO/Plant trees, shrubs and perennials at the proper depths:
When planting most containerized plants, the soil level of the new planting location should match the soil level of the container. When planting most bare root plants, the soil level should meet the point where the roots meet the stem.
For more information, see “Plant Selection.”

TO DO/Match plant species with their preferred growing environment:
Sometimes people choose plants based on appearances, only to get them home and find they have chosen a shade-loving plant for a sunny area. Take note of the environmental conditions prior to going to the nursery – how much sun/ shade a location gets, soil type (Sandy? Clay? Dry? Wet?) and then choose plants accordingly.
For more information, see “Plant Selection.”

TO DO/Take note of the recommended spacing and height requirements for trees and shrubs:
You should always note the grower’s information about plants – the width requirement, the mature height, sun or shade, etc. Woody plants should be planted with mature height and width in mind. Planting too close together will result in lack of air circulation, poor form and potential health problems for the plants. Planting too far apart will result in poor design and dissatisfaction with the final result.
For more information, see “Plant Selection.”

TO DO/Avoid using too much wood mulch:
For a typical planting, 2-3" of mulch is plenty. Woody plants contains lignin, a chemical which gives the plant the strength and physical properties we call “wood.” A great deal of energy is required to decompose wood. By using too much mulch, you are allowing the wood to take nitrogen and other nutrients away from the plants. Too much mulch also attracts detrimental insects and animals such as slugs and moles that like to burrow or like to stay protected in the cool mulch.
For more information, see “Mulching.”
**TO DO/Plant species that are hardy for your temperate zone:**

In Minnesota, we are in planting zones 3 & 4. Planting zones are based on the average high and low temperatures for our area. Plants that are not hardy for these temperatures and other climactic conditions (e.g. snow, drought) most likely require special protection from weather. By planting species that are proven to flourish in our area, you will have less maintenance and better results. *For more information, see “Plant Selection.”*

**TO DO/Brush up on pruning techniques before you make the first cut:**

Pruning is an important part of plant care. Pruning our dead or diseased wood or branches that are too close together will improve air circulation and the overall health of the plant. When to prune is as important as what to prune. Pruning certain plants at the wrong time of the year can open them up to a host of disease and insect problems. Always find out about the best time and method of pruning for your particular plant before you make a single cut. *For more information, visit the University of Minnesota Extension Service website: www.extension.umn.edu*

**TO DO/Mak e sure you can accommodate an overly aggressive species BEFORE you plant it:**

Sometimes we introduce a new plant to our landscape only to find out it is invasive and choking out the other plants. Be sure to read about or discuss a new plant selection with a professional. Find out how it spreads – by seed, by rhizome, by root – and make sure you are ready to accommodate it. Don’t select it thinking you can contain it completely. *For more information, see “Plant Selection.”*
Hennepin County Environmental Services
612-348-3777
www.hennepin.us
Hennepin County provides a variety of information on managing your yard in an earth-friendly way. Information is available on topics ranging from composting to the proper disposal of fertilizers and weed killers.

– Eco-Yard Demonstration Site (see Visit the Eco-Yard, pg 1) and educational programs
– Drop-off Sites for household hazardous waste and recycling, www.hennepin.us, search: A to Z or Drop Off Facilities

U of M – Extension Service of Hennepin County
612-596-2110
www.extension.umn.edu
The Extension Service provides education outreach for the University of Minnesota, delivering education programs on a variety of topics, including yard and garden information.

– Hennepin County Master Gardener Hotline, 612-596-2118 www.hcmg.umn.edu
– Yard and Garden Line, 612-624-4771
– INFO-U Hotline, 612-624-2200
– Sustainable Urban Landscape Information Services www.sustland.umn.edu
SULIS provides sustainable landscape information to the public and to the horticulture/landscape industry, from planning to maintenance.
BOOKS & PUBLICATIONS

Ornamental Grasses for Cold Climates.

Landscaping for Wildlife and Water Quality
Henderson, Carol; Dindorf, Carolyn; and Rozumalski, Fred. Minnesota Department of Natural Resources, St. Paul, Minnesota.

Manual of Herbaceous Ornamental Plants.

Native Plants for Northern Gardens
An innovative approach to landscape design and maintenance that minimizes air pollution is called clean air landscaping. Reducing ground-level ozone (smog) is important for maintaining good air quality in the Twin Cities metropolitan area. Lawn mowing, trimming, and leaf blowing are big contributors to ground-level ozone pollution. These common landscape maintenance practices typically result in high emissions of volatile organic compounds (VOCs), which combine with nitrogen oxides, sunlight and heat to cause smog. Emissions are especially high from older, gas-powered yard care equipment – particularly from two-cycle (gas/oil mix) mowers. Old gas cans lacking spill-proof spouts are also a problem. You can help reduce smog and make a difference by implementing the clean air landscaping practices highlighted on this page.

For more information on improving our air quality through modified landscaping practices, visit www.hennepin.us/cleanairlandscaping

The Minnesota Pollution Control Agency notifies people when air quality in the area is compromised. You can sign up for Air Pollution Alerts at www.pca.state.mn.us/air/aqi-subscribe.html.

- Do not use a gas mower, trimmer, or leaf blower on very hot days or on Air Pollution Alert days
- Mow or trim less frequently, in general, and keep equipment well-maintained
- Convert some turf to ‘no-mow’ vegetation, such as native grasses and wildflowers
- Replace your old gas can with a new, no-spill model
- Replace your 2-cycle mower with a 4-cycle gas mower, OR
- Replace your gas mower with an electric or reel-to-reel (push) mower
- Never burn yard waste; compost it in your backyard, use your yard waste pick-up service or drop it off at a compost site
- Talk to neighbors and friends about changing their landscaping and yard care practices

HENNEPIN COUNTY IS A FOUNDING PARTNER IN CLEAN AIR MINNESOTA.
EARTH FRIENDLY HOME LANDSCAPING

NATIVE PLANTS AND GRASS CLIPPINGS LEFT ON THE LAWN REDUCE THE NEED FOR FERTILIZER.

A DIVERSITY OF NATIVE TREES, SHRUBS, AND FLOWERS CREATES BUTTERFLY AND BIRD HABITAT.

RAINWATER GARDENS CAPTURE EXCESS WATER FROM ROOF AND SIDEWALK RUNOFF.

TREES AND SHRUBS CREATE A NATURAL PRIVACY FENCE

PRAIRIE WILDFLOWERS AND GRASSES

BACKYARD SWALE

GRASS CLIPPINGS LEFT ON LAWN

REDUCED LAWN AREA

VEGETABLE GARDEN

COMPOST BIN

POROUS PAVER BLOCK DRIVEWAY AND STONE WALKWAYS

TREES SHADE THE HOUSE AND KEEP IT COOLER DURING HOT SUMMER DAYS

RAINFOREST GARDEN

RAIN BARREL

Hennepin County Environmental Services
612-348-3777

www.hennepin.us/sustainablelandscaping