Landscaping for Water Quality

Designing Your Garden & Sample Designs

Booklet # 2

Landscaping For Water Quality in Michigan
Designing Your Garden & Sample Designs

This is the second booklet in a series on landscaping while keeping water quality issues in mind. The first booklet, *Landscaping for Water Quality: An Overview*, covered the benefits of landscaping for water quality and steps to follow to understand the land areas you wish to landscape.

This booklet is designed to help you plan a simple, yet effective, water quality garden. Utilizing more than one garden in your yard, adding trees, and reducing turf grass area will all help improve water quality.

You will be walked through the steps for design and basic installation of gardens in your landscape to improve water quality and reduce the amount of water leaving your property. By considering function when designing an aesthetic garden you can add beauty to your landscape, minimize topsoil loss and lower the cost of maintenance, all while capturing valuable rainwater.

When you plan your design, remember that your landscaping is more than plantings, it is an overall concept of improving infiltration, absorption and filtration. More specifically, landscaping for water quality is:

- Removing turf grass wherever possible
- Changing impervious surfaces to pervious
- Optimizing on-site infiltration and absorption through plant selection
- Selecting plant species suitable for your soil conditions to keep maintenance at a minimum
- Using a mixture of plant species to provide diversity, increase survival rates, and add aesthetic qualities spring through fall
- Designing dry areas surrounding all wet areas to help reduce soil and nutrient loss

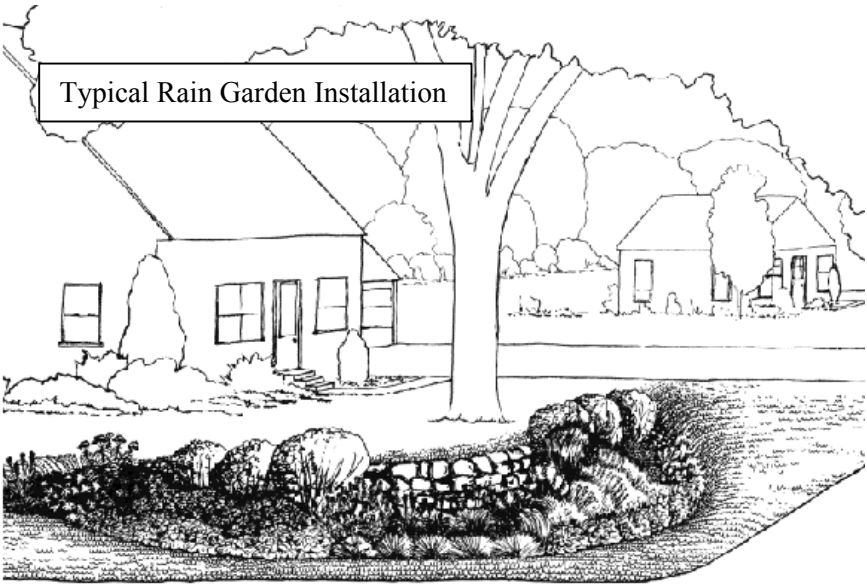
Planning Your Garden

A few simple concepts are central to all water quality gardens. Any planned areas should actively encourage filtration, storage or infiltration of water into the ground. They can include prairie areas, as well as very wet areas, rock gardens, or patios paved with pervious materials. Existing cultivated garden beds can be transformed, at least minimally, into simple water quality gardens by incorporating slight depressions into the plans.

Whether you are starting from scratch with new construction or have an established lot, water quality gardens are wise additions. Because the gardens are created to optimize on-site infiltration, planning the placement of more than one garden on your property will ensure the capture and filtration of as much water as possible.

A water quality garden can be placed on any property. Replacing turf grass with appropriate groundcovers, adding trees to lower the temperature and utilize water on site, and adding specialized "rain gardens" positioned to collect rainwater runoff are all possibilities.

Rain gardens are special water quality gardens that are expressly designed for areas where water habitually pools or where rainwater is deliberately channeled. These water quality gardens may require soil replacement and more complicated preparation than the simple gardens discussed here. If you are interested in more information about rain gardens, please contact Rain Gardens of West Michigan (see resource list inside the back cover).



Source: Adapted from Nassauer et al., 1997.

Incorporating Water Quality Benefits into Existing Landscape

The first step is simply observing your landscape. Look at your existing turf grass, beds, trees, and slopes for opportunities.

What percentage of the area is landscaped in turf grass?
This is one instance where "less" is definitely "more". Turf grass has a very short and matted root system that hinders water infiltration. By replacing turf grass with gardens, groundcovers or ornamental grasses that have deep root systems, infiltration is greatly enhanced.

Does water pool in a specific area and you just don't want to add a garden?
Consider planting a groundcover that will help manage the water. Although groundcovers do not have deep root systems, the tunnels formed by rhizomes along with beneficial foliage encourages infiltration and storage significantly more than turf grass. Native groundcover choices include:

- Aromatic and rapidly spreading wild ginger is ideal for shady and moist spots. It features big, shiny green leaves and unique brownish-purple flowers.
- Pest-free horsetail is suitable for boggy and shady sites. The cylindrical leaf stalks feature black bands and the inch-long cones add interest.
- Ferns look lovely beneath mature trees. The only pruning is to remove injured or old fronds periodically.
- Wild strawberry needs only filtered shade to show off its thick mat of glossy green leaves, white flowers in spring and red fruits in summer.
- Sun-loving marsh marigold features bright yellow flowers that attract butterflies. It prefers moist to wet soils and full sun.
- Yarrows, with their fernlike foliage, do well in poor soils in sunny sites.
- Blue Violet is sun loving and will spread quickly and evenly.

Are there areas that "washout" frequently?
Even a very slight slope can have areas that washout during rain or when sprinkling. Adding plants to help stabilize the slope and absorb water to the area can be a beautiful solution.

Examples of plants for use on a gentle slope are the groundcovers mentioned above or, if you prefer a taller plant to fit in with the bed, try Cord Grass (*Spartina pecinata*) or Bee Balm (*Monarda fistula*).

A steep slope will require more careful planning. You may wish to incorporate a terrace design in conjunction with plants to help stabilize the slope. Plants suitable for steep slopes are: Eastern Ninebark, an ornamental shrub, or Canada Wild Rye, an ornamental grass.

Are there large trees in your landscape?
Creating small circular depressions two to three feet from the trunks of the trees in your landscape will encourage rain and sprinkler water to be used by the trees more effectively. The depressions can be made in the turf grass (by lifting the turf and removing 2 – 3 inches of the subsoil) or by mulching around the base of the tree and forming the depression in the mulch.

Does the terrain slope toward the edges of your property?
Creating a rolling terrain through the use of berms and depressions can help keep rain water runoff on your own property for use in your water quality gardens.

Designing Your Garden

Concepts to Keep in Mind

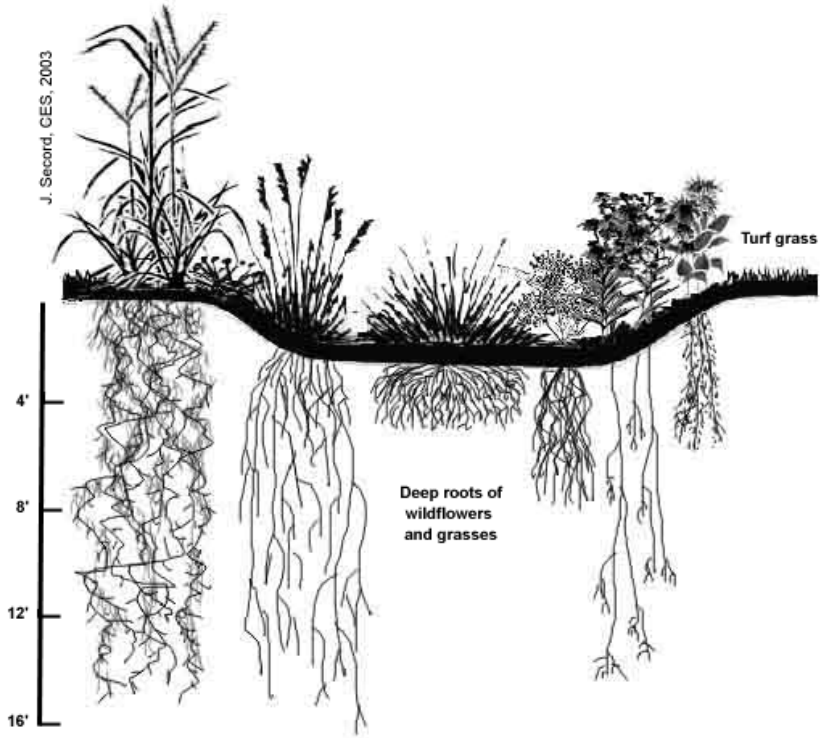
It can be fun to design your own water quality garden. The style of garden is up to you. Remember that the more formal the style, the more maintenance is required. The garden should have a lowland zone (wet zone) and an upland zone (dry zone). The dry zone should surround the wet zone to help buffer, trap nutrients, retard erosion and stabilize the slopes. Selection of water tolerant plants for the wet zone is essential. The dry zone can be planted with plants adapted to moderate and dry areas.

Selecting appropriate plants will maximize the benefit of your water quality garden. As discussed in the first booklet in this series, *Landscaping for Water Quality: An Overview*, it is important to know your existing soil conditions to be able to select the plants that will do well for you. While larger gardens will be able to absorb and process more water, almost any size garden is possible.

Be flexible when choosing your plants. You may design your landscape with a few specific plants in mind, but when you go to the nursery to buy them, you may have to substitute. Take your plant list with you. Work with the nursery to come to a solution that will give you the effect you desire.

The third booklet in this series, *Landscaping for Water Quality: Plant List,* cites the size, moisture needs, sun needs and other details for each plant.

Incorporation of grasses, sedges (grass-like plants that grow in wet conditions) and ferns will aid in your water quality impact. Ornamental grasses such a*s Big Blue Stem, Switch Grass*, or *Bottle Brush Grass* add color and interest in the winter. Grasses knit the garden into a pleasing composition, adding movement and sound to the landscape. In addition, grasses serve as a support structure for some of the wildflowers. By incorporating these plant types you are enhancing your garden's infiltration rate. Both grasses and sedges have deep roots that tunnel through the soil creating paths for water to follow. In the winter the roots die back and create new channels in the next season. The old tunnels become storage areas for excess water.



Other hints:

- Use pervious paving stones when planning patios and pathways.
- Modify your existing landscape by incorporating depressions or adding borders designed to capture water runoff.
- Consider a substantial reduction in the square footage of your turf grass. Using ground cover can add visual appeal as well as improve your impact on water quality.
- Neat edges and fences help instill a look of care to a natural garden.
- Use multiple species to keep the color alive and the maintenance down.
- Avoid single species beds. These are vulnerable to pest infestations and are significantly more work to maintain.
- Use a blend of plant heights. Variation will add interest year round as well as serve to trap water as it enters the garden.

Once established, the garden reduces maintenance issues while aesthetic, economic and water quality benefits are appreciated. Your garden will mature more quickly if you use seedling plants rather than seeds. Although using seeds may be more economical initially, the long term cost will be greater because of increased maintenance needs, the time needed to establish the garden, and delay in realization of the benefits desired.

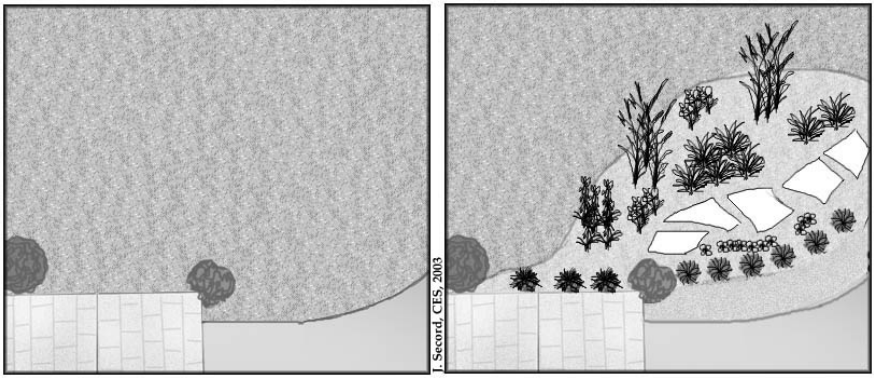
Starting with the Basics

It is important to know the measurements, soil types, moisture, sun exposure and terrain of your property before you begin the actual design. Tips are given in the first booklet in this series, *Landscaping for Water Quality: An Overview*, on how to gather this information.

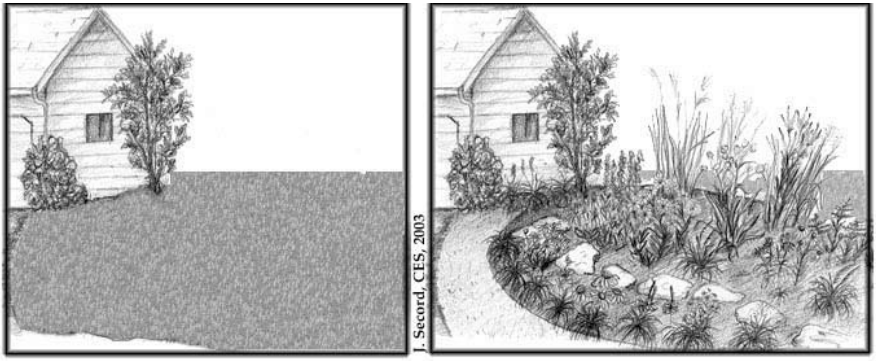
Using the information you gathered, make a rough drawing of the various areas in your yard that you are considering. Show existing beds, your house, trees, areas of sun and shade, areas that currently shed water, and areas where water pools. Now make a new drawing to show the changes you wish to make by installing water quality gardens. There are grids at the back of this booklet to help you with this process.

The following drawings gives examples of the before and after overhead drawings, as well as street view perspectives.

Overhead view…



Street view….



Although this booklet does not cover selection or installation of trees, they are an important component of your landscape and can significantly impact water quality. If you wish to incorporate trees into your design, please consult with your local nursery for instructions on installation.

Before you begin any digging, it is important to make sure there are no underground utilities in the areas affected. "Miss Dig" is a free service that will flag where any underground cables, lines or pipes are found. The toll-free number is: 1-800-482-7171.

Installing Your Garden

Preparation

- Remove any existing sod from the area you've chosen to plant.

- Gently contour your garden, making sure it has a depression of at least 4-5 inches deep in the center area. Variation and undulation can add to the beauty of your garden. To minimize erosion, keep slopes gentle.
- Use the soil you remove from one area to create interesting topography in another. For example, you could create a berm on one side of the garden. Just remember to plan ahead – you want the water to stay in the garden, not flow away from it and off your property.
- No matter what your soil type, you will need to till the subsoil layer. Doing so will help your plants establish and take root. After they are mature, they will do well, even in adverse soil conditions.
- If your soil is rich in clay, you may wish to amend it to help the plants establish. To do so, till weed-free compost into the top 6"- 8" of the bed prior to adding the topsoil.
- Add a layer of topsoil over your prepared garden about 5-6” thick.

Planting

- You can plant a garden at anytime of the growing season, spring through fall, although you will have best success in the spring. Also take note that frequent watering will be necessary if you plant during the heat of summer.
- Although this step is not required, it is good to know what the filtration rate is before you plant. To test this, turn the sprinkler on in the garden area for 60 minutes. Make a visual note of the depth of the water in the garden. Make a check every 15 minutes for an hour. If the water is completely absorbed within 45 minutes, you are good to go. If it takes an hour or longer, you may want to amend your topsoil by adding weed-free compost to the top 4”-5”. Once plants are mature, infiltration will be much quicker. Be sure to let the garden dry out before planting.
- If there will be a delay before you can plant your garden, (more than 7 days) mulch it lightly with fibrous shredded wood chips. You will not have to remove the mulch when you do plant. Just gently brush it aside and replace it around the newly planted seedlings.
- You will need to mulch around all of the new seedlings. This mulch layer should be about 4 inches thick. It helps retain moisture and discourage weeds.
- Not all mulches work in water quality gardens. The preferred mulch is a coarse, fibrous shredded wood chip mulch. After the garden has established, varying the wood type from year to year is a good practice to guard against algae growth on the mulch.

Maintenance
Maintenance for these garden beds is minimal. The plants suggested are hardy in our region and require little work once established. As with any young plants, they need to be nurtured for several weeks after planting. Regular watering and maintaining 3-5 inches of mulch around them is all it takes.

After the first few weeks, a once a week soaking through rainfall or sprinkling should be enough. Do not add fertilizer to these gardens, they don't need it!

In the fall or very early spring, cut the plants back to about 6 inches tall and remove any dead foliage. Add or replace the mulch, which acts as your weed control, and that's it. You are encouraged to split clumps of growth after several years and use them to create new gardens.

If you choose an extensive native landscape, encompassing a majority of your property, you may wish to seek an experts opinion on a maintenance plan.

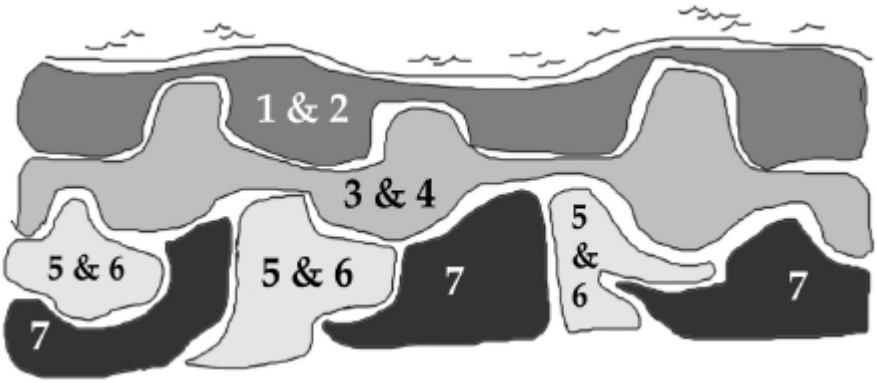
Sample Garden Designs

The following are sample garden designs to give you a jump-start at using the concepts of Landscaping for Water Quality. These are examples only, you will have to keep in mind the attributes of your property when considering what plants to choose for your unique gardens. Vary the shapes of the gardens to fit your individual needs. The drawing you made of your property earlier will help you decide on garden type, size and shape.

To determine how many plants your garden will need – calculate your square footage and then figure on one (1) plant for every square foot. This will give you an estimate from which to work. Because individual plant requirements differ, ask your nursery for spacing and planting specifics.

In the first two examples, riparian layouts, the lowland (wet zone) plants are placed closest to the water's edge, while the drier plants are planted farther away from the water's edge. (Riparian refers to the land found at the edges of a river or lake.) It is essential that contaminated water runoff is prevented from entering the water bodies. A riparian garden is a beautiful option to meet that need.

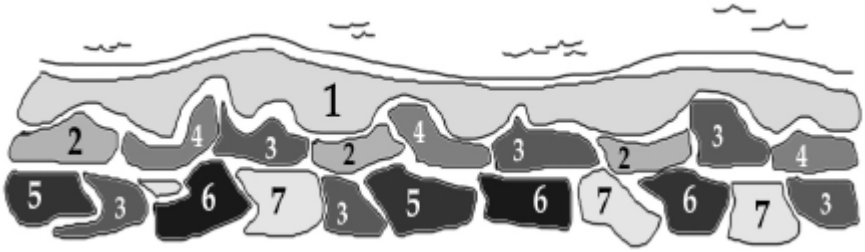
A Riparian Garden Layout



1. Switchgrass (*Panicum vigatum*)
2. Cardinal Flower (*Lobelia cardinalis*)
   & Great Blue Lobelia (*Lobelia siphilitica*)
3. Culver's Root (*Veronicastrum virginicum*)
4. Dense Blazing Star (*Liatris spicata*)
5. Little Blue Stem (*Schizachyrium scoparium*)
6. Tall Bellflower (*Campanula americana*)
   & Black Eyed Susan (*Rudbeckia hirta*)
7. Harebell (*Campanula rotundifolia*)

This layout functions as a water body buffer zone and utilizes taller species, up to six feet in height. The tall foliage is useful as a privacy screen as well as providing excellent butterfly, bird and other wildlife habitat. The various plant varieties will migrate into each other over time.

A Second Riparian Layout



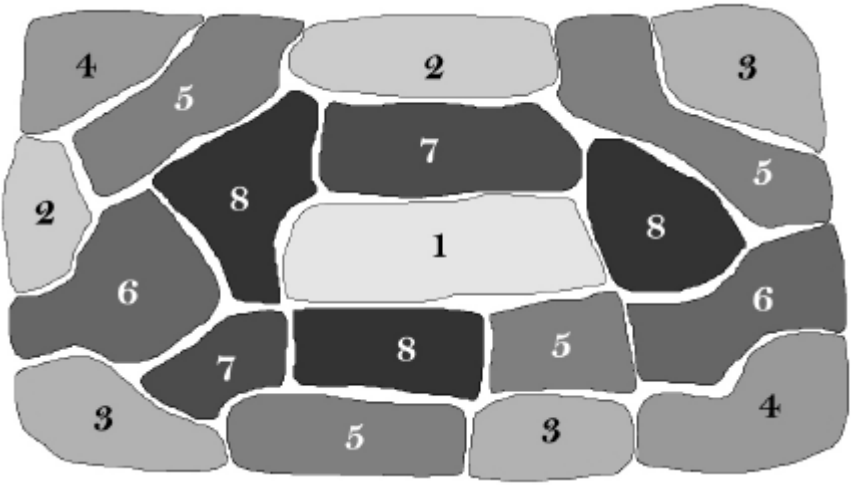
1. Tussock Sedge (*Carex stricata*)
2. Marsh Milkweed (*Asclepias incarnata*)
3. Bottle Gentian (*Gentiana andrewsii*)
4. Dense Blazing Star (*Liatris spicata*)
5. Blue-eyed Grass (*Sisyrinchium angustifolium*)
6. Early Meadow Rue (*Thalicatrum dioicum*)
7. Harebell (*Campanula rotundifolia*)

This is another buffer zone example that utilizes shorter species of plants. The roots encourage filtration and the dense foliage acts as an effective barrier to storm water runoff.

It is suggested that you make your natural vegetation buffer at least four to six feet wide. As a rule of thumb, the steeper the slope the wider your buffer zone should be. For a very steep slope, you may wish to consult with a landscape expert.

In the remaining garden design examples, the lowland (wet zone) plants are placed in the center of the garden design. The ground gradually slopes from the upland (dry zone) areas on the outer edges down to the center. Storm water runoff is encouraged to enter and stay in the garden where it will be filtered and absorbed into the ground.

Prairie Garden Layout

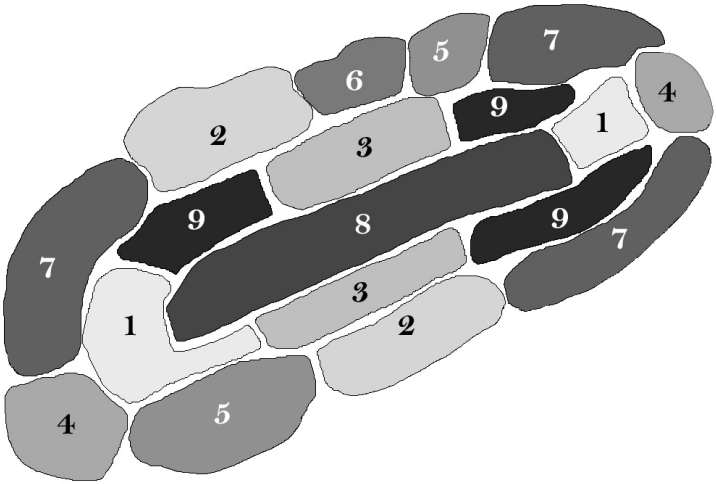


1. Switch Grass (*Panicum virgatum*)
2. Yarrow (*Achillea millefolium*)
3. Black-Eyed Susan (*Rudbeckia hirta*)
4. Little Bluestem (*Schizachyrium scoparium*)
5. Blazing Star (*Liatris spicata*)
6. Purple Coneflower (*Echinacea purpurea*)
7. Missouri Ironweed (*Vernonia missurica*)
8. Blue Flag Iris (*Iris versicolor*)

Prairie gardens offer extensive water quality benefits to any landscape. Deep roots encourage water infiltration, water storage and soil stabilization, while interesting foliage provides windbreaks. This style of garden is very natural looking and is a low maintenance garden choice.

As the name “prairie” implies, this garden does best in full or partial sun. These plants also tolerate drought conditions well, reducing or eliminating the need for sprinkling, even during a dry spell.

Sunny Garden Layout



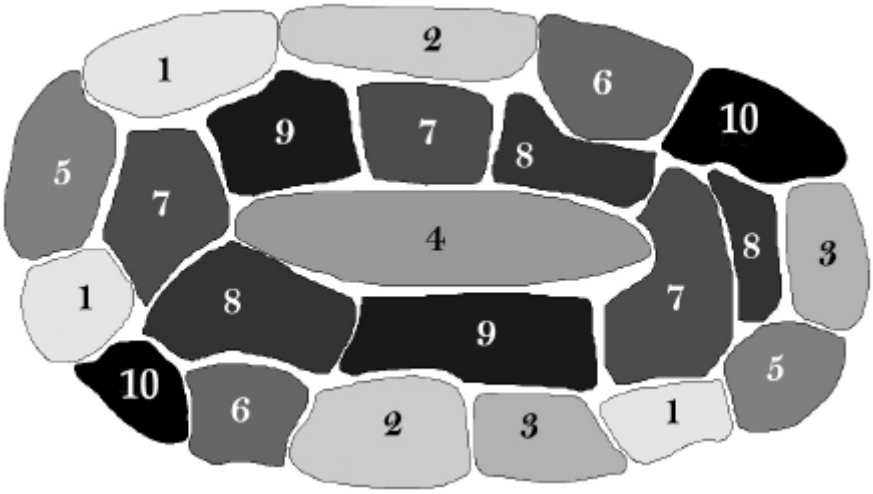
1. Bee Balm (*Monarda fistula*)
2. Blue-Eyed Grass (Sisyrinchium angustifolium)
3. Oxeye Sunflower (*Heliopsis helianthoides*)
4. Hoary Vervain (*Verbena stricta*)
5. Spiderwort (*Tradescantia ohiensis*)
6. Black-Eyed Susan (*Rudbeckia hirta*)
7. Blackberry Lily (*Belamcanda chinensis*) *
8. Queen of the Prairie (*Filipendula rubra*)
9. New England Aster (*Aster novae-Angliae*)

(* denotes not native in Michigan)

This garden is for sunny areas – places receiving more than six hours of direct sunlight per day. The plants used encourage water infiltration while providing vibrant colors.

There are numerous species of sun loving plants that can have a positive impact on water quality. If the nursery near you does not carry a specific plant in your plan, substitute a similar one.

Butteryfly Garden Layout

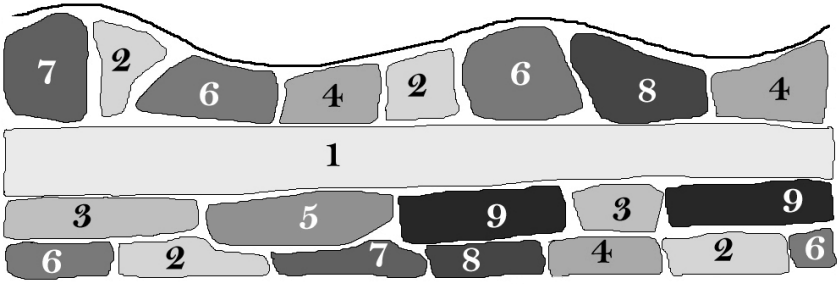


1. May Night Salvia (*Salvia X superba*)*
2. Butterfly Milkweed (*Asclepias tuberosa*)
3. Smooth Aster (*Aster laevis*)
4. Fireweed (*Epilobium angustifolium*)
5. Black-eyed Susan (*Rudbeckia hirta*)
6. Blazing Star (*Liatris spicata*)
7. Joe Pye Weed (*Eupatorium maculatum*)
8. Blue Vervain (*Verbena hastata*)
9. Missouri Ironweed (*Vernonia missurica*)
10. Autumn Joy Sedum (*Sedum 'Autumn Joy'*)*

(* denotes not native in Michigan)

Designed for a fairly steep slope, the plants in this garden not only provide water quality benefits, but are also attractive to butterflies and birds. The plants were selected to provide a long colorful blooming season with fragrant blossoms. Wildflowers are a great choice when your goal is to ensure water quality and storm water management.

Sunny Border Garden Layout



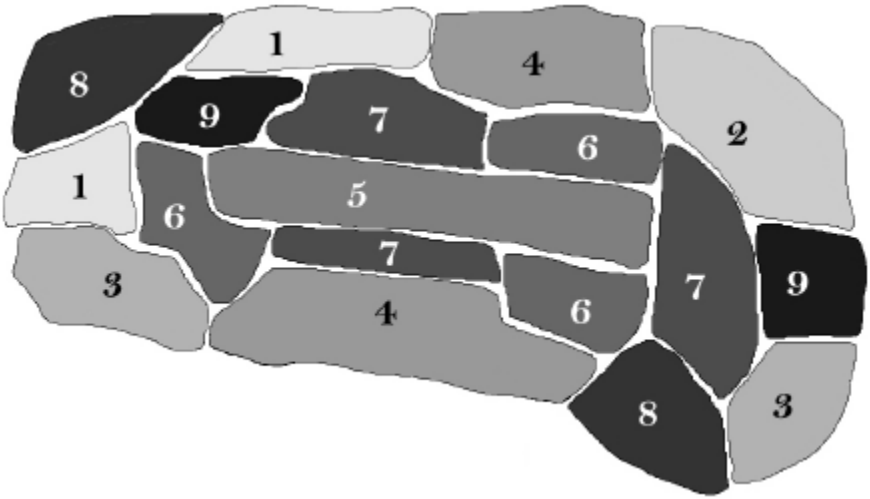
1. Blue Flag Iris (*Iris versicolor*)
   & Golden Alexander (*Zizia aurea*)
2. Blue-Eyed Grass (*Sisyrinchium angustifolium*)
3. White Coneflower (*Echinacea purpurea alba*)
4. Purple Leaf Sedum (*Sedum X 'Vera Jameson'*) *
5. Tall Bellflower (*Campanula americana*)
6. Moonbeam Coreopsis (*Coreopsis verticalliata 'Moonbeam'*)
7. Hairy Beard Tongue (*Penstemon hirsutus*)
8. Lambs Ears (*Stachys lanata*)
9. Missouri Ironweed (*Vernonia missurica*)

(* denotes not native in Michigan)

This garden is designed as a running border at the edge of your property or wherever you wish to have a border of color. The flowers and seeds are attractive to birds and butterflies while providing an interesting mix of foliage and textures.

The lowland (wet zone) is planted with Blue Flag Iris, which does very well in shallow water, interspersed with Golden Alexander for variety. You may wish to add a second or third species in the lowland area to add diversity, such as Bottle Gentian or Monkey Flower.

The Shady Garden Layout



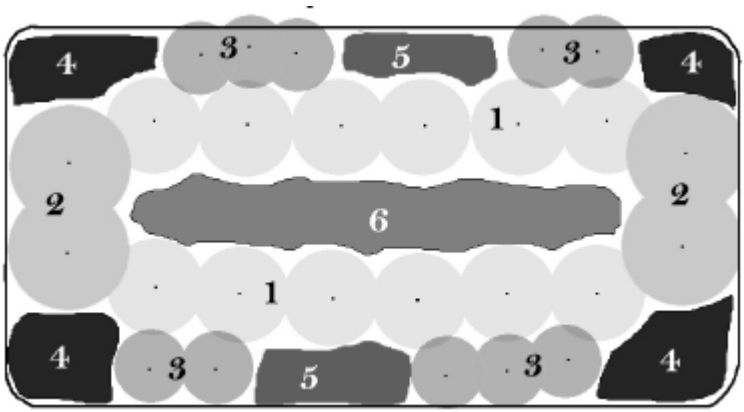
1. Jack-in-the-Pulpit (*Arisaema triphyllum*)
2. August Lily Hosta (*Hosta plantaginea*) *
3. Golden-Edged Hosta (*Hosta fortunei*) *
4. Pink Astilbe (*Astilbe Arendsii 'Rheinland'*)
5. Great Blue Lobelia (*Lobelia siphilitica*)
   mixed with Riverbank Wild Rye (*Elymus riparius*)
6. Culver's Root (*Veronicastrum virginicum*)
7. Ostrich Fern (*Mateuccia pennsylvanica*)
8. Lady's Mantle (*Achelmilla mollis*)
9. Black-Eyed Susan (*Rudbeckia hirta*)

(* denotes not native in Michigan)

This garden is for shady or partly shaded areas – places receiving less than six hours of direct sunlight per day. The blooming season is long, giving three-season color. Shade plants help hold moisture in the soil, which is beneficial to the trees providing the shade.

To replace turf grass that is often difficult to grow in the shade, you may want to try areas of groundcover such as Round-lobed Hepatica or Lady's Mantle. Although groundcovers offer less than optimum water quality benefits, they can make a large impact over time.

Inviting Shrub Garden



1. Large Cranberrybush (Viburnum macrocarpon)
2. Annabelle Hydrangea (Hydrangea arborescens 'Annabelle') *
3. Maple Leaf Viburnum (Viburnum acerifolium)
4. Happy Returns Daylily (Hemerocallis 'Happy Returns') *
5. Horsemint (Monarda punctata)
6. Tall Bellflower (Campanula americana)

(* denotes not native in Michigan)

Plants for this garden are mostly shrubs and were selected to provide water uptake and storage. The fabulous blue & white colors may attract hummingbirds.

Planning your landscape can bring out both the engineer and artist in you. Imagine having a landscape that is awash with color year-round, requires little maintenance and helps insure water quality for years and years to come! Share the ideas with your neighbors and friends. We all could make a tremendous impact.

The third booklet in the series, *Landscaping for Water Quality*: *Plant List,* contains specific plant attributes to help you choose what plant is right for your garden. Also included in that booklet is a reference to find the right nursery in your area to obtain the native plants you may want.

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United States Environmental Protection Agency.
http://www.epa.gov/

Watershed Enhancement Team.
http://www.open.org/~h2oshed/

The Rouge River Watershed -The Rouge River Project

The Michigan Environmental Protection Agency

Rain Gardens of West Michigan
http://www.raingardens.org

Resources

A list of nurseries can be found at the back of the third booklet in this series, *Landscaping for Water Quality: Plant List*.

NOTES

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