Landscaping for Water Quality

Concepts and Garden Designs
for
Homeowners

Landscaping for Water Quality

A guide and resource booklet for understanding the concepts and applying garden designs for improving Michigan's water quality through landscaping practices.

Second Edition

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Section 1:

An Overview

Landscaping For Water Quality in Michigan – An Overview

The purpose of this booklet is to provide readers with the information needed to incorporate methods that enhance water quality when landscaping their property.

Residents of Michigan enjoy a unique environment. Carved out by retreating glaciers many thousands of years ago, the Great Lakes, along with the thousands of smaller lakes, rivers and streams, were formed. Water is an important resource for our health, economy, and ecosystem. Landscaping practices can impact the quality of our water systems. We need to keep water quality in mind when planning or maintaining our landscape.

Traditionally, a lush green carpet of turf grass from one edge of your property to the other is the ultimate goal. But have you considered it carefully? We precisely sow a tight field of grass that is difficult to coax into growing, ply it with fertilizer, spray it with pesticides, water it till it finally takes hold and grows. Then, just as the plants are healthy and happy, we cut off the top third and it has to struggle all over again! This process is expensive to maintain in both dollars and time, and it is very costly to the environment. Installing landscaping that doesn't require fertilizing, watering or mowing – now that's an idea worth exploring!

Landscaping for water quality is a method that invites nature back into our lives and yards. In addition to being attractive, grasses, sedges (grass-like plants that grow in wet conditions) and wildflowers require less fertilizer and water to thrive. You are in control of the impact from your property. From a simple buffer zone (an area that helps absorb rainwater and filter pollutants) to a radical yard change, the possibilities are endless.

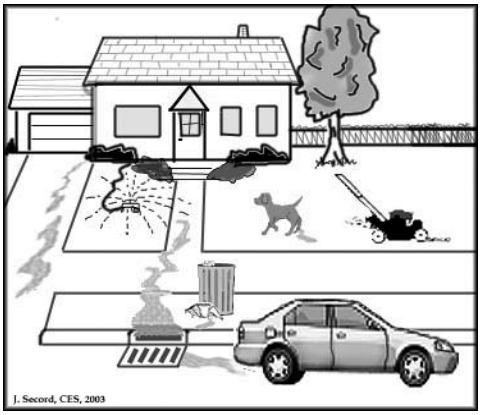
A common misconception about emulating nature in our gardens is that they are unkempt and weedy. In reality, incorporating water quality into your plans for landscaping is not at all limiting. You can produce a finely sculptured, manicured look or that countryside cottage appeal. It is all up to you. Following the basic concepts here, you will get to know your property, so that you can end up with a design specifically for you.

This first section will give an overview of the "why" and "what" of Landscaping for Water Quality. The second section, *Designing Your Garden*, concentrates on the "how", while the third, *Plant List*, gets specific about what plants to use and "where" to find them.

Why Landscape For Water Quality?

To Protect Water Quality

In nature, rainwater infiltrates into the soil almost completely. Many contaminates are filtered out before the water enters the surface or ground waters. Where development adds homes, driveways, roads, turf grass and compacted soils (impervious surfaces), infiltration is nearly eliminated. As seen in the graphic below, the water running off of these impervious surfaces washes soil, fertilizer, grass clippings and other contaminates into the drains. If we use landscaping for water quality practices, any water that does leave our property will be cleaner and reduced in volume.



To Capture Rainwater

The water that falls in the form of rain or snow and water you use to sprinkle, wash cars etc. is a valuable resource. Consider that in a 1" rainstorm, 13,000 gallons of water falls on a typical 1/2 acre residential lot. That's enough to fill three average above ground swimming pools! Normally about 2/3rd of this amount runs off your property – meaning you lose about 8,500 gallons down the storm drain (*Schueler, 1994*). By designing your gardens to 'capture' this water, you retain a treasure for your own use.

To Increase Infiltration Rates

Decreasing the amount of impervious surface is an important component of any landscaping plan. Carefully decide where you need to use walkways or patios and then choose pervious or permeable products. This beautiful alternative will enhance the look of your landscape while reducing the amount of water running off your property.

To Reduce Flooding.
Even if you live on a curb and gutter system, rainwater eventually drains to a lake or stream. This can contribute to water quality and quantity problems. By capturing large amounts of water on your property, storm drain limits are not exceeded and the extent of flooding within the streams and rivers is reduced. When flooding does occur upstream, plants on the stream banks intercept the floodwaters, slowing it down and reducing the extent of flooding downstream.

To Ease Soil Erosion.
The loss of topsoil from stream banks, construction sites and sloped yards is significant. The problem is twofold. One, your physical property is literally washing down the drain. Two, the impact upon both surface and sub-surface waters by the resulting siltation in the waterways chokes aquatic habitat and pollutes drinking water.

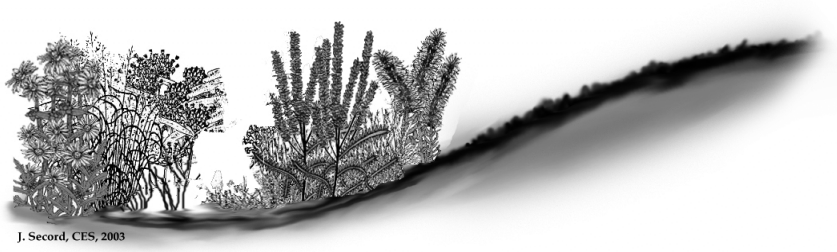
While better than bare ground, the roots of turf grass are too shallow to effectively restrict soil loss from flowing water. Maintaining buffer zones of water quality garden vegetation can abate the force of water that sweeps the topsoil off of your property. The roots of the plants hold the soil in place, absorb some of the excess water and encourage infiltration. The deeper the roots, the more effectively slopes are stabilized.

Prairie plants and flowers have roots that grow from one to several feet deep. These deep roots not only draw up and store water, but form channels in the earth and they die back each winter and reform in the spring. This naturally aerates the soil, maintaining the health of the plants. Stabilizing the soil on slopes and resisting compaction in flat areas helps prevent soil erosion.

To Increase Infiltration and Reduce Pollution through Buffer Strips
A carpet of turf grass typically has a root structure that resembles a three-inch thick dense mat (picture a welcome mat 3" thick). This mat of material restricts water flow into the ground and can actually become nearly as impervious as your paved surfaces (this is why aerating your lawn is periodically necessary). During and after a rainstorm, water rushes off paved and turf grass surfaces.

Buffer strips or zones are effective tools to capture the water running off your property.

The plants in the buffer zone act to slow down the water and increase infiltration. This, in turn, allows filtration of any contaminants, including chemicals, nutrients, soil, pet waste, oil, and salt.



The end result is less water entering the storm drain system and eventually ending up in the nearest waterway. Remember, no matter where your home is located, the water (and the contamination) leaving your property ends up in the nearest body of water. **You could say that every house is on waterfront property!**

To Gain Advantages of Reducing Turf Grass.
With few exceptions, using plants other than turf grass in your landscape: contributes to cleaner air, reduces the amount of yard waste, reduces fertilizer use and subsequent contamination of waterways, reduces mechanical watering needs, and increases habitat for pest predators.

In addition, the turf that you do keep will be easier to maintain due to an increase in moisture retained on your property.

To Provide Wildlife Habitat.
The USDA defines habitat as an environment providing the food and shelter required for an animal to make its home. Therefore, providing "natural" shelter and food would indeed improve habitat. The diversity of the plants used encourages a variety of wildlife to call the gardens home.

Because wildlife provides natural pest management, the use of pesticides is greatly reduced or eliminated. (It should be noted that pesticides pose a threat to the beneficial wildlife.)

To Enhance Property Values.
Landscaping enhancement is a proven method of increasing the value of your property. Using landscaping specifically designed for water quality results in this same value increase. Incorporating ornamental pervious paving stones for your drive or patio adds to the value even more.

Water quality gardens also save homeowners money because of the lower costs of maintaining native gardens, buffer zones, shrubs and trees. An average savings of $500/year (*U.S. EPA*) can be realized through reduced water, fertilizer, herbicide and pesticide usage, along with freedom from weekly mowing. Therefore, having a water quality landscape plan can result in yearly maintenance savings along with higher property values.

A Recap of the Reasons for Landscaping for Water Quality:

- Protects water quality.
- Captures rainwater for personal use.
- Increases infiltration.
- Reduces flooding.
- Reduces soil erosion.
- Filters contaminants from rain water.
- Benefits gained from reduction of turf grass
- Provides beneficial wildlife habitat and biodiversity.
- Increases property values.

Before you Start your Design:

The first step is to evaluate your property based on the categories below. Understanding the different components will simplify the process when choosing your plants. Make a sketch of your property to guide your decisions and to show your landscape designer (if you choose to use one).

Suitable Areas to Consider
Do you have an eroding bank? A washout area? A low area in which water pools after a storm? A gently sloping yard that dumps all of the rain

water right into the storm drain? An area that is too dry? Is your property on a lake, stream or wetland where the lawn is mowed to the edge? Are beneficial shade trees present? Do you want to redirect rainwater to a specific spot? Do you want to change the topography? (add a berm?)

Keep your chosen area in mind and set a goal that you want to achieve. By utilizing ideas in this booklet you will be able to achieve your goal and improve water quality.

Existing Plants

Is the area turf grass?
Are there existing perennials or trees that you wish to utilize?
Do you have an existing garden where you can incorporate the concepts?
Are there existing plants or trees that you wish to remove?

Sun Exposure

You need to take note of where the landscape is exposed to sun and for how much of the day. Buildings and existing trees may provide shade for part of the day. Keep in mind that the standard for plants requiring full sun is a minimum of 6 hours per day.

Soil Conditions

Plants have preferences to certain soils based on the soil's attributes. These attributes include soil moisture, soil pH, soil type, and soil nutrient availability. Some plants prefer steady moisture, while others are drought tolerant. Knowing if your area is moist or dry is important before choosing your plants.

Soils can be alkaline, neutral or acidic. Knowing your soil's pH will help you choose the appropriate plants. You can pick up a pH testing kit at your local home improvement store or nursery.

Soils are made up of three components – sand, silt, and clay. Combinations of these components are referred to as a loam. You may hear them referred to as a clay-loam; this is a combination of the three components, with clay dominating the mix. A sandy-loam would have sand as the dominant component. Many plants have adapted to these different soil types. When planting in a sandy, or clay loam, seek out plants that prefer these areas.

Regular use of fertilizers is common for those of us who want a beautiful lawn and garden. This practice is usually not necessary and can be harmful from a water quality point of view. **Even if you opt to change nothing in your landscape, it is important to test your soil before adding fertilizers**. The nutrients that fertilizers offer are nitrogen, phosphorous, and potassium, listed as the N: P: K ratio on your fertilizer bag. Most of Michigan has plenty of phosphorous occurring naturally in the soil. By eliminating phosphorous in your fertilizer application, you will make a major positive impact on the local stream quality. Your local MSU Extension office will test the soil for a nominal fee (less than $15) and provide interpretation of the results. (Ask for Bulletin #E-498 for directions about collecting the soil sample.) The scope of this section is not broad enough to give details here, but you can discuss your specific soil concerns with your local county MSU Extension office.

What if the plants I choose don't fit with my soil conditions? You can either replace your choices with appropriate plants or you can amend your soil. Amending your soil will create more work during installation, however, the long-term gains may make this the best choice for your project. Contact MSU Extension office for advice if you choose to amend your soil.

The second section will take you through a more detailed explanation of preparing your garden site.

Change a Little or a Lot?

Are you happy with the basic look of your landscape? Then you probably want to just plan a few changes, such as adding berm water bars to hold the water near your existing gardens. How about going for the max? This is easy with new construction, but an existing property may need several smaller projects over time. Work with your existing shrubs and trees to reach your goal.

Plant Hardiness Zone

When planning your garden you need to take planting zones and frost dates into consideration. "Plant Hardiness Zones" divide the United States into 11 planting zones based on a 10 degree Fahrenheit difference in the average annual minimum temperatures. There are also different climates and frost dates within planting zones in a region due to the topography, lakes and

rivers, gulleys or hills. These can cause altered airflow, which can raise or lower the temperature, changing the zone in your area. The chemical balance and texture of the soil, exposure, altitude, rainfall, humidity, sun light levels, wind, and wind chill factors can also alter the effects of plant hardiness zones. (USDA)

The plants included in the third section are hardy for most of the State of Michigan (zones 4, 5 & 6). If you are uncertain about the suitability of a plant for your locale, check with a local nursery.

What's Next?

Now that you have a basic understanding of the merit of planting with water quality in mind, planning and designing your new landscape is the next step. It will involve taking the information you just gathered and having fun. The next section will give you some concrete ways to design your own water quality garden.

Section 2:

Designing Your Garden & Sample Designs

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

This section is designed to help you plan a simple, yet effective, water quality garden or incorporating the concepts into an already existing garden area. 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

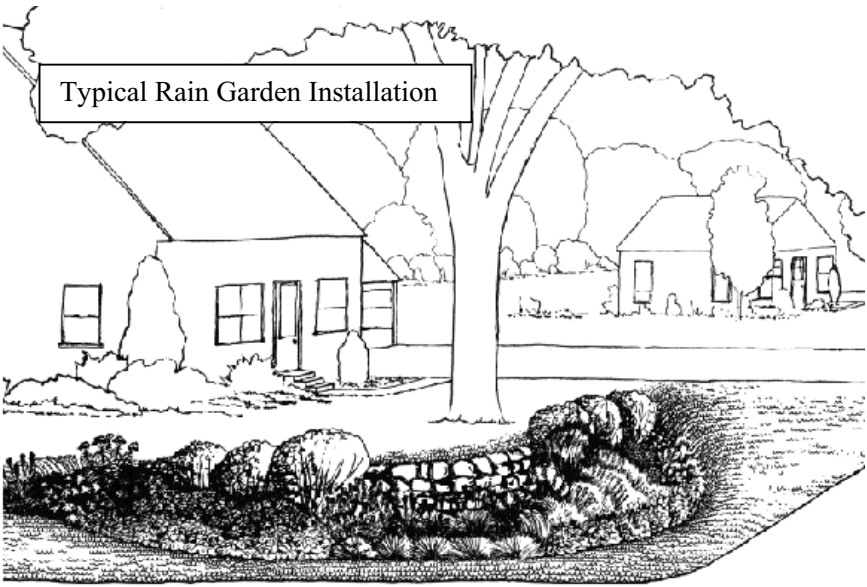
Planning Your Garden

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 on 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 the following:

- 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. This non-native plant's cylindrical leaf stalks feature black bands and inch-long cones which 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.
- Common Blue Violet is sun loving and will spread quickly and evenly.

If you want to retain your turf grass, consider altering the topography, adding earth-berm water bars. These mild undulations in the turf are specifically placed at planned angles, channeling the water run-off to desired areas.

Are there areas that "washout" frequently?
Even a very slight slope can have areas that washout during rain or when sprinkling. Adding plants and strategically placed rocks to help stabilize the slope 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*) which spread quickly. Both of these species would need shorter support plants around them. 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. Adding shredded bark around the Ninebark and Wild Rye would aid in both soil and water retention.

Are there large trees in your landscape?
You may have trees that are flush with your turf grass or areas where they were planned to be raised on berms. In either case, creating small depressions (3-4 inch wide and deep) two to three feet from the trunks of the trees in your landscape (resembling a moat around the tree) 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. If you have a large bermed area containing many trees, a depression following the outline of the edge of the berm will keep the water in the area. Adding bright perennials in and on the outer edge of this depression will complete the transformation.

Does the terrain slope toward the edges of your property?
Building codes all require that the terrain slope away from the home to prevent wet basements etc. If that slope continues all the way to the street, water runs off, contributing to water quality problems and losing a valuable resource for your use.

As mentioned earlier, creating a rolling terrain through the use of earth-berm water bars and depressions can help keep rain water runoff on your own property for use in your water quality gardens. Border gardens and tree berms provide additional benefit to your plan.

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, 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.

Although many will call any area where there is a garden planted in a depression a rain-garden, a true rain-garden is well thought out and planned. If you wish to incorporate a true rain-garden, you will need to excavate at least a few feet from the area, creating a large swale. A bed of pea gravel to help store water is covered by a sandy loam (soil augmented with sand) to encourage infiltration. A final layer of topsoil completes the preparation. It is a must that small swales throughout the yard are created to channel water to the rain-garden.

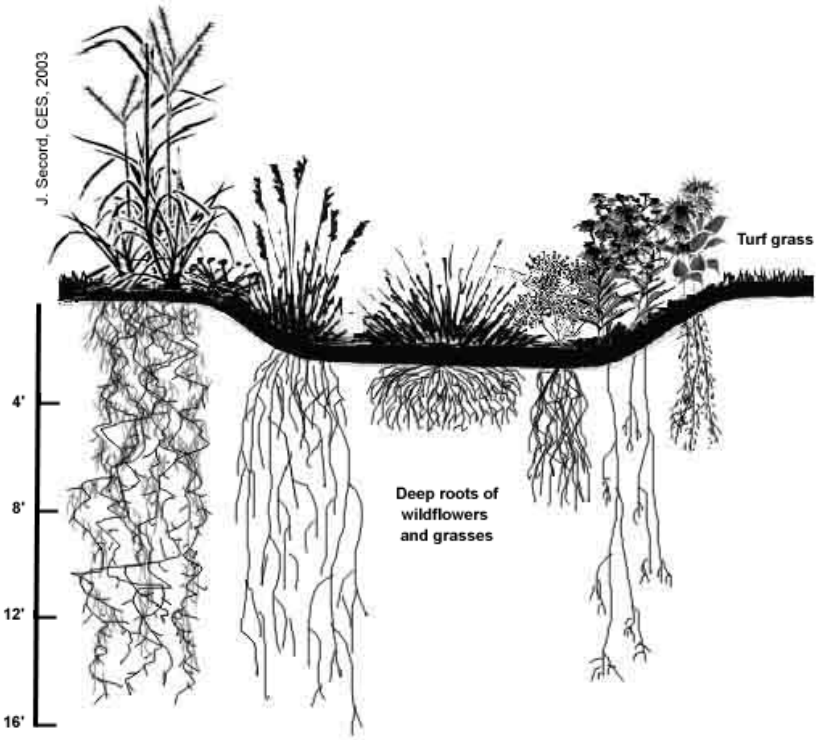
Remember that one goal of your plan is to reduce or eliminate fertilizer use. So, resist the urge to feed your garden. Adding unneeded fertilizer will only serve to encourage weed growth.

Selecting appropriate plants will maximize the benefit of your water quality garden. As discussed in the first section, it is important to understand 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, choosing two or three species that will work for each area of the garden. This will make your trip to the nursery much more rewarding. The third section in this booklet lists several plants and cites the size, moisture needs, sun needs and other details for each.

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. Most 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.

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. You may initially wish to plant the seedlings a little closer together than would be expected. This will speed the establishment of the garden and the plants can later be thinned to be used in another location. Once established, the garden reduces maintenance issues while aesthetic, economic and water quality benefits are appreciated.

Starting with the Basics

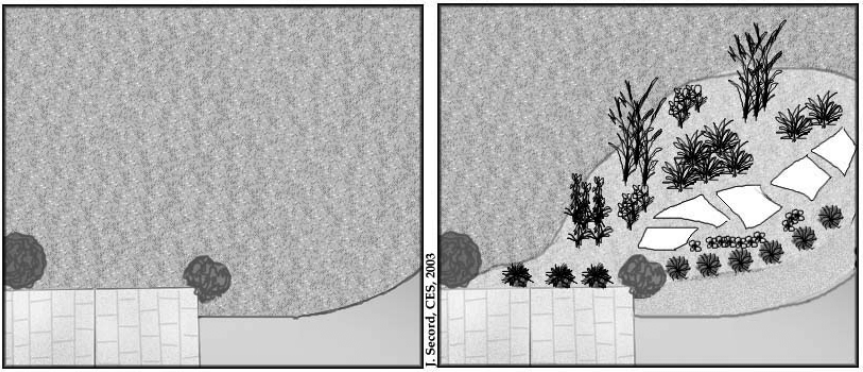
It is important to know the measurements, soil types, moisture, sun exposure and terrain of your property before you begin the actual design. Tips are given in the first section of this booklet on how to gather this information.

Although this booklet does not cover selection or installation of trees and bushes, they are an important component of your landscape and can significantly impact water quality. We strongly suggest that you consider adding both to your overall plan. If you decide to incorporate them into your design, please consult with your local nursery for instructions on installation. Remember to incorporate depressions around your trees as discussed earlier.

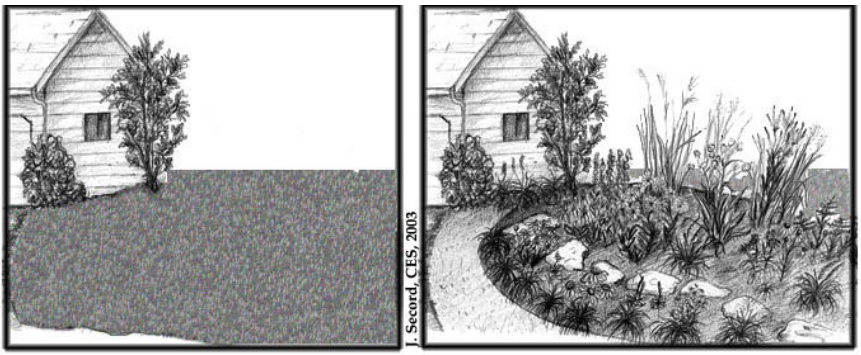
Using the information you gathered, make a rough drawing of the various areas in your yard that you are considering for change. Show existing beds, your house, trees, areas of sun and shade, areas that currently shed water, and areas where water pools. Take a walk around your property to view it from several angles when making your drawing to make sure you haven't missed anything.

Now make a new drawing to encompass the changes you wish to make by installing water quality gardens, berms, swales and pervious surfaces. The following drawings gives examples of the before and after overhead drawings, as well as street view perspectives.

Overhead view…



Street view….



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. Please call at least three full working days before you dig. The toll-free number is 1-800-482-7171.

Installing Your Garden

Preparation

Garden preparation is similar to preparing for any type of garden. As with anything, the better the preparation, the better the final results.

- 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 or mold 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, watching for and pulling weeds, 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!

Before the next growing season, cut the plants back to about 6 inches tall and remove any dead foliage. While this can be done in the fall, you may want to wait until spring as the plants will add interest to your landscape all winter long. 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 to incorporate a majority of your property in an extensive native landscape design, every second or third year burning or mowing with a brush hog may be necessary for prairie plants and other maintenance issues may arise. You may wish to seek an experts opinion on a maintenance plan.

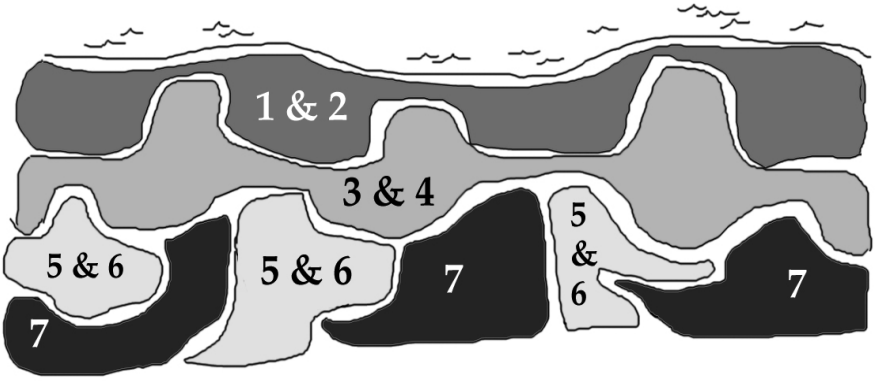
Sample Garden Designs

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 to two plants 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.

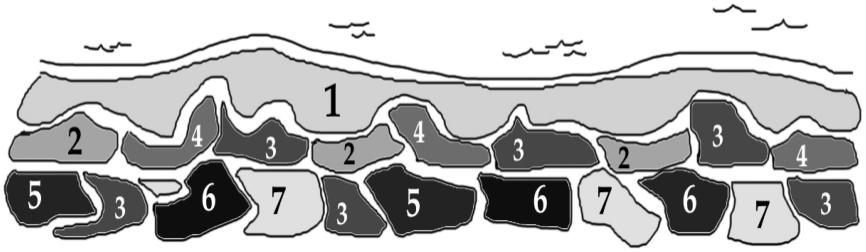
In the first two examples, riparian layouts, the lowland (wet zone) plants are placed closest to the water's edge, while the drier plants are planted farther away from the water's edge. (Riparian refers to the land found at the edges of a river or lake.) It is essential that contaminated water runoff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

A Second Riparian Layout



1. Tussock Sedge (*Carex stricta*)
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 (*Thalictrum dioicum*)
7. Harebell (*Campanula rotundifolia*)

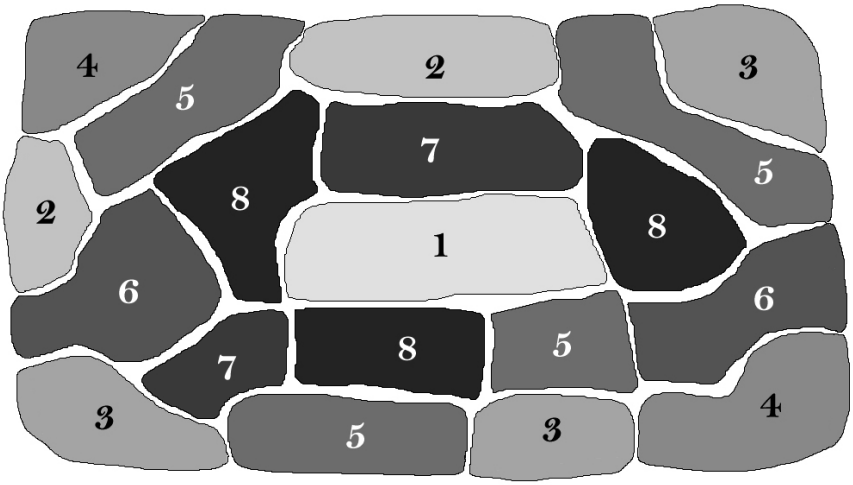
The first layout functions as a water body buffer zone and utilizes taller species, up to six feet in height. The tall foliage is useful as a privacy screen as well as providing excellent butterfly, bird and other wildlife habitat. The various plant varieties will migrate into each other over time.

The second layout 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 buffer at least four to six feet wide. As a rule of thumb, the steeper the slope the wider your buffer zone should be. On a very steep slope, the entire slope should be used as a buffer zone.

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

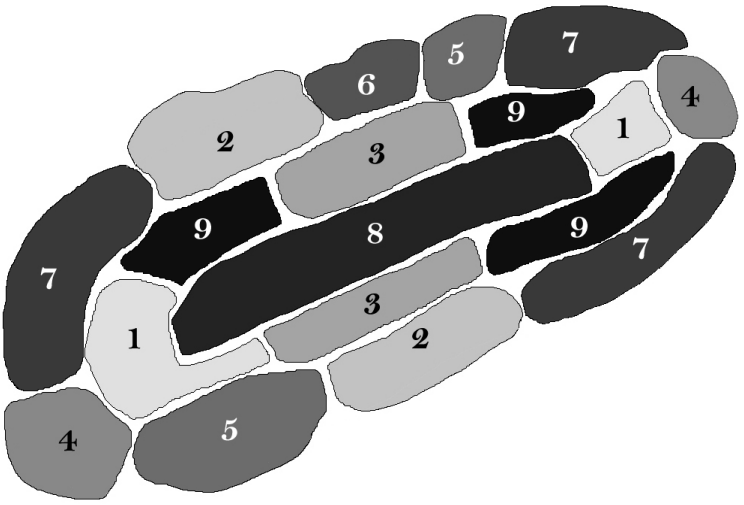


1. Switch Grass (*Panicum virgatum*)
2. Yarrow (*Achillea millefolium*)
3. Black-Eyed Susan (*Rudbeckia hirta*)
4. Little Bluestem (*Schizachyrium scoparium*)
5. Blazing Star (*Liatris spicata*)
6. Purple Coneflower (*Echinacea purpurea*)*
7. Missouri Ironweed (*Vernonia missurica*)
8. Blue Flag Iris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

(* denotes not native in Michigan)

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



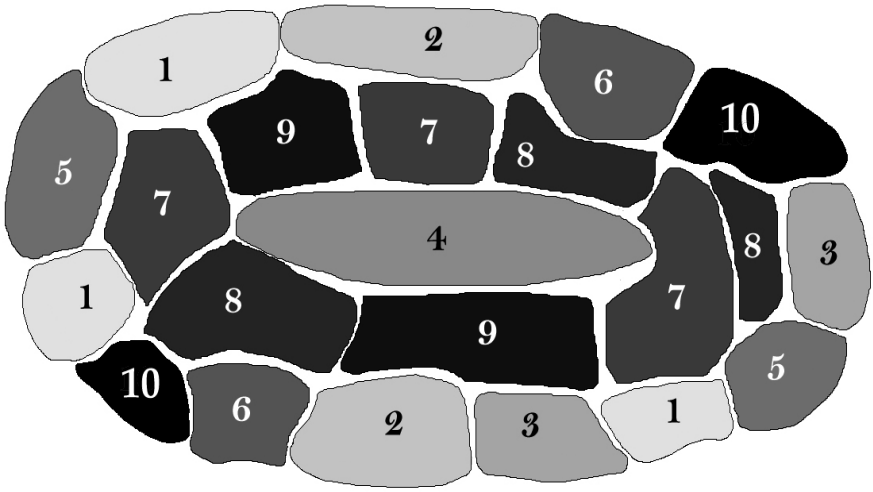
1. Bee Balm (*Monarda fistulosa*)
2. Blue-Eyed Grass (*Sisyrinchium angustifolium*)
3. Oxeye Sunflower (*Heliopsis helianthoides*)
4. Hoary Vervain (*Verbena stricta*)
5. Spiderwort (*Tradescantia ohiensis*)
6. Black-Eyed Susan (*Rudbeckia hirta*)
7. Blackberry Lily (*Belamcanda chinensis)**
8. Queen 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

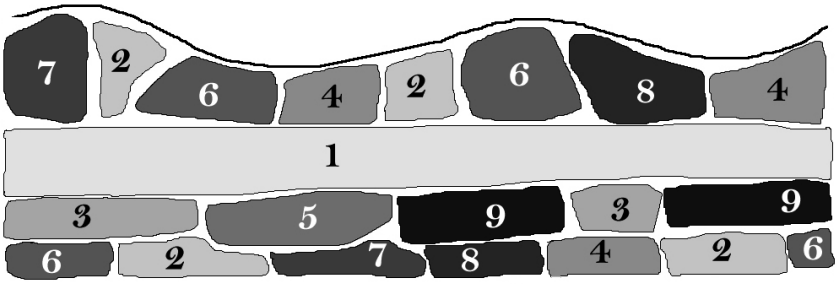


1. May Night Salvia (*Salvia X superba*)*
2. Butterfly Weed (*Asclepias tuberosa*)
3. Smooth Aster (*Aster laevis*)
4. Fireweed (*Epilobium angustifolium*)
5. Black-eyed Susan (*Rudbeckia hirta*)
6. Blazing Star (*Liatris spicata*)
7. Joe Pye Weed (*Eupatorium maculatum*)
8. Blue Vervain (*Verbena hastata*)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



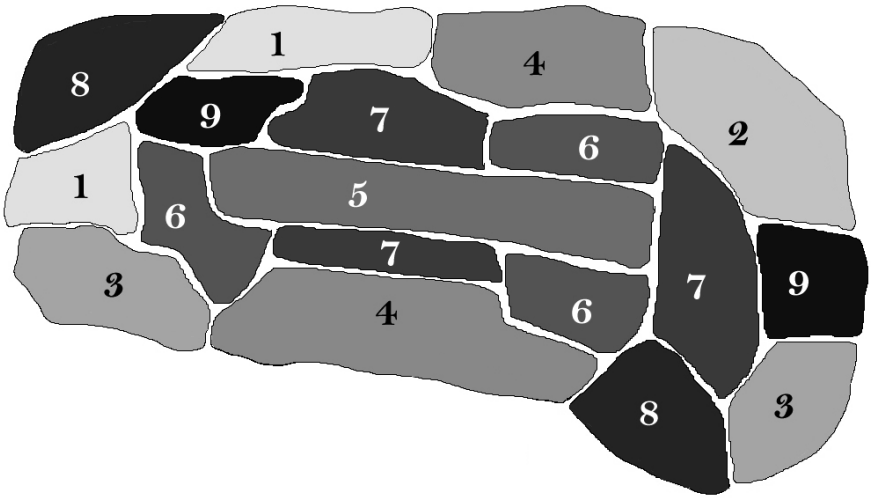
1. Blue Flag Iris (*Iris versicolor*)
   & Golden Alexanders (*Zizia aurea*)
2. Blue-Eyed Grass (*Sisyrinchium angustifolium*)
3. White Coneflower (*Echinacea purpurea alba*)*
4. Purple Leaf Sedum (*Sedum X 'Vera Jameson'*)*
5. Tall Bellflower (*Campanula americana*)
6. Moonbeam Coreopsis (*Coreopsis 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



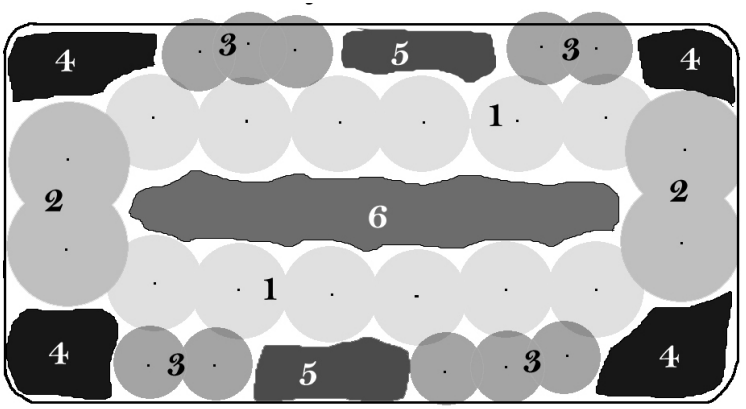
1. Jack-in-the-Pulpit (*Arisaema triphyllum*)
2. August Lily Hosta (*Hosta plantaginea*)*
3. Golden-Edged Hosta (*Hosta fortunei*)*
4. Pink Astilbe (*Astilbe Arendsii 'Rheinland'*)
5. Great Blue Lobelia (*Lobelia siphilitica*)
   mixed with Riverbank Wild Rye (*Elymus riparius*)
6. Culver's Root (*Veronicastrum 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 (Vaccinium 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 next section contains specific plant attributes to help you choose what plant is right for your garden. Also included in that section is a reference to find the right nursery in your area to obtain the native plants you may want.

Section 3:

Plant list

Landscaping For Water Quality in Michigan – Plant Lists

Before utilizing this third section, it is suggested that you read about the concepts in*, An Overview*, and plan your design using one or more of the ideas in the second section, *Designing Your Garden and Sample Designs*.

What Plants do I use for MY Garden?

The specific plants you choose to use is entirely a personal choice. In this booklet we offer a variety of plants from which to choose. The plants listed are by no means the complete list of plants you can consider. You will see than the majority of the species listed are native to Michigan, defined here as: "Plants that were found in this region prior to European settlement". Native species are well suited to the local quirks of nature and many provide the functions desired to have a successful water quality garden. Use of native species also provides food and habitat for native animals and can cultivate a better appreciation for Michigan's past. Some will argue that the use of genetically pure native species is the preferred choice. However, it can also be argued that many species of plants that are not native to Michigan also provide excellent water quality benefits. The specific functions to look for in a plant species is ultimately more important than whether or not the plant is native to Michigan. Those with deep root systems, ability to filter or absorb pollutants, have little or no need for fertilization or sprinkling and are nearly maintenance free are the ones to choose.

Be flexible when choosing your plants. You will probably 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. Work with the nursery to reach a solution that will give you the effect you desire.

As a note of caution, when selecting any species ask questions of your nursery to ensure your choices are not invasive species that could spread

beyond your garden and cause environmental damage. In addition, some species may be on endangered or threatened species lists. Please verify that your choices are appropriate for the intended use.

The plants in this booklet are divided into several categories. Each species will have specific characteristics listed, and in addition, short comments to help you make your decisions. This listing is in no way comprehensive. There are many other species that are suitable for water quality gardens that were not included in this list. You can consult with your local native plant nursery for more native suggestions, discuss your needs with your nursery or explore the resource list suggested at the end of this booklet.

A quick note about the categories:

Plant Names
Because there is no standardization of common names of plants, look for the plant tags at the time of purchase. The tags will list the scientific name and the plant characteristics. This is helpful in both securing the exact plant you seek as well to identify good substitutions, if necessary.

Plant Height
Influences such as water availability, sun exposure and proximity to other plants can affect plant height. In addition, you can physically limit plant height through pruning. Many of the shrubs can be utilized as trees if desired.

Exposure (Sun)
The symbols used are: ○ = full sun, ◖ = partial sun, ● = shade.

Native (*)
A star (*) in this column indicates that the species is native to Michigan.

Wildflowers

PLANT NAMES		Height (ft)	Bloom Time
Botanical	**Common**		
Achillea filipendula	Moonshine Yarrow	2-4	June-Sept
Achillea millefolium	Yarrow	1-4	June-Sept
Acorus calamus	Sweet Flag	2-5	May-Jul
Actaea pachypoda	Baneberry	1-3	May-Jun
Alchemilla mollis	Lady's Mantle	1-2	May-Aug
Alisma subcordatum	Water Plantain	2-3	June-Sept
Allium cernuum	Nodding Onion	1-2	May-Aug
Amorpha canescens	Lead Plant	2-3	May-Aug
Anemone canadensis	Canada Anemone	1-2	May-July
Anemonella thalictroides	Rue Anemone	0.5-1	April-June
Aquilegia canadensis	Columbine	2-3	May-Jul
Arisaema triphyllum	Jack-in-the-Pulpit	1-2	April-June
Asarum canadense	Wild Ginger	0.5-1	April-May
Asclepias incarnata	Marsh Milkweed	1-2	Jun-Sept
Asclepias syriaca	Common Milkweed	1-6	May-Aug
Asclipias tuberosa	Butterfly Weed	1-3	Jun-Aug
Aster laevis	Smooth Aster	2-4	Aug-Oct
Aster novae-angliae	New England Aster	3-6	Aug-Oct
Aster umbellatus	Tall Flat Top White Aster	3-7	Aug- Sept
Astilbe arendsii	Pink Astilbe	3-5	June-July
Belamcanda chinensis	Blackberry Lily	1-2	Aug-Sept
Calla palustris	Wild Calla	0.5-2	June-July
Caltha palustris	Marsh Marigold (Cowslip)	0.5-2	March-May
Campanula americana	Tall Bellflower	2-6	Jul-Oct

Flower Color	Water Needs	Sun	*	Notes
Yellow	Med	○		Resistant to deer; aromatic leaves; use in dried flower arrangements.
White	Med-Dry	○	*	Can be aggressive; drought tolerant.
Yellow	Wet	○	*	Wildlife benefits; medicinal uses.
White	Med	◐	*	Flowers followed by white berries; attractive shade plant.
Yellow	Med	○◐		Interesting as a groundcover; dried flower arrangement use; clump-forming.
White	Wet	○		Must be kept in moist to flooded areas; waterfowl food source; fast grower.
Pink	Med-Dry	○◐	*	Best in sandy soils; clump-forming; attractive garden plant.
Purple	Med-Dry	○◐	*	Attracts butterflies; spike flowers; drought tolerant; longlived.
White	Med-Wet	○◐	*	Spreads aggressively; delicate 1-2" flower, deep green leaves.
White	Med	◐	*	Long-lasting spring blooms; MI native in southern-lower peninsula; groundcover.
Red	Med	○◐	*	Deer deterrent; attracts hummingbirds; best in partial shade gardens.
Purple	Med-Wet	◐	*	Interesting shade plant; bright red fall fruit; easily grown from seed.
Red	Med-Wet	◐	*	Medicinal uses; satiny,deep-green, heartshaped leaves; groundcover.
Pink	Med-Wet	○	*	Deep root; clump-forming; attract butterflies; attractive garden plant.
Pink	Med-Dry	○◐	*	Medicinal purposes; attract butterflies; poisonous when ingested; sandy areas.
Orange	Med-Dry	○◐	*	Gorgeous bed plant; attracts butterflies; medicinal uses; poisonous if ingested; can be aggressive.
Variety	Med-Dry	○	*	Grows well in sand; blooms late; attracts butterflies.
Purple	Med	○◐	*	Medicinal uses; attracts butterflies; rabbit deterrent; prefers sand.
White	Med-Wet	○◐	*	Attracts butterflies and birds; wonderful garden plant.
Pink	Med-Wet	◐		Gorgeous floral spike; dark green foliage; great addition to shade beds.
Orange	Med	○		Delicate flowers followed by black berry seeds; drought tolerant.
White	Wet	○	*	Best in calm water; beautiful for water gardens.
Yellow	Wet	○◐	*	Attracts butterflies; soft, spongy roots - best along stream banks; early flower.
Blue	Med	○◐	*	Fabulous star shaped flowers; easily grown.

Wildflowers - continued

PLANT NAMES		Height (ft)	Bloom Time
Botanical	**Common**		
Campanula rotundifolia	Harebell	1-1.5	July-Sept
Cassia hebecarpa	Wild Senna	4-6	Jul-Aug
Chelone glabra	Turtlehead	1-3	July-Oct
Claytonia virginica	Spring Beauty	0.5	March-May
Coreopsis tripteris	Tall Coreopsis	3-6	July-Sept
Coreopsis verticillata	Moonbeam Coreopsis	1-3	June-Sept
Dalea purpurea	Monkeyflower; Purple Prairie Clover	1-3	May-Sept
Echinacea purpurea	Purple Coneflower	1-3	June-Aug
Epilobium angustifolium	Fireweed	2-6	Jun-Aug
Eryngium yuccifolium	Rattlesnake Master	2-6	June-Sept
Eupatorium maculatum	Joe-Pye Weed	4-6	Jul-Sept
Eupatorium perfoliatum	Boneset	4-6	Aug-Oct
Eupatorium purpureum	Purple Joe-Pye Weed	5-7	Aug-Sept
Eupatorium rugosum	White Snakeroot	1-5	July-Oct
Filipendula rubra	Queen of the Prairie	6-8	Jul-Aug
Fragaria virginiana	Wild Strawberry	0.5	April-June
Gentiana andrewsii	Bottle Gentian	1-2	Aug - Oct
Gaillardia pulchella	Blanket Flower	1-2.5	May-Sept
Geranium himalayanse	Johnson's Blue Geranium	1-2	May-June
Geranium maculatum	Wild Geranium	1-2	April-May
Helenium autumnale	Sneezeweed	2-5	July-Oct

Flower Color	Water Needs	Sun	*	Notes
Blue	Med-Dry	○◖	*	Attracts butterflies; fond of sandy soil; gorgeous garden plant.
Yellow	Med-Wet	○	*	Attracts birds; clay-loving; brilliant color addition to any native garden.
Variety	Med-Wet	○◖	*	Unique flower; prefers a compost mulch.
Pink	Med	○◖	*	Clump forming spring ground cover dies back completely in summer); can be aggressive; early bloom.
Yellow	Med-Dry	○	*	Tolerant to heat, humidity and drought; a colorful addition to a bed.
Yellow	Med-Dry	○		Delicate foliage; low maintenance; drought tolerant; tolerates poor soils.
Purple	Med	○		Extripated in Michigan - only grandfathered stock or non-native specimens are available; Wildlife benefits; medicinal uses; very attractive.
Purple	Med-Dry	○◖		Extripated in Michigan - only only grandfathered stock or non-native specimens are available are available; Medicinal uses; popular flower garden plant; easy to grow. Also available in "alba" or white variety.
Pink	Med-Wet	○◖	*	Attracts butterflies; striking flower; medicinal uses; aggressive in wet areas; prefers disturbed ground.
White	Wet-Dry	○		Threatened species in Michigan - requires MDNR permit or grandfathered stock to sell/trade; attractive plant; used in prairie restoration; beneficial to wildlife.
Pale Pink	Med-Wet	○	*	Flower clusters up to 6" across; attracts butterflies.
White	Med-Wet	○◖	*	Tolerant of sandy and clay soils; clump-forming; fuzzy cluster blossoms.
Pink	Med	○	*	Clump-forming; fragrant; attract butterflies; attractive addition for a garden.
White	Dry	○●◖	*	Beautiful cut flower; poisonous if ingested.
Pink	Med-Wet	○◖	*	Threatened species in Michigan - requires MDNR permit or grandfathered stock to sell/trade; striking addition to the garden; use in clay soils; fragrant.
White	Med-Dry	○◖	*	Ground cover; beneficial to wildlife; edible fruit.
Purple	Med-Wet	○◖	*	Blooms never fully open, hence bottle-like appearance.
Red & Yellow	Med-Dry	○◖		Daisy-like red blossoms with yellow rims; forms dense colonies. Very easily grown from seed.
Blue	Med	○◖		Easily grown; also called Cranesbill; clump-forming.
Pink	Med	○●◖	*	Clump-forming; great addition to shade beds.
Yellow	Med-Wet	○◖	*	Avoid fertilizer; bright yellow daisy-like flowers.

Wildflowers - continued

PLANT NAMES		Height (ft)	Bloom Time
Botanical	**Common**		
Helianthus giganteus	Tall Sunflower	3-12	July-Oct
Heliopsis helianthoides	Oxeye or False Sunflower	2-5	June-Sept
Hemerocallis "Happy Returns"	Happy Returns Daylily	0.5-2	May-Aug
Hepatica americana	Round-Lobed Hepatica	0.5-1	April-May
Hosta fortunei	Golden-Edged Hosta	1-2	June-Aug
Hosta plantaginea	August Lily Hosta	2	Aug
Hydrophyllum virginianum	Virginia Waterleaf	1-3	May-Aug
Iris versicolor	Blue Flag (Wild Iris)	2-3	May-July
Liatris aspera	Rough Blazing Star	2-5	Aug-Sept
Liatris spicata	Dense or Marsh Blazing Star	1-3	July-Sept
Lobelia cardinalis	Cardinal Flower	2-6	July-Oct
Lobelia siphilitica	Great Blue Lobelia	1-4	July-Sept
Lupinus perennis	Lupine	1-2	May-June
Mimulus ringens	Monkeyflower	1-3	June-Sept
Mitchella repens	Partridgeberry	<1	April-July
Monarda fistulosa	Wild Bergamot, Bee Balm	2-4	June-Sept
Monarda punctata	Horsemint	1-3	Jul-Sep
Nymphaea tuberosa	White Water Lily	1-5	Jul-Aug
Oenothera biennis	Common Evening Primrose	2-5	June-Oct
Peltandra virginica	Arrow Arum	1-2	May-July
Penstemon digitalis	Foxglove Beard Tongue	3-4	May-June
Penstemon hirsutus	Hairy Beard Tongue	1-3	May-July
Phlox divaricata	Woodland Phlox	1-3	April-June

Flower Color	Water Needs	Sun	*	Notes
Yellow	Med-Wet	○◖	*	Tall, bright addition to a partial shade garden; 4" wide flower head.
Yellow	Med-Dry	○◖	*	Easily grown; native to the Eastern U.S.; grows well in clay.
Yellow	Med	○◖		Heat tolerant; long flower season; gorgeous addition to any bed.
Blue-Pink-White	Med-Dry	●◖	*	Delicate 1" star shaped flower; great groundcover in shade beds.
Purple	Med	●◖		Beautiful foliage; great addition to shade gardens; mass for groundcover.
White	Med	●◖		Shiny foliage; fragrant flowers; great planted close together as groundcover.
White	Med-Wet	●◖	*	Medicinal properties.
Blue	Med-Wet	○◖	*	Gorgeous perennial; attracts butterflies; does well in shallow water.
Purple	Med-Dry	○	*	Drought tolerant; attracts butterflies; blooms late in season.
Purple	Med	○◖	*	Drought tolerant; used in cut flower arrangements; feathery plume attracts butterflies.
Red	Med-Wet	○●◖	*	Gorgeous bright red stalk attracts humming birds and butterflies; prefers part shade. Save seedlings to replant this short-lived perennial
Blue	Med-Wet	○◖	*	Easily grown; attracts hummingbirds; grows well in a variety of soils.
Variety	Med-Dry	○●◖	*	Attracts rare Karner Blue butterfly; attractive flower and foliage.
Purple	Med-Wet	○◖	*	Great for wet areas; interesting flower shape.
Pink	Med-Dry	●	*	Produces red fruit; medicinal uses; food source for wildlife; groundcover.
Pink / lavender	Med-Dry	○◖	*	Aromatic; attractive to butterflies and hummingbirds; medicinal uses; can be aggressive.
Yellow	Med-Dry	○	*	Attractive to hummingbirds; likes sandy soil.
White	Wet	○◖	*	Beautiful aquatic plant; tuber; floating leaves and flower; beneficial to wildlife.
Yellow	Med	○	*	Medium bright flowers, open in evening; used in dried flower arrangements; attracts hummingbirds; can be aggressive.
Yellow	Wet	○●◖	*	Salt tolerant; variable pH tolerant; can grow in water; used in buffer zones; beneficial to wildlife.
White	Med-Dry	○●◖	*	Ornamental; beautiful flower and foliage; attractive to butterflies and hummingbirds.
Purple	Med-Dry	○◖	*	Versatile plant; low grower; early summer bloomer; likes sandy soil.
Blue	Med	○●◖	*	Can be aggressive; gorgeous 1 1/2" flower; caution - not *Phlox paniculata* which is invasive.

Wildflowers - continued

PLANT NAMES		Height (ft)	Bloom Time
Botanical	**Common**		
Phlox pilosa	Prairie or Downy Phlox	1-1.5	April-June
Podophyllum peltatum	May Apple	1-2	April-May
Polygonatum biflorum	True Solomon Seal	1-3	May-June
Pontederia cordata	Pickerelweed	2-4	May-Oct
Potentilla simplex	Common Cinquefoil	0.5-1.5	April-June
Ratibida pinnata	Yellow Coneflower	3-5	Jul-Sep
Rudbeckia hirta	Black-Eyed Susan	1-3	Jun-Sep
Rudbeckia laciniata	Cut-Leaved Coneflower	3-10	Aug-Sept
Rudbeckia triloba	Three-Lobed Coneflower	2-5	July-Oct
Sagittaria latifolia	Arrowhead	1-4	July-Sept
Salvia X superba	May Night Salvia	1-1.5	Apr - Jun
Sanguinaria canadensis	Bloodroot	0.5-1	March-April
Saururus cernuus	Lizard's Tail	1-2	June-Sept
Sedum "Autumn Joy"	Autumn Joy Sedum	1-2	September
Sedum "Vera Jameson"	Purple Leaf Sedum	1	Aug-Sept
Silphium integrifolium	Rosinweed	3-6	Jul-Sep
Silphium laciniatum	Compass Plant	3-10	June-Sept
Silphium perfoliatum	Cup Plant	4-8	Jul-Sep
Sisyrinchium angustifolium	Blue-Eyed Grass	0.5-2	May-July
Sium suave	Water Parsnip	2-6	July-Sept
Stachys lanata	Lamb's Ear	0.5-2	June-July
Stylophorum diphyllum	Celandine Poppy	1-2	May-June

Flower Color	Water Needs	Sun	*	Notes
Pink	Med-Dry	○◐●	*	Early flowering prairie plant; ornamental plant.
White	Med	◐●	*	Medicinal uses; dormant in summer; early bloomer; produces a yellow fruit.
White	Med-Wet	◐●	*	Bell-shaped flowers; black berries in fall; beneficial to wildlife.
Blue	Wet	○◐	*	Provide wave buffering along shorelines; wildlife benefits; grows in water.
Yellow	Dry	○◐●	*	Groundcover; dainty flower; attracts butterflies; early blommer.
Yellow	Med-Dry	○	*	Long, drooping petals; Wildlife benefits; strong competitor; long lived; attracts butterflies; prefers sandy or clay soils; tall stem may need support.
Yellow	Med-Dry	○◐	*	Erosion control plant; wildlife benefits; biennial; does well in sandy soils.
Yellow	Med-Wet	○◐	*	Easily grown; great for wet areas; grows well in a variety of soils; leggy.
Yellow	Med	○◐	*	Attracts butterflies; great for cut flower arrangements; long blooming season.
White	Wet	○◐	*	Aquatic plant; edible; wildlife food source; great for water gardens.
Deep Blue	Med	○◐		Very showy; wrinkled foliage; best in poor soil.
White	Med	◐●	*	Needs rich soil in shade; red sap from roots-poisonous;large striking flower.
White	Wet	○◐●	*	Great for water gardens; fragrant; aggressive in optimum conditions.
Pink	Med-Dry	○◐		Also called Stonecrop; succulent; drought tolerant; not tolerant of clay.
Pink	Med-Dry	○		Ornamental foliage; succulent; drought resistant; clump-forming.
Yellow	Med	○	*	Threatened species in Michigan - requires MDNR permit or grandfathered stock to sell/trade; wildlife food source; attract butterflies.
Yellow	Med-Dry	○	*	Threatened species in Michigan-requires MDNR permit or grandfathered stock to sell/trade; tremendous taproot; grows well in clay.
Yellow	Med-Wet	○◐	*	Threatened species in Michigan - requires MDNR permit or grandfathered stock to sell/trade; attracts hummingbirds and butterflies; beneficial to birds.
Deep Blue	Med	○◐	*	Low growing; clump-forming; grass-like foliage.
White	Wet	○◐	*	Aquatic plant; showy in bloom.
Purple	Med-Dry	○◐●		Furry leaves; drought resistant; can be aggressive; attracts hummingbirds.
Yellow	Med-Wet	◐●	*	Requires consistantly moist soil; blooms repeatedly.

Wildflowers - continued

PLANT NAMES		Height (ft)	Bloom Time
Botanical	**Common**		
Thalictrum dasycarpum	Purple Meadow Rue	3-6	Jun-Jul
Thalictrum dioicum	Early Meadow Rue	1-2	April-June
Tiarella cordifolia	Foamflower	1-2	May-June
Tradescantia ohiensis	Spiderwort	2-4	June-July
Trillium grandiflorum	White Trillium	1-2	May-June
Verbena hastata	Blue Vervain	3-6	Jul-Sep
Verbena stricta	Hoary Vervain	2-4	July-Sept
Vernonia missurica	Missouri Ironweed	3-10	Aug-Oct
Veronicastrum virginicum	Culver's Root	2-6	June-Sept
Viola papilionacea	Common Blue Violet	<1	Apr - Jul
Zizia aurea	Golden Alexanders	1-3	Apr-Jun

Grasses, Sedges, Rushes

PLANT NAMES		Height (ft)	
Botanical	**Common**		
Andropogon gerardii	Big Blue Stem	3-8	
Carex comosa	Bristly Sedge	2-5	
Carex grayi	Gray's Sedge	2-3	
Carex hystericina	Porcupine Sedge	1-2	
Carex lacustris	Lake Sedge	2-5	
Carex stricta	Tussock Sedge	1-3	
Elymus canadensis	Canada Wild Rye	2-5	
Elymus riparius	Riverbank Wild Rye	1-4	
Elymus virginicus	Virginia Wild Rye	3-5	

Flower Color	Water Needs	Sun	*	Notes
White	Med-Wet	○◖	*	Attractive foliage and flowers; early summer bloom; may need staking.
Green	Med	○●◖	*	Early spring blooms; attractive foliage; needs male & female to seed.
White	Med	●◖	*	Spike of tiny flowers; attractive foliage turning bronze in autumn.
Blue	Med-Dry	○◖	*	Aggressive; each tri-petalled blossom lasts one day.
White	Med-Dry	●◖	*	Long lived; medicinal uses; white flower turns pink with age.
Blue	Med-Wet	○	*	Attracts butterflies; wonderful for cut flower arrangements; can be aggressive.
Blue	Med-Dry	○	*	Attracts butterflies; great for cut flower arrangements; drought resistant.
Purple	Med	○◖	*	Easily grown; attracts butterflies; aggressive; late summer blooms.
Pink	Med	○●◖	*	Small dense flower, on tall spike; great for cut flower arrangements.
Deep Blue	Med-Wet	●◖	*	Prefers moist conditions; shade plant.
Yellow	Wet	○◖	*	Can be aggressive; interesting addition to gardens.

	Water Needs	Sun	*	Notes
	Med-Dry	○◖	*	Erosion control use; preferred by livestock; beneficial to birds.
	Med-Wet	○◖	*	Waterfowl food source; long-lived.
	Med-Wet	○◖	*	Ornamental grass; interesting flower form; easily grown.
	Wet	○◖	*	Long-lived; clump-forming; tufted.
	Wet	○◖	*	Can grow in shallow standing water; adds color to waters edge.
	Wet	○◖	*	Forms bluish-green tussocks; attracts butterflies; aquatic grass.
	Med-Dry	○◖	*	Cool season, clump-forming ornamental grass; wheat/rye like spikes that remain well into winter; excellent ground cover for dry, sunny slopes.
	Med-Wet	○●◖	*	Slightly nodding, long, wide, wheat like spikes; beneficial to butterflies.
	Med-Wet	○●◖	*	Mixes well with Bottle Brush grass and tall woodland flowers; excellent for wooded openings and forest edges.

Grasses, Sedges, Rushes - continued

PLANT NAMES		Height (ft)	
Botanical	**Common**		
Equisetum fluviatile	Water Horsetail	1-3	
Hystrix patula	Bottle Brush Grass	2-3	
Juncus effusus	Corkscrew Rush	1-2	
Juncus tenuis	Roadside Rush	1-2	
Juncus torreyi	Torrey's Rush	1-3	
Panicum virgatum	Switchgrass	3-6	
Schizachyrium scoparium	Little Bluestem	2-4	
Scirpus atrovirens	Bulrush	3-5	
Sorghastrum nutans	Indian Grass	3-4	
Spartina pectinata	Prairie Cord Grass	4-6	

Ferns

PLANT NAMES		Height (ft)	
Botanical	**Common**		
Adiantum pedatum	Maidenhair Fern	1-2	
Athyrium filix-femina	Lady Fern	1-3	
Dryopteris celsa	Log Fern	3-4	
Dryopteris goldiana	Goldie Fern	3-5	
Matteuccia struthiopteris	Ostrich Fern	3-5	
Onoclea sensibilis	Sensitive Fern	3-4	
Osmunda cinnamomea	Cinnamon Fern	2-3	
Osmunda claytoniana	Interrupted Fern	3-4	
Osumunda regalis	Royal Fern	2-4	
Polystrichum acrostichoides	Christmas Fern	1-2	
Thelypteris noveboracensis	New York Fern	1-2	

	Water Needs	Sun	*	Notes
	Wet	○◖		Fast spreading; bank stabilizer; have hollow, jointed stems.
	Med-Dry	○◖	*	Ornamental grass; bristly flower heads resemble a bottle brush.
	Wet	○◖	*	Easily grown in wet soils, including standing water; corkscrew stems can be cut and used in floral arrangements.
	Med	○◖	*	Tolerates droughts; tolerates compacted soil; may be used as a groundcover.
	Med-Wet	○	*	Tolerates droughts; has interesting "seed balls" at tips of stems.
	Med-Wet	○◖	*	Clump-forming ornamental grass; erosion control; establishes readily from seed.
	Med-Dry	○	*	Ornamental grass; distinctive "blue" coloration at the base of the stems; attractive reddish brown fall color.
	Wet	○	*	Soil stabilizer; tolerates floods or drought for short periods; can be invasive.
	Med-Dry	○◖	*	Showy; clump-forming; often used in wind erosion control; tolerates a moderate amount of salt; may become invasive if not maintained.
	Med-Wet	○	*	Aquatic grass that grows well in regular drained soil; good fall yellow color; great plumes; can be aggressive.

	Water Needs	Sun	*	Notes
	Med-Wet	●◖	*	Clump-forming; ornamental fern; good for borders.
	Med	●◖	*	Attractive in shade beds.
	Med-Wet	●◖		Threatened species in Michigan - requires MDNR permit or grandfathered stock to sell/trade; dark green fronds with contrasting dark stripes.
	Med	●◖	*	Large fern; attractive in shady garden borders.
	Med-Wet	●◖	*	Excellent landscape fern; large in size.
	Med-Wet	●◖	*	Aggressive in optimum conditions; bright green color; drought and frost sensitive.
	Med-Wet	●◖	*	Excellent for wet areas; yellow in autumn.
	Med-Wet	●◖	*	Easily grown; use in borders and along streams.
	Med-Wet	●◖	*	Clump-forming; yellow in autumn; needs wet areas.
	Med-Dry	●◖	*	Grows in fountain-like clumps; utilized for erosion control.
	Med	●◖		Hardy; easy to grow; aggressive.

Vines

PLANT NAMES		Height (ft)	Bloom Time
Botanical	**Common**		
Amphicarpa bracteata	Hog Peanut	2-8	Aug-Sept
Celastrus scandens	American Bittersweet	1-20	May-June
Clematis virginiana	Virgins' Bower	10-20	July-Sept
Menispermum canadense	Moonseed	8-10	May-July
Parthenocissus quinquefolia	Virginia Creeper	1-60	May-June

Shrubs

PLANT NAMES		Height (ft)	GROWTH RATE
Botanical	**Common**		
Alnus rugosa	Speckled Alder	15-25	Med
Amelanchier arborea	Serviceberry	25	Med
Ceanothus americanus	New Jersey Tea	3-4	Slow
Celtis occidentalis	Hackberry	25	Med
Cephalanthus occidentalis	Buttonbush	5-12	Med
Cornus amomum	Silky Dogwood	7	Med
Cornus foemina	Gray Dogwood	6-15	Med
Cornus stolonifera	Red-Osier Dogwood	6-9	Med
Corylus americana	Hazelnut	3-13	Med
Hydrangea arborescens	Annabelle Hydrangea	3-6	Fast
Juniperus horizontalis	Creeping Juniper	1-2	Med-Fast
Lindera benzoin	Spicebush	3-16	Slow
Physocarpus opulifolius	Eastern Ninebark	3-10	Slow
Prunus virginiana	Chokecherry	20-30	Fast

Flower Color	Water Needs	Sun	*	Notes
Pink	Med	◐●	*	Pea-like flowers; delicate twining vine.
Yellow	Med-Dry	○	*	Needs support; attractive fruit; poisonous fruit; aids in erosion control; wildlife food source; aggressive.
White	Med	◐	*	Aggressive; fragrant; needs support.
White	Med-Wet	◐	*	Medicinal uses; poisonous if ingested; form black berries.
Green	Med-Dry	○◐●	*	Useful in erosion control and watershed protection; beneficial to wildlife; ornamental vine; salt tolerant.

Flower color	Water Needs	Sun	*	Notes
Brown	Med	◐	*	Soil stabilizer; acid to neutral conditions; fixes nitrogen.
	Med-Dry	◐	*	Excellent landscape plant with dark green foliage.
White	Dry	◐	*	Taprooted, do not try to transplant; drought tolerant.
	Med-Dry	◐	*	Easily transplanted; can grow in dry soils; withstands grime of cities.
White	Med-Wet	◐	*	Used for wetland restoration; exceptional wildlife benefits; best in wet conditions.
White	Wet	◐	*	Used for field windbreaks and wildlife borders; used for streambank protection; bright red stems fall, winter and spring.
White	Med-Wet	◐	*	Utilized by several birds; not typically stocked in nurseries.
White	Wet	◐	*	Streambank protection; habitat improvement; slope stabilization; plant in masses.
Brown	Med-Dry	◐	*	Beneficial to a variety of wildlife; medicinal uses; ornamental shrub.
White	Med	◐		Best in partial shade; clump-forming; deciduous shrub; medicinal uses.
	Med	○	*	Adaptable; withstands hot, dry situations; produces dark blue berries; ornamental evergreen shrub.
Yellow	Med-Wet	◐	*	Beneficial to wildlife; in partial shade leaves turn bright yellow in autumn.
White	Med	◐	*	Ornamental shrub; beneficial to wildlife; used for erosion control on banks.
White	Med	◐	*	Can grow in acidic to alkaline soils; ornamental small tree or shrub.

Shrubs - continued

PLANT NAMES		Height (ft)	GROWTH RATE
Botanical	**Common**		
Ptelea trifoliata	Hop Tree	20	Slow
Ribes americana	Wild Black Currant	3-5	Med
Rosa carolina	Carolina Rose	3-6	Med
Rosa palustris	Swamp Rose	3-7	Med
Salix candida	Sageleaf Willow	3-6	Fast
Salix interior	Sandbar Willow	6-20	Med-Fast
Sambucus canadensis	American Elderberry	6-26	Fast
Sambucus racemosa	Red-Berried Elder	8-20	Fast
Spiraea alba	Meadowsweet	2-5	Med
Spiraea bumalda	Anthony Waterer Spirea	2-3	Fast
Staphylea trifolia	American Bladdernut	10-15	Fast
Vaccinium macrocarpon	Large Cranberry	2-6	Slow
Viburnum acerifolium	Maple-Leaf Viburnum	2-6	Slow
Viburnum dentatum	Arrow Wood	3-10	Med
Viburnum lentago	Nannyberry	14-16	Slow
Viburnum prunifolium	Blackhaw	12-15	Slow
Viburnum opulus (var. americanum)	Highbush Cranberry	6-10	Med

Trees

PLANT NAMES		Height ft@ 20 years	GROWTH RATE
Botanical	**Common**		
Evergreen Trees			
Abies balsamea	Balsam Fir	40-90	Slow
Juniperus virginiana	Eastern Red Cedar	25	Slow
Picea glauca	White Spruce	100	Slow
Picea mariana	Black Spruce	100	Slow

Flower color	Water Needs	Sun	*	Notes
	Wet	◌◖	*	Shade tolerant; seeds and foliage have an unpleasant odor.
Yellow	Med-Wet	◌◖	*	Can be invasive; wildlife food source; ornamental shrub.
Pink	Wet-Dry	◌	*	Better resistance to disease than most hybrid roses.
Pink	Med-Wet	◌◖	*	Attractive throughout the year; food source for wildlife.
Green	Wet	◌◖	*	Used for erosion control and restoration practices.
Brown	Med-Wet	◌	*	Short-lived; forms colonies; does well in flooded areas.
White	Med-Wet	◌	*	Edible fruit; medicinal uses; beneficial to wildlife; blue berry.
White	Med-Wet	◌	*	Red berries; raw fruits are toxic.
White	Wet	◌◖	*	Fragrant; good in low spots or boggy areas.
White	Med	◌◖		Showy autumn foliage; ornamental value; showy flowers.
White	Med-Dry	●◖	*	Easily grown; seed capsules used in dried flower arrangements.
Pink	Med-Wet	◌◖	*	Grow in acidic soils; leaves become purple in winter.
White	Wet-Dry	◌●◖	*	Reddish-purple fall color; black fruit; develops large colonies; beneficial to wildlife; acidic soil tolerant.
White	Med	◌◖	*	Medicinal uses; bird food source.
White	Med	◌●◖	*	Good seasonal displays; food source for wildlife.
White	Med-Dry	◌◖	*	Special Concern plant in Michigan; Attracts birds; adaptable.
White	Med-Wet	◌◖	*	Beneficial to wildlife; good windbreak; red fruit; ornamental shrub.

Flower color	Water Needs	Sun	*	Notes
	Med-Wet	◌●◖	*	Readily transplanted; prefers acidic soils; tolerates a wide range of soils.
	Dry	◌◖	*	Used for windbreaks.
	Med	◌◖	*	Used for windbreaks; adaptable to a wide range of conditions.
	Med-Wet	◌●◖	*	Interesting irregular form; tolerant of nutrient poor soils; prefers acidic soils.

Trees - continued

PLANT NAMES		Height ft@ 20 years	GROWTH RATE
Botanical	**Common**		
Evergreen Trees			
Pinus resinosa	Red Pine	50-80	Fast
Pinus strobus	Eastern White Pine	150	Fast
Thuja occidentalis	Northern White Cedar	40-50	Slow
Tsuga canadensis	Eastern Hemlock	75	Slow
Deciduous Trees			
Acer rubrum	Red Maple	35	Med-Fast
Acer saccharinum	Silver Maple	45	Fast
Acer saccharum	Sugar Maple	100	Slow
Aesculus glabra	Ohio Buckeye	40	Med
Betula alleghaniensis	Yellow Birch	25	Fast
Betula nigra	River Birch	40	Fast
Betula papyrifera	Paper Birch	40	Fast
Carpinus caroliniana	American Hornbeam	18	Slow
Carya cordiformis	Bitternut Hickory	30	Med-Slow
Carya ovata	Shagbark Hickory	15	Fast
Cercis canadensis	Redbud	16	Slow
Cornus florida	Flowering Dogwood	30	Med
Crataegus mollis	Downy Hawthorn	25	Med
Fagus grandifolia	American Beech	30	Slow
Fraxinus americana	White Ash	40	Med

Flower color	Water Needs	Sun	*	Notes
	Med-Dry	○	*	Prefers dry, sandy, acidic soils; found in low fertility areas; cold tolerant; susceptible to salt damage; used for windbreaks.
	Med-Dry	○◖	*	Tolerates many soil types; intolerant of air pollutants; used for windbreaks.
	Med-Wet	○◖	*	Prefers neutral soil; well adapted to find water and nutrients.
	Wet	●◖	*	Must plant in cool, moist conditions; creates beautiful screen; long-lived.
Red	Med	○◖	*	Gorgeous red fall color; fragrant blossoms March into April; does not tolerate heavily polluted areas.
	Med	○◖	*	Easily transplanted; one of the best trees for poor soils.
	Med	●◖	*	Best in slightly acidic soils; great shade providing tree; not for crowded and polluted conditions; used for maple syrup production.
	Med-Wet	○●◖		Leaves shaped like hand; wonderful color spring-fall; attracts hummingbirds.
	Med	○◖	*	Good lawn tree; providing relatively light shade; showy bark.
Yellow	Wet	○	*	Very attractive ornamental tree; very good for erosion control.
Yellow	Wet	○◖	*	Striking coloration with white bark and yellow fall color; good riparian buffer.
Green	Med	○●◖	*	Beautiful understory tree; difficult to transplant; tolerates periodic flooding; used in landscaping for its unique fruit and vibrant fall colors.
	Med-Wet	○◖	*	Large tap-root makes transplanting difficult; flowers April-May; used for fruit and unique bark.
	Dry-Med	○◖	*	Edible fruit; adaptable to a wide range of soils; bark has culinary use.
Purple	Dry	○●◖	*	Flowers bloom in early spring; will grow taller in shade conditions.
White	Dry	○◖	*	Excellent ornamental tree; striking display when in full bloom.
	Med	○		Small, wide spreading tree; silvery-grey bark, thicket of twigs and thorns; produces copious fruit.
	Med	○●◖	*	Prefers acidic soils; handsome shade providing tree for large open areas.
	Wet	○	*	Attractive shade providing tree; pH adaptable; easily transplanted.

Trees - continued

PLANT NAMES		Height ft@ 20 years	GROWTH RATE
Botanical	**Common**		
Deciduous Trees			
Fraxinus pennsylvanica	Green Ash	35	Fast
Liriodendron tulipifera	Tulip Tree	50	Fast
Malus coronaria	Sweet Crab Apple	20	Slow
Nyssa sylvatica	Black Gum	30	Med
Ostrya virginiana	Ironwood	30	Med
Platanus occidentalis	Sycamore	65	Fast
Populus tremuloides	Trembling Aspen	50	Fast
Prunus serotina	Black Cherry	40	Fast
Quercus alba	White Oak	25	Slow
Quercus bicolor	Swamp White Oak	30	Fast
Quercus macrocarpa	Bur Oak	25	Slow
Quercus rubra	Red Oak	35	Med
Salix nigra	Black Willow	50	Fast
Sassafras albidum	Sassafras	25	Slow
Sorbus americana	American Mountain Ash	30	Med
Tilia americana	Basswood	60	Med

Flower color	Water Needs	Sun	*	Notes
	Med	◌◖	*	Widely used as shade providing tree; can be used as windbreak.
Yellow	Med	○	*	Great ornamental tree; grows rapidly; pyramidal shaped; insect & disease resistant; unusual flowers; yellow fall color.
Pink	Med	◌◖	*	Native to lower Michigan only; ornamental tree; edible fruit.
	Med	◌●◖	*	Provides erosion control; attractive dense autumn foliage.
	Med	◌●◖		Shade tolerant; dark green foliage; attractive cluster of nuts.
	Wet	◌◖	*	Disease resistant; tolerant of air pollution; rehabilitates strip-mined soils.
	Med	◌◖		Beautiful clear-yellow fall color; smooth bark; spreads rapidly.
	Med	○	*	Fast growing shade providing tree; leaves may be toxic.
	Med	◌◖	*	Excellent residential tree; large crown; dense foliage; red fall color.
	Wet	◌◖	*	Grows well in compacted soils; drought tolerant; tolerates flooding.
	Med	◌◖	*	Tolerant of air pollution; tolerant of compacted soil, sand, and alkaline soils; common shade providing tree; deep tap root facilitates water infiltration.
	Med	◌◖	*	Shade tolerant with space available; hardwood for furniture; easily transplanted; tolerant of air pollution and dry, acid soils.
	Wet	○	*	Thrives in wet areas; week branchers; discouraged for landscape use.
Yellow	Dry	○	*	Vibrant spring flower; aromatic tree; striking fall color; attracts butterflies.
Whitw	Med	◌◖	*	Beautiful fall color; grows a stunted form in dry soils.
Yellow	Med	◌●◖	*	Shade providing tree; soil-enriching.

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The Rouge River Watershed -The Rouge River Project

The Michigan Environmental Protection Agency

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

Recommended Nurseries:
For a list of reputable nurseries and consultants, you can contact the Michigan Native Plant Producers Association - http://www.nohlc.org/MNPPA.htm