



*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 I:

## 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.

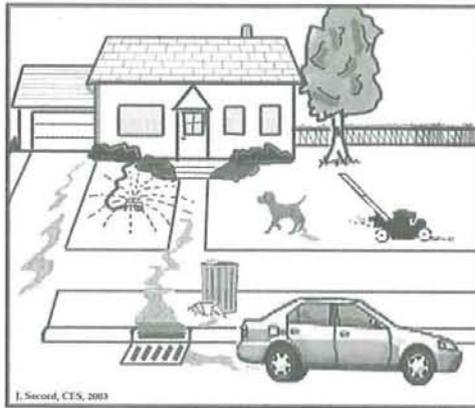
A common misconception about emulating nature in our gardens is that they are unkempt and weedy. In reality, incorporating water quality into your plans for landscaping is not at all limiting. You can produce a finely sculptured, manicured look or that countryside cottage appeal. It is all up to you. 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 contaminants 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 contaminants 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 2/3<sup>rd</sup> 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.

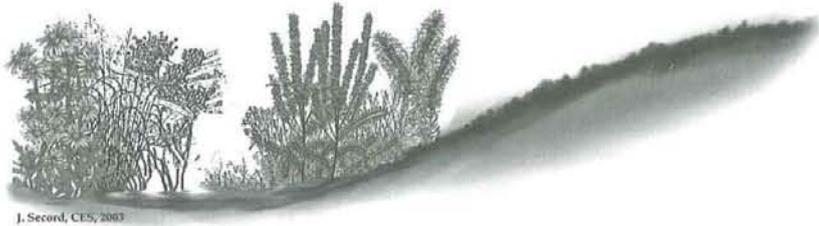
Prairie plants and flowers have roots that grow from one to several feet deep. These deep roots not only draw up and store water, but form channels in the earth and they die back each winter and reform in the spring. This naturally aerates the soil, maintaining the health of the plants. Stabilizing the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

