Part 3 of 3

Have you hugged your green infrastructure today?

LOWER GRAND RIVER ORGANIZATION of WATERSHEDS

The nature of green infrastructure

The Grand River begins as a few small trickles.

These trickles merge with other trickles, converging from many different places. A creek, then a stream, and finally a river takes shape.

The land in the watershed gathers these trickles and directs them to the river. The Grand River then delivers them to Lake Michigan. This is how rain trickling from your yard finds its way to the Great Lakes.

Chances are that when rain fell in your yard, it fell on some hard surfaces – rooftops, driveways, roadways, walkways and more. These surfaces quickly shed the rain and the resulting storm water likely ended up in a storm drain. Storm drains often discharge a load of untreated pollutants right into a stream.

Since there are so many places in the watershed where these pollutants originate, they are often called nonpoint source pollution. Nonpoint source pollution is the largest source of pollutants to the Grand River and Lake Michigan.

A watershed is a pattern of developed areas, cultivated ground and natural land. All of these lands and their uses have an impact on water quality in the watershed.

Storm water flowing across certain areas gathers pollutants, such as sediment, pesticides, road salts, pet waste, detergents and oils. This load is taken to our river of trickles.

Some people have to drive for hours to sit on the banks of a river. Walk out the door; it's there waiting for you.

A user's guide to green infrastructure for long-term thinkers

You may be most familiar with the intricate road system that connects all of us – one part of our modern infrastructure. Other parts include such essential facilities as the power grid, gas pipelines, telephone lines and cell towers, school buildings, sewers and railways.

Infrastructure is the physical framework and services that makes it possible for us and our communities to function. For example, this infrastructure allows us to surf the Internet, drive to work, cook a meal and talk to someone in California. This part of our infrastructure we call "gray" infrastructure.

Another kind of infrastructure is called "green" infrastructure. Green infrastructure is the part of nature that has also been providing us with many essential services. It is the source of clean air, drinking water and local food.

It provides habitat for producing fish and wildlife. Farmlands, forests, soils and wetlands are all part of green infrastructure – the foundation of the Grand River watershed.

Sometimes green infrastructure is very obvious, such as Michigan's forests, and sometimes it's not, such as microscopic communities inhabiting soils. You can find green infrastructure everywhere, even poking through sidewalk cracks.

Green infrastructure can be designed and built, such as green roofs and walls, rain gardens, tree planters and window boxes.

If you fish, hunt or watch birds, you require this green matrix. It will be difficult to enjoy hiking, biking or riding a horse without it. Your interest may be in gardening, organic food, farm markets or buying Michigan-grown food, all dependent on green infrastructure. Your out-of-town visitors may be in awe of the Lake Michigan shoreline, but it is green infrastructure that makes it all work.

To help in your understanding of green infrastructure, here are the ABCs:

Apple trees

A In addition to providing food, apple and other fruit trees provide shade and beauty. As part of its green infrastructure, the Lower Grand River watershed is graced with a diverse and highly productive agricultural region. With more than 50 percent of the land in the watershed classified as cultivated lands, these working lands are part of the watershed's agricultural heritage and a vital element of its green infrastructure.

Biodiversity

B The saying goes "Variety is the spice of life," which essentially describes biological diversity or biodiversity. Biodiversity reflects all of the different plants and animals living in the watershed. Each one is a specialist with an important role in nature. Each depends on the other for survival – just as we depend on them, too. Biodiversity enhances our lives in countless ways. The greater diversity in our green infrastructure, the more flexibility and better opportunities we have in adapting to change.

Connections

C What good would a road be if it didn't connect to another road and that road connected to a highway? It wouldn't be very useful. The same rule applies to green infrastructure. Nature is all about connections – everything in nature is linked to everything else. The more connections created in our green infrastructure, the healthier our watershed. Like the beads on a string, a network of linked green spaces maintains vital watershed functions, ecological processes and wildlife corridors.

Dunes

D Our Lake Michigan shoreline is world-class, containing the largest collection of freshwater dunes in the world. These coastal resources support a globally unique ecosystem. Beach grass, with its spreading root system, stabilizes open dunes.

From open dunes, heavily forested dunes emerge. As waves wash over beaches and storms climb the dunes, large volumes of water sink into the sand. This water is filtered and nutrients are recycled by the plants and animals living in the dunes.

Part One

What watershed are you drinking?

Although we typically identify where we live in terms of cities, zip codes, or school districts, we also live in watersheds, defined by the flow patterns of rainwater or snowmelt. As part of the earth's hydrologic cycle, watersheds help recycle water.

Whenever a body of water is in trouble, one of the first things a water-quality specialist investigates is its watershed. Water quality is closely tied to what is happening on the land surrounding the water body.

Part Two

Ten things your parents didn't tell you about nonpoint source pollution

Water quality declines where land use exposes rainwater or snowmelt to various contaminants — or nonpoint sources of pollution. This arises from things like exposed construction sites, animal or pet waste, litter, leaking cars and uncontrolled farm runoff.

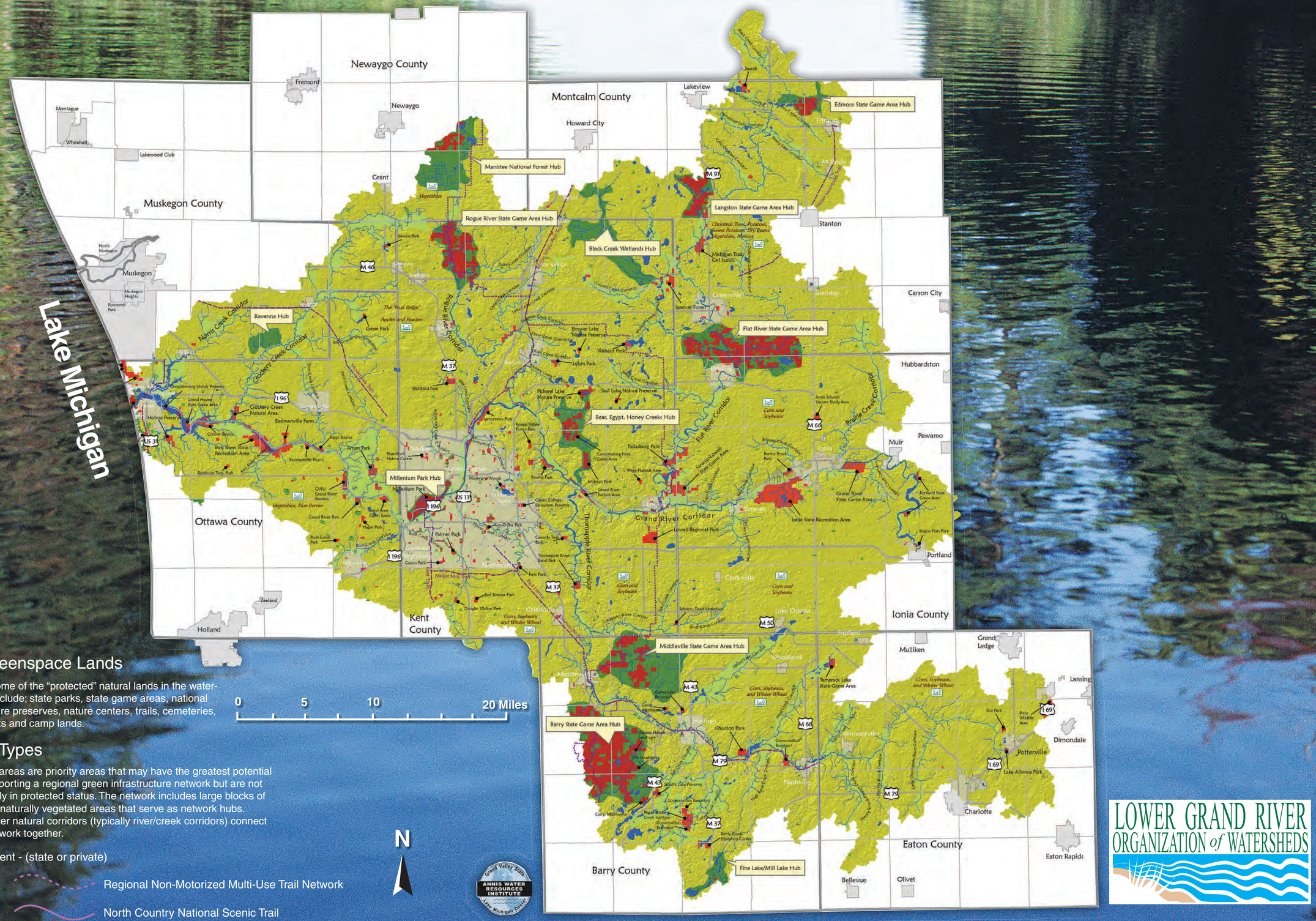
It is the No. 1 source of pollution to the Grand River. As runoff crosses parking lots, chemical lawns and farms, it picks up whatever is on the ground and takes it to the river.

Part Three

Have you hugged your green infrastructure today?

In the past, rain falling on the Grand River Watershed fell mostly into forests where trees caught and filtered it before it flowed into the river. Today, pavement and sewer systems (gray infrastructure) have diminished the water treatment services of these natural systems (green infrastructure).

Such natural systems have become more scattered, isolated and less able to create healthy watersheds and better water quality.



0 5 10 20 Miles

N

Legend

Committed Greenspace Lands

These areas identify some of the "protected" natural lands in the watershed. Areas mapped include; state parks, state game areas, national forest, local parks, nature preserves, nature centers, trails, cemeteries, conservation easements and camp lands.

Green Infrastructure Types

Hub — These areas are priority areas that may have the greatest potential for supporting a regional green infrastructure network but are not currently in protected status. The network includes large blocks of mostly naturally vegetated areas that serve as network hubs.

Corridor — Narrower natural corridors (typically river/creek corridors) connect the network together.

Conservation Easement - (state or private)

Cemetery

Cultivated Land

Regional Non-Motorized Multi-Use Trail Network

North Country National Scenic Trail

Grand Valley State University ANNIS WATER RESOURCES INSTITUTE Lake Michigan Center

LOWER GRAND RIVER ORGANIZATION of WATERSHEDS

Ecosystem services

How much do you value clean water? How about a breath of fresh air, a handful of fertile soil, or the pollinating insects that make blueberry muffins possible? These services are provided courtesy of nature and its ecosystems. Ecosystems are communities of organisms plus their interactions with their surroundings. Ecosystem services are the vast range of natural processes that secure vital resources and maintain life on earth, such as filtering runoff, decomposing wastes, dispersing seeds and recycling nutrients. Although nature might seem distant in our daily lives, all of our products can be traced back to ecosystem services.

Fragmentation

When viewing aerial photos of the watershed, the landscape is revealed in a way that is not apparent on the ground: a watershed fragmented by different land uses. Fragmentation is the process where the landscape is broken into smaller pieces by roads, utility corridors, cultivation and development. As the watershed is divided into smaller and smaller pieces, natural water flow, forests, wildlife habitat and wetlands are disconnected. Barriers to the dispersal of native plant seeds are created. Wildlife and plant populations become isolated. Green infrastructure provides a mechanism to reconnect parts of the landscape and minimize future fragmentation.

Greenways

Greenways are linear, vegetated open spaces following natural corridors, such as rivers and ridgelines, or utilizing manmade features, such as railways and utility right-of-ways. Greenways accommodate movement. They may provide footpaths, horse trails and bikeways. They link movement between neighborhoods, schools and community centers. Greenways also shelter biodiversity by facilitating the movement of wildlife for feeding and during migration. They also protect water resources by trapping the movement of water and filtering out contaminants.

Heritage

How much have we missed the passenger pigeon or walking in a forest of 500-year-old white pine trees? Our forebears believed these natural wonders were vast and boundless. In hindsight, we now know better. Our heritage is this awareness that our natural resources are not inexhaustible. Many areas of incalculable natural importance and scenic splendor still remain in our green infrastructure. Could future generations live with diminished green infrastructure? Could they survive with fewer trees, fragmented landscapes and reduced diversity? Do we leave future generations with less than we have today? Or do we leave this watershed in better shape?

Invasive species

Invasive species are plants and animals that arrive from another place and change the way green infrastructure in the watershed works. They thrive because they are away from their true home and its natural controls. They displace native plants, reduce biodiversity and disrupt the way water moves in the watershed. Invasive species can clog wetlands and waterways. When an old oak tree dies, a young oak tree should take its place, but it may not be there due to invasive species.

Join others

Join others in the watershed in securing the watershed's green infrastructure for the future by celebrating apple trees and farming, protecting biodiversity, creating connections, planting dune grass, preserving ecosystem services, seeking solutions to fragmentation, biking a greenway, improving our heritage, removing invasive species, knowing your flow and reducing your exposures, using low-impact development, making a difference, using native species, visiting our parks, promoting quality of life, installing rain gardens, building healthy soils, planting trees, using your greens, following a vision, protecting wetlands, mimicking xeriscape, naturalizing your yard, and maintaining a zone of buffer along water.

Know your flow. Reduce your exposures.

Know your way around the watershed by knowing how water flows from your yard. Can you connect your yard with the Grand River and Lake Michigan? Watch the water move when it's raining. How much soaks into vegetation and how much runs off? At the same time, is the runoff exposed to any wastes or chemicals in your yard? How can you reduce these exposures? Can you do it today?

Low-impact development

Low-impact development (LID) is a strategy for designing and developing a site to mimic the natural flow of water. LID uses best practices to capture, filter and infiltrate storm water on the site and reduce the need for offsite controls.

LID can take advantage of green infrastructure. For example, detention ponds can use native plants to slow and filter runoff while providing wildlife habitat. Other LID strategies might include green roofs and walls, infiltration basins, flow-through planters, porous pavement, grass filter strips, vegetated swales and buffers, and rain gardens.

Make a difference

Making a difference is simple. It starts with a need, say improving water quality. Ideas for meeting that need are shared, like improving green infrastructure. Then you decide to install a rain garden and do it.

You notice there are more butterflies in your yard, plus your driveway no longer floods.

Your friends, family and neighbors are impressed. They install rain gardens – with your help, of course. Their friends, family and neighbors notice and they are impressed. They install rain gardens. What is the moral of the story? Think big. Start small. Share.

Native plants

Native plants are emerging as the heroes of green infrastructure. Native plants are those trees, shrubs, grasses and other plants that have shared the Grand River watershed for thousands of years. They are particularly adapted to supporting each other.

For example, acorns in the fall support squirrels, deer and turkeys for winter. Native plants in your yard are as maintenance-free as plants can be – no mowing, fertilizer or pesticides. Very little watering required. Such traits reduce the potential for water pollution. Typically, green infrastructure performs best with native plants.

Our parks

For some, it might be time spent on a family picnic or playing fetch with the dog. For others, it's a quiet walk in the woods. Others look forward to morning runs on the trails or simply sitting under the trees. Quite a few delight in paddling on slow-moving waters. Many enjoy watching their kids play soccer or baseball or tennis.

Our parks not only support our outdoor passions but also provide outstanding opportunities to secure open spaces and preserve green infrastructure. Our parks connect us to our nature.

Prairies, grasslands and savannas

While Michigan is known for its forests, there were once thousands of acres of prairies, grasslands and savannas in the state, including parts of this watershed. These dynamic ecosystems are a unique part of our natural heritage. Today, only a few remnants persist. Prairie plants can sometimes be found along railways, roadsides, retired farm fields and parks.

"Urban prairie" is used to describe untended, vacant city lots, typically overgrown with grasses and other plants. Regardless of their urban or rural appearances, the green infrastructure of prairies, grasslands and savannas remain valued elements of the Grand River watershed.

Quality of life

Quality of life reflects those pleasant and satisfying aspects of our community that make it a desirable place to live and work. The greenness of our surroundings contributes to our well-being – from the draw of waterfront parks to the splendor of flowering orchards. It also leaves an impression with visitors. Whether it's an entrepreneur locating a business, a family considering a new home, or a college student selecting a college, the appearance of a vibrant green place with clean water influences their perceptions. We believe our quality of life is above average – and climbing.

Rain gardens

Keep rain where it falls – and there's no better place than in a flourishing rain garden gracing your yard.

Rain gardens are shallow depressions planted with native grasses, perennials and shrubs that thrive on changing water levels.

These attractive plantings capture and accumulate runoff from your roof, driveway, walkway, patio and other hard surfaces. A rain garden is designed with hardy, water-loving plants with deep roots that soak up excess water, trap and filter pollutants and improve water quality.

Rain gardens offer a green infrastructure opportunity for the individual site – whether at home, school, church or work.

Soil

Get to know the soil beneath your feet. It is the foundation for building our green infrastructure.

Healthy soils are essential for supporting plant survival, filtering storm water and reducing the need for landscape chemicals. Development has taken a toll on most soils, sometimes suffocating soil life.

Dig in and take a look. Do you find sand (doesn't hold water well), clay or compacted layers (either won't let water in or out), or light color (suggests low organic content). Adding compost and mulch is one way to improve soil health.

Stay in touch with your watershed at www.lgrow.org

Trees

T The watershed and your yard want to be covered with trees, not with buildings, lawns or pavement. Trees are one of the strongest indicators of a healthy watershed. Trees slow runoff, filter pollutants and prevent erosion in addition to providing wildlife habitat, recreation and economic resources.

However, the ability of trees to provide these services is threatened by the fragmentation of woodlands. Avoid cutting down trees. Avoid creating areas where trees can't grow. The simple act of planting a tree can be an important step. Help make the watershed a shade better.

Use your greens

U Green infrastructure is all around you. It's available to improve water quality in the Grand River watershed. Use your greens to catch rain. Use it to filter run-off, such as directing roof gutters into vegetated areas.

Use it to buffer shorelines, wetlands and waterways. Use native plants to reduce the amount of water, fertilizers and pesticides applied to your yard. Use clover or hardy groundcovers to replace grass in your lawn. Use layers of green varieties – evergreen and deciduous, young and old, tall and short, to create diversity. Its uses are limitless.

Vision

V Nearly 100 years ago, trees were planted along roadways to provide shade when there was no shade. Michigan's forests were depleted and the landscape was barren and bleak. The individuals who planted those trees were not likely to relax in the shade these trees would offer. Instead, they imagined the shade and how it would be welcomed by future travelers along the road.

Next time you travel around the watershed, note the rows of ancient trees alongside the road. What would the watershed look like if we increased green space, like planting more trees? What will it look like if we don't?

Wetlands

W Wetlands are where land and water – the two most-important features defining a watershed – become one. Wetlands excel at ecosystem services. Wetland plants improve water quality by trapping and filtering runoff that contains sediment and excess nutrients.

They also recharge groundwater, store flood waters, reduce erosion, stabilize shorelines, and provide critical feeding and breeding habitat for fish and wildlife, including threatened, endangered, and commercially important species. Wetlands are incredibly vital for our waters.

Xeriscape ™

X Xeriscape is a landscaping approach that embraces local conditions. Although developed for desert climates, its principles can be applied to the watershed's green infrastructure. The approach emphasizes low-maintenance landscaping through the use of native plants, conservation of water and energy and maintenance of soil integrity.

Your yard

Y Every yard is part of the watershed's green infrastructure and a factor in its destiny. One way or another, each yard – backyard, schoolyard, churchyard or business yard – connects to green infrastructure and shapes the watershed's future. No doubt, yards are great fun – beautiful spots for relaxing and enjoying the outdoors. But don't let your yard add to non-point source pollution.

By working with Michigan native plants, you can have a great-looking yard that's easier to care for and healthier for the watershed. Your yard contains your nature. Use it to improve water quality.

Zones for buffers

Z If you live next to water, be generous – give it some buffer. Creating zones of Michigan native plants between land and water – whether a lake, pond, stream, river or wetland – protects the natural characteristics of the resource.

Native trees, shrubs and unmowed grasses alongside water prevent erosion by holding soil together. Water quality is improved when natural vegetation filters runoff, providing greater resistance to flow than a mowed lawn.

Additionally, mowed lawns have very little habitat value compared to a natural buffer. Celebrate your waterfront property with a natural buffer zone, a gift for generations.

Living in the Lower Grand River Watershed - It's like sharing your bathtub with 1 million other people

This watershed is a gathering place where people's lives are connected by falling rain and flowing water and where water quality is a vital part of its economic possibility.

Who speaks for the watershed?

The Lower Grand River Organization of Watersheds (LGROW) was formed to work with West Michigan communities in restoring, protecting and enhancing water quality in the Grand River Watershed.

LGROW, an agency of the Grand Valley Metropolitan Council, provides a framework for creating opportunities to achieve local benefits that can carry over across watersheds.

Sub-watershed groups take the lead in improving water quality at the grassroots level, emphasizing local interest and local commitment. LGROW serves as an umbrella organization for these groups, made up of people living and working in several sub-watersheds, such as the Rogue River, Thornapple River, Sand Creek, Coldwater River, Spring Lake and Bear Creek.

Through the joint efforts of its many partners, LGROW is acting to ensure a healthy and sustainable Grand River Watershed by:

1. **Providing opportunities for partners to work together in solving watershed problems**
2. **Recognizing and sharing accomplishments and successes**
3. **Ensuring that local priorities are represented in regional and statewide efforts**
4. **Identifying and pursuing common goals and strategies**
5. **Collectively setting priorities**
6. **Preparing a Grand River Watershed Management Plan**
7. **Organizing and maintaining watershed-based information**
8. **Tracking watershed conditions and measuring results**
9. **Promoting best management practices**
10. **Preserving local decision-making authority while encouraging regional cooperation**

Watershed management is a strategic action for West Michigan. The more partners that sign on, the stronger and more influential LGROW will be for improving water quality. LGROW sees its efforts as a long-term investment in West Michigan communities.

LOWER GRAND RIVER ORGANIZATION of WATERSHEDS

No resource is as precious as clean and safe water.

Our legacy starts with our commitment to improving water quality.

Our responsibility is to go in that direction.

Michigan's Nonpoint Source Program

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See you around the watershed...