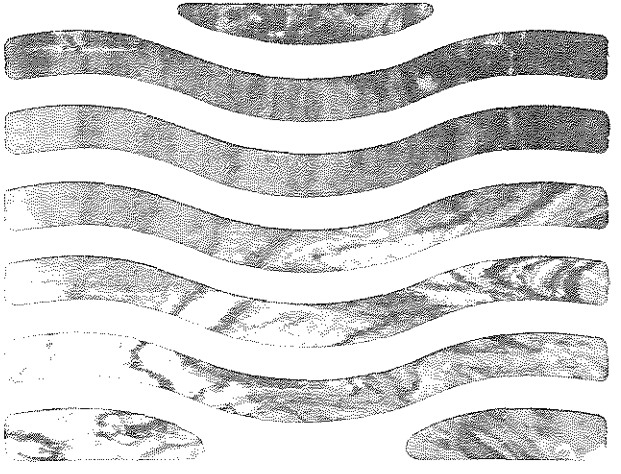
Runoff As Resource



The art of handling water runoff, in six easy sections

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Runoff As Resource

The art of handling water runoff...

The Huron River Watershed is a source of great pride, beauty and recreation for residents of southeastern Michigan. The watershed spans 908 square miles, crossing seven county boundaries and encompassing 63 communities. It is home to over 525,000 people. The Huron River is 125 miles long, with 370 additional miles of creeks and streams, and it is the cleanest urban river in the state. The Huron is the only river in southeast Michigan special enough to qualify as a State Scenic River.

This guidebook addresses the problem of water runoff and its impacts on our water resources. In increasingly urbanized areas, runoff is the issue that will most affect water quality in the near and distant future.

Residents, planning officials, municipal councils and boards, developers, site engineers and other interested parties will find useful information inside, including ways to convert water runoff from a nuisance into an asset.

We appreciate your interest in this topic. Understanding how to effectively manage water runoff means understanding how to effectively preserve and protect water resources, ensuring continued access to safe, clean water for everyone.

— the staff and board of the Huron River Watershed Council (HRWC)

THE HURON RIVER WATERSHED COUNCIL

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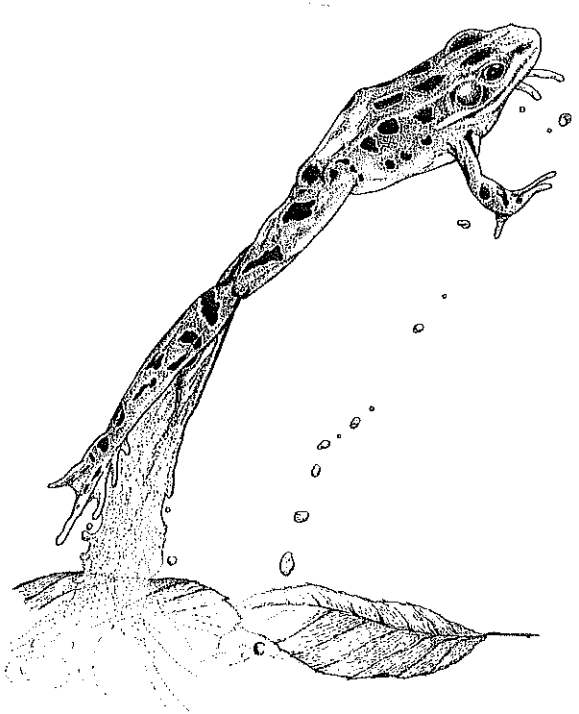
Six easy sections!

Plus...



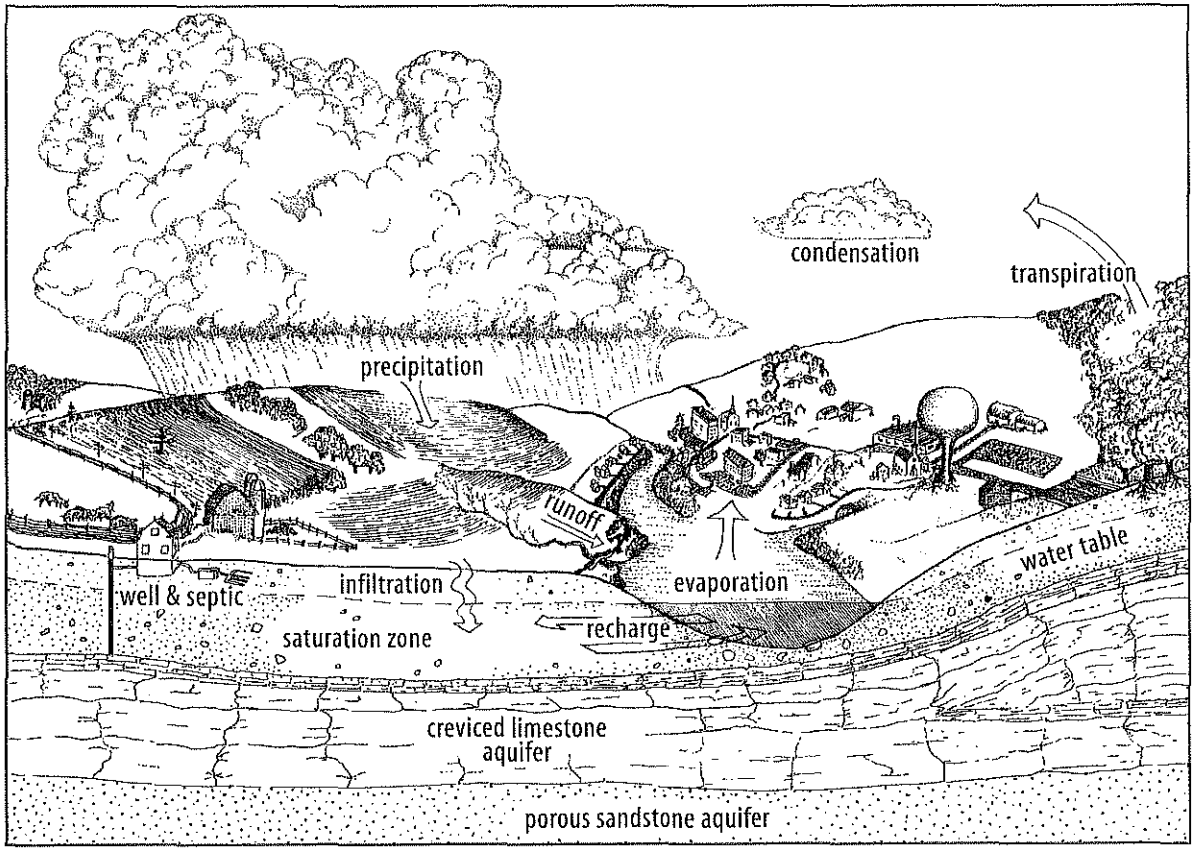
An explanation of water runoff and its impacts

The next time it rains, watch the water run off your roof, your driveway, down the street. Everywhere you go, water is on its way to the nearest stream, lake, river or wetland. Some of it soaks into the soil to become groundwater. Some of it runs overland. Add up all the land that drains into the same waterway and you have a watershed. Parts of seven counties in southeast Michigan drain into the Huron River and make up its watershed. The Huron, in turn, drains into Lake Erie and is part of the Great Lakes Watershed.

The path rain takes from your roof to the river affects the quality of the water you depend on for drinking, recreation, industry, agriculture, and hydro-electric power. This booklet explains the water cycle and activities that impact it. As you read, watch for the "Take action!" boxes suggesting ways you can help preserve and protect the Huron River Watershed and its invaluable resources.

What happens when rain falls? Some of the rain evaporates back into the air, some rain soaks into the ground, and some rain travels over the surface of the land. The same is true for any other water that falls on a site, be it from snow melt, sprinklers, hoses or other sources.

Water that soaks into the ground travels slowly through layers of soil. Some of the water is absorbed by plants. The rest travels deeper into layers of rock and soil, becoming the groundwater that recharges wells, streams and the river. The process of filtering water through plants and soils is important for cleaning and cooling the water. Water that is stored in the ground moderates the flow of rivers and streams because it is released into the river system at a slow, steady rate throughout the year.



The water system is "closed," meaning that no new sources of water exist. Of all the water available on earth, only 1% is accessible and clean enough for human consumption.

Water that cannot soak into the ground is called "runoff." Saturated soils, heavy storms, and impervious surfaces like roads, driveways, roofs and patios prevent water from soaking into the ground and cause the water to rush overland into ditches and storm drains. Once the water enters the drain system it travels directly to the rivers and streams, unfiltered.

As the water runs off the land, it carries pollutants, litter and sediments (dirt!) directly into the river system. Called "nonpoint source pollution" because it cannot be traced to one specific source such as a factory, this type of pollution results from activity on home sites, businesses, roads and farms. Excess fertilizers and pesticides, pet waste, motor oil and antifreeze from leaking cars, and debris off streets are examples of nonpoint source pollution.

Polluted runoff not only affects the health of rivers and streams but also the quality of groundwater. During dry times, water in rivers and streams will naturally seep into the groundwater reservoirs. If the rivers and streams contain high levels of pollutants, the groundwater becomes contaminated. In turn, wells used to supply drinking water may become contaminated.

The pollutants in runoff affect the wildlife living in and around the river system. Pollutants such as motor oil, gasoline, pesticides and herbicides are toxic to aquatic and land animals. Fertilizers that wash into streams, lakes and the river over stimulate plant growth in the water, causing "algae blooms." As the plants decay, they draw oxygen from the water, essentially "robbing" fish and other aquatic creatures of the oxygen they need to survive.

Runoff also causes sudden increases in flow, erosion of stream banks, disturbance of sediments and in some cases flooding. Unstable water levels decrease aquatic habitat by changing the shape of stream channels and causing erosion, which clogs animal homes with sediment. Because the water is not stored in the ground for slow release over long periods of time, droughts severely impact creeks and rivers by reducing flows to a trickle.

Increased runoff also causes river and stream temperatures to rise. There are two main reasons runoff increases temperatures: the runoff is not filtered and cooled through the ground; and the runoff draws heat from pavement and asphalt as it travels over land. Warmer temperatures reduce oxygen levels and are detrimental to fish, amphibians and aquatic invertebrates (insects, mollusks, etc.).

Understanding how human activity impacts the water cycle is the first step toward protecting water quality. The following sections in this booklet offer a variety of actions individuals, businesses and government agencies can take to ensure the Huron River and its tributaries are preserved and protected now and in the future.

↓ Take action!

Canaries in the coal mines

Aquatic insects are the "canaries in the coal mines." The composition of insect populations can reveal the overall health of the river system.

The HRWC's Adopt-A-Stream Program monitors ecological health by studying which insects can be found living at over 50 stream sites throughout the watershed. Insects are a good measure of ecological health since they respond quickly to disturbance. Changes in insect populations also affect other wildlife since they are an important food source for fish, amphibians and birds.

Through careful monitoring, the HRWC has shown that increases in impervious surfaces and increased water runoff lead to poor ecological quality and a loss of the diverse animal populations living in the Huron River system.

You can help monitor the health of the river system as an Adopt-A-Stream volunteer. Data is also available for all Adopt-A-Stream monitoring sites. Call (734) 769-5971 for details.

Homeowner tips for improving water quality

Benefit the environment while improving home site value and safety

It comes as a surprise to many residents that 75% of the pollutants in the Huron River are due to the activities on individual home sites. The good news? This means that your actions make a significant difference! Even better, the tips suggested in this section are easy to follow and save you time and money.

Many communities have storm drain systems designed to prevent flooding of streets and neighborhoods after heavy rainstorms by quickly diverting water runoff from streets to streams, rivers and wetlands. Storm drains also carry water runoff during dry weather from activities like car washing and lawn watering. In some communities, road side ditches serve the same purpose as an underground storm drain system. In other cases, no apparent storm drain system exists but it is important to realize that water leaving a home site still carries pollutants into the river.

Storm drains discharge runoff directly into streams rivers, and wetlands without any filtering or treatment process. Anything carried by the water as it flows over the streets ends up in the river. Residents can reduce pollutants entering the river system in a variety of ways.

Reducing home toxics

Hundreds of commonly used household products contain toxic ingredients. Improper use or disposal of such products allows toxic chemicals to contaminate water resources. Improper storage of home toxics increases the risk of injury or death from accidental poisonings.

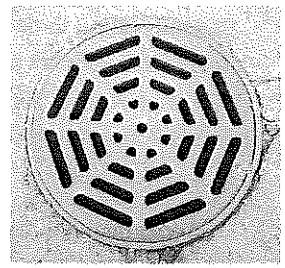
Examples of home toxics include hobby products (paints, thinners), lawn care products (fertilizers, pesticides, herbicides), and automotive care products (motor oil, brake fluid, antifreeze). If and when you decide to use these products, purchase only the amount needed for a project. Carefully follow the directions for use on the label. Store any unused portion in a cool, dry location away from children and pets. Dispose of any excess toxics properly and consider safer alternatives when possible. Not sure where to take your home toxics for proper disposal? See the "Take action!" box at right.

Proper car care

A well maintained car is less likely to leak fluids like motor oil and antifreeze. In addition to leaving unsightly stains on drives and roadways, fluid leaks harm the environment when rain washes them into the river through the storm drain system. If a spill or leak occurs, contain it in a pan or absorb it right away using kitty litter or saw dust, then dispose of it in the trash.

Antifreeze is particularly hazardous since its sweet taste appeals to pets and children. Check with local service stations regarding disposal of used antifreeze. Less toxic antifreeze alternatives are available at most auto supply stores.

By law, Michigan residents must dispose of used motor oil at a designated collection facility. Many municipalities and service stations have facilities for the collection of used motor oil.



credit Steve Gilzow

↓ Take action!

Call your county health department for proper home toxics disposal guidelines:

Ingham County	(517) 887-4312
Jackson County	(517) 788-4433
Livingston County	(517) 546-0040
Monroe County	(734) 240-7670
Oakland County	(248) 858-1312
Washtenaw County	(734) 997-1472
Wayne County	(734) 326-3936

Proper lawn care

Practices designed to reduce the use of toxics in the yard also yield a heartier, healthier lawn and garden, requiring less maintenance. Follow these tips to save time and money:

- Start new lawns from seed, using the right mixture for soil and climate conditions.
- Use soil testing to determine the specific products needed for your lawn and garden. County MSU Extension Agents offer soil testing services at low cost. See the "Take action!" box in this section for contact information.
- Minimize lawn size. Use the remaining space for gardening. Consider native plant species. They are adapted to this area and require less maintenance because of their deep root system and resistance to disease. See page 11 for more details.
- Mow high, keeping lawns three inches high and never cutting off more than one third of the blade when mowing. Taller grass has deeper roots that tolerate hot, dry conditions better and require less water. Taller grass also shades out some weeds.
- Leave grass clippings on the lawn for a natural, slow-release fertilizer rich in nitrates.
- If fertilizers are necessary, choose a low-phosphorus, slow-release fertilizer.
- Prevent fertilizers from washing off lawns and into storm drains. Do not fertilize right before a rain storm. Sweep up fertilizer spills on sidewalks and driveways.
- Always consider the safest alternatives for weed and pest control. If you must use herbicides, fungicides or pesticides, apply them with extreme caution. Many of these products are highly toxic. Follow guidelines for proper use and disposal.
- Consider compost as an alternative to commercial fertilizers. Compost provides organic matter, which loosens heavy clay soils. Composting on the home site is easy, plus some municipalities offer compost to residents at little or no charge.

Confused about composting? Michigan Composting Council can help! Call (517) 371-7073 or check their website at www.recycle.net

The Washtenaw County website also offers helpful information:
www.co.washtenaw.mi.us/depts/eis/eiscomp.htm

↓ Take action!

Soil testing is easy! Call your MSU Extension Agent for details:

Ingham County	(517) 887-4588
Jackson County	(517) 788-4292
Livingston County	(517) 546-3950
Monroe County	(734) 240-3170
Oakland County	(248) 858-0881
Washtenaw County	(734) 997-1819
Wayne County	(313) 833-3268

On-site water retention

Keeping rain water in the yard benefits plants while reducing the time and expense associated with lawn and garden watering. Reducing water runoff protects water quality. Fertilizers and other products stay on the home site as intended, instead of washing down the storm drains. Follow these tips to keep rain and sprinkler water on site:

- Direct gutters and downspouts away from the home and onto lawns and gardens.
- Use rain barrels to collect water from gutters and downspouts for use in the yard on dry days.
- Use a broom, not a hose, to clean up sidewalks and driveways.
- Water in the morning, using light frequent waterings for lawns and deeper, slow soakings for trees and shrubs.
- If you have a sprinkler system, install sensors that shut off the sprinklers when it rains.
- Place hoses and sprinklers carefully, keeping water off paved areas.
- Place gardens along property borders, keeping rain and sprinkler water on site.
- Keep paved areas to a minimum.
- Use slopes, trenches or berms to direct water runoff to soils and gardens.

In addition to saving time, saving money and protecting water quality, keeping water on site can lead to landscapes that are innovative in design, attractive and easy to maintain. See page 10 for more information about on-site water retention.

Go native! For landscaping information, call Wild Ones, a nonprofit organization promoting native plant use, at **(734) 669-2713** or check their website at www.for-wild.org

Another helpful website: www.nativeplant.com

Definitions of critical areas within a watershed

The following definitions explain some of the functions performed by "critical areas" in the river system. These areas are especially important to maintaining the natural water cycle. Functions include storing, cleansing and filtering water runoff, and moderating temperatures and flow rates in streams and rivers.

Flood plains

Floods are a natural part of the water cycle. A flood plain is the land area next to a river, stream or creek that may be covered with water following a heavy rain storm. When a river overflows its banks, the flood plain holds the excess water and slowly releases it back into the river system. Sediment is also deposited in flood plains, keeping it out of the river.

Barriers designed to keep water out of the flood plain cause water to overflow the banks in other locations along the river system. Barriers also force the water to flow through the river faster, causing erosion on river banks and increased flooding downstream. Building on or modifying a flood plain increases the risk of property damage and threatens lives.

Local governments should protect floodplains by deciding what land uses to permit and encourage in their flood plains. For example, residential and commercial development should be banned, but a public park may be an appropriate use of a flood plain.

Wetlands

As with flood plains, some wetlands preserve space for rivers and streams to expand during high water. Wetlands act like a sponge and help moderate high and low flows of water. Wetlands absorb spring melt water and rain water, gradually releasing it throughout the year. Wetlands also filter out pollutants and excess nutrients which would otherwise get into the river system and lower water quality.

Additionally, wetlands provide vital habitat for a variety of plants and animals, many of which are adapted only to live in this unique environment.

Historically, wetlands have been viewed as unproductive or undesirable land, hindering agriculture and development. Property owners have filled, dredged, and drained wetlands with little thought given to the impact such modifications may have on the river's natural flow pattern. Areas downstream are affected, times of drought and flood become more severe since the water is no longer "stored" in the wetland, water quality declines because the water is no longer filtered through the wetland, and wildlife habitat is lost. Proper wetland management is an essential part of a healthy watershed.

> Wetland plants cleanse water by removing 90% of the phosphorus and nitrogen.

Many wetland protection measures are available for homeowners, developers, and local and state governments. Under the Clean Water Act any activity altering a wetland over five acres requires a permit application. Local governments should adopt wetland ordinances to protect wetlands under five acres. Educational materials targeted at homeowners and developers explaining the functional and aesthetic values of wetlands are also good tools for increasing wetland protection. (The HRWC has sample materials available. Call **(734) 769-5123** to request copies.)

Shorelines

Shoreline development along inland lakes, rivers and streams affects the appearance, character and property values of an area. Increased runoff, leaks from failing septic systems, and streambank "cave-ins" caused by shoreline development degrade water quality. Shoreline vegetation is essential to reducing these impacts, and vegetation is a far better solution than constructed walls or fill. Plants filter pollutants and protect water quality while stabilizing shorelines against erosion. Natural shorelines also stimulate local economies because their scenic beauty encourages wildlife viewing, fishing, boating and other recreational activities.

The Natural Rivers Program defines simple zoning criteria that local communities can use to develop a plan for protecting the river. Criteria include shoreline protection using vegetative buffers that filter pollutants, support wildlife, and stabilize river banks. Natural Rivers Program zoning ordinances require minimum lot widths to avoid overcrowding and establish reasonable setback distances for buildings and septic systems, reducing pollutants entering the river system and enabling wildlife passage. Local measures like the Natural Rivers Program go a long way toward maintaining healthy rivers, streams and lakes.

To learn more about the Natural Rivers Program or to see if your local government can participate, call (517) 241-9049.

Stream courses

A "stream course" is the path and speed at which a river or stream flows through the land. The Huron and its tributaries have undergone a variety of modifications which alter their natural course.

Flood plains and wetlands were filled in when dams were built to create lakes, ponds, hydropower and water level controls. Dams disturb natural variations in water levels, disrupting fish spawning and habitat, and allowing invasive plant species to flourish. Dredged channels create deeper or wider areas for faster water flow or the passage of boats.

Faster flows caused by stream course alterations undercut banks and increase sedimentation. Pollutants bound to sediment are released into the system when dredging occurs.

Ironically, such changes are usually made to "solve" problems, such as flooding or poor drainage. In fact, stream course alterations negatively impact the river system by compromising its natural ecology, biological diversity, visual appeal, water flow patterns and water quality.

Open spaces

Open spaces like forests and fields help protect water quality by absorbing rainwater and filtering it through plants and soils prior to discharge into ground and surface water sources.

Critical areas should be protected. Replacing their natural functions with engineered solutions is cumbersome and cost prohibitive. Significantly, natural systems do a better job regulating and cleansing water runoff than engineered alternatives.

The HRWC offers a variety of ordinance models, homeowner guides and informational materials regarding the use and protection of critical areas. Call (734) 769-5123 for details.

Innovative tips for managing water runoff

Historically, water runoff was considered a nuisance. To prevent flooding of streets and neighborhoods, runoff was flushed into storm drain systems as quickly as possible. Today, water runoff is increasingly recognized as a resource and techniques for managing runoff continue to improve.

This section expands on the recommendations found on page 7 using the same basic principle: keep the water for use on site rather than discharging it down drains as a waste product.

↓ Take action!

To keep stormwater ponds functioning properly, regular maintenance is required. Call HRWC at (734) 769-5123 for guidelines.

Stormwater ponds

Water runoff from developments like subdivisions, business parks, apartment complexes and shopping malls is high in volume and pollutants. Since the 1970's, many developments have tried to manage this runoff through the use of "stormwater ponds." The ponds may be grassy depressions that fill with water only after heavy rains or remain wet all year. Decorative fountains, benches and landscaping may be used to enhance their appeal.

While the designs may differ, the function is the same: stormwater ponds capture runoff in a pool and release it slowly. This decreases surging storm flows and protects downstream areas from flooding. Some newer ponds include added features designed to "settle" out pollutants before the water leaves the pond.

While stormwater ponds are an improvement over doing nothing at all to contain water runoff, they are still not enough to adequately protect water quality. Additional techniques must be used to keep water on site while filtering out pollutants. A combination of practices (called "Best Management Practices" or "BMPs" in regulatory circles) may work best, and most are appropriate for both old and new developments.

Stormwater pond designs like the one shown here can benefit significantly from the addition of plant buffer strips along the waters' edge. The plants absorb runoff from the lawn areas, including excess fertilizers and pesticides.

Buffer strips

"Buffer strips" are broad areas of land alongside rivers or streams covered with deep-rooted plants such as shrubs, trees and native grasses. The plant root systems protect the river by preventing bank or shoreline erosion. The buffer strips provide further benefits by slowing and filtering the runoff before it enters the river. Farmers use buffer strips to protect streams on their property. The same technique works well for commercial or residential developments with streams, ponds or rivers on site.

Swales, wet meadows and water gardens

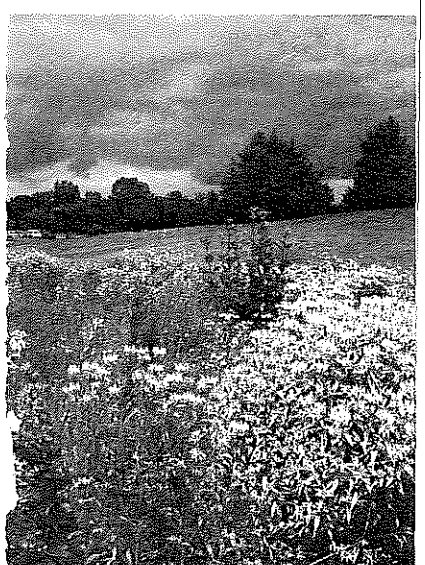
In some places, swales and wet meadows can replace storm drains. Rather than piping water under streets and parking lots, these systems convey water overland through grassy depressions called "swales." For example, runoff from a parking lot contains motor oil, antifreeze and other toxics. The swale filters and cleans the water using plants and soils. By absorbing runoff, swales also slow the flow of water entering the river system.

Low areas landscaped with water-loving plants, called "wet meadows," serve a similar purpose, trapping the water for filtering through plants and soils. "Water gardens" are smaller versions of wet meadows.

An example of the efficiency of water gardens can be found in an older neighborhood near Minneapolis. As an alternative to installing storm drains to control flooding, the city offered to help residents landscape

wet gardens along neighborhood streets. Although dubious at first, residents found that the gardens were attractive, retained the neat appearance of a manicured lawn, and saved them money on yard maintenance. The city saved money too. The plants and landscaping work cost $13,000 less than an engineered solution to their flooding problems. The local river benefited by the retention of water in the neighborhood.

Below: The Children's Wet Meadow in Ann Arbor is a wonderful example of a community response to a stormwater problem at a local park. Working with the city authorities and neighbors, a group of children and their teacher created a small flowering meadow that captures some of the park's runoff during rain storms.

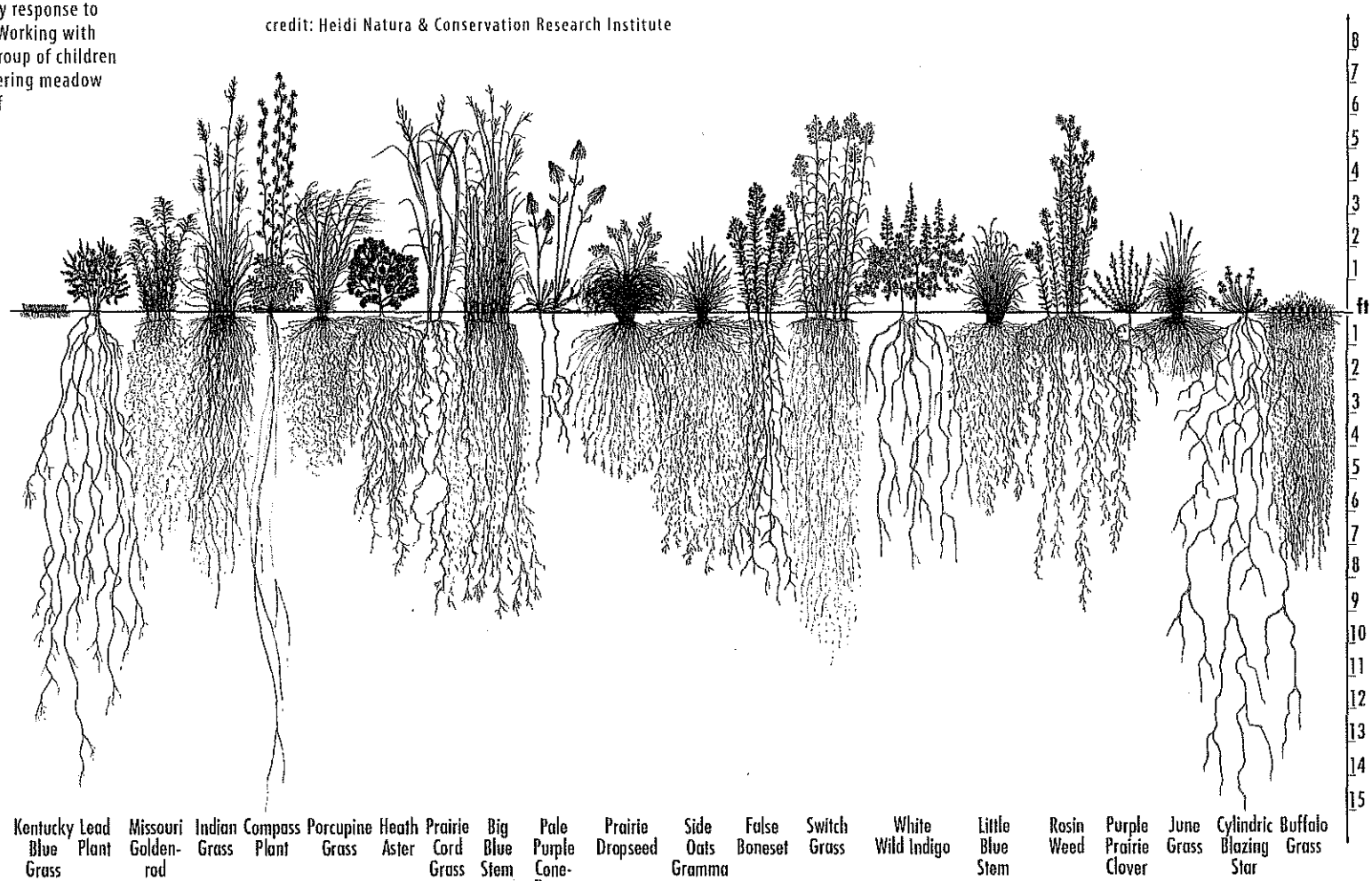


Native landscaping

Native landscaping uses only plants indigenous (or "native") to the area. Once established, this low-maintenance form of landscaping provides habitat for many birds, butterflies and other wildlife. Thanks to their extensive, deep root system, native landscapes hold rain and survive drought much better than non-native plants and turf grass. Native landscapes are becoming more common. A popular technique is to reduce lawn sizes and use native landscaping for attractive borders. Because native plants have adapted to local soils and pests, they require less watering and need no chemicals or fertilizers to protect them. Unfertilized landscapes mean less contamination of waterways. A fertilized lawn can

Below: The deep root system of native plants makes them resistant to drought and disease.

credit: Heidi Natura & Conservation Research Institute



pollute the river with ten times more phosphorus than a native landscape. Homeowners realize that native landscaping is attractive and lower maintenance, leaving them with more time to relax during the summer. Many businesses, hospitals and municipal offices are catching on to this cost effective, attractive trend.

Green roofs

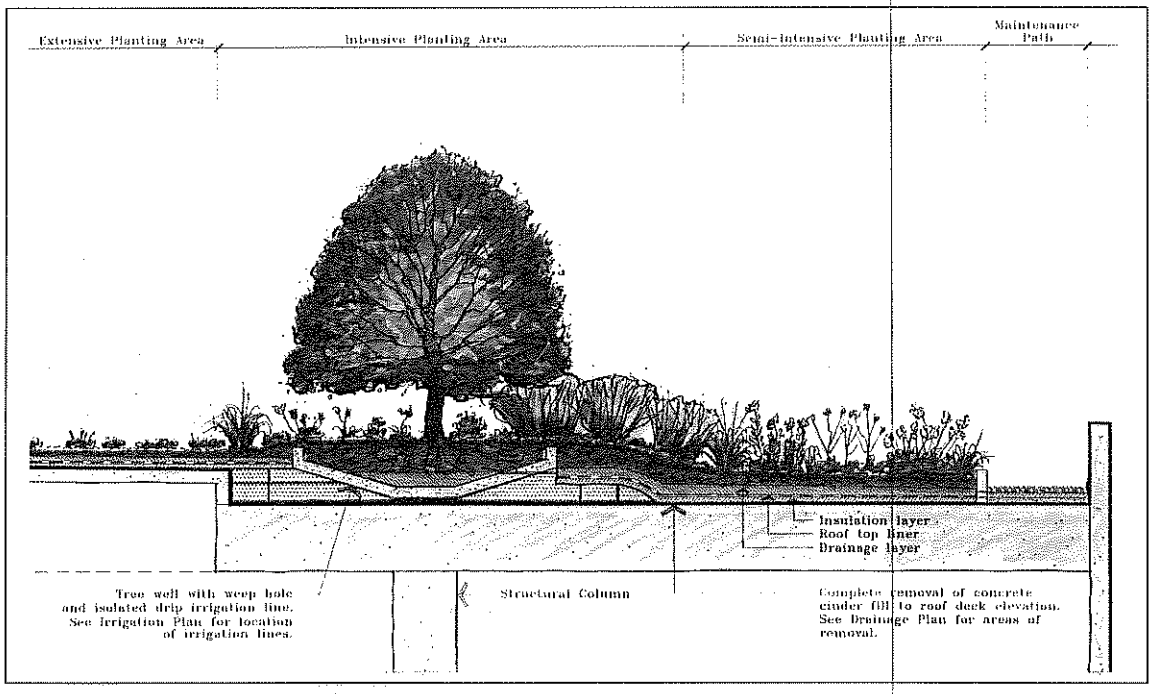
Using soil and plants on rooftops is not a new idea, yet today most people do not consider "green roofs" a serious possibility. There are so many advantages to green roofs that they are required on new commercial buildings in some European cities and are being installed on some existing buildings in this country, such as Chicago's City Hall. Depending on the weight bearing capacity of the underlying structure, these revolutionary roofs are home to a variety of plants from low-growing ground covers to larger plants with extensive root systems. The soil and plants retain rain water, improve air quality, and provide insulation which reduces energy use and noise levels — all while adding beauty to urban environments.

↓ Take action!

To learn more about green roofs, call Green Roofs for Healthy Cities at (416) 971-4494 or check out their website at www.peck.ca/grhcc/main

↓ Take action!

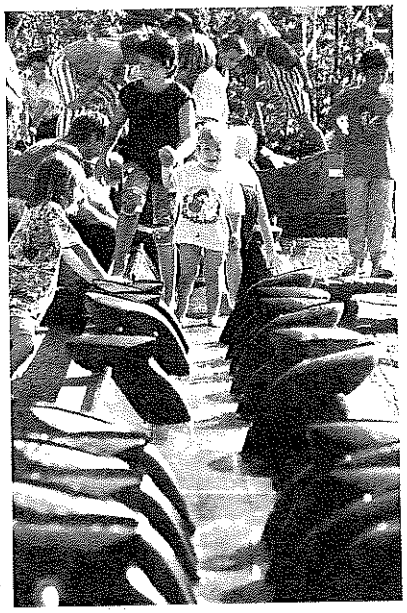
To learn more about landscaping with native plants, contact Wild Ones at (734) 669-2713 or check out their website at www.for-wild.org

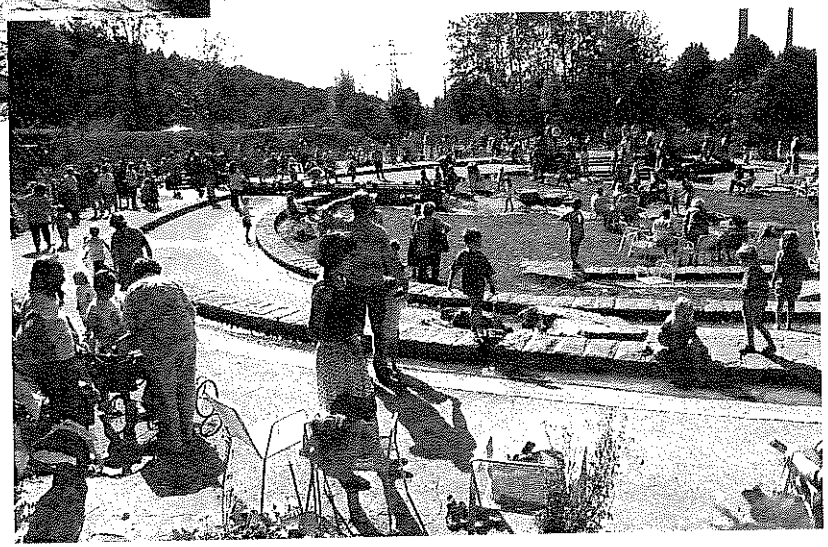


credit: Conservation Design Forum, Inc., Elmhurst, Illinois

Public sculpture

Interactive designs utilize rain water, providing entertainment while slowing water runoff.





The beauty of rainwater is celebrated in an urban water park in Berlin. Shimmering, clear rainwater flows over attractive designs in walkways and through an enormous sculpture. People can move pumps and levers to change the flow in exciting ways. Water is essential to life and the sight of clean flowing water evokes wonderful responses ranging from relaxation to delight.

See more on the web at http://www.dreiseitl.de/engl.htm

photos this page: Atelier Dreiseitl

Land use planning impacts on water quality

An ounce of prevention is worth a lot when it comes to land use planning and water quality. In developed areas it makes sense to use innovative treatment systems to manage water runoff. But in undeveloped areas, it is cheaper and far better to plan ahead by identifying areas for compact development and protecting open spaces that maintain the natural water cycle.

Developing land as efficiently and compactly as possible keeps the river system healthy while still providing places for people to live, shop, and work. Preserving the natural systems that filter, cleanse and moderate the flow of water runoff saves engineers, builders, and communities the enormous cost and trouble of creating treatment systems, retention ponds and other artificial means of controlling increased runoff.

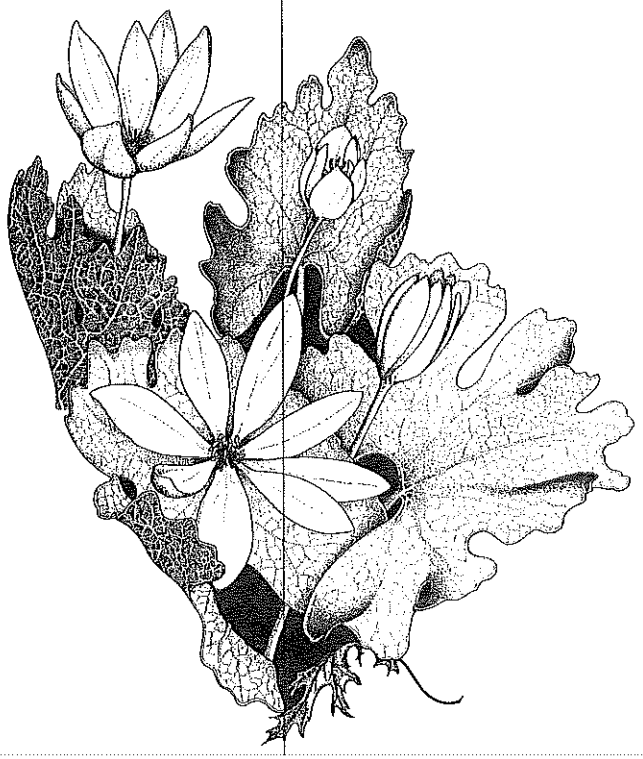
Unfortunately, current land development trends are consuming natural areas and farmland more quickly than at any time in modern history. The irony is that while Michigan's population is expected to grow at a modest rate of 11% through the year 2020, the demand for larger houses and lots is requiring more and more land to accommodate that growth. The next 1.1 million people in Michigan will occupy as much land as did the first 9.2 million people to populate the State.

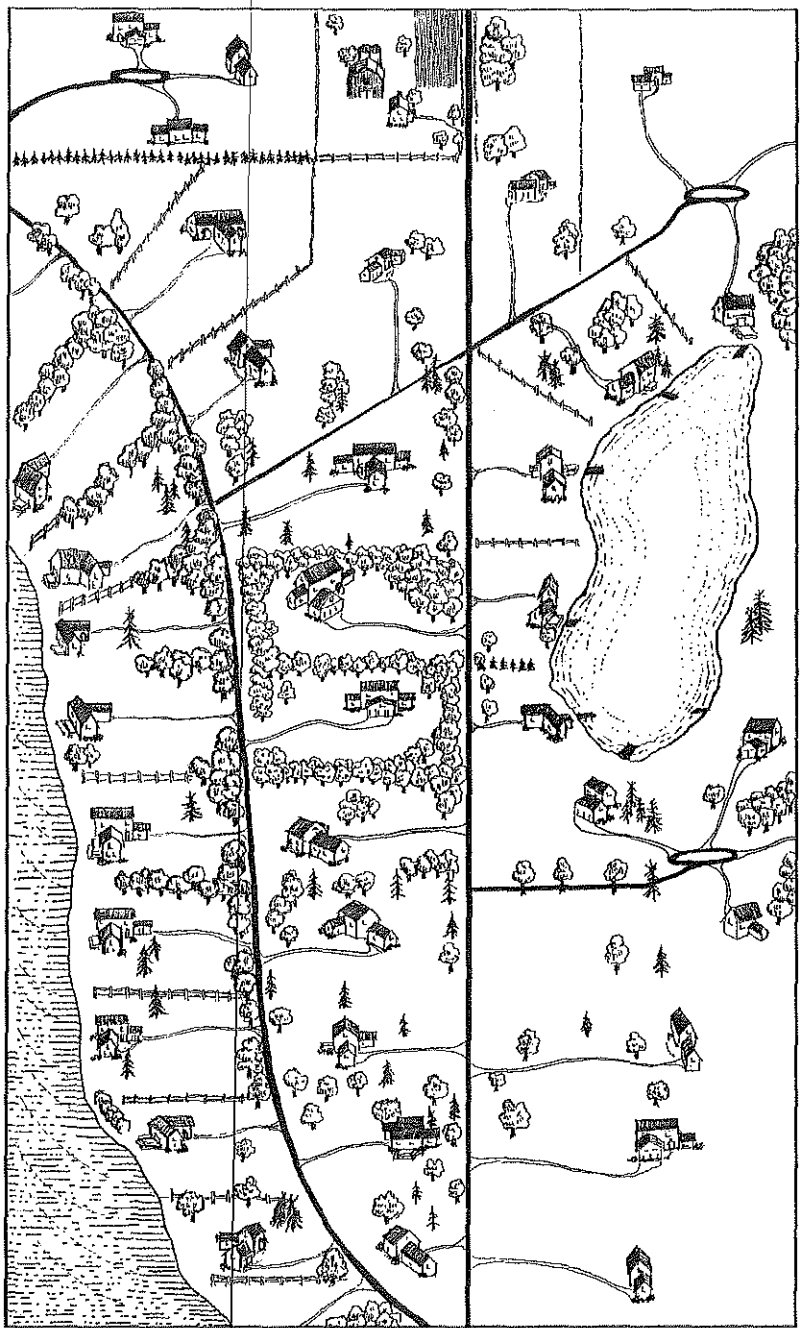
Rivers, streams and wetlands in Michigan are especially sensitive to land development. Studies show that the quality of the Huron River begins to decline when 8% of the land surface becomes impervious. Unfortunately, nearly every kind of development exceeds this limit. However, grouping neighborhoods, shopping areas, and workplaces into well designed, compact communities while preserving open spaces can keep imperviousness in the overall region at healthier levels.

Compactly designed communities protect water quality by allowing for the preservation of open space. Compact design also means additional benefits for area residents. The need for costly new infrastructure like sewer and roads is reduced. Taxpayers save money on road maintenance, schools, fire services and police services. Developers can reduce costs by working together to manage water runoff from multiple sites.

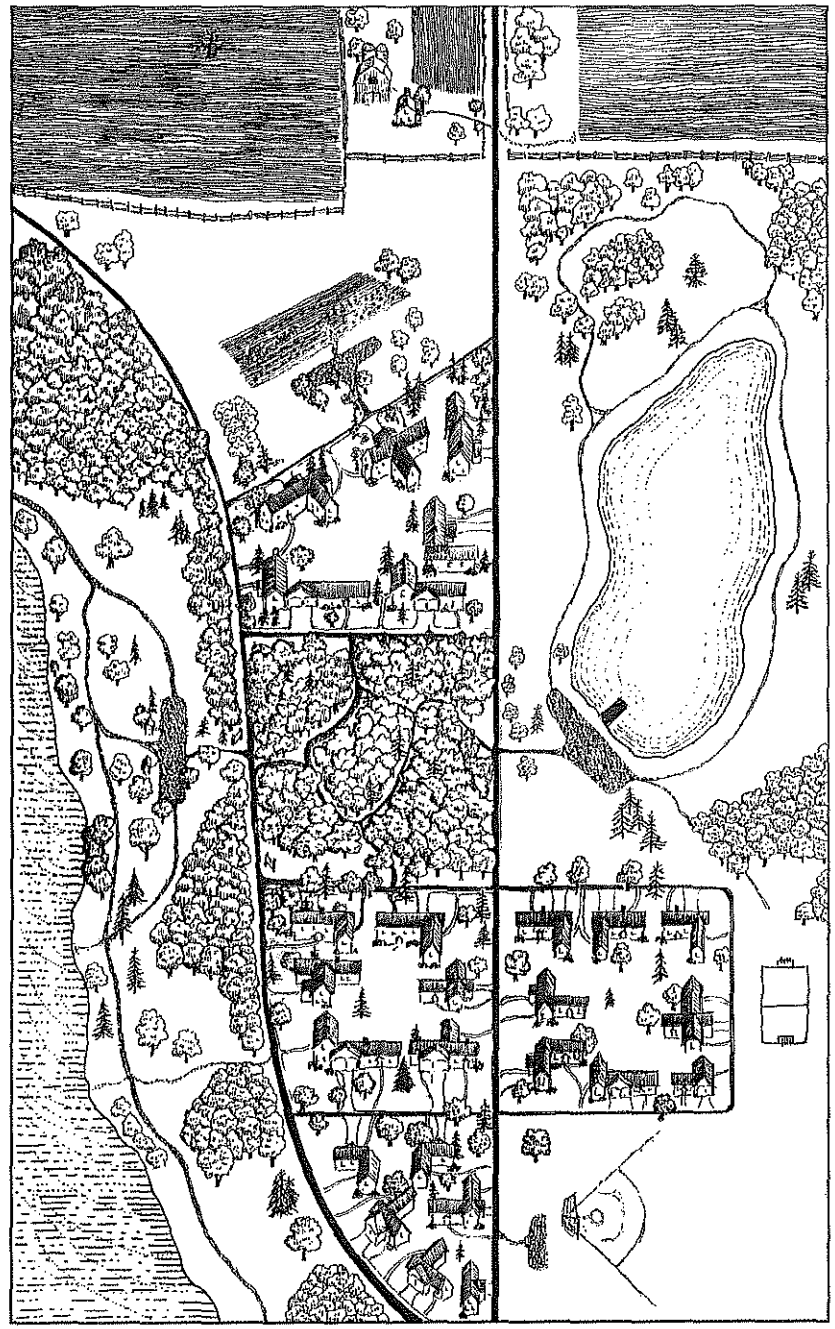
Compact development and preserved open space also enhance quality of life for residents. With shorter distances between work, play and home, traffic congestion eases. Regional areas retain their natural beauty and diverse wildlife populations. Resident services such as childcare, shopping, and community parks can be integrated into the neighborhood.

Citizens, planners, developers, and elected officials throughout the State are joining to create opportunities to encourage this pattern of development. Many local boards and councils are reviewing their zoning laws to allow more compact development while encouraging natural areas and farmland preservation. State legislators are drafting policies to encourage more regionally focused planning, farmland preservation, natural areas preservation, and investment in existing infrastructure. Builders and architects are designing buildings and neighborhoods that are compact, energy efficient, and provide innovative designs for treating water runoff.





Large lot developments increase the amount of imperviousness and compromise water quality.



Compact developments with preserved open space protect water quality naturally.

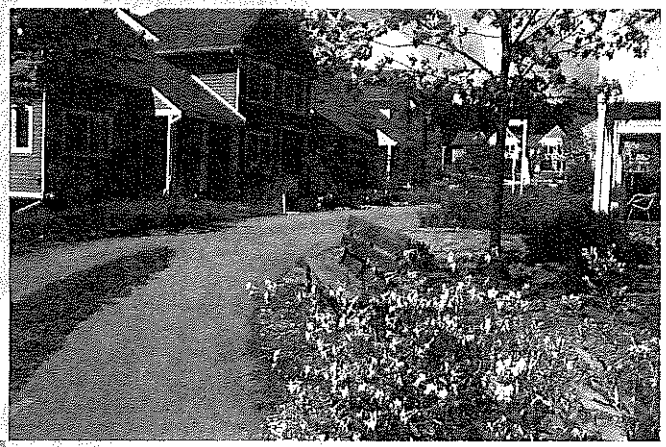
Where's that water going?

For each inch of rainfall...

A one acre parking lot generates 25,806 gallons of water runoff, much of it destined to flow into the storm drains for discharge into the river system, unfiltered and untreated.

Compare that to a one acre meadow, which generates just 1,630 gallons of water runoff for each inch of rainfall.

Right: Residents of this innovative community in Washtenaw County own 20 acres of land. 40 homes are clustered on 8 acres. Vehicle use on the roads within the development is restricted, creating a safer, more relaxing environment for residents. The remaining 12 acres of land are preserved as open space, protecting ponds, woodlands and fields while offering residents a place for recreation and relaxation.



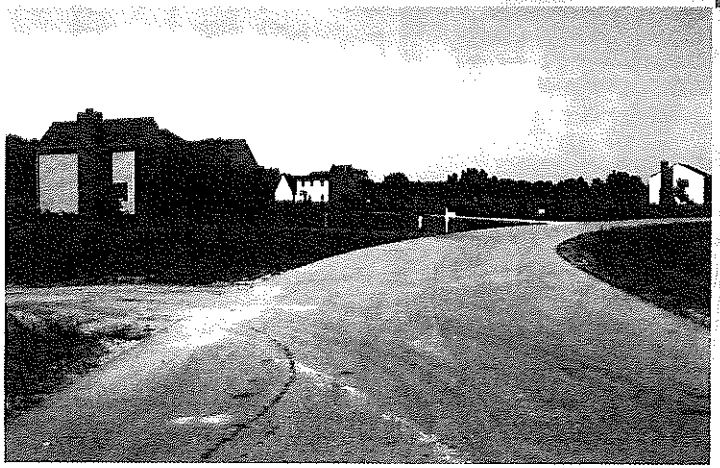


photo: Huron Land Use Alliance

Left: Comparatively, this Washtenaw County community reflects the current development trend toward low density, auto dependent subdivisions. The sprawling large lots require more roads, driveways, sewer and other public services, straining township budgets. Open space is consumed at an alarming rate and impervious surface coverage increases. Acres of lawn contribute to declines in water quality through fertilizer-intensive maintenance and increased runoff.

↓ Take action!

You can help preserve land and reduce sprawl. Here's how:

- Urge your local board or council to adopt policies that will:

  1) encourage compact developments in areas of existing services;

  2) preserve open spaces and farmland. (The next section discusses detailed involvement in local land use decisions.)

- Find out how your state senator or representative feels about this issue. Encourage him or her to sponsor changes in state policy to encourage more compact development patterns while preserving open space.

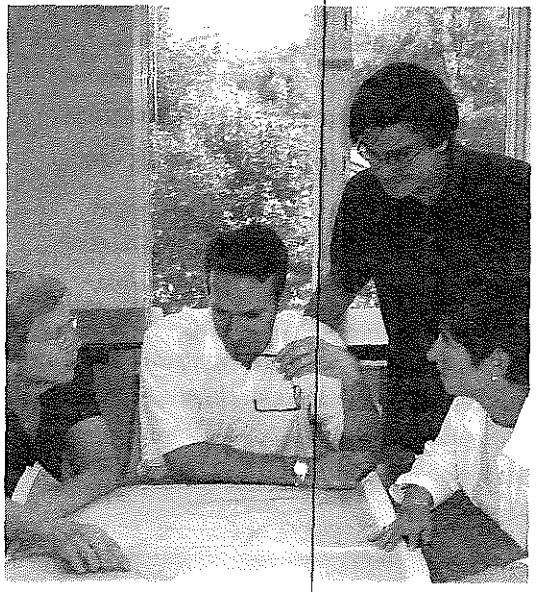
- Think about your own housing and commuting choices. Consider the benefits of living closer to work and shopping, in a well-designed, compact community with open spaces preserved for recreation and wildlife.

- Get involved in state wide land use planning decisions. Contact the Michigan Land Use Institute, at **(231) 882-4723**, or www.mlui.org

- Call the Huron Land Use Alliance at **(734) 930-1970** or check out their web page at hcvn.org/info/hlua for additional ways to become involved.

Community planning and zoning ordinances

Many decisions about land use and its impact on water resources occur at the local level. While federal, state and local laws, and public comment all influence land use decisions, in Michigan the "home rule principle" gives substantial decision making power to local governments. The good news is that everyone can participate in local government, and it works best when everyone is involved.



Critical documents: master plans and zoning ordinances

Different communities within the same watershed often make very different land use decisions, which can impact water quality throughout the watershed. The Huron River Watershed includes 63 communities of varying sizes, each with its own planning documents and land use decision makers.

Two critical documents that cities, villages, and townships use to control and plan land use are the Master Plan and the Zoning Ordinance.

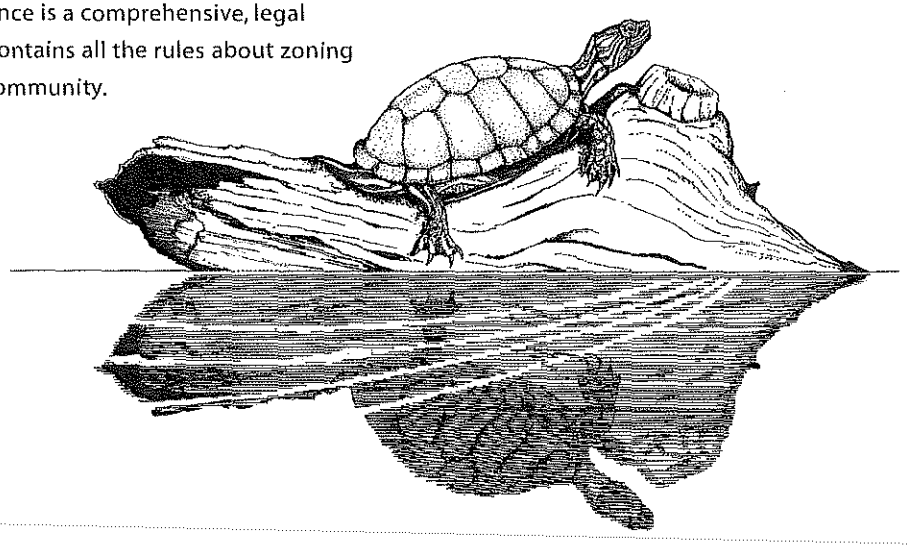
A Master Plan is a general statement by a community defining its goals and future objectives in a single, comprehensive plan. The goals, objectives and strategies outlined in the Master Plan guide government officials, providing a basis upon which zoning decisions are made at the local level.

A Zoning Ordinance is a comprehensive, legal document that contains all the rules about zoning for a particular community.

The zoning ordinance largely determines the pattern of development in a community. It specifies:

- Types of land uses permitted (indicated in the list of zoning districts)
- Locations where different types of development can be built (shown on the official zoning map)
- Guidelines for how individual sites will be developed (specified in site plan review)

A standard Zoning Ordinance does not automatically include protection for water resources. In most cases, a municipality must add water resource protection measures into their Zoning Ordinance. To address the issue of water quality, many communities are amending their Zoning Ordinances to include protection of natural features, reduction of impervious surfaces, and proper stormwater management.



Four ways to protect natural features with a zoning ordinance

1 Make changes to the zoning map

There are many ways that communities can amend their zoning map to help increase protection for water resources. Inclusion of natural features and open space zoning are two of the most common and useful ways.

2 Allow for compact development and open spaces

Compact developments are designed to preserve a significant amount of open, undeveloped land by grouping buildings and paved surfaces together to produce more compact communities while maintaining open spaces.

3 Use setbacks

A setback is the distance between a front, side or rear property lot line. Require setbacks from lakes, rivers, and wetlands to allow runoff to filter through the ground before entering the waterway. In subdivisions, setbacks between homes and sidewalks should be reduced to allow compact development.

4 Create overlay zones

Overlay zoning means a zoning ordinance can be applied "on top of" an existing zoning ordinance, thereby imposing an additional set of requirements without altering the requirements already put in place. Overlay zones provide an extra layer of protection for areas of special concern. For example, a community may have a 50-foot setback requirement along lakes, rivers and streams. In addition to the established setback, an overlay zone can further protect water quality by prohibiting lawn fertilization within 25 feet of the water's edge and requiring vegetative buffers between home sites and waterways.

Sources for samples of regulations protecting water quality

The Charter Township of Ann Arbor adopted a wetland and watercourse protection and restoration ordinance, a complementary natural features setback ordinance, and protection and mitigation of natural features development standards. Together, these local regulations and standards protect local water resources by preserving wetlands and watercourses. Regulations include minimum setbacks from natural features and guidelines for developers to follow when natural features exist on a site. For information call **(734) 663-3418.**

Salem Township's comprehensive stormwater ordinance requires that runoff from a development not cause erosion, and that rates of flow and volume of runoff not exceed natural conditions. A stormwater management ordinance details requirements for how runoff is handled on a development, including considerations for long term maintenance of the system. The office of the Washtenaw County Drain Commissioner can also recommend standards for use with stormwater ordinances. For information call Salem Township at **(248) 349-1690.**

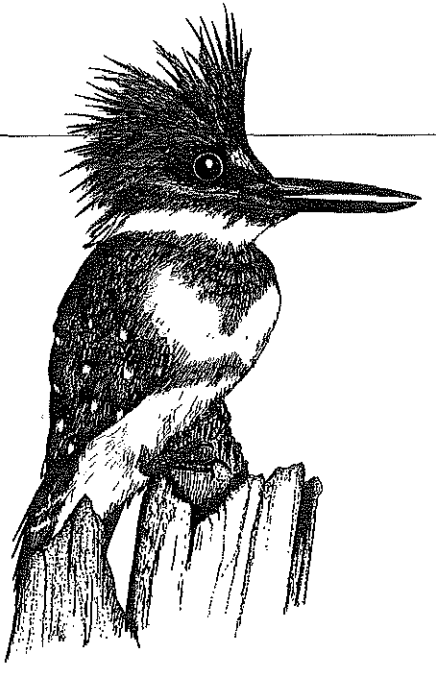
The City of Ann Arbor adopted a rigorous chapter on stormwater management and soil erosion control as part of its city code. Measures include soil erosion controls during and after construction projects, plus proof that waterways, wetlands, stormdrain systems and public properties will not be impacted. For information call **(734) 994-2674.**

The Huron River Watershed Council and the Office of the Washtenaw County Drain Commissioner developed model ordinance language for minimizing impervious surfaces in new developments. Recommendations include reduced road widths and driveway lengths, alternative materials use, and reductions in building setbacks and footprints. For information contact the Drain Commissioner at **(734) 994-2525.**

↓ Take action!

You can make a difference and protect water quality by becoming involved at the local level. Consider the following:

- Become involved in the decision making that takes place at Planning Commission meetings. Call your clerk to find out when Planning Commission meetings are held. Be sure to get an agenda for the meeting you will attend and raise concerns about water quality. For a yearly fee, your municipal board, council, planning commissioner and zoning board of appeals will mail agendas and minutes to your home.
- Get involved in the master plan revision process. If your community is updating its master plan, public participation and/or public comment must be solicited. Many communities hold a visioning session prior to master plan revisions. This is your opportunity to describe what you would like your community to look like in the future. These sessions are very influential in the kind of changes that are made to a master plan.
- Comment on possible zoning ordinance amendments. Zoning ordinance amendments require time for public participation and comment. Many communities have established citizen groups that help them identify ordinances and zoning ordinance amendments to improve their land use planning decisions. Offer to participate in or start such a group in your community.
- Comment on specific developments during a site plan review session. Voice concerns you may have about the development's impact on wetlands and other natural features in your community. Encourage designs that use land efficiently and employ effective ways to treat water runoff.
- Call the HRWC at **(734) 769-5123**. We offer assistance in creating ordinances to protect water resources and host a library containing model ordinances from communities in the watershed and from around Michigan.



Resource guide

Adopt-A-Stream Program
(734) 769-5971
www.hrwc.org

County Health Departments
(home toxics disposal)

Ingham County
(517) 887-4312

Jackson County
(517) 788-4433

Livingston County
(517) 546-0400

Monroe County
(734) 240-7670

Oakland County
(248) 858-1312

Washtenaw County
(734) 997-1472

Wayne County
(734) 326-3936

Huron Land Use Alliance
(734) 930-1970
www.hcvn.org/info/hlua

Huron River Watershed Council
(734) 769-5123
www.hrwc.org

Green Roofs for Healthy Cities
(416) 971-4494
www.peck/ca/grhcc/main

Michigan Composting Council
(517) 371-7073
www.recycle.net

Michigan Land Use Institute
(231) 882-4723
www.mlui.org

MSU Extension Agents
(soil testing & lawn care)

Ingham County
(517) 887-4588

Jackson County
(517) 788-4292

Livingston County
(517) 546-3950

Monroe County
(734) 240-3170

Oakland County
(248) 858-0881

Washtenaw County
(734) 997-1819

Wayne County
(313) 833-3268

Native Plant Nursery
www.nativeplant.com

Natural Rivers Program
(517) 241-9049

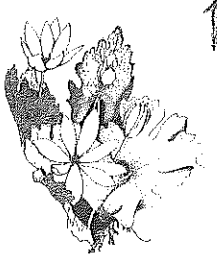
Wild Ones
(native plant resource)
(734) 669-2713
www.for-wild.org

For zoning and master plan samples, see descriptions and contact numbers on page 18.

design: Mary Christianson | illustration: Steve Gilzow © 2000 | unless noted, photography by HRWC

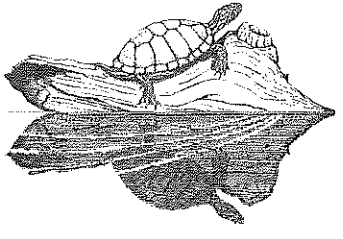
Trillium *Trillium grandiflora*

In the right conditions, this woodland plant blankets the forest floor with showy white flowers. Trillium are sometimes called "Wake Robin" plants since their appearance coincides with the return of robins in the spring.



Bloodroot *Sanguinaria canadensis*

Named for its distinctive root, which oozes red juice when broken, the bloodroot has been used medicinally for centuries. This plant contains several alkaloids shown to have antiseptic and anesthetic qualities.

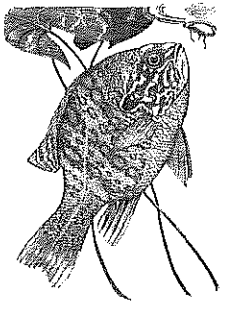


Painted Turtle *Chrysemys picta*

This species is the most widely distributed North American turtle and the only one to range across the entire continent. On sunny days, it can be seen basking in stacked groups on logs in the river. The Painted Turtle was designated Michigan's State Reptile in 1995.

Mink *Mustela vison*

Relatively common but rarely seen, this member of the weasel family depends on abundant shoreline vegetation to provide a rich, discrete hunting ground. To satisfy its voracious appetite, mink hunt prey both in the river and on land, traveling up to a quarter mile from the river bank.

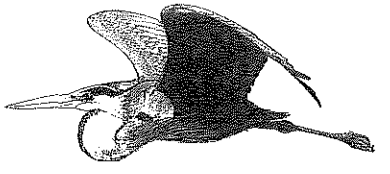


Pumpkinseed Sunfish *Lepomis gibbosus*

Distinguished by the bright orange spot at the tip of its ear flap, this colorful fish prefers weedy patches in lakes and ponds. There, its specially adapted teeth allow it to feed heavily on snails.

Belted Kingfisher *Megaceryle alcyon*

Sporting a "punk" hairdo and announcing itself with a loud, rattling cry, the Belted Kingfisher is a familiar site along the river. Nests are burrowed into the highest parts of exposed river banks, and pairs share the work of raising young,

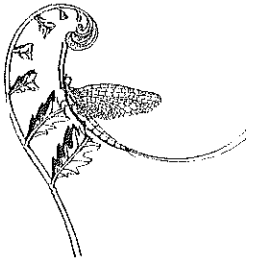


Great Blue Heron *Ardea herodias*

The largest and most widely distributed heron, the Great Blue breeds throughout much of North America. Great Blue Herons are easily observed as they stand motionless in the water, poised to spear their prey. Their huge wings, curved neck and trailing legs give them a distinctive profile in flight.

Leopard Frog *Rana pipiens*

Once the most widespread frog species in North America, the familiar Northern Leopard Frog has experienced disturbing declines in population. A fearless hunter, adult leopard frogs eat insects and invertebrates, with some larger specimens tackling fish or mice for dinner.

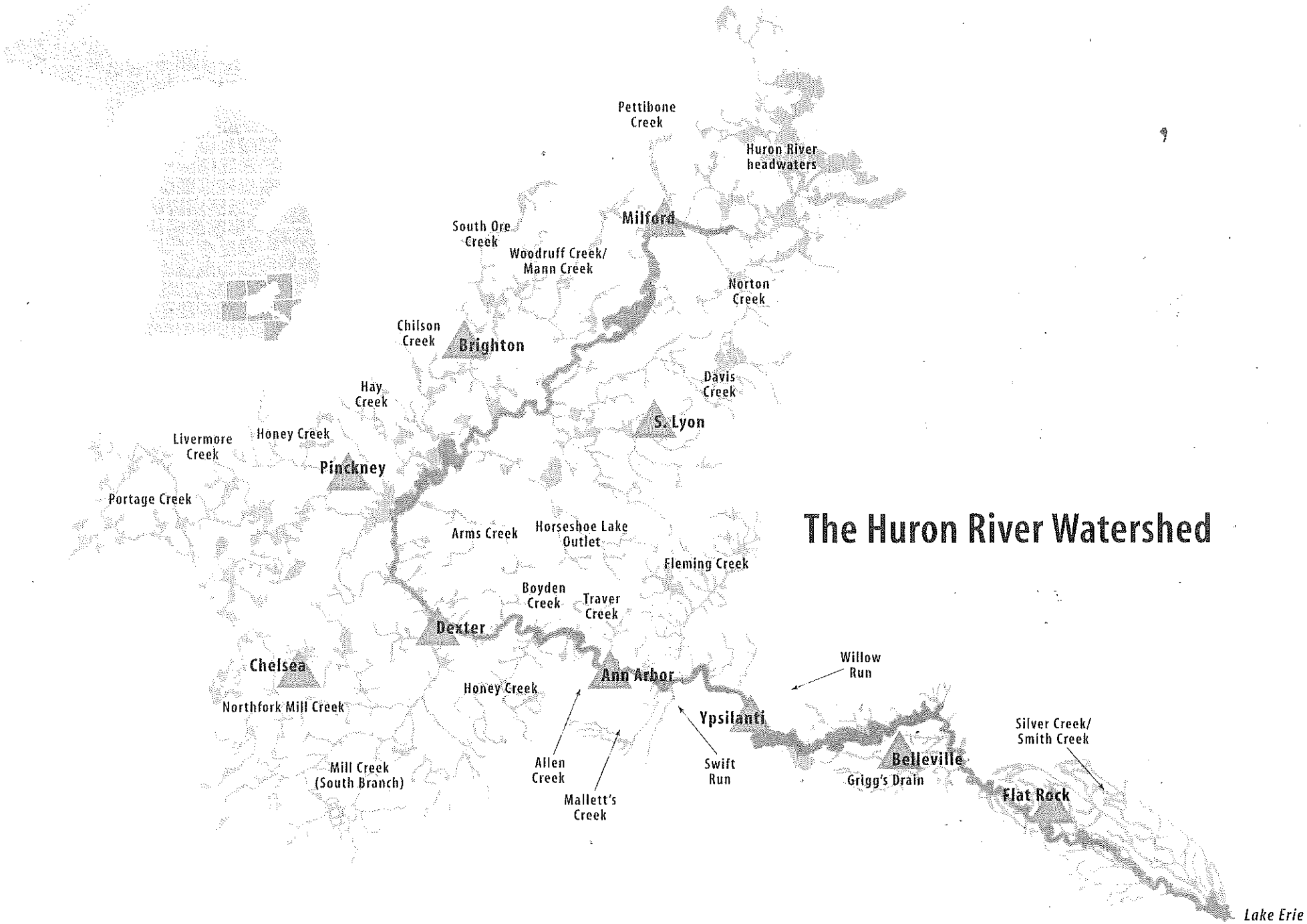


Mayfly

Fossil records indicate that the Mayfly is one of the most ancient of winged insects on the planet. The Mayfly is famous for both the brevity of its adult life (measured in hours) as well as its connection with fly-fishing. The only way to distinguish Mayfly species is by the arrangement of the veins in the wings, so no scientific name is given for this drawing.

Steve Gilzow *Homosapien illustratus*

Steve Gilzow is a self-taught artist whose drawings have been featured by *The Ecology Center of Ann Arbor, The Center for Children's Environmental Literature,* and *Musicians United to Sustain the Environment.* For river recreation, Steve loves poling upstream in a wood-canvas canoe and then paddling downstream. An elementary school teacher in Milan, Michigan since 1976, Steve lives south of Saline with his wife, Ava, and daughter, Ann.


The Huron River Watershed
Pettibone Creek
Huron River headwaters
Milford
South Ore Creek
Woodruff Creek/ Mann Creek
Norton Creek
Chilson Creek
Brighton
Davis Creek
Hay Creek
S. Lyon
Livermore Creek
Honey Creek
Pinckney
Portage Creek
Arms Creek
Horseshoe Lake Outlet
Fleming Creek
Boyden Creek
Traver Creek
Dexter
Chelsea
Ann Arbor
Willow Run
Honey Creek
Northfork Mill Creek
Ypsilanti
Silver Creek/ Smith Creek
Belleville
Mill Creek (South Branch)
Allen Creek
Swift Run
Grigg's Drain
Flat Rock
Mallett's Creek
Lake Erie

Making the most of the water we share

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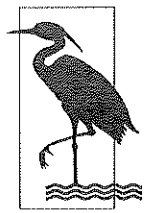

THE
HURON RIVER
WATERSHED
COUNCIL

The Huron River Watershed Council
1100 North Main Street, Suite 210
Ann Arbor, Michigan 48104
(734) 769-5123
www.hrwc.org

Funded in part by MDEQ and EPA.

The Huron River Watershed Council is a public, nonprofit coalition of local communities and residents established under Michigan's Local River Management Act in 1965 to protect the Huron River and its tributary streams, lakes, wetlands and groundwater. The Council works to inspire attitudes, behaviors and economies that effectively protect, rehabilitate and sustain the Huron River system.