Citizen's Guide *to* Land Use Planning

By Lisa Brush and Anne Monnelly

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Second Printing

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Introduction to the Citizen's Guide to Land Use Planning

In Michigan the most important land use decisions get made at the local level. This document is a hands-on tool for working with your local government to protect water resources by positively affecting land use decisions. It is intended as an introduction to both water resources and land use planning. Anyone who is just learning to work effectively with their local government to protect rivers, lakes, wetlands, and other water resources in their community should find this booklet valuable. Whether it's the role of the land in the water cycle, soil erosion, or zoning issues, we hope you'll learn something new here. We also hope these readings stimulate you to learn more and continue to become more effective in participating in your local land use decisions.

Chapter One gives an overview of different aspects of the water cycle (which we call water cycle jobs) and explains how different land uses and development patterns can impact the water cycle. Chapter Two explains how land use decision making works at the local level, presents ways for you to get involved in the planning process, and explains how to use your local planning documents to protect water.

If we are to preserve our water resources intact for future generations, we must plan for the future. It is your informed voice that can help us all work together to preserve the living legacy we have!

Introduction to the Huron River Watershed

Introduction to the Huron River Watershed

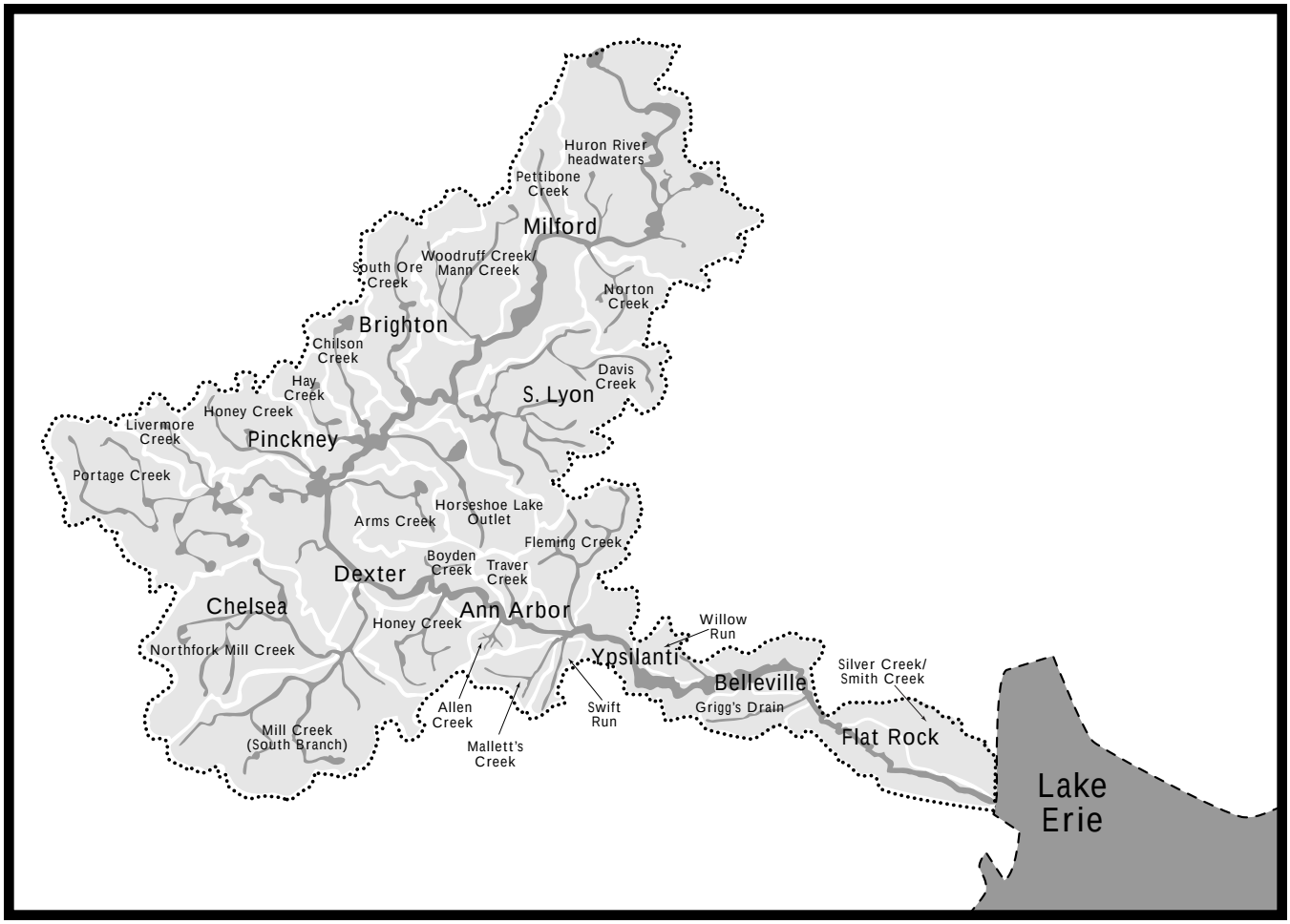


Figure 1: The Huron River Watershed covers 908 square miles of land. This land drains into the Huron River which in turn drains into Lake Erie.

Does the boundary around the map shown in Figure 1 look familiar to you? It's not a political border, and you won't find it on most road maps. It's a naturally formed boundary that marks the edges of the Huron River Watershed, which is the geographical area covered by this workbook. Anyone with an interest in protecting local rivers, lakes, streams, wetlands, and other water resources will most likely become familiar with this boundary and her or his community's location within it.

What is a watershed?

The hills and valleys of the land we live on form basins which catch water and direct it downhill toward a river or lake. These catchment basins are also known as watersheds. A watershed is all the land that drains to any body of water. (See Figure 2.) Watersheds can vary in size from several square miles to thousands of square miles. The small creek in your neighborhood has a watershed, as do the Great Lakes. The boundary separating one watershed from another is marked by high points or ridges on the landscape. Rain that falls on the ridge between two watersheds can contribute to either watershed, depending on which side of the ridge it flows down.

The Huron River Watershed

In Michigan, the difference in elevation between the high and low points on the landscape is relatively modest. You have almost certainly crossed over the Huron River Watershed divide and may not have even noticed. This is because the hills that mark the edges of the watershed are small; the highest point is only 1,018 feet above sea level. From this point, the river falls 446 feet on its journey to Lake Erie at 572 feet above sea level. (This 446 foot drop is about equal to

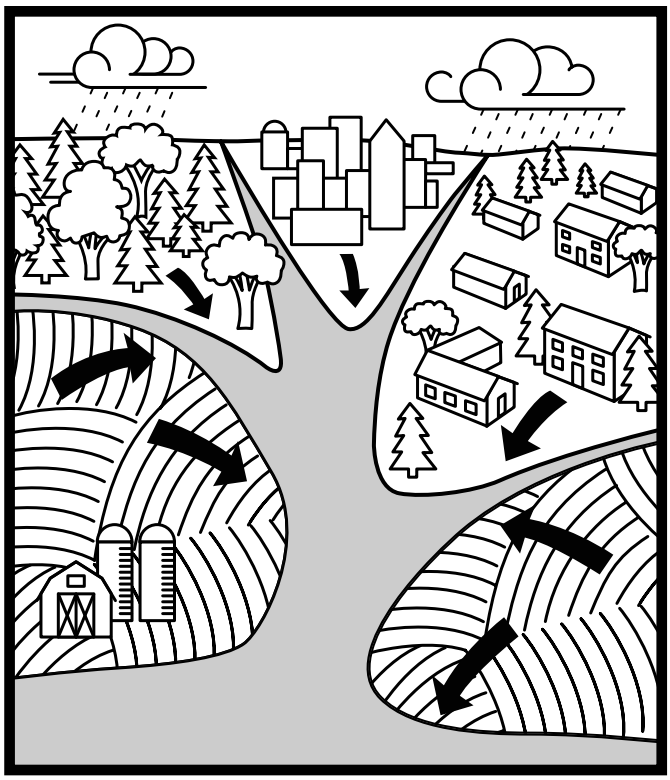


Figure 2: Much of the precipitation that falls within a watershed eventually flows to the river (or other water body). All of this land makes up the watershed.

a 34 story building. The Renaissance Center in Detroit is 39 stories tall.)

The Huron River Watershed covers 908 square miles of land and is home to 525,670 people (as of 2000). It includes parts of seven counties: Oakland, Livingston, Jackson, Ingham, Washtenaw, Wayne, and Monroe; 38 townships; and 19 cities and villages.

The Watershed is bounded by five other watersheds: the Raisin River Watershed to the south, the Grand River Watershed to the west, the Shiawassee and Clinton River Watersheds to the north, and the Rouge River Watershed to the east (Figure 3).

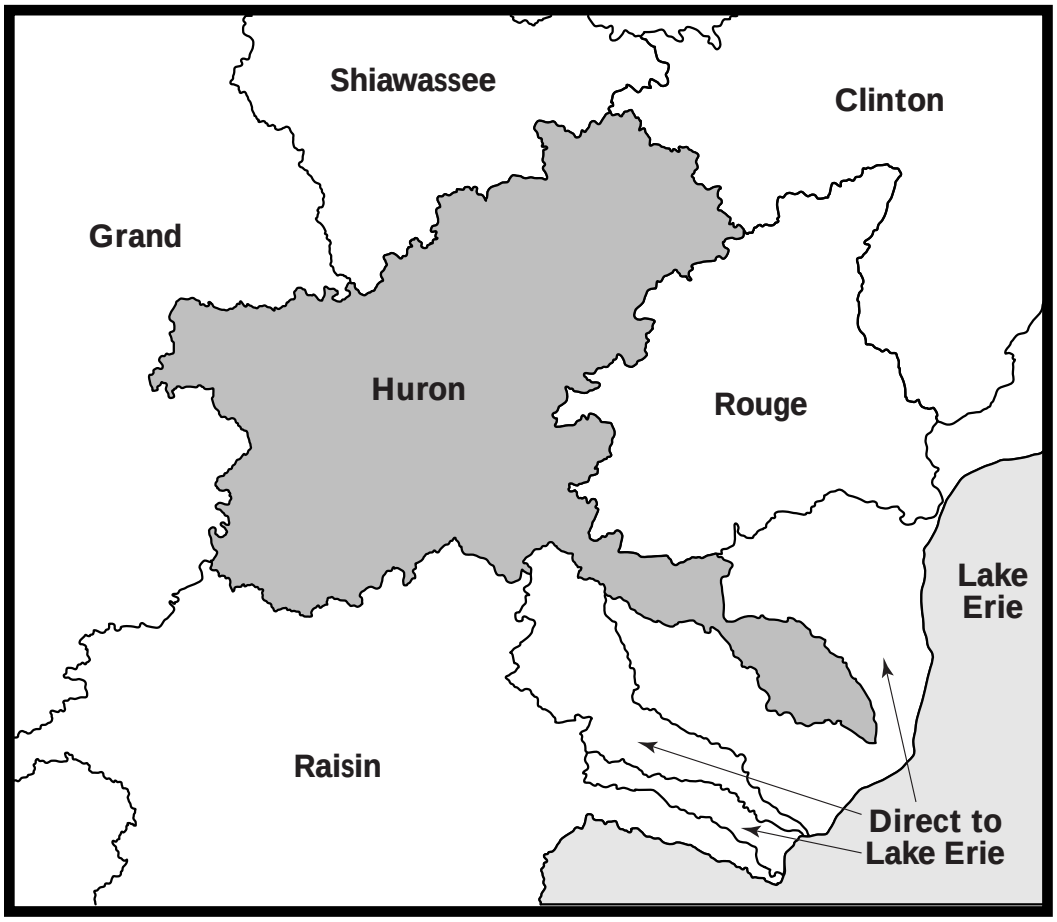


Figure 3: The Huron and its surrounding watersheds

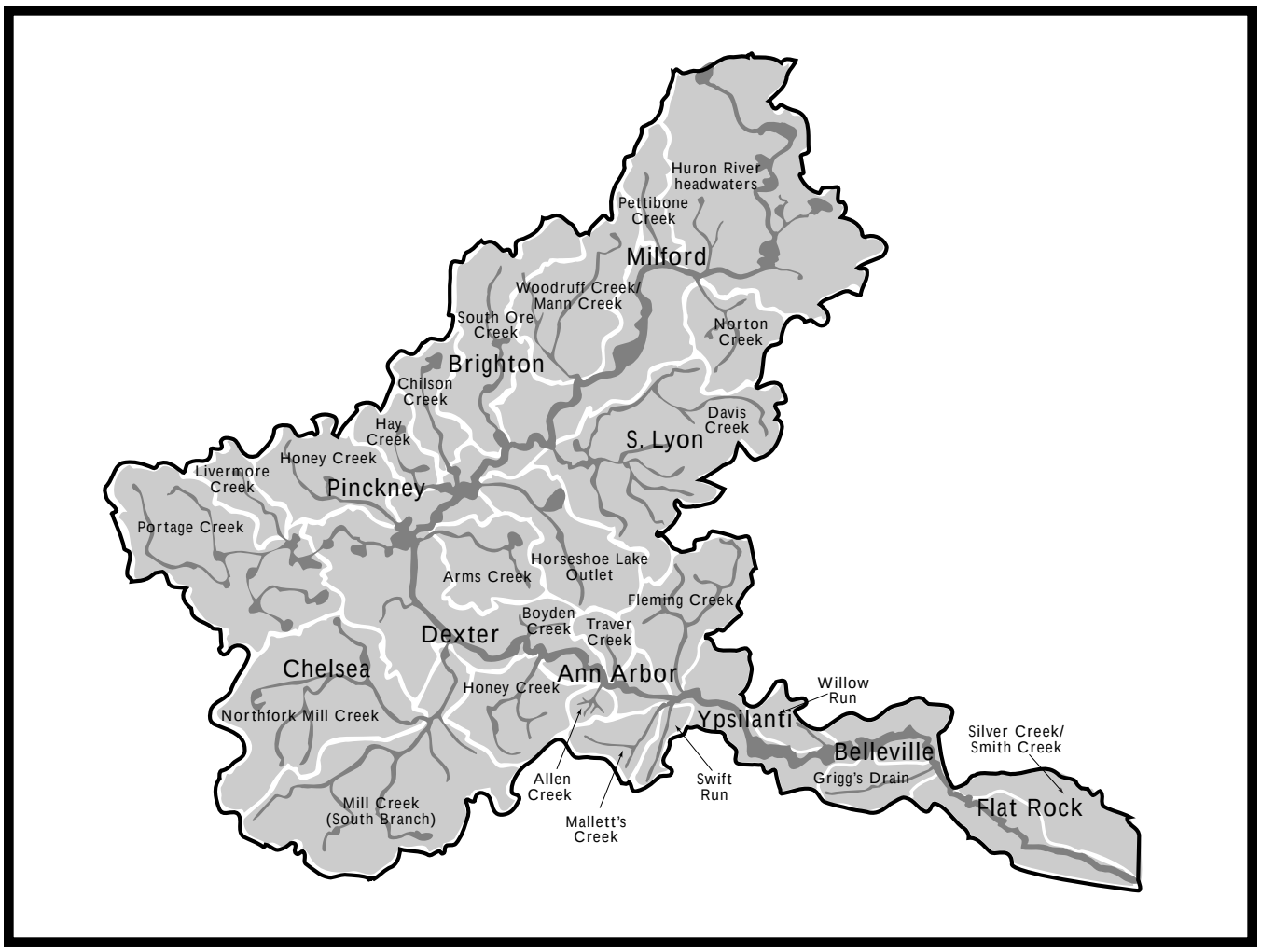


Figure 4: The Huron River Watershed

Tributaries are smaller creeks and streams that feed into a larger river. The Huron River has 34 major tributaries. Like the Huron River and its watershed, each tributary has a smaller area of land that drains water to it. These "mini" watersheds are nested within the Huron River Watershed; they are often called subwatersheds, subbasins, or creeksheds. In this workbook we will use the term creekshed. The Huron River Watershed contains 34 major creeksheds.

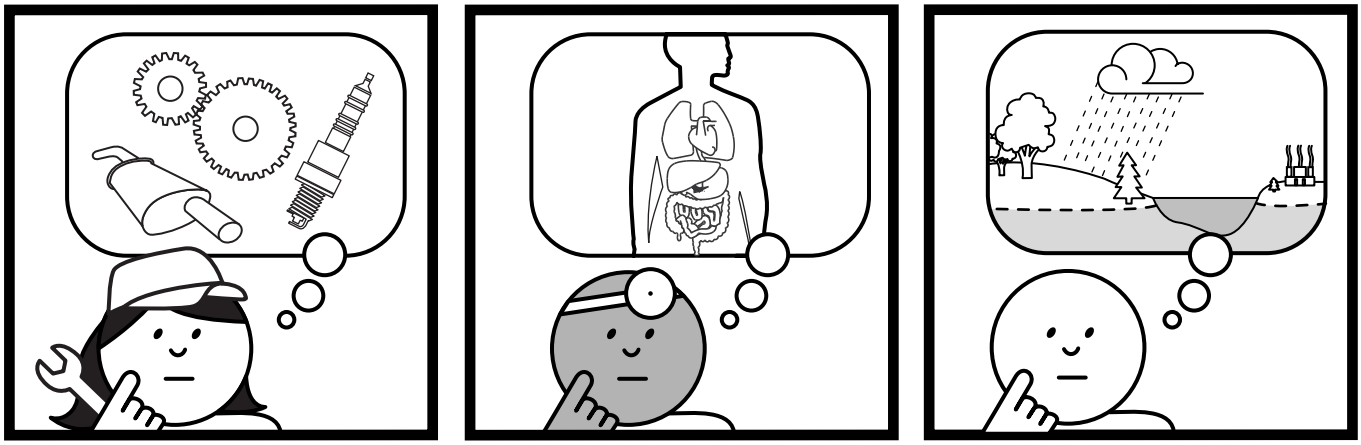
Do you know your watershed address?

Can you locate your community on the map shown in figure 4? Do you know which creekshed you live in? Look at the map above to begin to get an idea of what is your neighborhood creekshed. If you need to, do a little more research—consult a topographic map, explore the area and discover your neighborhood creek! You can call the Huron River Watershed Council's Adopt-A-Stream Program (734/769-5971) to learn more about your creek.

Now that you are oriented, let's begin with the connection between land use and water quality.

Chapter One:
The Connection Between Land Use and Water Quality

The Connection Between Land Use and Water Quality



Overview:

Do you know what factor has the greatest impact on the quality of water in the Huron River and all the lakes, streams, wetlands, and other water resources in the Huron River Watershed?

If you answered "land use," you are at least one step on your way to learning how to protect water resources; you have recognized one of the major issues of concern.

The major objective of this chapter is to explain how our use of land affects water resources. We will begin by learning some basics about how water is stored on the land and how water moves from the earth to the atmosphere and back. This process is known as the water cycle (Figure 5). How is water kept clean? How are floods handled? Which parts of the land hold water?

Once we develop a working vocabulary and understanding of important water cycle terms we will bring people into the picture. What kinds of changes do people make to the land? How do these changes affect the quality of our waters?

By the end of this chapter you will understand:

- The many important roles of land in the water cycle
- Why every activity that occurs in a watershed affects the quality and condition of the water that drains from that watershed

The Role of Land in the Water Cycle

Introduction

Just as a mechanic needs to know how an engine works, and a doctor must understand the functioning of the human body, anyone who wants to protect water resources needs to understand the land's role in the water cycle.

The water cycle refers to how water moves or "cycles" from the atmosphere, to the ground, through the landscape, and back to the atmosphere. Our discussion will focus on the parts of the cycle that occur in and on the landscape because this is the place where our actions can make the most difference.

Although we all realize that the land is not really an actor, our discussion will use the metaphor of land as a manager with jobs to do. Our story begins with a rainstorm. What happens to the rainwater once it reaches the land? In other words, how does the land handle its share of the water cycle?

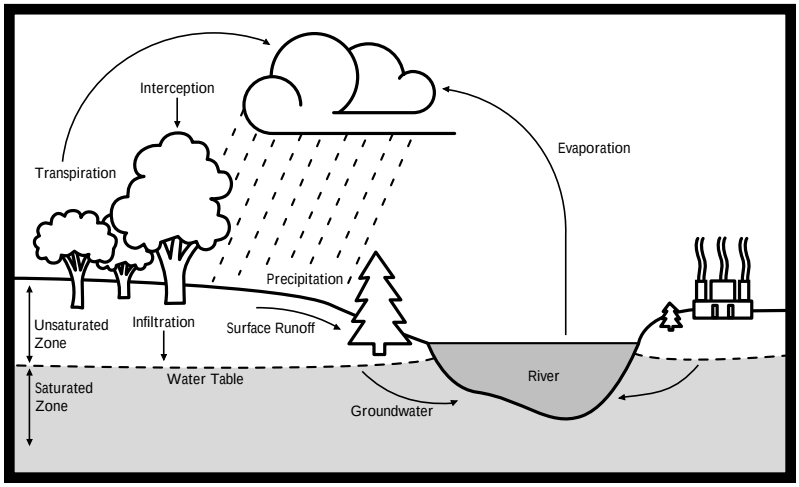


Figure 5: The water cycle

The land receives water from a rainstorm. Some of the water is sent back to the atmosphere through evaporation and plant transpiration (or "breathing"), some is stored in depressions on the surface of the land, some soaks into the ground and is stored in soil, and some runs across the surface of the land. The land naturally balances how much water goes where.

Characteristics of the land such as soil type, vegetation, surface waters, and topography help to determine what will happen to water. These characteristics are often called natural features. Along with helping to determine where water goes, natural features help to keep water clean. We'll refer to the "management jobs" performed by the land and its natural features as the landscape jobs.

The landscape jobs we'll look at are:

- The process of infiltration: how water moves through the soil
- The process of interception: how water is caught by vegetation
- The job of storage: all the ways water is held in and on the land
- The process of transport: all the ways that water moves

Let's take a closer look at how the land and the natural features on it "manage" water.

Landscape Job #1: INFILTRATION

Rain that soaks into the ground filters through the soil in a process called infiltration. Infiltration is the flow or seepage of any fluid (we'll be talking about water) through the soil, sediments, or rocks of the Earth's surface.

Where does infiltration occur?

Well, it's almost easier to talk about where infiltration doesn't occur. There are two situations where it doesn't occur:

- If the surface of the land is covered by a material that doesn't allow water to soak in, infiltration will not occur. Roads and other pavement are examples of surfaces that prohibit infiltration.

- When soil becomes saturated with water (in other words, when all the spaces between soil particles are filled with water), infiltration will not occur because the soil cannot hold any more water.

- When the ground is frozen, infiltration will not occur.

Other than these three situations, infiltration occurs everywhere in a watershed (Figure 6). However, some land areas allow more infiltration than others, and this fact has important consequences. Lands that allow a lot of infiltration can help to replenish underground water supplies. These areas are often called groundwater recharge areas. To learn more about what groundwater recharge areas are and how they work, see the section that follows on saturated soil storage.

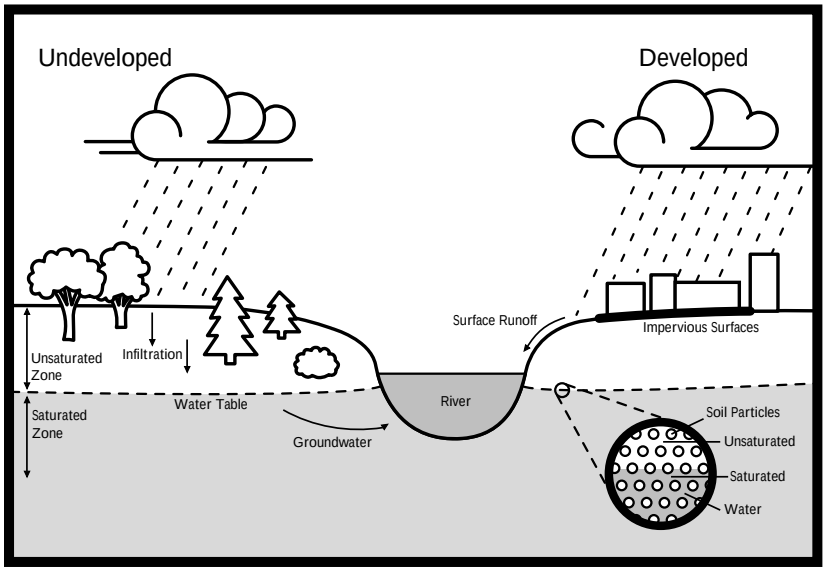


Figure 6: On undeveloped land, rainwater soaks into the ground, or vegetation intercepts it, resulting in very little surface runoff. On developed land, impervious surfaces prevent infiltration and water runs off the surface. Note the groundwater feeding the river, on the left side, providing a stable, cool flow of water. And on the right, the surface runoff provides a rush of water to the river right after a rainstorm.

Why is infiltration important?

- The process of infiltration can help water quality. Many soils can filter out some types of pollutants as water moves through them. The degree of purification depends on the size and type of pollutant in the water and the type of soil it is traveling through. For example, soil can filter out many kinds of bacteria and prevent them from reaching groundwater.

- The process of infiltration can contribute water to underground water supplies. To learn more about how this works, see the Soil Water Storage section on page 10.

- The process of infiltration can provide a stable, cool flow of groundwater to streams and rivers.

Landscape Job #2: INTERCEPTION

Interception is what happens when precipitation (rain, snow, sleet, etc.) is caught (or intercepted) by vegetation (Figure 7). During a rainstorm you've probably seen rain wash down the pavement or carry mud down a dirt road. Have you noticed in the woods how little rain flows across the forest floor? In fact, for a while after the rain begins, you remain quite dry under the trees. The movement of water during a storm is very different before the land is cleared of trees and bushes. Much of the rain is caught by the vegetation, except in very heavy storms. In an undeveloped watershed interception is provided by woods and other areas with lots of vegetation like prairies and shrubby areas.

Why is interception important for water quality?

Interception by vegetation reduces the mechanical power of rain to cause soil erosion. Rain that does get to the forest floor usually trickles down gently. In addition, vegetation has extensive root systems that hold soil in place, helping to prevent erosion.

Did you know?

Soil Erosion and Water Quality

Rain falling on bare soil wears away this precious soil. Did you know that soil erosion leads to one of the biggest pollutants for rivers and streams-mud? Yes, everyday old mud can be a pollutant. Large quantities of mud can be a problem because when they reach water they:

- Increase treatment costs for drinking water
- Clog the gills of fish, insects, and other animals, making it harder for them to breathe
- Cover food supplies on the bottom of water bodies
- Cover eggs laid by fish and other creatures, preventing them from hatching
- Carry with them other pollutants, such as pesticides, making water unsafe for humans and other creatures
- Block light from reaching beneficial plants that live underwater
- Absorb the sun's heat and thereby warm up the water to the point where sensitive and beneficial species can no longer live there

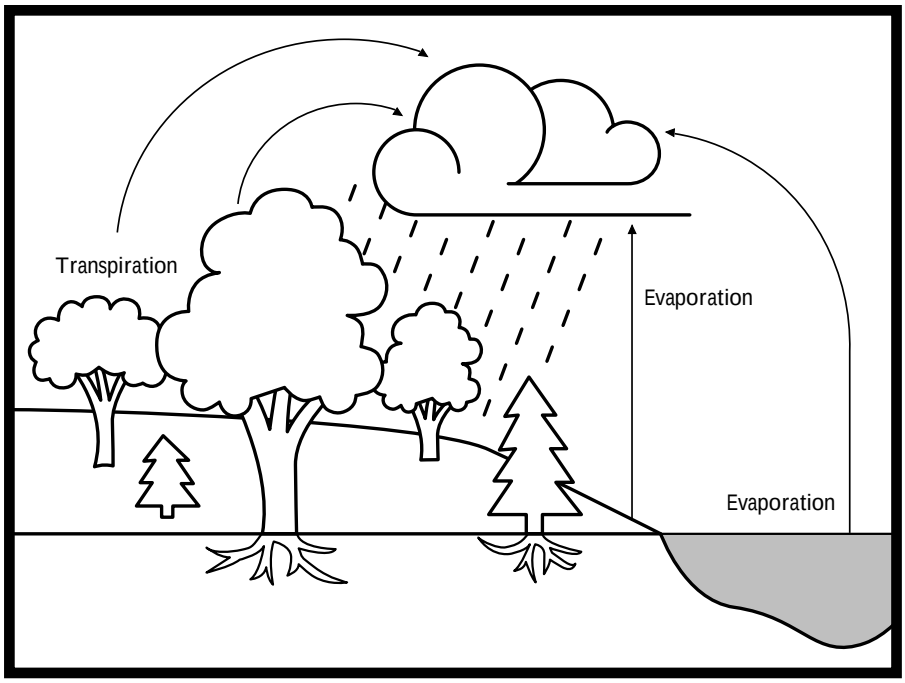


Figure 7: Vegetation intercepts rain and reduces soil erosion.

Landscape Job #3: STORAGE

The landscape has a tremendous capacity for storing water in a variety of ways. Storage provided by the land can take many different forms. Water can be stored in different states—as ice, snow, or liquid—and it can be stored for varying lengths of time—from days to years to decades. There are essentially two ways that land stores water:

- Surface water storage
- Soil water storage

Surface Water Storage

Surface storage is provided by depressions on the surface of the landscape that hold water. Surface storage areas can be as small as puddles or as large as the Great Lakes. Lakes, ponds, puddles, bogs, swamps, reservoirs, and marshes are all surface storage areas (Figure 8). Surface storage areas have storage periods ranging from temporary, to seasonal, to permanent. A puddle may hold rainwater for a day or two until it evaporates, some wetlands may hold water only in the wet season, and a lake or reservoir may hold water for many years.

Surface storage areas are often connected to the groundwater beneath them (see Figure 10). Water can travel out of them and into the ground (see Figures 5 and 6) or water can travel into them from the ground, as in a spring-fed lake.

What services do surface storage areas provide?

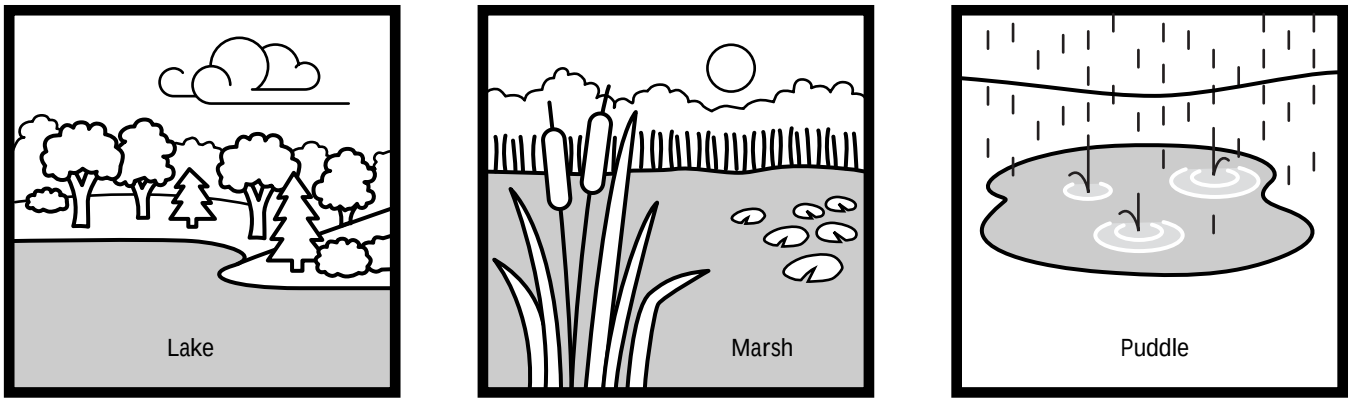
- During and after a heavy rainstorm, surface storage areas often hold excess water, which prevents flooding downriver.
- Many surface storage areas hold water for long periods of time, which allows sediments, like mud, to settle out. See the previous section on soil erosion to learn more about why sediments in water can be a serious problem.
- Some surface storage areas contribute water to underground water supplies.
- Many surface storage areas provide sources of drinking water.

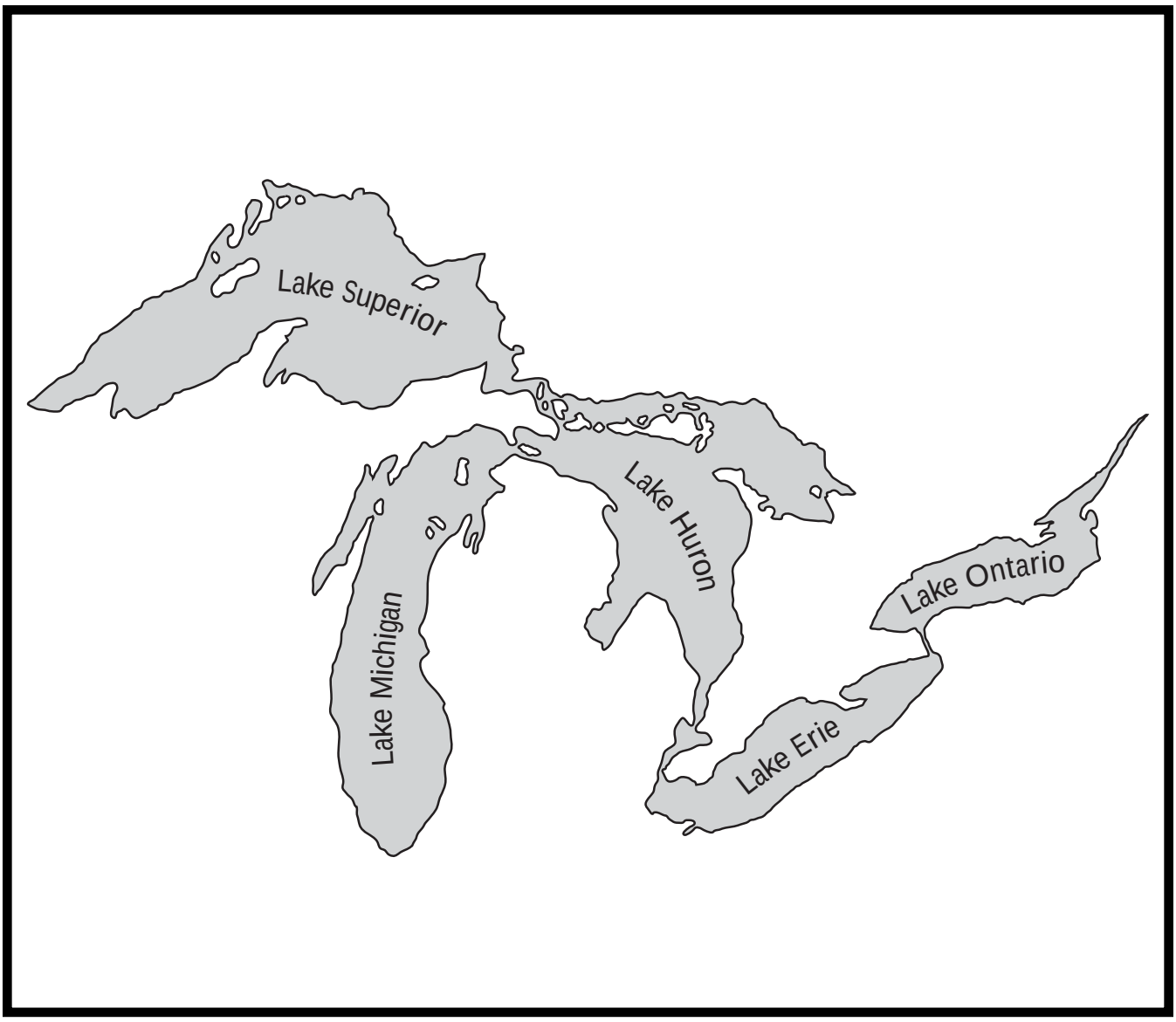
Did you know?

The largest natural surface storage area in the Huron River Watershed is Portage Lake.

Collectively, the Great Lakes basin is the largest freshwater surface storage area in the world. It holds 20% of the world's fresh surface water.

Figure 8: There are many different forms of surface storage areas. Some hold water for a day, others for a season, and still others hold water for many, many years.





The five lakes that make up the Great Lakes basin: Huron, Ontario, Michigan, Erie, Superior. The Great Lakes basin is the largest freshwater surface storage area in the world.

Soil Water Storage

While some water is stored on the surface of the land, the bulk of the precipitation that falls on the landscape soaks into the ground and is stored in the soil. Water moves into and through the soil by the infiltration process described earlier.

Once water enters the soil two things can occur:

- It may be taken up by the roots of plants
- It may move down further into areas referred to as the unsaturated and saturated zones

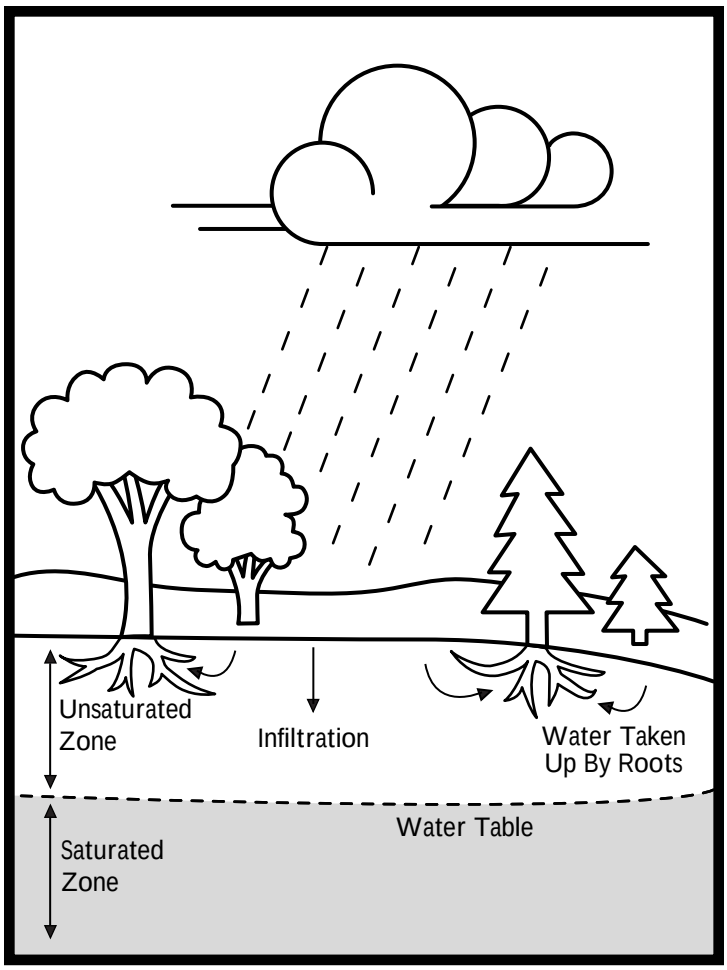


Figure 9: When water enters the soil it is either taken up by the roots of plants or infiltrates down to the saturated zone.

What is the saturated zone?

Soils are said to be saturated when freshwater entirely fills the spaces between clay, sand, gravel, and rock particles underground. Water in the saturated zone is referred to as groundwater.*

Many Huron River Watershed residents use groundwater as their drinking water. Maintaining the quality and quantity of our groundwater is therefore very important. In Chapter Two we will learn about ways to protect groundwater through planning. The information on the next two pages provides a framework to help communities understand groundwater storage so they will be better able to protect it.

**Some people find this terminology confusing. They argue that literally speaking, water in the unsaturated zone is groundwater in the sense that it is water stored in the ground. However, groundwater is actually a technical term and refers only to water in the saturated zone.*

What is the unsaturated zone?

Unsaturated soils have some air in the spaces between the soil particles. Storage of water in the unsaturated zone is usually temporary. Eventually the water is either taken up by plants or it moves down (infiltrates) to the saturated zone (Figure 9). Groundwater recharge is the process whereby water moves from an unsaturated zone to a saturated zone, or directly from a surface storage area to a saturated zone (Figure 10).

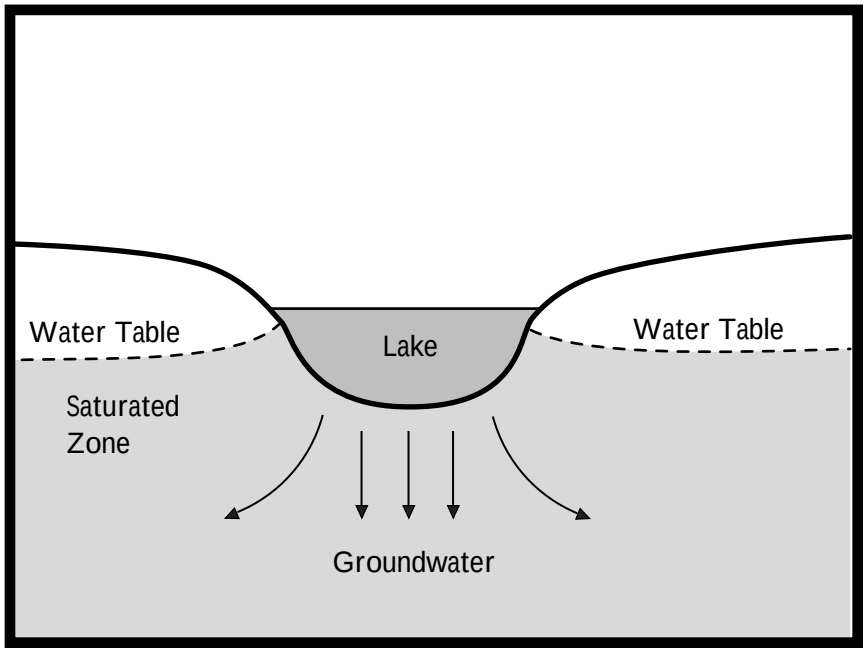


Figure 10: Surface storage areas, like lakes, can recharge groundwater. The opposite is also true: often groundwater migrates to surface storage areas and supplies them with water.

Groundwater Resource Sheet

Depth to Groundwater

The top of the saturated zone is called the water table. (Remember, all the water below this point is groundwater.) The water table line marks the upper surface of groundwater storage. Just as lake levels go up and down with seasons and water availability, so does the water table and hence groundwater availability. The height of the water table (how far down it is from the surface) also varies from place to place. In dry areas such as deserts, the saturated zone may be thousands of feet down. In Michigan, the water table can be at the surface (some of the lakes we see are just surface expressions of the groundwater) or hundreds of feet down, depending on the season and where you are.

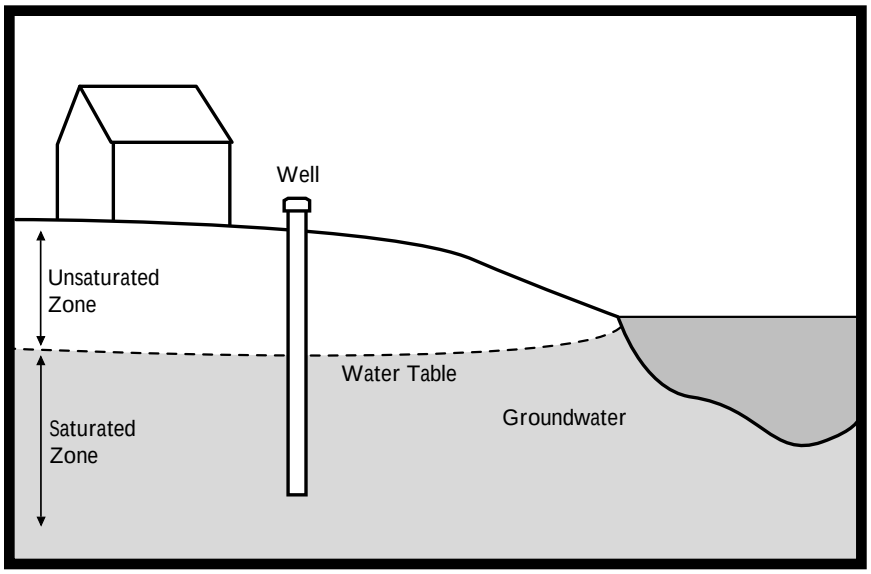


Figure 11: When people drill wells they need to drill down until they find the water table and then drill even further, because the depth of the water table can vary with the seasons.

Quality of Groundwater

Many people use groundwater as their primary source of drinking water (Figure 11). Thanks to the process of infiltration, groundwater is usually high quality water. The process of infiltration can help water quality because many soils can filter out some types of pollutants as water moves through them. The degree of purification depends on the size and type of pollutant in the water and the type of soil it is traveling through.

Movement of Groundwater

Although we refer to groundwater as water that is "stored" in soil, it is actually moving, albeit very slowly. The rate of groundwater flow can range from a foot a day to a foot a decade. Groundwater flows from areas of recharge to areas of discharge. A recharge area contributes water to underground water supplies. A discharge area receives groundwater from springs. Whether an area provides recharge or discharge depends on a variety of factors, including geographic location, soil type, precipitation, and time of year.

Wellhead Protection

If your community supplies drinking water to its residents from municipal wells, you should have a Wellhead Protection Program. Communities in this program are working to protect the groundwater that supplies municipal drinking water. These communities are working to understand the sources of the groundwater that provides drinking water; to learn about the potential sources of contamination of the local water supply; to find ways of managing these sources in order to protect drinking water; to plan for drinking water emergencies; and to educate the public about their drinking water and what they can do to protect it.

Groundwater Resources

- About half of the Huron River Watershed's residents use groundwater as their drinking water.
- Groundwater contributes a significant amount of water to many lakes, rivers, and wetlands in Michigan. During dry summer months, groundwater often provides the only source of water to these surface water bodies.
- Michigan's world famous trout streams are sustained by a plentiful supply of groundwater.

To recap, there are two things that can happen to rainwater once it moves into the soil:

- Water can be taken up by roots of plants
- Water can move into the unsaturated zone or into the saturated zone where it becomes groundwater

Landscape Job #4: TRANSPORT

Transport includes all the ways that water moves over and through the land and how it gets back up to the atmosphere. There are three main types of transport:

- Runoff
- Channel transport
- Transpiration and evaporation

Runoff

Runoff is water that flows downhill across the surface of the land and into rivers, lakes, streams, and other water bodies. Runoff occurs when the land can't store any more water in soil and/or surface storage areas. Actually, in an undeveloped watershed, runoff is rare. It must rain very long and hard before all the storage capacity of the land is filled. Runoff is much more of a problem in a developed watershed; we'll learn why when we talk about the changes people make on the landscape.

Did you know?

27,200 gallons of water fall on a one-acre area in a one-inch rainfall.

Channel Transport

Channel transport is a fancy name for the job performed by rivers, streams, creeks, drains, and any other water bodies that form channels on the land and move water. These systems form major transportation networks for water movement. They move water and sediments across land from higher to lower elevations.

Transpiration and Evaporation

We've talked about how water moves across the land and how it is held on the surface of the land and underground. Eventually some of this water must return to the atmosphere where it will become precipitation and eventually fall back down to earth completing the water cycle. How does water get back up to the atmosphere? There are two major ways: transpiration and evaporation (Figure 12).

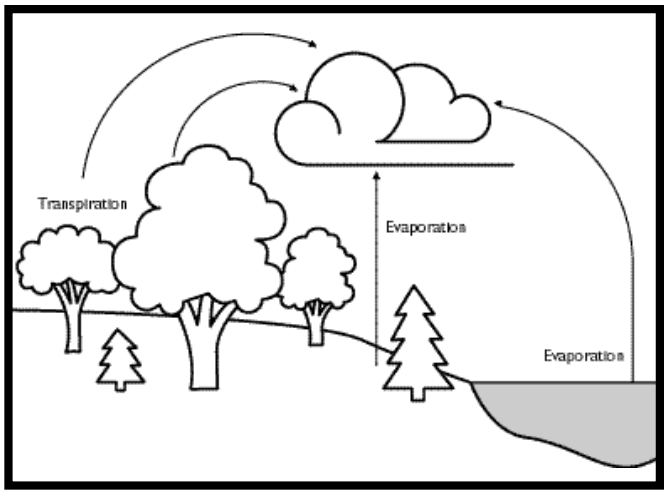


Figure 12: Transpiration and evaporation

- Transpiration is the process by which water leaves a plant. Trees and other plants take up some of the water that is stored in soil. More than 90% of the water they take up is ultimately lost to the atmosphere; most of this loss occurs when water evaporates from the surface of their leaves.

- Evaporation is the process by which water leaves surfaces other than plants, such as the ground, and returns to the atmosphere.

Did you know?

The Huron River drains 908 square miles of land! This is an area the size of about 581,000 football fields.

Did you know?

The general process of water leaving natural areas and returning to the atmosphere is often called evapotranspiration.

The Role of Natural Features in the Water Cycle

This next section will explore the natural features that do the landscape jobs we've just described.

What are natural features?

Up to this point we have referred to land simply as "the landscape." However, there are features on the landscape that help it perform its jobs. In this workbook, we will use the term "natural features" to refer to features on the land that play important roles in the water cycle.

A Brief Introduction to the Natural Features in the Huron River Watershed

- Woodlands (one of the vegetated areas) include hardwood forests of deciduous trees such as oak,maple, hickory, ash, birch, etc. and evergreen forests (Figure 13).

- Prairie remnants, meadows, and other areas with substantial vegetative cover (also referred to as vegetated areas) are open sites dominated by grasses and other vegetation, with few shrubs or trees (Figure 14).

- Surface waters include standing water bodies– lakes, ponds, and wetlands**– and flowing water bodies -rivers, creeks, and streams (Figure 15).

***The term "wetlands" is an umbrella term that includes many natural features. Wetlands are commonly defined as areas having:*

- *Soils that are saturated for part of the growing season*
- *Plants that can grow and reproduce in saturated soils*

Michigan's wetland laws clump the many different wetland types into three categories: marsh, swamp, and bog. Marshes have open water areas and usually dry down for part of the year, swamps are wooded wetlands, and bogs have peaty soils and acidic waters. For more information on wetlands see A Homeowner's Guide to Wetlands, Tip of the Mitt Watershed Council, 1997.

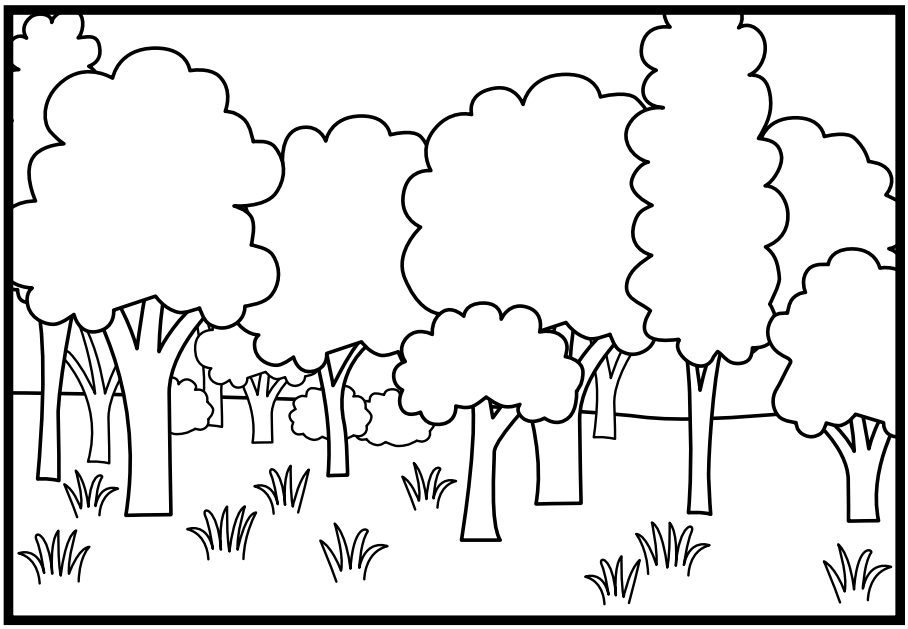


Figure 13: Woodlands

Figure 14: Prairies, meadows

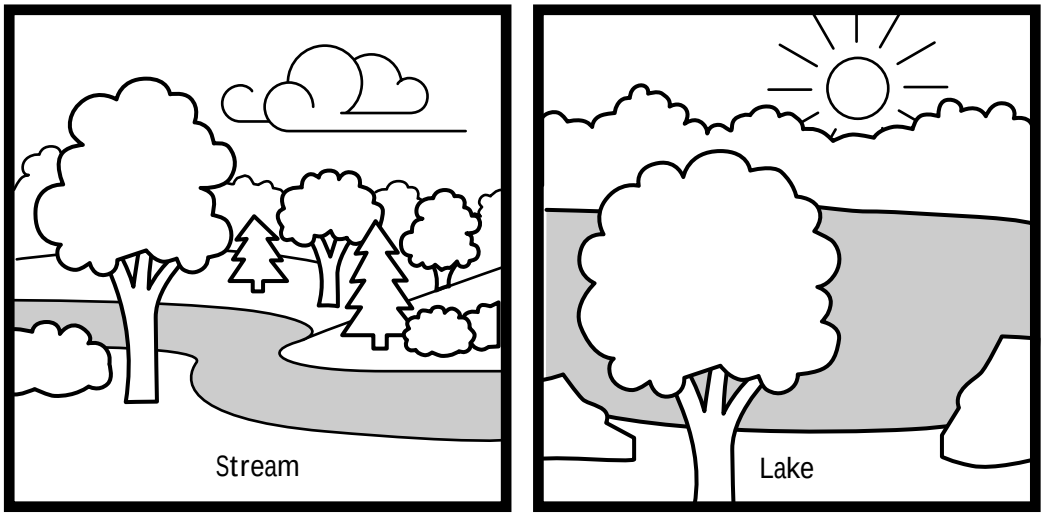
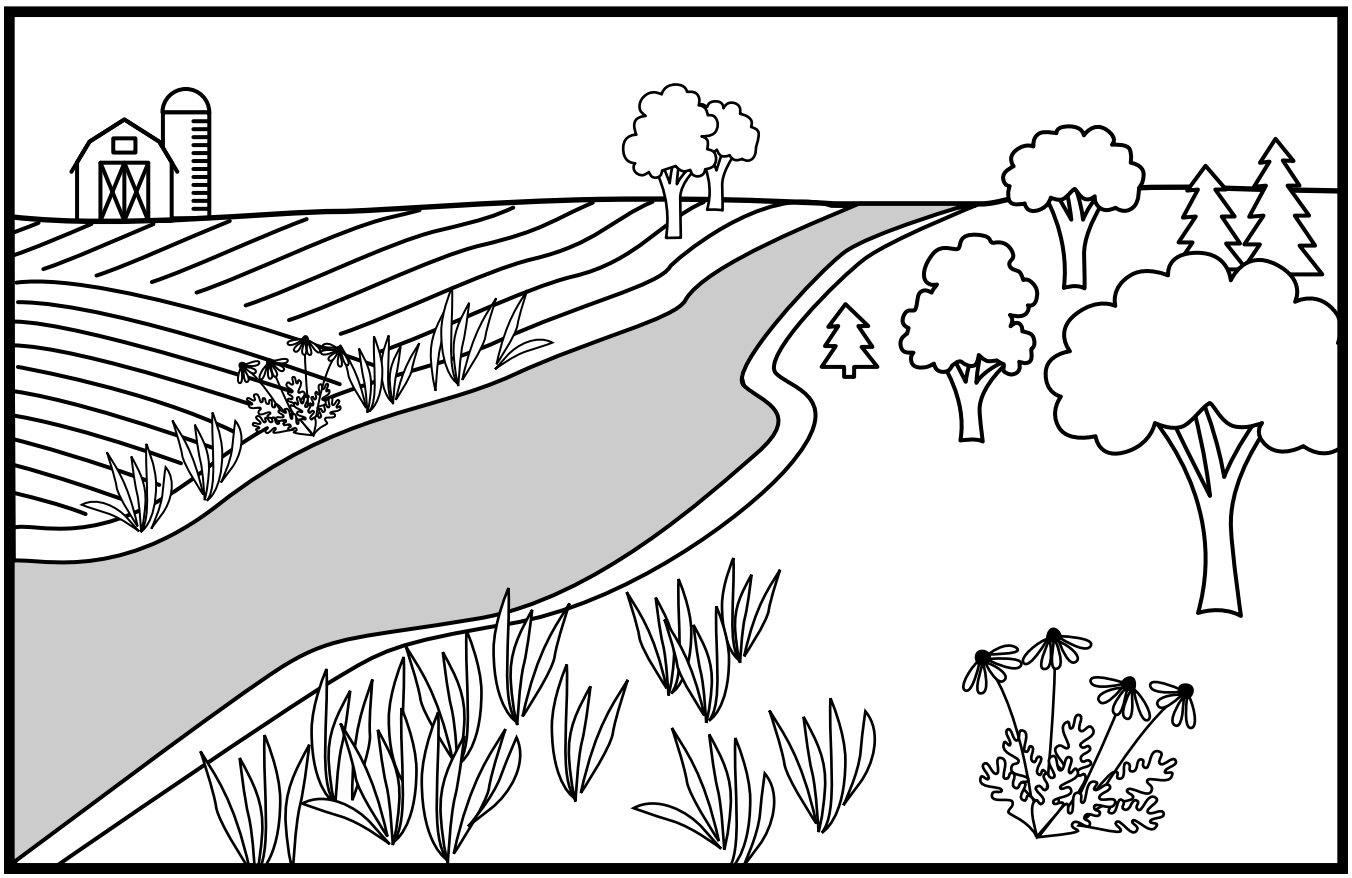


Figure 15: Surface water

- Floodplains are broad, flat lands along a river or stream that normally become inundated during floods, resulting in the deposition of sediments.

Figure 16: Floodplain



The Roles of Vegetated Areas

An important characteristic shared by woodlands, prairie remnants, meadows, and wetlands is the presence of substantial vegetative cover. We'll look at three important roles of vegetated areas in the water cycle, namely reducing erosion, filtering water, and returning water to the atmosphere.

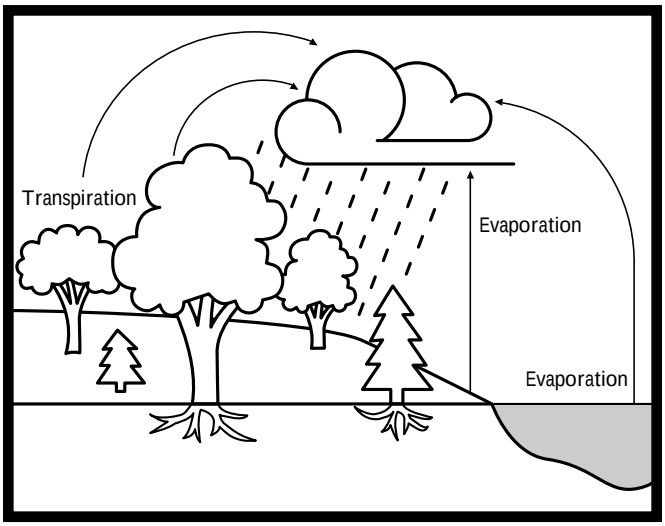
1. *Reducing erosion*
Erosion is a process by which material is worn away from the Earth's surface. It is a naturally occurring process, but sometimes our actions accelerate the amount of erosion that occurs, and this can cause problems for water resources. (Refer to the earlier section on soil erosion and water quality to find out why erosion can cause problems.)

Vegetation helps to reduce erosion by water in several ways:
- Interception-Vegetation "catches" precipitation, breaking its fall and thereby reducing its power to erode
- Soil stabilization-The network of roots helps hold soils in place
- Slowing water down-It slows the flow of water across the land, which helps to reduce the power of the water to cause erosion

2. *Filtering water*
Vegetation can filter runoff and clean it by:
- Slowing flow-Slowing down the flow of runoff allows some sediments to settle out or become trapped in the vegetation
- Using nutrients-Vegetation can take up some nutrients in the runoff and prevent them from running into waterways (See "Did you know?" box below.)

3. *Returning water to the atmosphere*
Vegetation can return water to the atmosphere by transpiration, when water evaporates from the surface of trees' and plants' leaves.

Evaporation is the process that happens when water turns from a liquid to a vapor and rises up into the atmosphere. Transpiration is a technical term that refers specifically to evaporation that occurs on the leaves of vegetation. Trees and other plants take up water that is stored in soil. Most of the water they take up is returned to the atmosphere when water evaporates from the surface of their leaves (transpiration).



Vegetation performs several roles including returning water to the atmosphere.

Did you know?

Nutrients and Water Quality

Excess nutrients can cause two main problems:
- Oxygen depletion
- Eutrophication

Oxygen depletion in water occurs because excess nutrients result in an increase in plant growth. With this excess growth comes a corresponding increase in plant decomposition. The decomposition process takes more oxygen than the plants produce (remember plants take in carbon dioxide and release oxygen) and this results in oxygen depleted water. Aquatic life suffers because the animals that live in water need oxygen to live.

Eutrophication is also the result of increased plant growth. As plant growth accelerates as a result of the excess nutrients, plants fill in the banks, open water areas shrink, and gradually the waterway gets filled in.

The Roles of Surface Waters and Floodplains

Surface waters not only store water, but they move it across the landscape. These waters provide valuable services. Surface waters and floodplains:

- Provide a drainage system for the land
  Rivers, streams, creeks, and drains form channels on the land and move water. These systems form major transportation networks for water movement. They move water and sediments across land from higher to lower elevations.

- Store flood waters
  Lakes, wetlands, and floodplains store flood waters in times of excess precipitation. When a river overflows its banks, the floodplain holds the excess water and slowly releases it back into the river system. Sediment is also deposited in floodplains, keeping it out of the river.

- Trap sediments
  Lakes, wetlands, and floodplains also trap sediments carried in water and allow them to settle out.

Here is a little review. See if you can decipher the landscape jobs described below.

WORD SCRAMBLE

Can you decipher what happens to the rain?

Landscape Jobs

1. Some precipitation is caught by vegetation.
   TCEPRIENOINT

   _____

2. Some precipitation is held in soil.
   LOSI TOARSGE

   _____

3. Precipitation that soaks into the ground filters through the soil.
   ATINILRTIONF

   _____

4. Some precipitation fills up water bodies on the surface of the land.
   ESURAFC TOARSGE

   _____

5. Some precipitation flows across the surface of the land.
   ORFUNF

   _____

6. Some precipitation is used by plants and returned to the atmosphere.
   IATANSIRTONRP

   _____

ANSWERS:

1. Interception 2. Soil Storage 3. Infiltration 4. Surface Storage
5. Runoff 6. Transpiration

Summing Up

The landscape jobs you've just learned about and deciphered in the word scramble—infiltration, interception, storage, and transport-are the jobs we need to protect if we want to protect water resources. It is clear that the natural landscape and the natural features on it are very cost-effective water resource managers. They "manage" water by storing it, filtering it, replenishing underground drinking water supplies, and feeding water bodies with runoff and groundwater. In fact, if we keep them intact, they do the job for free!

If the landscape were "managing" water perfectly in the Huron River Watershed there would be no need for this workbook. However, we have not yet discussed the impact of people and their actions on the land. In the next section, we'll talk about the ways people have changed land in the Huron River Watershed and how our changes affect the ability of the land to perform its water cycle jobs.

Our Role in the Water Cycle

Introduction

The landscape description earlier in this chapter doesn't take into account the actions of people on the land. People interact with the landscape and change it in many ways. The development we introduce has many impacts on the way the landscape performs its water cycle jobs. This section is broken up into four parts. We'll talk about how the landscape changes as a watershed becomes developed and what the consequences of these changes are for water resources. We will examine:

- Developing Watersheds: Moving from Natural Features to "Human Features"
- The History of Land Use Change in the Huron River Watershed
- How We Change the Landscape: Development Trends
- What Do the Changes Mean for Water Resources?

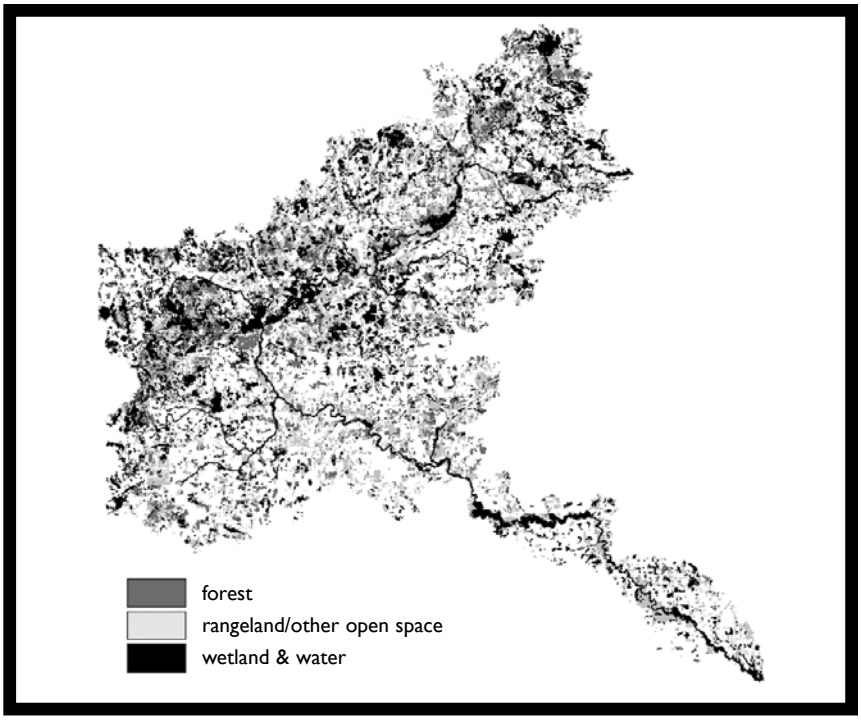


Figure 18: Current land use in the Huron River Watershed

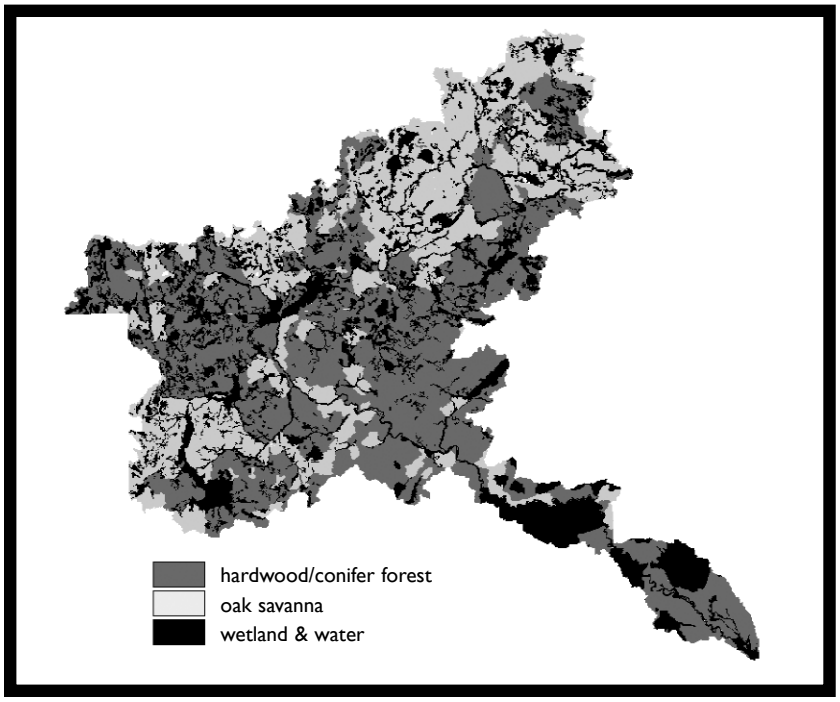


Figure 17: Pre-settlement natural features in the Huron River Watershed

Developing Watersheds: Moving from Natural Features to Human Features

Undeveloped Watershed: Landcovers in the Huron River Watershed

In this map (Figure 17) of the Huron River Watershed you can see what natural features covered the land before European settlers moved into the area.

The map in Figure 18 shows how the land looked in 1995. Think of all the landscape jobs that have been lost!

In comparing these two maps of the Huron River Watershed, notice we have retained some of the natural features that existed before the watershed was settled by Europeans, and we have replaced some of them with "human features" represented by the white areas on the map in Figure 18. Human features are land uses introduced by people. They include residential, commercial, industrial, recre-

ational, and agricultural uses. Local land use laws decide where different land uses will be located. In Chapter Two we will look closely at some of these land use laws.

From here on our discussion will talk about how the water cycle works in watersheds that have these human features as well as natural features.

The History of Land Use Change in the Huron River Watershed

When we talk about pre-European settlement we refer to a time before the early 1800s. The last two centuries have seen dramatic changes to the land. Waterways have been dammed for power and mills, wetlands have been drained to grow crops, and we have paved over large areas of land to build houses, roads, and businesses. In the last thirty years southeast Michigan has experienced major growth and development and these pressures continue. In comparing figures 17 and 18 you can see the changes in land use over the last 200 or so years.

Land Cover/Land Use in the Huron River Watershed

	early 1800s	**1978**	**1995**
Natural Features (as a percentage of total land cover)			
Deciduous forest	45%	12%	11%
Prairies/grassland	29%	1%	1%
Non-forested herbaceous			17.5%
Lakes and streams	3%	2%	4.6%
Wetlands	23%	11%	12.5%
Land Use			
Urban and suburban	0%	8%	26.7%
Agricultural	0%	66%	26.7%

Note- The urban and suburban land use category includes residential, commercial, and industrial lands. Also, the non-forested herbaceous category may include some prairie remnants and grasslands, but also includes fallow agricultural fields.

Do you know what the natural feature/land use mix is in your community?

Land Use
Urban and suburban _____%
Agricultural _____%

Land Cover
Deciduous Forest _____%
Lakes and Streams _____%
Wetlands _____%
Barren _____%
other _____%

If you're not sure, go ahead and guess. You will learn how to find out in Chapter Two.

How We Change the Landscape: Development Trends

How do we alter the landscape with residential, commercial, industrial, and agricultural development? How do these changes impact the landscape's ability to perform its water cycle jobs? A closer look at some common development trends should help to answer this question.

In this section we'll look at two traditional development trends that are occurring in the Huron River Watershed. We refer to these development practices as "traditional" only in the sense that they represent the most common ways development has occurred in recent years. There are alternatives to these trends. They will be discussed in some detail in Chapter Two. The trends we will discuss here are:

- Losing Natural Features
- Paving Paradise

Development Trend 1: Losing Natural Features

There are a number of landscape changes that are associated with residential, commercial, industrial, and agricultural land uses. We will focus on two of the most common alterations of land:

- Clearing land of vegetation
- Draining and/or filling surface storage areas

Clearing Land of Vegetation

Whether the proposed land use is a residential subdivision, industrial park, retail area, or cornfield, the first step

of development is almost always the same. Most or all of the land area is cleared of vegetation. Woodlands, meadows, and shrubby areas are all removed.

If your community is currently experiencing development you may have noticed this trend. Often the natural features we lose when we clear land are replaced with lawns.

Development also often builds right to the edge of water bodies. When this happens the natural buffers for the water are gone.

How does clearing the land of vegetation affect water cycle jobs?

In a nutshell, we lose the functions that vegetated areas provide. The water cycle jobs we lose are:

- Erosion control
- Water filtration
- Water return

Draining and/or Filling Surface Storage Areas

During development, surface storage areas like wetlands and floodplains are often drained or filled. In order to make Michigan more hospitable to settlers, the Michigan Drain Code was enacted and provided a means for wetlands and other areas to be drained so they could be settled and farmed. Development has also often resulted in filling wetlands to provide suitable conditions for building.

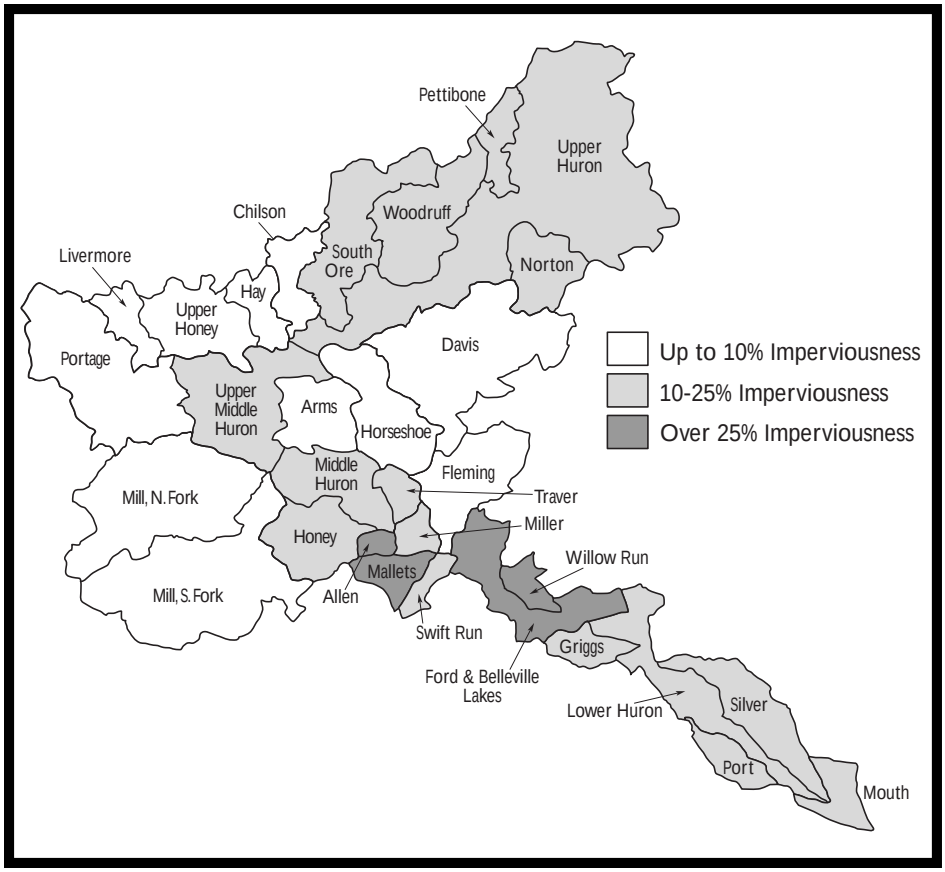
What are the results of draining and filling?

With these actions many landscape jobs are lost in one fell swoop. Draining and filling both reduce the land's capacity to store water. Water that would have been held will now become runoff.

Development Trend 2: Paving Paradise

An impervious surface is any surface that stops rainfall from soaking into the ground. Roads, parking lots, sidewalks and rooftops are impervious surfaces. Even soils can become compacted and impervious. General trends indicate that more people in a watershed almost always leads to more impervious surfaces because we build more roads, houses, and parking lots.

Figure 19: Imperviousness in the Huron River Watershed



Do you know how much of the land in your community is covered with impervious surfaces? The map in figure 19 shows impervious surfaces in the Huron River Watershed in 1995. It illustrates the trend we just described. The dark areas are the most populated areas in the watershed and they have the greatest amount of impervious surfaces.

How does paving affect the landscape jobs?

Figure 20 shows that as we develop watersheds we decrease the amount of infiltration that can occur. Water that falls on the land is

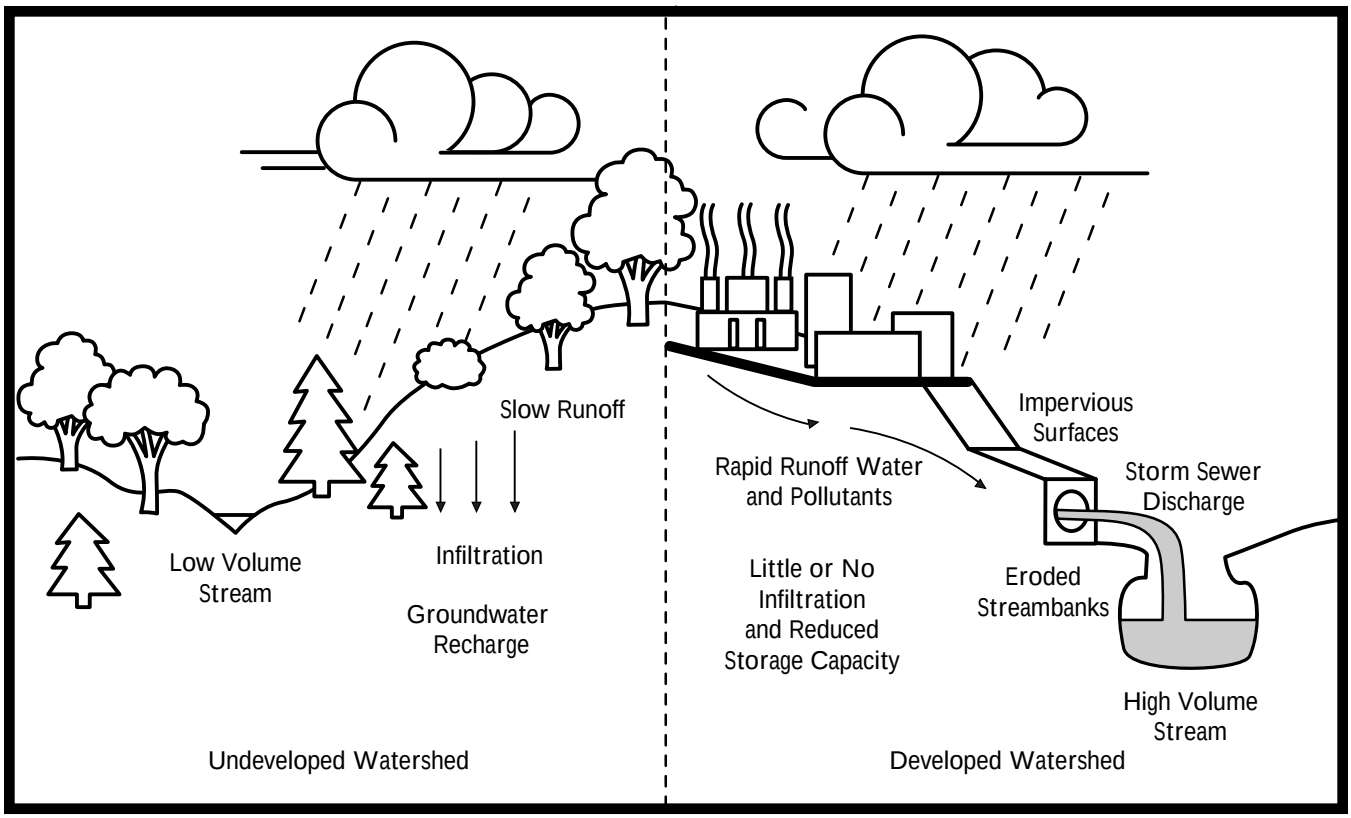


Figure 20: Less infiltration results in less soil storage and more runoff.

blocked by impervious surfaces. Reduction in infiltration leads to less storage. Reduction in infiltration and storage capacity results in a large increase in the amount of runoff that occurs every time it rains. This is because all the water that is not allowed to infiltrate becomes runoff.

But what can I do about it?

At this point you may be wondering whether you have any control over the loss of natural features and the amount of impervious surface in your community. The answer is yes! Chapter Two will show you how.

What Do the Changes Mean for Water Resources?

By now you've probably gotten the point: The water cycle changes when we include the actions of people on the landscape. We've talked a lot about the changes that occur but we still need to discuss what the changes mean for the health of our water resources.

Let's revisit the ability of land to manage rain. Remember we learned that in a less developed watershed, land and the natural features on it manage water very efficiently.

- Some stormwater is intercepted and taken up by forested areas. These areas reduce the power of rain to cause erosion.
- Some stormwater soaks into the ground and may eventually replenish underground drinking water supplies, and some is held in surface storage areas such as wetlands.
- When all these storage areas become full, the remaining water, which is usually a small percentage of the original rainfall, flows over the land as runoff. The land it flows across is covered with vegetation and so the runoff remains clean.

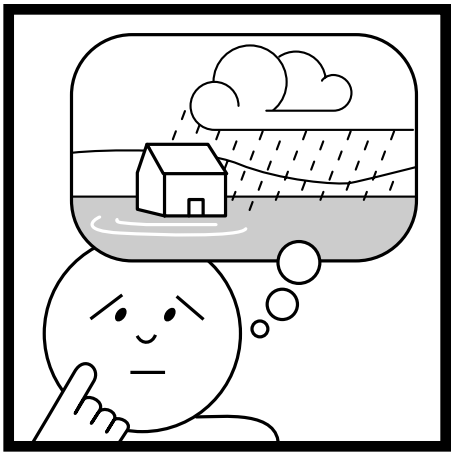
In a developed watershed the natural landscape is often significantly altered.

- Impervious surfaces prevent water from soaking into the ground.
- Important vegetation areas, such as woodlands, are cleared for new development.
- Surface storage areas, such as wetlands, are commonly filled or drained.

- Surface storage areas, such as rivers, lakes, and streams, are overtaxed and cannot store all the water that is flowing into them.

The overall ability of land to manage water from storms is changed as a result of these alterations. The water cycle jobs are not being done well because

"The river hardly ever used to get this high. What has changed?"



the natural features that help to perform the jobs have been impacted by human alteration of the landscape. There are several major consequences for water resources. Let's take a look around the Huron River Watershed to see how water resources are being impacted when it rains.

Why are there more floods?

Scientific studies of recently developed watersheds have reported some startling results. Some studies found areas that in the past experienced one flood every five years and are now facing five floods in one year. The average number of precipitation events per year has not changed. Many urban and suburban areas are also experiencing higher and more intense flows each time it rains. What is causing these changes?

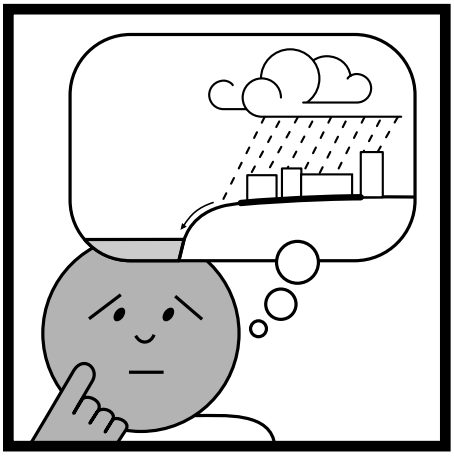
In developed watersheds, flows are higher because more water is running off each time it rains. Instead of soaking into the ground and reaching water bodies slowly (as a mix of groundwater and a little runoff), most stormwater now reaches water bodies as runoff. Runoff travels across the land rapidly and enters water bodies shortly after a storm event.

Thus:

- Water bodies receive a greater volume of water at one time.
- Channels aren't shaped to hold the new larger amounts and banks flood.
- Runoff water also has greater velocity, because it is not slowed by vegetation, and therefore more power to scour and erode as it moves.

What are the costs of increased flooding?

- Loss of life
- Expensive flood damage to property, including loss of property and loss of frontage
- Damage to stream banks, bridges, and road crossings
- Stream channels scoured by powerful floodwaters, increasing erosion and destroying habitat for many fish species
- Loss of valuable topsoil, often resulting in increased fertilizer use



"I thought rainwater was clean. Runoff is just rainwater so why is everyone saying that it's a source of pollution?"

Why is runoff a concern?

In developed areas runoff is often a serious source of pollution. The water quality of runoff is determined by the condition of the landscape it flows over. Impervious surfaces in urban and suburban areas tend to collect many different pollutants, including soil, nutrients, pesticides, herbicides, animal wastes, oil from cars, and metals. Runoff flows over these impervious surfaces, picks up the pollutants that accumulate there, and delivers them to nearby water bodies.

Often, stormwater is collected from parking lots, rooftops, and roads, and piped directly, without any treatment, into water bodies.

As water flows over these impervious surfaces, it also heats up quickly. As a result, water that is warmer than it would be if it were slowly filtered is delivered to water bodies. Many of the plants and animals living in the water depend on cool, oxygen rich water.

What are the costs of lost water quality?

- Increased costs to treat community drinking water
- Public health concerns
- Lost recreational potential
- Lost fisheries
- Increased levels of contaminants that harm aquatic life
- More nuisance algae blooms

THESE TRENDS ARE NOT INEVITABLE. YOU CAN HELP TO CHANGE THEM. CHAPTER TWO WILL SHOW YOU HOW!

What can we do to reduce our impact on the water cycle?

One of the most important tools we have to change land use trends is LAND USE PLANNING. The rest of this workbook will present ways for communities and individuals to reverse these trends using land use planning that considers watersheds and the importance of maintaining a landscape that can perform its water cycle jobs.

What could this type of land use planning look like?

The ABC's of Water Resource Protection

We can protect the water cycle by protecting all the parts. We can start to protect our lakes, rivers, and wetlands by establishing goals for changing the development trends we talked about. The goals could include:

A) Protecting natural features

Identify areas and protect them, guide development elsewhere.

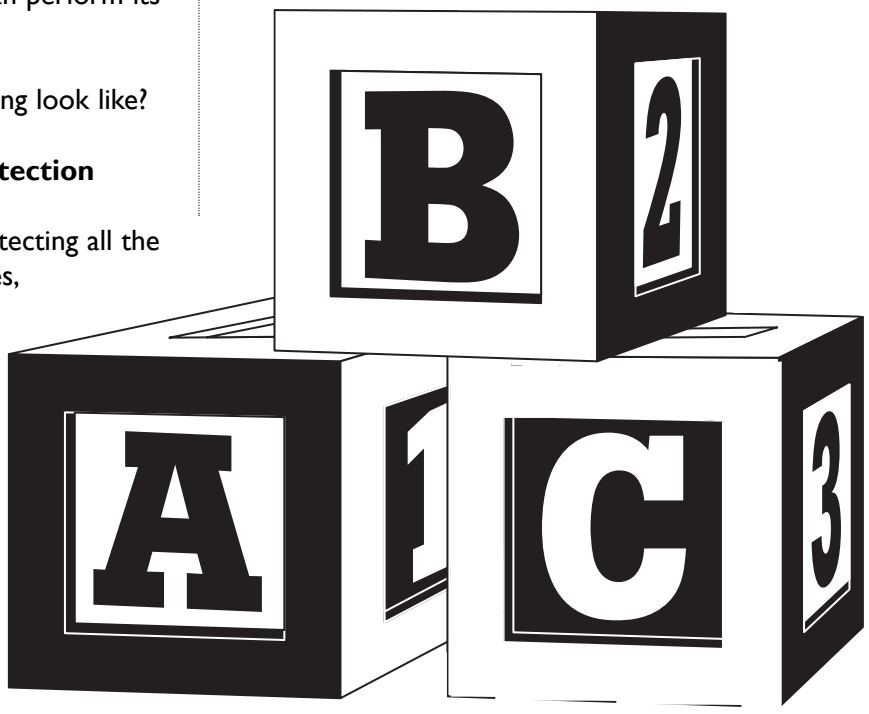
B) Reducing impervious surfaces

Reduce hard surfaces that don't allow water to soak into the ground or have vegetation to slow the flow of the runoff.

C) Where development is to occur, minimizing impacts on the water cycle functions with best management practices

Best management practices are tools that can help minimize our impact on natural features. Most of the best management practices we will discuss enhance the land's ability to manage stormwater. For example, if a development will destroy a surface storage area, it could be replaced by another that performs the same water cycle jobs.

The ABC's represent land use planning that considers watersheds and the importance of maintaining a landscape that can perform its water cycle jobs. Chapter Two will discuss ways to incorporate the ABC's into our growth and development plans.



Chapter 2:
Local Government

Local Government

Introduction

In Chapter One we learned how different land uses and development patterns can impact water resources. As you read about the effects of land use you may have thought, "Okay, so land use is important, but how do I influence it? Who decides how the land should be used in my community? How can I be involved in those decisions?" In this chapter you will find the answers to these questions.

Land use decisions are influenced by federal, state, and local laws and public comment. Your local elected and appointed officials play a very important role. In Michigan, we are guided by the home rule principle, which means that state planning laws give substantial decision making power to local governments. Because of home rule many important land use decisions are made at the local level. The good news about this is that everyone can participate in local government, and it works best when we are all involved.

The major objectives of this chapter are to explain how land use decision making works at the local level, to present ways for you to get involved in the planning process, and to explain how to use planning documents to protect water. We will begin with an introduction to the structure of local governments in Michigan and in the Huron River Watershed. Next, we will learn about the planning documents used when making land use decisions. Lastly, we will cover the major local government bodies that make land use decisions. Throughout this chapter our approach will be interactive. We will provide follow-up activities that allow you to evaluate your community.

By the end of this chapter you will understand:

- How land use decisions are made in your community
- How your local government can protect water resources and how you can help assure that it is successful
- How you can use your local laws and planning documents to protect water resources

Let's start with an introduction to the structure of local governments in Michigan and in the Huron River Watershed.

Municipal Boundaries

Our discussion of local land use decision making must begin with an introduction to municipal boundaries. Municipal boundaries have a huge effect on water because many land use decisions that will affect the water cycle are made based on municipal boundaries. Communities in the same watershed often make very different land use decisions. Yet as we discussed in Chapter One, water ignores municipal boundaries and instead moves within watershed boundaries. The Huron River Watershed crosses many municipal boundaries - 64 in fact!

Which local levels of government are making land use decisions?

Figure 21 provides an illustration of the local government structure. In Michigan there are four major units of local government: counties, cities, villages, and townships. Counties are the largest unit-generally covering many hundreds of square miles. Cities vary in size but are larger in population than villages. Townships are almost always 36 square miles. Villages and cities fall within the bounds of townships but have separate land use laws and local government officials.

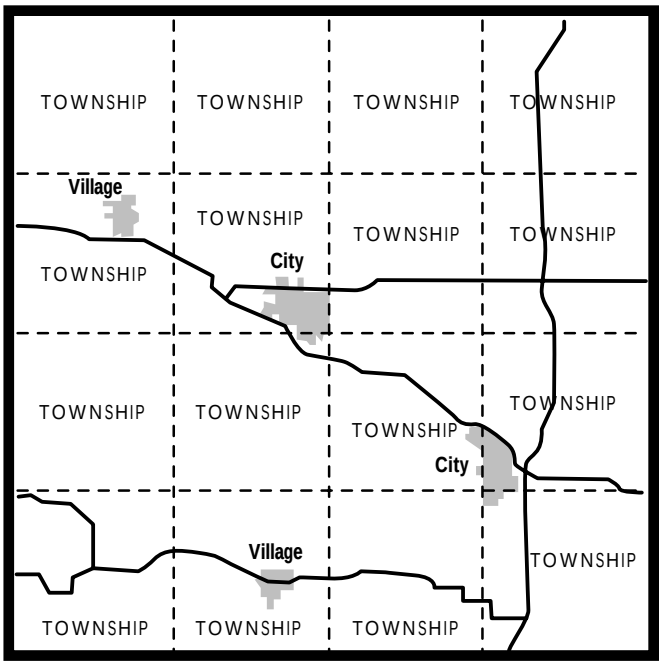


Figure 21: The four levels of local government - county (entire area shown), township, village, and city.

In this workbook, municipality and community will be used interchangeably to indicate cities, villages, and townships.

There are twelve cities, seven villages, and thirty-eight townships within the boundaries of the Huron River Watershed. All of these municipalities are making separate land use decisions that will affect the water quality in the watershed. Each city, village, and township has its own planning documents and land use decision makers. There are seven counties within the watershed that also participate in land use decisions (although their actions and structure will not be covered in this guide.)

Municipalities within the Huron River Watershed

Cities:

City of Ann Arbor
City of Belleville
City of Brighton
City of Flat Rock
City of Gibraltar
City of Orchard Lake Village
City of Rockwood
City of South Lyon
City of South Rockwood
City of Walled Lake
City of Wixom
City of Ypsilanti

Counties:

Ingham County
Jackson County
Livingston County
Monroe County
Oakland County
Washtenaw County
Wayne County

Townships:

Ann Arbor Township
Ash Township
Berlin Township
Brighton Township
Brownstown Township
Commerce Township
Dexter Township
Freedom Township
Genoa Township
Green Oak Township
Hamburg Township
Hartland Township
Highland Township
Huron Township
Lima Township
Lodi Township
Lyndon Township
Lyon Township
Milford Township
Northfield Township
Novi Township
Pittsfield Township
Putnam Township
Salem Township
Scio Township
Sharon Township
Springfield Township
Stockbridge Township
Sumpter Township
Superior Township
Sylvan Township
Unadilla Township
Van Buren Township
Waterford Township
Webster Township
West Bloomfield Township
White Lake Township
Ypsilanti Township

Villages:

Village of Barton Hills
Village of Chelsea
Village of Dexter
Village of Milford
Village of Pinckney
Village of Stockbridge
Wolverine Lake Village

Land Use Planning: Directions & Decisions

The two critical documents that cities, villages, and townships use to control and plan land use are:

- The master plan
- The zoning ordinance

The land use planning decision makers that use these documents are:

- The planning commission
- The township board or village/city council
- The zoning board of appeals

Fortunately, the structure and purposes of these documents and government bodies are fairly consistent across communities in Michigan. Once you understand how they work in your community you will realize that your knowledge is transferable to other communities. Let's begin with a closer look at the planning documents by starting with the zoning ordinance.

The Master Plan: A Community's Comprehensive Guide for All Aspects of Future Development

What is a master plan?

The master plan and the zoning ordinance go hand-in-hand. Aside from consulting a crystal ball, or your zoning ordinance, reading your master plan is the next best way to get an overall sense of what your community will look like in ten to twenty years. Communities refer to master plans by many different names, including "comprehensive plans," "municipal plans," and "general development plans."

A master plan commonly serves three purposes:

- It is a general statement of a community's goals and provides a single, comprehensive view of what a community desires for the future.
- It serves as an aid in day-to-day decision making. The goals, objectives, and strategies outlined in the plan guide local government officials in their decisions. In effect, it forms an agenda for the achievement of goals and objectives.
- It provides a basis upon which zoning decisions are made.

The next section in this chapter provides an introduction to a typical master plan. It includes:

- An overview of the structure and contents of a typical master plan
- A focus on several key parts of a master plan
- Ideas for how to protect water resources with a master plan
- A worksheet to evaluate your community's master plan to see how well it protects water resources.

Did you know?

Unlike the zoning ordinance, the master plan is not a legal document. However, if someone challenges the legality of a zoning ordinance, most courts give deference to local governments if their zoning ordinance is consistent with their master plan. This is likely because Michigan law states that a zoning ordinance should be consistent with "a plan." Although it is not spelled out clearly, most municipalities and courts assume that this statement refers to a master plan.

Before You Begin

It will be useful to have a copy of your master plan to refer to as you read. You can get a copy of your master plan the same way you got a copy of your zoning ordinance: 1) You can request a copy be sent to you (Again, it will be a long document and you should expect to pay copying costs.) or 2) You can make an appointment to visit your township/village/city hall and look over the document while you are there. In either case you will need to contact the receptionist or clerk at the township/village/city hall. She or he will be able to help you with your request or can direct you to someone who can. You can find the number for your township/village/city hall in the government section of your phone book.

Getting to Know Your Master Plan

How is a master plan organized?

Because a master plan is not a legal document, like the zoning ordinance, the format is less technical, and so it

is easier to read. The master plan format usually follows an organizational hierarchy that includes Goals, Objectives, and Policies/Strategies.

Goals
- Each subject area starts with a goal statement that is relatively general in nature. Goals are long-range statements that reflect the community's underlying values and desires for the future.

Objectives
- Objectives are shorter term, more specific statements. Think of an objective as one step towards meeting a goal.

Strategies/Policies
- Strategies and/or policies provide ideas for implementation of the objectives.
- Strategies are specific actions the planning commission and board can take to achieve each objective. They should identify who will perform a task and by what date.
- Policies set forth a particular approach that the planning commission will take when resolving a planning issue.

Master plans vary in makeup from community to community. Figure 22 is an overview of the subject matter covered in a typical master plan. (Topics with a shaded background will be covered in more detail on the pages to follow.) It is important to note that all parts of the master plan are important and can affect land use and water quality. We are focusing only on the areas that deal directly with land use.

An example from a Huron Watershed township

Goal:

Protection and preservation of the natural resources and features of the township.

Objective:

Restrict development within the Huron River corridor.

Strategies:

Amend the zoning ordinance and zoning map to include an overlay district along the corridor to detail additional, more restrictive regulations (setbacks, open space, tree removal, grading, bluff development, etc.).

Figure 22: Overview of a Master Plan

TYPICAL TOPICS COVERED IN A MASTER PLAN

Introduction
Commonly includes a statement of purpose along with a description of how the plan was created and how it should be used. If the community conducted surveys of their residents, the results may be summarized here.

The Land Use Plan
Discussed in detail on the following pages

The Community Facilities Plan
Indicates approximate areas where public and private community facilities will be needed and where commercial or industrial complexes are contemplated. Could include:
- Reservation of land for school sites
- Plans for additional recreational areas/facilities
- Provisions for fire and police protection for the entire community

Transportation
Outlines areas for transportation development such as:
- Potential locations of bike and pedestrian paths
- Locations of proposed roads
- Modification of existing road networks to improve circulation patterns

Utilities
Outlines areas for utilities development, such as expansion of sewer and water services.

Design
Examines factors that affect community appearance, such as:
- Building design and location
- Open space
- Signs
- Historic preservation

Maps
Discussed in detail on the following pages

The Land Use Plan

A land use plan reveals the basic pattern for land use and shows what types of land uses are situated relative to each other. It includes a discussion of all current zoning districts and may introduce proposals for the creation of new zones. If a community wants to change their zoning they can present ideas for new zones, such as a change from a minimum ten-acre zone to a minimum forty-acre zone, or giving an area prime agricultural designation.

A land use plan serves as a general guide to the community's desired future land use patterns.

A land use plan map is not a zoning map, but a generalized guide to a community's desired land use patterns for the next ten to twenty years.
Descriptions are provided for all current and planned land use categories. These descriptions are not as technical as zoning districts, but describe the intent of the land use categories.

Maps

The maps show existing and future land use (FLU) and may show natural features. They may include the following:

- Soils
- Topography
- Woodlands
- Wetlands
- Groundwater recharge areas
- Watersheds
- Existing land use
- Existing zoning
- Future land use

Future land use map

Instead of "future land use," some communities may use the terms "land use strategy," "land use plan," or "general development plan." The future land use map is very important. It shows where the community envisions development, and it can also reveal which parcels and areas the community wants to protect. It may include components such as capital improvement plans, zoning plans, and other elements.

Natural features maps

A natural features map is a valuable source of information about a community's natural resources. It is important that communities have an adequate inventory of their natural features. An inventory by a qualified expert can add crucial information to the natural features maps. These maps in turn can help a community direct its future land uses.

How is a master plan kept up to date?

Planning experts suggest that municipalities revise their master plan at least every five years. During the revision process, a municipality should gather information to determine historical trends and present conditions in order to project future needs. Municipalities undertake the revision process in a variety of ways. Some communities undertake the process on their own, while others choose to hire a professional planning consultant to revise and update their master plan. A community or its consultant may ask residents to fill out surveys or participate in a vision session where they describe in detail what they would like their community to look like in twenty years.

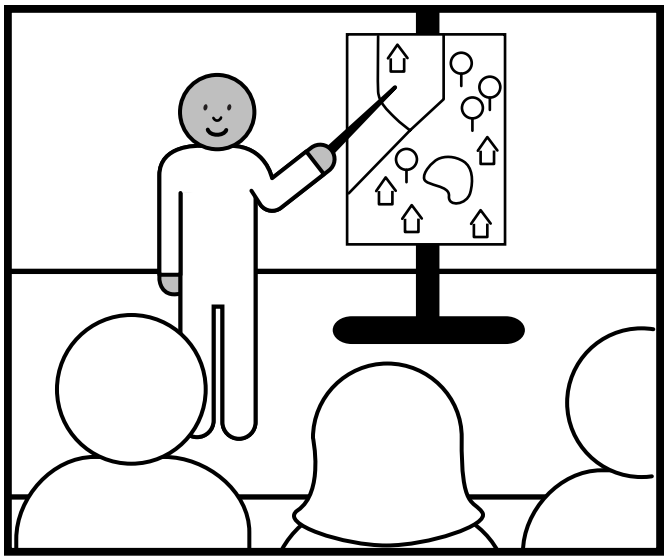
The master plan revision process provides an invaluable opportunity to document what you have and what you value, and construct a plan of action to protect the things you value. A community can then use the zoning ordinance and other tools to implement the plan.

How can a master plan protect water resources?

Communities can begin with these principles of water resource protection:

A) Protecting natural features
B) Reducing impervious surfaces

In a master plan, these recommendations can be incorporated in many different ways. However, every community can include each water protection recommendation (or some variation of it) in its goal statement. (Remember these goal statements should be backed up with objectives, strategies, policies, and the zoning ordinance.) Beyond this basic framework, every community will differ. Each community will have different environmental settings and economic and political situations to consider when deciding which tools to use.



Part of the master plan revision process often includes a session in which residents can describe what they would like their community to look like in the future.

The examples in this section come from master plans from approximately twenty municipalities in the Huron River Watershed. It is important to remember that the strategies presented in a master plan are only suggestions; the community must use its zoning ordinance and other tools to implement the master plan strategies.

Include Natural Features Maps

Why do natural features need to be mapped?

Natural features need to mapped in the master plan for the same reason they need to be mapped in the zoning ordinance. Communities must make decisions about where development will take place. They will use their master plan as a guide to help make these decisions. If communities have not documented the characteristics of their land and water resources, their decisions will be uninformed and they will risk losing these resources.

Here is a sampling of commonly mapped natural features:

- Wetlands
- Prairie remnants
- Prime agricultural lands
- Woodlands
- Steep slopes (greater than 12%)
- Important habitats or breeding areas identified by naturalists
- Groundwater recharge areas

Use of the Future Land Use Map

The future land use map delineates where land uses will go. It can also be used to document many protection measures for water resources. These protection measures include but are not limited to:

- Overlay zones that provide additional protection for water resources, groundwater recharge areas, woodlands, and other natural resources
- Identification of natural lands to be protected through purchase, conservation easement, or other means

Reduce Imperviousness

A master plan can address imperviousness by including a goal that sets a limit for the total amount of impervious surface in the community. Studies have shown that water quality begins to decline in creeks and rivers when the impervious cover in a watershed reaches just 10-15% of the total area. While it would be hard to have a community with a downtown area that had less than 10-15% impervious cover, there are things communities can do to reduce the overall impact. Impervious cover in one area may be high but it could be low in another to attempt to achieve an overall impervious cover of only 15%. For example, communities can group development densely in appealing, livable neighborhoods and leave more of the community in open space. This will allow for development and population growth, but result in lower overall imperviousness. Also, measures like including green roofs (rooftops covered with plants rather than shingles or sheet metal) on buildings can reduce imperviousness. A master plan can set a limit on the total amount of impervious surface for the community.

Is Your Master Plan Doing All It Can?

Just as with your zoning ordinance, now that you have learned some of the ways a master plan can help to protect water quality, the next step is to become familiar with your community's master plan.

Once you are sitting down with the master plan, the checklist on the following page will help you become familiar with the document and whether it provides for water quality protection.

Does Your Master Plan Protect Water Resources?

Your community:

_____

1) Goals

Does your master plan include goals that state a commitment to protect:
(Please circle those that apply.)

Open space *Agricultural lands*

Water resources *Natural areas*

Others (please list):

_____

_____

_____

2) Strategies/Implementation

Are the goal statements backed up with implementation strategies? Circle protection strategies that are included in your master plan.

Establishment of buffer strips along water bodies

Establishment and protection of river corridors

Identification and protection of natural features and open space

Others (please list):

_____

_____

_____

3) Maps

Does your community have plans to conduct natural features inventories?

yes *no*

What was/will be involved in this inventory?

_____

_____

_____

If your community has conducted a natural features inventory, is it included in the master plan?

yes *no*

Circle the water resources and natural features that are mapped in your master plan.

Woodlands *Tributaries to the Huron River* *Lakes*

Wetlands over 5 acres *Wetlands under 5 acres*

Steep slopes *Groundwater recharge areas*

100 year floodplain

Other natural features (please list):

_____

_____

_____

Does the future land use (FLU) map establish floodplain protection zones?

yes *no*

Does the FLU map identify areas to protect through use of conservation easements or purchases?

yes *no*

List other things of note in your FLU map:

Does your community encourage citizen involvement in the master plan revision process?

yes *no*

If yes, how are citizens involved? (Circle those that apply.)

Visioning sessions *Public meeting*

Citizen master plan committees *Surveys*

Other (please specify):

4) Keeping the master plan updated

When was your master plan last revised?

Are there plans to update it?

yes *no*

If yes, when?

Other Notes:

Zoning and the Zoning Ordinance

When asked to comment on the importance of a zoning ordinance, a local official said, "you will not find more information about the future of your community in one place." The next section in this chapter provides an introduction to zoning. It includes:

- An introduction to some zoning vocabulary and history
- An overview of organization and content
- A focus on several key parts of a zoning ordinance
- Ideas for how to protect water resources with a zoning ordinance
- A worksheet to evaluate your community's zoning ordinance and see how well it protects water resources

What is Zoning?

Zoning is a powerful legal tool that local governments use to control how, and whether, land is developed. Using zoning, local governments designate the land uses that can take place on a piece of property.

Before we developed zoning, people could essentially build anything they wanted anywhere they wanted, if they owned the land. This often resulted in conflicts such as a noisy factory being built next to a residential neighborhood. Zoning was initially established as a means to avoid such conflicts between land uses. Communities used zoning to keep so called "nuisance" land uses, like noisy factories, out of residential areas.

The zoning ordinance is a legal document that largely determines the pattern of development you see in your community. It specifies:

- What types of land uses are allowed: indicated in the list of zoning districts
- Where different types of development can go: shown on the official zoning map
- Guidelines for how individual sites will be developed: often specified in site plan review or in the provisions described under each zoning district

Did you know?

History of Zoning

In the now famous case Village of Euclid v. Ambler Realty Co. (1926), the U.S. Supreme Court ruled that zoning was a valid use of local government power. The decision signaled state legislatures that they could give communities the power to regulate private use of land, i.e. zoning.

Think back to our discussion of development trends in Chapter One: paving paradise and losing natural features. Remember we talked about how our land use practices impact the land's ability to perform its water cycle jobs, which in turn impacts our water resources. Well, these development trends are primarily a result of current zoning laws.

At this point you may be wondering why zoning permits some land use practices that negatively impact water quality. Some would argue that this is because many communities have zoning ordinances that are out-dated. Historically, most communities wrote their zoning ordinance with little or no consideration of how the development standards would affect water quality. The bottom line is that a standard zoning ordinance does not automatically include protection for water resources. In most cases, a municipality must build protection measures into their zoning ordinance. Many communities have realized this and are amending their zoning ordinances to provide more protection for water. Some communities are requiring that buffers of vegetation be left along stream and river banks to protect the landscape jobs these buffers provide. Others are requiring that wetlands be protected, and still others are working to reduce impervious surfaces. These communities are enacting local ordinances that protect natural features and landscape jobs.

Getting to Know Your Zoning Ordinance

What is the goal of zoning?

Over time, the role of zoning has expanded greatly. These days, the most commonly cited goal of zoning is "to promote and protect the health, safety, and general welfare of a community." In addition, the following purposes are often cited as reasons for having zoning:

- Promoting and regulating growth to obtain orderly and beneficial development
- Conserving life, property, and natural resources
- Lessening and avoiding congestion on highways and streets

- Conserving funds for public services
- Providing each property with adequate light, air, and privacy

How does a community use zoning to address these goals?

A community strives to achieve these goals by establishing a set of standards for development. This set of standards is essentially a collection of many detailed rules about zoning that is included in a zoning ordinance.

Did you know?

State Enabling Acts

The State of Michigan gives local governments the power to zone through two acts: The City and Village Zoning Act (1921), and The Township Zoning Act (1943). These acts specify that a municipality must have a zoning ordinance in order to enact and enforce zoning regulations. In Michigan, communities are not required to have zoning ordinances but the majority have them in place.

How is a zoning ordinance organized?

A zoning ordinance can seem intimidating until you know where to look and what to look for. Because it is a legal document the format is standardized. Each subject area is referred to as an article. The articles are further broken down into sections. The text of zoning ordinances varies between communities, but the format is always similar.

Basically, the zoning ordinance has three components: a zoning map (although in some communities, this map may only be in the master plan) that provides the blueprint for community development and two components that are written texts. One part of the text describes the zoning regulation and how it is administered; the other specifies what can be done on the land in each zoning category.

Figure 23 is a list of the most common articles; you should find all of these and more in your municipality's zoning ordinance. They may not be in this particular order. Articles set off with a shaded background indicate topics that we will cover in more detail.

Figure 23: Overview of a Zoning Ordinance

TYPICAL ARTICLES INCLUDED IN A ZONING ORDINANCE

Article 1: Short title, purpose of zoning ordinance
Purpose usually includes a statement about how the zoning will "promote and protect the health, safety, and general welfare of a community."

Article 2: Definitions
The definitions attempt to provide legal clarity by explaining in detail what is meant by each term used in the text.

Article 3: General provisions
This article includes a list of all the zoning districts and introduces a zoning map as an official map and legal document.

Article 4: Schedule of district regulations
This article describes each zone including the restrictions of each zone.

Article 5: Site plan review
This article, which not every zoning ordinance has, describes the procedure that must be followed by anyone proposing to develop a piece of land.

Article 6: Planned Unit Development (PUD)
A PUD is a type of development that typically provides greater flexibility for development specifications, like density and setbacks, in exchange for other community amenities, such as open space and protection of sensitive environments.

Article 7: Conditional or special land uses
These include land uses that don't fit into any of the zoning districts.

Article 8: Off-street parking and loading requirements

Article 9: Administration and enforcement of the ordinance

Article 10: Nonconforming uses
Things that do not fit the requirements for the zone are given special exception, i.e. "grandfathered in."

Article 11: Zoning board of appeals
This article describes the makeup of this group and their responsibilities.

Article 12: Amendments
A place for additions to the original text.

Article 13: Effective date
The date when the document became official.

Zoning Districts

A zoning district (Figure 24) is a land use category defined by a particular set of restrictions. For example, one district may allow factories while another permits only residential dwellings. The major types of zoning districts are:

- Residential
- Commercial
- Industrial
- Agricultural
- Public

Each zone is defined by a set of restrictions that specify what is and is not allowed. For example, What type of structure is allowed? How big can it be? How many people can live in it? How far back from the road must it be? The five zoning districts mentioned above are often further subdivided based on differences in restrictions. The list of restrictions can go on for several pages. The best way to get a sense of what the different zoning districts are in your community is to take a look at your zoning ordinance. In most zoning ordinances you will find in Article 3 a list of all zoning districts.

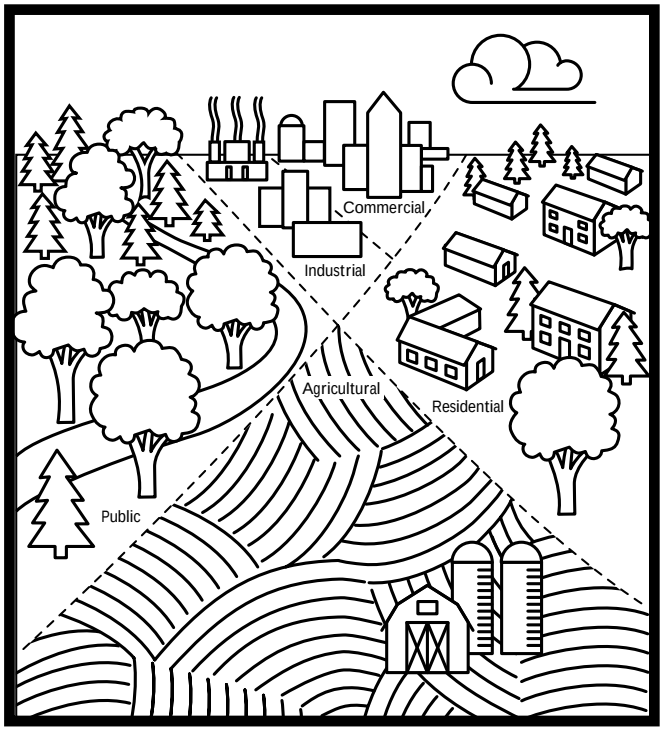


Figure 24: Zoning districts

Density Restrictions

Often, the restrictions in a residential zone include rules about density. In a zoning ordinance, density is a term that refers to the number of dwelling units (homes) allowed on a piece of land. High density means the zone allows many houses while low density allows fewer homes on the same amount of land.

Here is an example from a Michigan township that shows how the residential district is broken down further by restrictions on density.

Zoning District	Density Restrictions
Rural residential (low density)	1 dwelling unit per acre
Suburban residential (medium density)	2-4 dwelling units per acre
Urban residential (medium density)	5-8 dwelling units per acre
Urban residential (high density)	8-10 dwelling units per acre

"How will I ever make sense of this all this new terminology?"

Municipalities make different decisions about what constitutes low and high density. Notice in the above example that a requirement of one acre per dwelling unit is considered low density. Some communities require 10 or more acres to establish a low density categorization. ("Low density" development is sometimes referred to as "large lot zoning." This is because it takes a larger lot size to develop at a lower density. See "Did you know?" box on page 39.)

If you read through the list of restrictions for a particular zoning district you may find yourself getting overwhelmed by the detail. However, remember that these restrictions will determine how land is developed and consequently how your community will look, so stick with it!

Look at your zoning ordinance to learn a little more about the zoning districts in your community.
(To find out how to obtain a copy of your community's zoning ordinance see the section titled Is Your Zoning Ordinance Doing All It Can? on page 44.)

How many residential districts do you have? _____

Does your community have high density zones? _____

Does your community have agricultural districts? _____

What types of industrial districts do you have?

_____

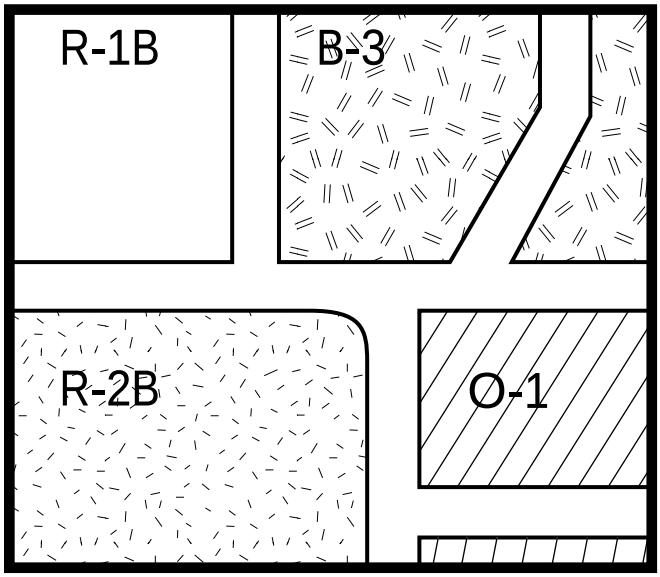
_____

_____

The Zoning Map

The zoning map is the official map that accompanies the zoning ordinance. Many zoning ordinances consider the zoning map to be the final authority on the current status of land. It is a very important document! The map shows the zoning districts for the entire land area of a municipality.

If you look at the zoning map for your community you will see that it is divided up like a puzzle and every piece of land is assigned a zoning district.



A zoning map may have sections that look something like this.

Can the zoning map be changed?

Absolutely. The map and the text of a zoning ordinance can be changed.

Did you know?

The zoning ordinance is a legal document. Consequently, there is a procedure that must be followed for making changes to it. First a proposal is made. Then a public hearing is held. Next, members of the planning commission vote on the proposal. Then they make a recommendation to the board, who has the ultimate power to change the zoning. (Remember, we will learn more about the planning commission and the board later in this chapter.)

Check your municipality's zoning map

In which zone do you live?

_____

In which zone do you work?

_____

What are the restrictions in the zone you live in?

_____

How many different types of residential zones are shown on the zoning map?

_____

Site Plan Review

Most communities require site plans for all development projects that will be reviewed by local officials. A site plan is a set of drawings that shows the physical layout of a project, including buildings, lot lines, roads, utilities, landscaping, etc. Site plans are reviewed first by the planning commission and then by the community board or council. Officials examine the plans to ensure that development within a community is in accordance with the standards set forth in the zoning ordinance.

Many zoning ordinances have an entire article devoted to site plan review. A typical article specifies which types of developments need to submit site plans, what

the plans should include, who will review the plans, and how the review process will be conducted.

For example, the zoning ordinance may require:

- 25-foot setbacks from all water bodies
- Landscape screening (a "wall" of vegetation) between commercial and residential development

The site plans are supposed to detail how the applicant will fulfill these and other requirements.

How can a zoning ordinance protect water resources?

In Chapter One we introduced the ABCs of water resource protection:

A) Protecting natural features

B) Reducing impervious surfaces

C) Using best management practices

There are many ways that zoning ordinances can be amended so they address the ABCs. Several municipalities in the Huron River Watershed have begun to examine ways to amend their zoning ordinances to increase protection for water resources. On the following pages, we will examine some of the provisions they have developed.

A) We will look at four ways to protect natural features with a zoning ordinance

B) We will introduce ways to reduce impervious surfaces with a zoning ordinance

C) We will look at best management practices that can be included in a zoning ordinance

FOUR WAYS TO PROTECT NATURAL FEATURES WITH A ZONING ORDINANCE

The four ways described below are good steps to take, but none of these is enough alone. The greatest benefit can be seen from applying all of them. Also, while each of these ways is something you can do right away, there are other long-term measures about which you should consider learning including: urban growth boundaries, transfer of development rights, and regional planning efforts.

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. Two of the most common and useful ways are:

- Including natural features
- Adding open space zoning

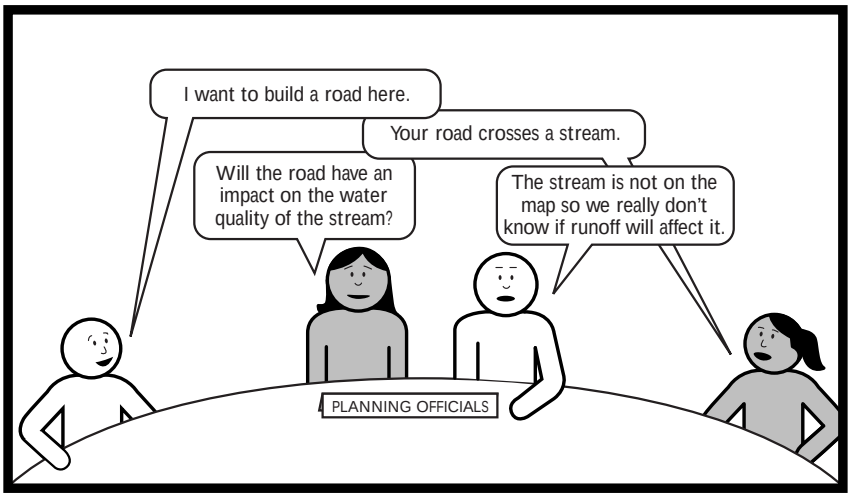
Including Natural Features

What are natural features?

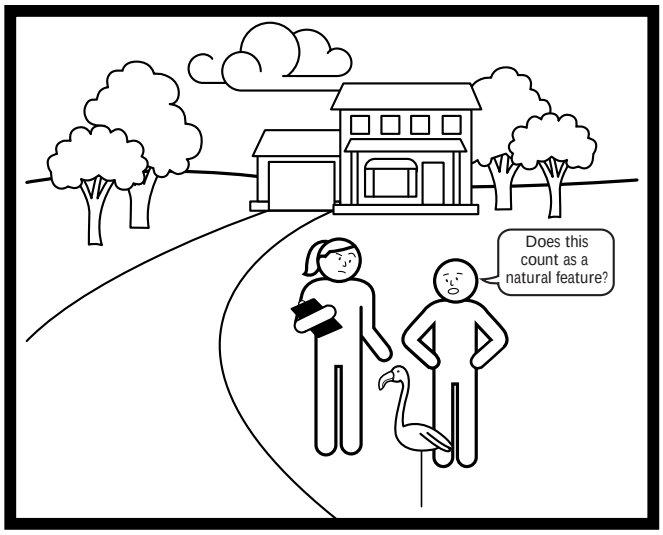
Remember from Chapter One, we defined natural features as features on the land that play important roles in the water cycle. Natural features in the Huron River Watershed include woodlands, surface waters, floodplains, and areas with substantial vegetative cover, such as prairie remnants and meadows. Remember also that the water quality functions they perform include keeping water clean, returning water to the atmosphere, moving water across the land, and storing floodwater.

Why include natural features?

Local decision makers refer to the zoning map routinely to make deci-



If natural features are not mapped it is much harder for officials to determine the impact of development on these features.



A natural features inventory is done by a trained professional who will be able to determine mesic forests from wet meadows (as well as to distinguish lawn art from important natural features).

sions about whether a certain use for a piece of land is acceptable. Part of their decision making process will involve determining whether the proposed land use will impact the health, safety, and welfare of the community. It is critical that water resources and natural features are mapped, so that health, safety, and property values will be protected from flooding, water borne disease, and resource degradation.

How can natural features be included in the zoning map?

A community can start to map natural features by looking at existing map resources including your county, ~~Michigan Resource Information System (MIRIS),~~ and Southeast Michigan Council of Governments (SEMCOG) maps. (Contact your county planning department to make an appointment to look at their maps.

Did you know?

Open Space vs. Large Lot Zoning

Many people think large lot zoning preserves natural features and open space. You may think you will get what you want, however, given the way traditional development takes place, i.e. with the clearing of vegetation and leveling of land, this is not the case. Open space zoning (clustering) actually does what many think large lot zoning does.

You can contact ~~MIRIS at 517/373-2534~~ and SEMCOG at 313/961-4266 to find out what maps they may have available for your community.)

Many communities also conduct a natural features inventory. This process involves conducting a systematic scientific survey of all the land in the community. The goal is to identify and catalogue all the natural features deemed important by the community.

Add Open Space Zoning (Open space zoning is also often referred to as recreation or conservation zoning.)

What is open space zoning?

Historically, if you asked a local government official to list the most common zoning districts, they might list residential, commercial, industrial, agricultural, and public. Recently, some communities have added open space zoning or recreation/conservation zoning to their list of zoning districts. Open spaces are land and water areas that are retained in an essentially undeveloped state on a permanent or semi-permanent basis. An open space or recreation/conservation zone is a zoning district that has a set of restrictions designed to protect natural features.

How can open space zoning protect water resources?

Open space or recreation/conservation districts can play an important role in protecting water resources because they provide protection for important natural areas that perform the vital services of infiltration, interception, storage, and transport described on pages 6-13.

2) Allow for Open Space and Conservation Subdivisions

What are open space subdivisions?

Communities use the term "cluster development" synonymously with "open space subdivisions." Open space subdivisions differ from conventional subdivisions in a number of ways. Figure 25 illustrates the differences between these two types of subdivisions.

While traditional development (diagram A) typically clears land of all vegetation and spreads houses out evenly across a parcel, open space development

(diagram B) guides construction to one portion of a site while leaving the remaining portions open.

What is a conservation subdivision?

Conservation subdivisions have a maximum permitted lot size. This is very unusual in zoning ordinances. Usually the regulation specifies a minimum lot size. In a conservation subdivision, there is a permitted density, but the maximum lot size is smaller than the permitted density. For example, the density may be one dwelling unit per five acres, but the maximum lot size is only two acres. This is a huge advantage in creating open space. However, one burden for the developer is that often a standard plot plan is also required so the planning commission can make a comparison between the conservation subdivision and a traditional development.

How do open space and conservation subdivisions help to protect water resources?

Because development is limited to a small portion of the land, a large portion of land is left undisturbed and its ability to perform water cycle jobs is protected.

- Open space subdivisions can reduce imperviousness by providing a more compact way of siting development, which reduces the amount of roads needed.
- Open space subdivisions can maximize preservation of the natural features on the site (minimize clearing of vegetation, maximize open space).
- Open space subdivisions can provide an effective tool to protect natural landscape features, while still permitting development of the site.

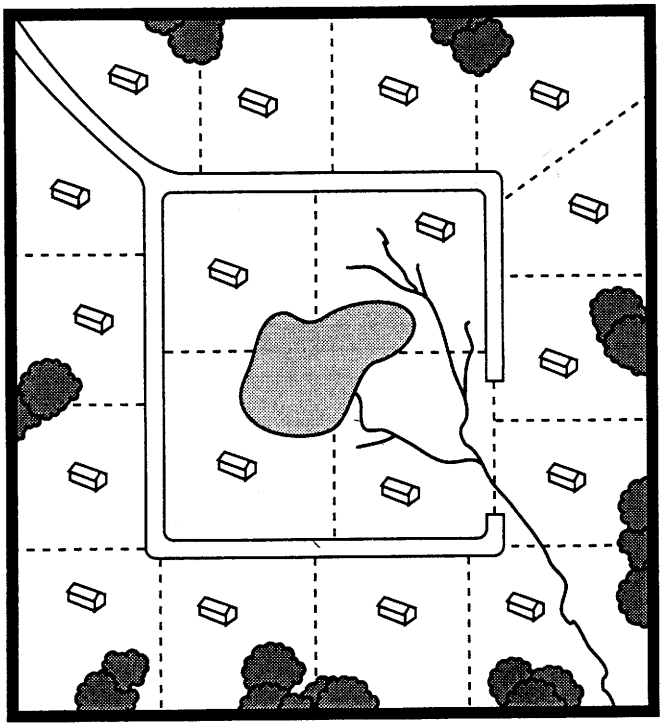
How can communities create the opportunity for open space subdivisions?

Communities can amend their zoning ordinances in a number of different ways to allow for an open space development option.

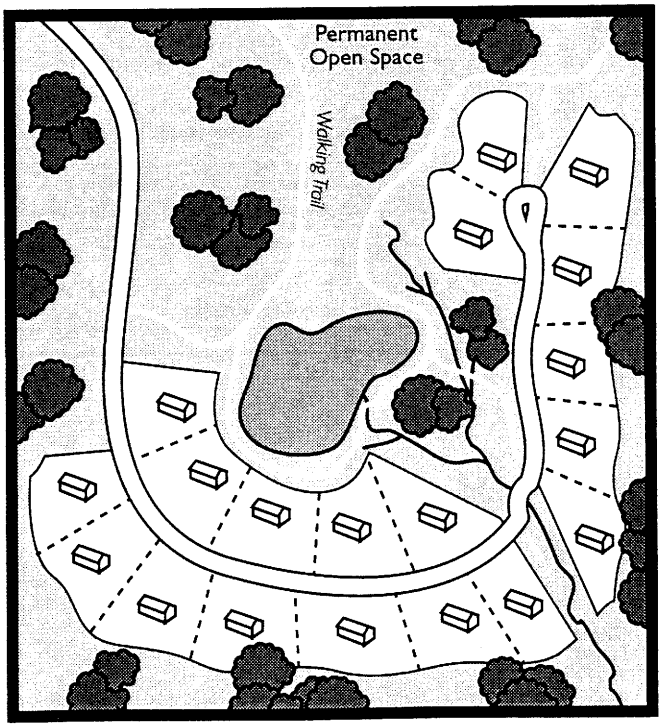
- Some communities include provisions for clustering in a Planned Unit Development (PUD) Article.
- Other communities have developed special ordinances that specify requirements for open space development, including a requirement for a percentage of land to remain as open space within each development.

Developers also find that people enjoy these homes more and will pay more for them. An added bonus for developers is that these homes do not need to cost more to build.

Figure 25: A) Diagram of conventional subdivision



B) Diagram of open space development



3) Use Setbacks

What is a setback?

A setback is the distance between a front, side, or rear lot line and any other object. This object could be, for example, a building or a lake. Figure 26 shows two examples of setbacks communities might require.

How can a setback help protect water resources?

Historically, many zoning ordinances have required little or no setbacks (an average of 0 - 25 feet), allowing people to build practically to the edge of bodies of water. Often this results in clearing of important vegetation. In Chapter One we discussed the importance of vegetative cover for preserving water quality. Vegetation intercepts rainfall and reduces its power to erode. The roots of vegetation help hold soils in place. Vegetation along the edges of bodies of water is often called "buffer vegetation." Preservation of this vegetation helps to protect water resources because:

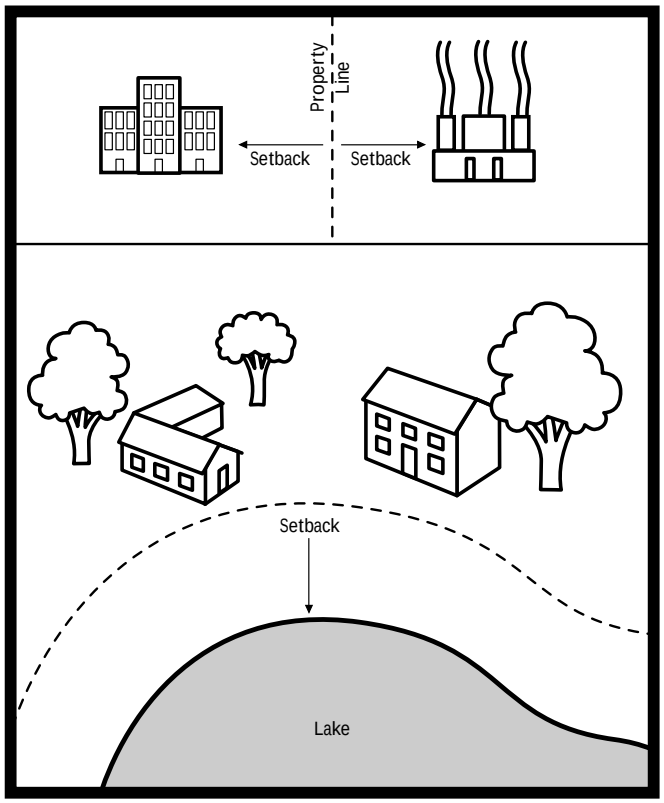
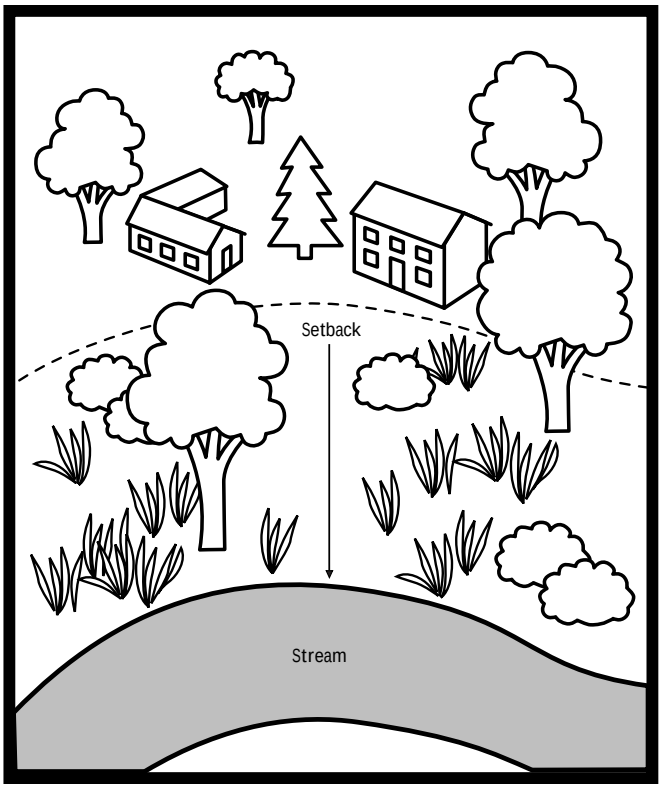


Figure 26: In the top illustration you see a setback between the property and the buildings. In the bottom illustration you see a setback between the houses and the edge of the lake.



Larger setbacks from water bodies provide more protection for water quality.

- Buffer vegetation helps filter sediments and nutrients from runoff before the runoff enters bodies of water
- Vegetation helps stabilize banks and prevent erosion
- Buffer areas are often part of a floodplain and store floodwater

In summary, setbacks can protect water by protecting buffer vegetation which cleans, slows, and stores water before it enters a body of water.

How can communities use setbacks to protect buffer vegetation?

In general, larger setbacks near water bodies allow for preservation of buffer vegetation. Setback distances, to protect water, vary across communities but to achieve water quality benefits, a 25-foot buffer is a good place to start. And, in some situations greater water quality benefits can be seen by increasing the width of buffer vegetation beyond 25 feet.

4) Create Overlay Zones

What is an overlay zone?

Overlay zoning allows a separate zone to be applied "on top of" an area of pre-existing zones, thereby imposing an additional set of requirements without altering the requirements imposed by the underlying zoning district. For example, a community can create an overlay zone that extends 50 feet from the edge of any body of water that requires restrictions on the use of certain lawn care chemicals that may be harmful to fish, frogs and other animals that live in the nearby bodies of water. This restriction would apply whether the underlying zoning is commercial, residential, public, or anything else (Figure 27).

How can an overlay zone protect water resources?

Overlay zones can provide added protection to an area of concern. Some common areas where overlay zones have been used to protect water resources include:

- Buffers along bodies of water
- Important aquifers either for drinking water or maintaining surface water quality
- Areas with steep slopes

Possible restrictions within overlay zones

The type of restrictions a community develops will depend on their protection goals. Restrictions for two types of overlay zones are listed below.

Buffer overlay zone restrictions

- Clearing vegetation
- Applying lawn care chemicals
- Salting driveways, roads, and sidewalks
- Creating impervious surfaces

Aquifer overlay zone restrictions

- Storing hazardous chemicals
- Storage tanks

Ways to Protect Natural Features with other Ordinances

Many communities have additional ordinances to supplement their zoning ordinance. These provide an extra layer of protection for areas of special concern. The following are examples of some of the most common ordinances.

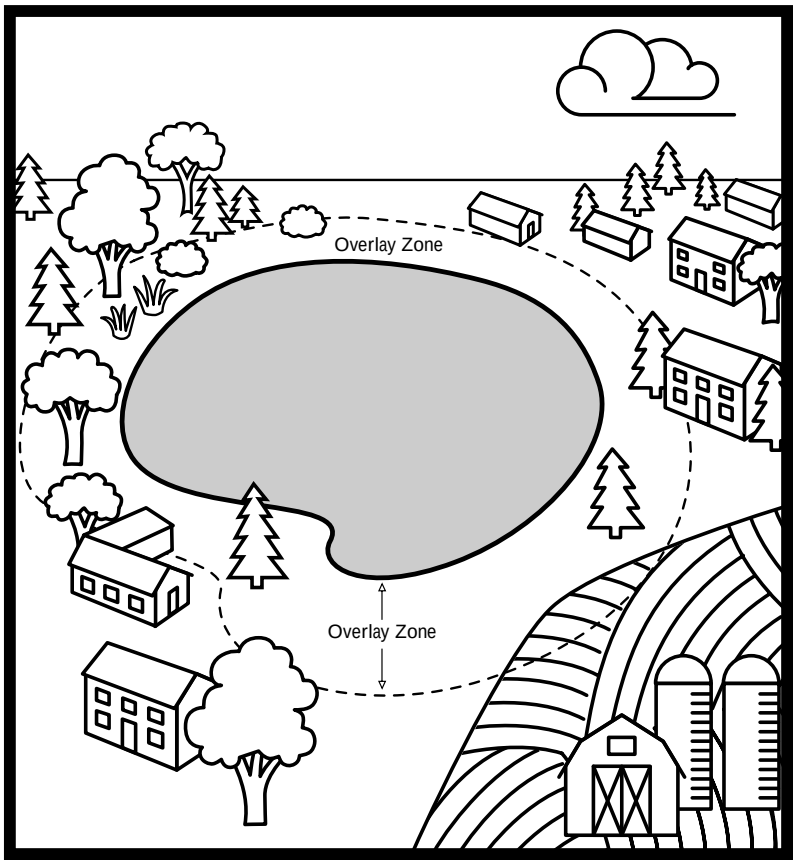
What ordinances are Huron River Watershed communities using?

- Wetlands ordinance
- Natural features setback ordinance
- Groundwater protection ordinance
- Soil erosion control ordinance
- Lot split ordinance
- Stormwater ordinance
- Woodlands ordinance
- Pesticide/fertilizer use ordinance

WAYS TO REDUCE IMPERVIOUS SURFACES WITH A ZONING ORDINANCE

A community's zoning ordinance includes many details about impervious surfaces, particularly those surfaces

Figure 27: In this overlay zone illustrated here, a community could require restrictions on the use of certain lawn and agricultural pesticides and fertilizers.



that are vehicle oriented, such as roads, parking lots, and driveways. Often, standards and requirements for these surfaces are developed before there is an awareness of the impact of impervious surfaces on the water cycle. Consequently, in many cases we end up with more impervious surfaces than we really need and the landscape jobs we discussed in Chapter One are compromised.

Did you know?

1600% more stormwater runoff is created by a one-acre parking lot than a one-acre meadow.

Communities can take steps toward reducing impervious surfaces by modifying some of the requirements in their zoning ordinances. The following suggestions were taken from communities around the country. They represent only a small subset of ways to reduce imperviousness. Remember that each community will have its own unique set of circumstances and must determine which changes will work for them.

Almost all impervious surfaces (parking spaces, parking lots, roads, and driveways) are affected by the standards in your zoning ordinance. There are two basic approaches to reducing the impervious surfaces in your community:

- Decrease the area covered by impervious surface
- Change the material to something pervious

Let's look at specific suggestions for reducing imperviousness in your community.

Parking Lots

1) Size of parking spaces

Reduce the size requirement or add flexibility.

An example: Reduce dimension requirements for straight-in parking (as opposed to diagonal) to 9 by 18 feet. You can also add small car parking dimensions of 8 by 16 feet and reduce aisle widths from 22 feet to 20 feet. This would result in an overall decrease in the amount of space taken up by parking lots and would therefore be an important way to lessen imperviousness. An important aspect of lessening the amount of imperviousness taken up by parking spaces is to allow for flexibility (rather than strict guidelines) in determining the size of parking spaces. Or require at least 30% of spaces at larger commercial developments to have smaller dimensions for compact cars.

2) Number of parking spaces required

Consider making the formula flexible.

An example: Require fewer permanent spaces for a building. If a building may need extra spaces on an infrequent basis, make overflow spaces available that are not impervious. These spaces could be constructed out of pervious materials or simply left unpaved.

3) Parking lot and driveway materials

Where possible, try to allow for use of pervious surfaces (surfaces that allow water to soak into the ground).

An example: For a parking lot, use pavers (concrete grid and modular pavement that has spaces filled with pervious materials, such as sod, sand, or gravel) for overflow parking. Or for a driveway, consider using a pervious surface such as gravel.

Roads

4) Street width

In Michigan, county roads have set standards for width; the dimensions are specified and cannot be changed. However, if a road is a private road, there is the option for more flexibility.

An example: A private road ordinance can be enacted that can be used to permit narrower roads.

BEST MANAGEMENT PRACTICES THAT CAN BE INCLUDED IN A ZONING ORDINANCE

What is a best management practice?

A best management practice (BMP) is a practical design, construction operation, or maintenance method that, when installed or implemented, will help prevent, reduce, or correct water pollution. A BMP is a devel-

opment practice that is designed to provide additional environmental protection beyond what would be provided by traditional development customs.

Below, we will introduce two avenues for including BMPs that address stormwater management. Specifically, we will look at the question: How can we manage stormwater so that the water washing off a piece of developed land is of the same quality and quantity and leaves at the same rate as the water that ran off the land before it was developed (or at least of a much better quality than typically runs off developed land)? This can be addressed in many ways, but we will look at two ways a zoning ordinance can be used.

- Site plan requirements
- Stormwater management ordinance

Site Plan Requirements

What is a site plan?

Site plans are important documents because they detail how a developer will go about developing the land. It is the final chance to ensure that a proposal adequately addresses the environmental effects of the development. Once the site plans are approved, a developer can go to work to develop the property. Site plan requirements that keep water cycle jobs in mind (and intact to the extent possible) can go a long way toward protecting water quality.

The site plan review process can be complex to learn and understand, but it is well worth the effort. Try to find someone in your community who can help you learn about the process. Once you do, you can become an even more effective advocate for water resources.

While site plan review is the final chance to address concerns in a development proposal, a community can also ensure that the plan is carried out as proposed during site inspection as the project is being built. Site inspectors (some communities use citizen volunteers to help with this job) regularly make developers fix mistakes while the project is under construction.

Stormwater Management Ordinance

What is a stormwater management ordinance?

A stormwater management ordinance details some requirements for how stormwater will be handled by a development.

How can a stormwater management ordinance protect water resources?

In an undeveloped watershed, if there's a storm, all parts of the landscape work to handle the excess water. The altered landscape no longer has the same capacity to perform the landscape jobs we discussed in Chapter One. The result is a need to create a system to manage the stormwater and replace as best we can the function of the natural water cycle. Historically, stormwater management systems were not designed with water quality in mind. In recent years, many improvements have been made, with the goal of minimizing change to the water cycle on a site. A stormwater ordinance can require that stormwater systems be built with water quality in mind and that a maintenance plan be developed.

Is Your Zoning Ordinance Doing All It Can?

Now that you have learned some of the ways a zoning ordinance can help protect water quality, the next step is to become familiar with your community's zoning ordinance and stand alone ordinances.

There are two ways to gain access to your community's zoning ordinance: 1) You can request that a copy be sent to you (It will be a long document and you should expect to pay copying costs.) or 2) You can make an appointment to visit your township/village/city hall and look over the document while you are there. In either case you will need to contact the receptionist or clerk at the township/village/city hall. You can find the number in the government section of your phone book. He or she will be able to help you with your request or can direct you to someone who can.

Once you are sitting down with the zoning ordinance, the checklist on the following page will help you become familiar with the document and determine whether it provides for water quality protection.

Use the space below for notes as you are reviewing your zoning ordinance.

Notes:

Checklist: Does Your Zoning Ordinance Protect Water Resources?

A zoning ordinance can help to protect water quality depending on what it includes. Is your community doing all it can? Take the time to fill out this checklist and find out.

Your community:

---

1) The zoning map

Look at the zoning map for your community. Circle below the water resources and other natural features it illustrates.

Tributaries to the Huron River *Woodlands*

Lakes *Wetlands under 5 acres* *Steep slopes*

Groundwater recharge areas *Wetlands over 5 acres*

Other natural features (please list):

To see which water resources your community's zoning maps have omitted, look at a United States Geological Survey (USGS) topographical map of your area. The Huron River Watershed Council has copies of topographical maps for the entire Huron River Watershed at our offices. Please feel free to call (734/769-5123) to set up an appointment to stop by and view them.

Does your community have open space zoning districts (they may also be called recreational, greenbelt, or conservation zoning districts)?

yes **no**

2) Allowances for cluster/open space/ conservation subdivisions

Does your community encourage open space or natural feature preservation in new developments?

yes *no*

Does your zoning ordinance allow cluster development (also known as, open space subdivisions, rural cluster subdivisions or conservation subdivisions)? These may be found in the planned unit development (PUD) section.

yes *no*

Are flexible site design criteria available for developers that utilize open space or cluster design options?

yes *no*

3) Setbacks

Setbacks are covered either in the article: Schedule of district regulation in your zoning ordinance or in stand alone ordinances.

Are any additional setbacks or buffer strips required for development adjacent to the bodies of water?

yes *no*

If yes, what is the minimum buffer width?

---

4) Overlay zones

Does your zoning ordinance include overlay zones that provide additional protection along bodies of water?

yes *no*

Does your zoning ordinance include overlay zones that provide additional protection for groundwater, aquifers, or wellhead protection areas?

yes *no*

5) Other ordinances for further protection of natural features

Circle those ordinances that your community includes in its zoning ordinance or as separate ordinances:

Soil erosion control *Open space*

Groundwater protection *Lot split*

Wetland *Natural features setback*

Woodland *Stormwater*

Others (please list):

_____

_____

_____

6) Parking lots

Does your zoning ordinance include specifications for overflow parking lots (these are parking lots designed to handle excess capacity on rare occasions) to be left unpaved?

yes *no*

Does your zoning ordinance recommend the use of pervious surfaces wherever possible (i.e., for driveways)?

yes *no*

What are the requirements for size of parking spaces?

_____

_____

_____

What are the requirements for number of parking spaces?

_____

_____

_____

7) Roads

Does your municipality have a private road ordinance?

yes *no*

If yes, what are the width and other standards specified?

_____

_____

_____

8) Site plan requirements

Has your community developed specific site plan requirements that emphasize protection of water resources for all types of development?

yes *no*

This can be done in many ways. The following is an example from a Huron River Watershed community.

One township requires the following information for site plan review for all proposed development. How does your municipality compare? Check those elements required by your community to be included in a site plan.

____ 100-year floodplain
____ Lakes, ponds, stream courses, and wetlands
____ Slopes over 12% and slopes over 18%
____ Organic soils
____ Vegetation in buffer zone (25 feet) adjacent to on-site and off-site surface water features
____ Free-standing landmark trees
____ Woodlands and areas of upland brush
____ Groundwater recharge areas
____ The existing topography (topography is the elevation of the land)

How can I get involved?

What did you find out from your survey? Is your community doing all it can to protect water? Now that you understand the importance of the zoning ordinance and master plan in shaping current and future land use, you may be anxious to begin working with your community to assure that your zoning ordinance and master plan protect water.

The next step is to learn about the local government officials who administer the zoning ordinance and hold responsibility for the master plan. Three elected and appointed local government bodies are the major players:

- The planning commission
- The township board or the village/city council
- The zoning board of appeals

All of their meetings are open to the public. Providing opportunity for public comment at these meetings is not just encouraged, it is required by state law. If you want to become involved in land use decision making in your community, you should begin by attending these meetings. In the following section we will provide a brief overview of these three local government bodies, all of which make decisions that will shape the future of your community and determine how well protected your water resources are.

The Planning Commission: Appointed Local Land Use Decision Makers

What is the planning commission?

The planning commission is a group of appointed citizens whose primary responsibilities are to administer the zoning ordinance and to create/update the master plan. In Michigan, members of a planning commission are appointed by the township board or the city/village council. Each township, city, and village has a planning commission. In general, the planning commission is composed of five to nine citizens who serve for three-year terms. It is an advisory body without regulatory powers. Any citizen can serve on the planning commission as long as she or he is a resident of the community. (Between cities, villages, and townships, there are some differences in the number of members, time served, and responsibilities of planning commissions. We'll talk in general terms; you'll discover your community may be slightly different.)

For what land use decisions is the planning commission responsible?

Many of the planning commission's decisions have a direct impact on land and water in a community. Common duties of the planning commission that affect water resources include:

- Developing and revising the master plan

- Developing and amending the zoning ordinance
  The planning commission reviews and makes recommendations to the township board or the city/village council on all zoning ordinances and zoning changes.

- Proposing new ordinances
  The planning commission may propose new ordinances like those described earlier.

- Reviewing site plans for development proposals
  The planning commission reviews all site plans to determine whether they meet all specifications in the zoning ordinance. When they complete their review, they make a recommendation to the township board or city/village Council, who makes the final decision on a development proposal.

How can I help my planning commission protect water resources?

One of the most effective ways for you to help protect water resources is to become involved in the decision making that takes place at planning commission meetings. Decisions that will shape the future of your community are made at these meetings such as:

- How should the master plan be changed to improve protection for groundwater recharge areas?
- Should the farmland in the northeast corner be rezoned from agricultural to commercial?

Planning commission meetings are open to the public and the public is invited to participate. Comment opportunities are twofold: You can prepare written comments and submit them prior to a meeting and/or you can comment in person during the meeting.

Address your written comments to the chairperson of the planning commission and submit them before the meeting. Planning commission meetings include a period for general comments on any community business as well as a chance to respond to specific agenda items.

What role can I play?

Here are some possible roles an individual could play at a planning commission meeting:

- *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 ask general questions/raise concerns about water quality.*

- *Get involved in the master plan revision process.* If the master plan is to be updated, your community may ask for public participation and/or public comment. Many communities hold a community 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 greatly influence the kinds of changes that are made to a master plan. Also, there are often opportunities to respond to a draft of a master plan. Be proactive, as you may not be asked. If not, be sure to be respectful in making your opinions known.

- *Comment on possible zoning ordinance amendments.* During zoning ordinance amendments, there is also time for public participation and comment. While it is less likely, you may be able to actually suggest and introduce amendments to the zoning ordinance.

- *Comment on specific developments during a site plan review session.* Site plan review is the time when best management practices can be added to a proposed building or development. Become involved early in this process to be a voice for water resources.

- *Apply to become a member of the planning commission.* Call your community to find out how to apply to become a member of the planning commission.

The Township Board of Trustees and the Village/City Council: Elected Local Land Use Decision Makers

What is the township board or city/village council?

The township board is the chief governing body of the township. It consists of the supervisor, clerk, treasurer, and several trustees. All board members are elected by citizens from their community for four-year terms. Village and city councils are the equivalent elected bodies in villages and cities. Their responsibilities are similar to the planning commission, but because they are elected rather than appointed, they have much more decision making power.

The township board or the village/city council (henceforth referred to as the board/council) appoints the planning commission and the zoning board of appeals.

What land use decisions are they responsible for?

Many of the board/council's decisions have a direct impact on land use and water quality in a community. Common duties of the board/council that affect water resources include:

- *Enacting or amending and approving the zoning ordinance* The board/council reviews the recommendations of the planning commission and makes the final decision on any revisions to the zoning ordinance.

- *Reviewing development proposals* The board/council reviews the recommendations of the planning commission and makes the final decision on development proposals.

- *Participating in appointment of planning commissioners and special committees*

- *Allocating funds for water quality studies and professional planning*

- *Approving all site plans and special land use requests, as well as rezoning requests, zoning text amendments, and subdivision plats*

How can I help my township board/city or village council protect water resources?

You can work with the board/council in the same way you work with the planning commission. The board/council has the final decision making power within a community. They have legislative power, whereas the planning commission has only an advisory capacity. The board/council is elected by you, so you should feel free to share your concerns and ideas with them. You can also run to become a member of your board/council.

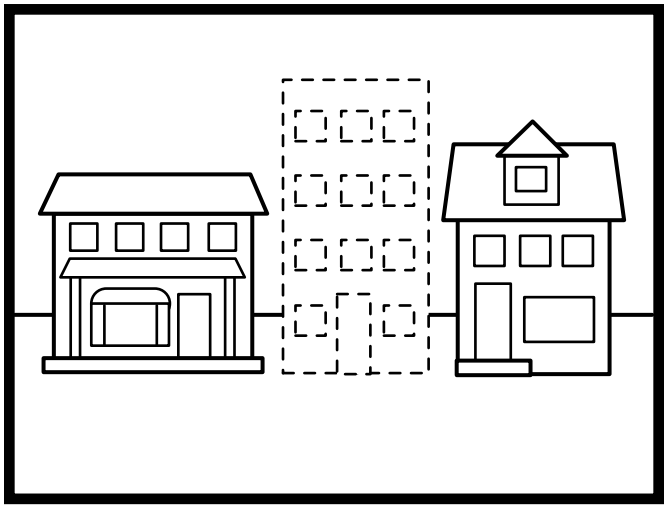
The Zoning Board of Appeals

What is the zoning board of appeals?

In townships, members are appointed to the zoning board of appeals (ZBA) by the township board and serve three-year staggered terms. One member must be a member of the township board and one other member must be a member of the planning commission.

What land use decisions are they responsible for?

The ZBA is an interpretive committee. The ZBA members interpret provisions of the zoning ordinance. When requested, they also determine whether variances should be granted when peculiar difficulties with property make it impossible to meet the strict provisions of the zoning ordinance. (A variance is a formal petition to the local government to officially exempt the petitioner from the designated zoning. In townships you cannot request a use variance.) For example, if your land was zoned low density residential (assume a height restriction of two stories) and you wanted to build a three story apartment on the land, you would ask the planning commission to change the zoning. If the planning commission turned down your request, you could apply to the ZBA for a variance.



If you wanted to build a three story apartment building in a zoning district with a two story height restriction and the planning commission turned down your request to rezone you could apply to the zoning board of appeals for a variance.

Common duties of the ZBA include:

- Hearing and deciding appeals from someone who thinks there has been an error in enforcement of the zoning ordinance
- Hearing and deciding requirements for special exceptions (variances) from the zoning requirements

Review

Use the questions on the next two pages to review some of the concepts presented in Chapter Two.

Test Your Understanding of the Concepts Presented in Chapter Two

1) A large clothing retailer wants to build a shopping center along the banks of Clear Water Creek in your community. What should his/her first step be?

a) Hire a bulldozer and start digging
b) Draw up plans and go to the next planning commission meeting
c) Look at the community's zoning ordinance

Answer: c
The retailer's first step should be to go to the community hall and look at the zoning ordinance. They need to find out what the zoning is for the property and whether there are any special restrictions. The shopping center that the retailer would like to build is considered a commercial use. If she/he finds that the desired area is zoned for anything other than commercial, she/he will not be able to build their desired shopping center unless she/he requests a zoning variance.

2) The retailer wants to ensure that the area in which he/she has chosen to build will be suitable for business in the future (that is, will there be support for a commercial district in this location in the future?). How can he/she find out?

a) Survey all the surrounding land owners
b) Look in the zoning ordinance
c) Check the master plan

Answer: c
The master plan is the place to look. The retailer may find that the land surrounding his or her potential site is agricultural at present, but the master plan can suggest that it be re-zoned for commercial use. Given this information, the retailer may have more confidence in his or her present investment.3) The retailer hired an architectural firm to draw preliminary site plans. How does the firm know what to include in the site plans?

a) It doesn't matter as long as the drawings are pretty
b) Site plan requirements are specified in the zoning ordinance
c) Look around the community and draw something similar

Answer: b
The firm must consult the zoning ordinance to find out what it should include in the site plans.

4) The retailer must now go before the planning commission for a preliminary review of the site plans. At the planning commission meeting citizens can comment and ask questions about the retailer's proposal.

True or False?

Answer: True
For example, during the comment period a group of residents may raise concerns about how the proposed parking lot's runoff might impact the water quality of Clear Water Creek.

At the request of the planning commission, the retailer could revise her or his site plans to protect the water quality of the local creek. The new design could include stormwater detention basins that hold runoff and allow sediment to settle out before the water enters the creek. At the second meeting the planning commission could approve the revised site design.

5) Can the retailer begin to build?

yes no

Answer: No
In the next step, the township board or the city/village council would receive the planning commissions' recommendations and vote to approve or reject the project. There may also be many other public agencies that would review, approve, and issue permits. These include the Michigan Department of Environmental Quality, the County Drain Commissioner's Office, the County Road

Commission, the County Health Department, and/or the County Soil Erosion Officer.

YOUR PLANNING COMMISSION

1) When does your planning commission meet for regular and working group meetings?

2) Does your municipality provide a way to get a copy of the agenda for the upcoming meeting and the minutes from the last meeting ahead of time?

yes *no*

3) Has your planning commission hired:
(circle those that apply)

a planning consultant? *an engineer?* *an attorney?*

3a) Do they attend the planning commission meeting?

Planning Consultant? *yes* *no*

Engineer? *yes* *no*

Attorney? *yes* *no*

YOUR TOWNSHIP BOARD OR VILLAGE/CITY COUNCIL

1) When does your board/council meet?

2) Does your board/council provide a way to get a copy of the agenda for the upcoming meeting and the minutes from the last meeting ahead of time?

yes *no*

Congratulations! By learning about the water cycle jobs, how development can impact them, and your local land use decision making process you are well on your way to becoming an effective advocate for water resources.