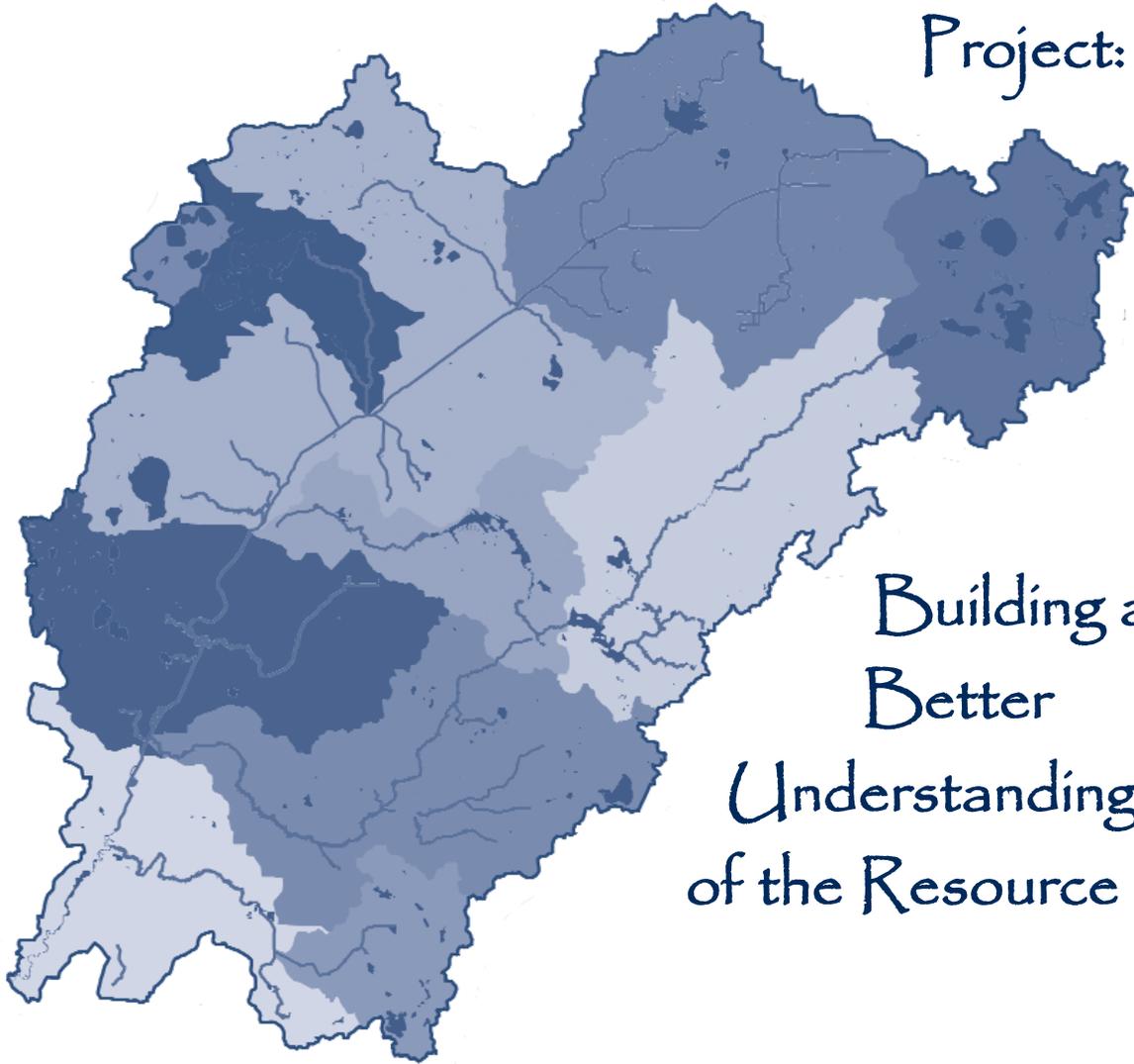


The Dowagiac River
Watershed
Project:



Building a
Better
Understanding
of the Resource



The Land Information Access Association is a non-profit, Section 501(c)3 approved, organization created to provide public assistance and training in the application of emerging information technologies to land use and community resource management concerns. We work with other non-profit organizations, state and local government agencies, and public organizations to help improve public access to information about the resources on which we all depend. We are committed to expanding the scope of digital data sharing and exchange while helping communities in planning their futures, and making wise land use and resource management decisions.



This booklet and CD-ROM were created for the Dowagiac River Watershed Project. This project has been funded wholly or in part by the USEPA under assistance agreement C9994014-00. The contents of the document do not necessarily reflect the views and policies of the EPA, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use (40 CFR 30.518 1e).



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Introduction

If you live or work in Cass County, southern Van Buren County, or eastern Berrien County, chances are good that you are helping to determine the fate of the Dowagiac River. Will the water quality improve? Will trout and other coldwater fish thrive? Will there be wildlife to enjoy along the river? These are some of the questions that you are helping to answer in the way you live, the resources you use, and the efforts you make to be part of your community planning and zoning process.

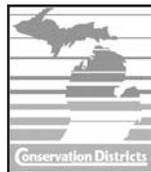
This booklet and the enclosed CD-ROM have been developed to help you participate in protecting and improving the Dowagiac River. The booklet will explain how you can use the CD to find useful information, create your own maps, and assess the possible impacts of land development in the Dowagiac River watershed. Using the CD, you can create maps that display detailed parcel information, soil characteristics, changes in land use, and other important topics. With just a few mouse clicks, you will begin working with the information needed to develop a community master plan, improve a local zoning ordinance, and begin a site plan review.

This booklet and enclosed CD are part of a larger package of important watershed planning tools developed by the Dowagiac River Watershed Project, managed by the Cass County Conservation District. The primary mission of the Project is to promote cooperative land use decisions and policies that will protect and improve the water quality of the Dowagiac River.

With funding support from the Michigan Department of Environmental Quality and the U.S. Environmental Protection Agency, under Section 319 of the Federal Clean Water Act, the Dowagiac River Watershed Project has developed a resource map atlas for each local unit of government, a series of guidance documents called the Watershed Resource Papers, and this unique interactive CD. Taken together, these tools will help you as well as other citizens and public officials better manage and preserve the Dowagiac River Watershed.

The Dowagiac River Watershed Project is led by a group of respected citizens and local community leaders. This group is called the Watershed Stewardship Team and includes many local government officials, county drain commissioners, Cass County Conservation District, Michigan Department of Environmental Quality, and a number of interested citizens.

The Dowagiac River Watershed Management Plan provides a plan of action for cooperative efforts that will lead to an environmentally and economically healthy and sustainable watershed. The plan identifies and prioritizes problems and issues, establishes goals and objectives and introduces an action strategy to meet the goals and objectives. The management plan was developed by drawing from the expertise and knowledge of many stakeholders in the watershed. Input from the general public was also gathered throughout the development of the plan.



How to load the CD-ROM onto your computer

Minimum System Requirements

486/Pentium IBM - Compatible Computer (Pentium or better recommended)

MS Windows 95®, 98®, 2000®, XP®, or NT 4.x®.

Greater than 10 MB of free disk space for CD application files and temporary files.

1 MB video card (2 MB or greater is highly recommended).

Color Monitor set in 800 x 600 pixel mode and 256 color resolution (greater than 256 color resolution highly recommended).

Mouse, touch-screen, or other MS Windows 95/98/NT compatible pointing device.

4X CD-ROM drive (8X or faster is recommended).

Using The CD-ROM

This CD runs in the MS Windows environment.

Insert the disk into your CD drive and it should start automatically. The menu screen appears with four buttons:

- Install Acrobat Reader
- Install the CIS-CD
- Run the CIS-CD
- Quit the CIS-CD

If the software is not installed on your computer or you have an older version, you will need to install it.

Click the INSTALL THE CIS-CD button to load LIAA's proprietary CIS™ software and the libraries and DLLs needed to run this CD. If the INSTALL button is disabled, the needed software is already installed and up to date.

During the installation, a message may appear indicating that a file on your computer is newer than the one on the CD. You will be asked if you want to keep the newer file and you should select YES. If you get a message that a system file is in use, select IGNORE.

You will need Acrobat Reader 5.0® to read some files on the CD. Click INSTALL ACROBAT READER if you have an older version.

Your monitor settings can be modified by clicking on "Display" in your "Control Panel." Choose the "Settings" tab. Set the "Color Palette" to "True Color" (or 256 if True Color isn't available). Set the desktop area to 800 x 600 pixels (1024 x 768 will work, but the CD was developed for 800 x 600). Click the OK button at the bottom of the box to save the changes. You may be required to restart your computer to complete these changes.

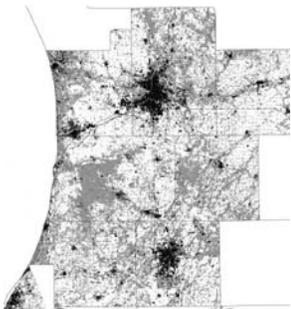
When you quit the CD software, the original startup menu will reappear. Click QUIT to exit.

Trends In The Dowagiac Watershed

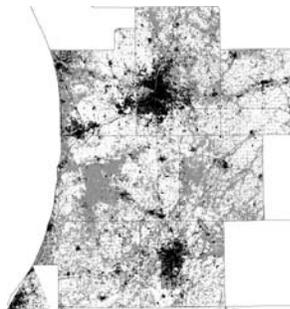


The Dowagiac River is a little-known, sparkling treasure flowing through southwest lower Michigan. Fed by both surface runoff and large amounts of cool groundwater, the Dowagiac sometimes meanders and sometimes flows swiftly through the open countryside and farm fields, under bridges, and along the edges of towns. In places, the river is shaded by shrubs and trees; in other places, wetlands protect its banks.

The large amount of groundwater feeding the Dowagiac River, assures that coldwater fish can thrive there. In fact, the Dowagiac River has the potential to rank among the finest trout rivers in the Midwest - with additional improvements. However, there has been a significant amount of urban development and land use change within the watershed in recent years - changes that threaten the water quality improvements already made. If not carefully planned, new construction and other land use changes could damage the river and quality of life in the region.



1980



1995



2020



2040

The Dowagiac River Watershed is located in the southwest corner of Michigan's lower peninsula. The term watershed is used to describe the land area drained by the Dowagiac River. That is all the rain and snowmelt that does not evaporate from that land area flows toward the Dowagiac River and on into the St. Joseph River and, eventually, to Lake Michigan. The Dowagiac gets its start in southern Van Buren County - its headwaters area - and flows through northwest Cass County and eastern Berrien County before entering the St. Joseph River near Niles.

The major tributaries to the Dowagiac River are the Dowagiac Creek, Pokagon Creek, Peavine Creek, McKinzie Creek, Silver Creek, and Lake of the Woods Drain. There are several lakes in the watershed including 23 larger than 10 acres. A few of these larger lakes include: Magician Lake, Lake of the Woods, Stone Lake, Twin Lakes, and Bunker Lake. In total, the Dowagiac River Watershed drains about 287 square miles or more than 183,000 acres of land.

These maps (above) are from the Michigan Land Resource Project and show the projected future of agriculture, forestry, tourism, and mining in Southwest Michigan if present land use trends continue. Black represents developed or built areas. This report was done by the Michigan Economic and Environmental Roundtable (MEER) and Public Sector Consultants, Inc.

Opportunities for Change

The way land is used has long-term and far-reaching effects on your community and its natural resources. A simple change in zoning can potentially preserve or destroy an entire ecosystem. When looking at the development of a particular parcel, a change in the zoning ordinance, or an improvement to the master plan, it is important to ask a lot of questions. The decisions your community and its decision-makers reach will influence your community and its residents for many years to come.

Townships, the Village of Cassopolis and the City of Dowagiac. In Van Buren County, the municipalities include the Village of Decatur and Decatur, Hamilton, Keeler and Porter Townships. In Berrien County, the City of Niles and Berrien, Niles and Pipestone Townships have land in the watershed. Due to the large number of governmental units involved and the complexities of local geography, watershed management planning efforts are often more effective at the smaller sub-watershed scale. The Dowagiac River

Most large watersheds are complex flow systems affecting one or more ecosystems. Human activities within a watershed can affect the soil, water, air, plants and animals, and our own health and quality of life.

It would be easier, perhaps, if watershed boundaries followed political boundaries - but they do not. Watersheds are defined by the topography of the land and have little to do with governmental boundaries. In most cases, no single governmental body presides over an entire watershed. Therefore, effective management demands cooperation and coordination between jurisdictions and between departments.

In addition to portions of three counties, the Dowagiac River Watershed includes all or portions of sixteen townships, two cities, and two villages. In Cass County, the municipalities that have land within the watershed include Howard, Jefferson, LaGrange, Marcellus, Penn, Pokagon, Silver Creek, Volinia and Wayne

Table 1. Sub-Watersheds of the Dowagiac River Watershed (DRW)

ID #	Sub-Watershed	Major Water Bodies	Acreage
1	Headwaters - Dowagiac River above Osborn Drain	Lake of the Woods and Lake of the Woods Drain, Dowagiac River headwaters	28,341.91
2	Silver Creek (at mouth)	Magician Lake, Dewey Lake, Priest Lake, Silver Creek	7,800.93
3	Transitional-Pipestone Creek	Big and Little Crooked Lakes	1,774.95
4	Dowagiac River above Dowagiac Creek	Dowagiac River*, Osborn Drain*, Keeler Lake, Geer Lake, Pitcher Lake, Twin Lakes, Indian Lake, Brush Lake	35,115.04
5	Dowagiac Creek Headwaters -Dowagiac Creek at Bunker Lake	Cedar Lake, Gravel Lake, Swift Lake, Saddlebag Lake, Fish Lake, Finch Lake, Bunker Lake	14,295.47
6	Middle Dowagiac Creek - Dowagiac Creek at LaGrange Lake	Dowagiac Creek*, Kelsey Lake, LaGrange Lake	23,289.17
7	Lower Dowagiac Creek (at mouth)	Dowagiac Creek, Mill Pond	9,882.50
8	Middle Dowagiac River - River above USGS gauge	Dowagiac River*, Peavine Creek*, O'Brien Lake, Smith Lake, Rodgers Lake	20,212.66
9	Pokagon Creek (at mouth)	Stone Lake, Pokagon Creek*	22,083.89
10	Mudd Lake Extension Drain	Pine Lake, Mudd Lake Drain	6,297.77
11	Lower Dowagiac River (at mouth)	McKinzie Creek*, Dowagiac River*	14,022.44
Total	Dowagiac River Watershed	entire watershed	83,116.73

*designated cold water fisheries

Watershed can be divided into 11 sub-watersheds, each of which drains a portion of the water that flows into the Dowagiac River. These are listed in Table 1 with their respective acreages. (From: *Dowagiac River Watershed Management Plan*, December 2001)

Historical Perspective

Before European settlers came to this area, oak savanna and oak hickory forests dominated the sandy uplands of the watershed. Beech and sugar maple forests covered many of the drier soils. As settlers moved into the area, the forested uplands were quickly converted into agricultural fields and the wetlands and wetland forests were eventually cleared and drained so farmers could utilize the rich organic soils.

Since being settled by Europeans in the early 1800s, the watershed has been converted from 87% forest cover to 65% agriculture, with only a few upland forests and small isolated prairies remaining. Much of the region is covered by soils that are well suited for farming, including the production of food crops, animal feed, fiber, and oilseed crops. These are the areas termed Prime Agricultural Lands by soil scientists. However, there are many pockets of unique wet prairies, grasslands, forested floodplain, and wetlands

remaining. These natural areas protect water quality and provide habitat for many species of plants, flowers, insects, animals, and songbirds - some of which are rare and endangered.

Of course, people continue to shape the land. As in other beautiful areas of Michigan, people continue to develop homes and small businesses on large lots in widely dispersed areas. This trend of low-density development in rural areas is often called urban or suburban sprawl. Such sprawling development can have many undesirable side effects, including: increased community service costs (e.g., fire protection, schools, road maintenance); increased conflicts with agricultural uses; loss of open space and the disruption of wildlife habitat; and increased water pollution from runoff. The current trend toward sprawling development presents serious threats to the water quality of the Dowagiac River.

Changes in land use from 1978 to 1996 have included quite a bit of dispersed urban development. In fact, over 10,000 acres of land were converted to urban uses from other uses. At the same time, over 18,000 acres of agricultural lands were converted to some other use. You can use the CD to look more closely at this and other land use change maps. Try using the CD to "zoom in" on an area (i.e., change map scales) and compare existing land uses and soil

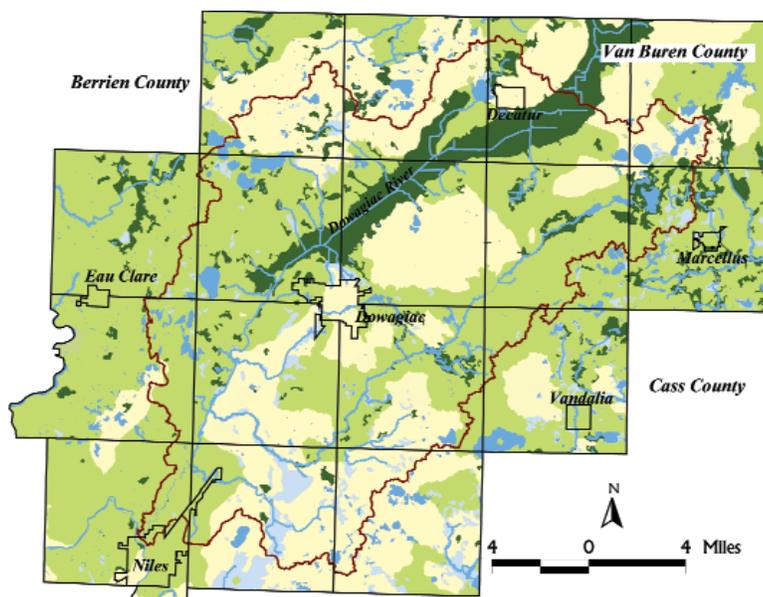
Pre-Settlement Vegetation

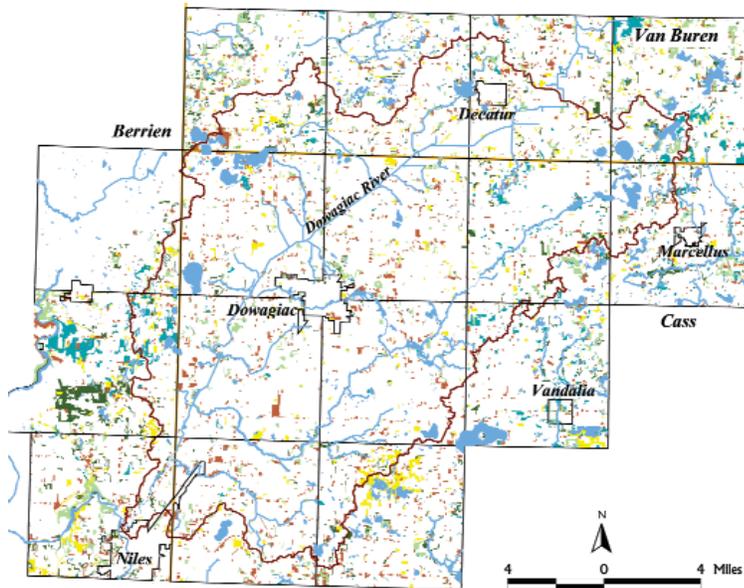
This information has been compiled by the Michigan Natural Features Inventory and MDNR Wildlife Division from notes and sketches made by General Land Office surveyors between 1816 and 1856. Vegetated areas less than 10 acres in size are not represented, and accuracy is greatest along section lines (where surveyors actually traversed).

PRE - EUROPEAN SETTLEMENT VEGETATION

-  Non-Forested Upland
-  Forested Wetland
-  Forested Upland
-  Non-Forested Wetland
-  Sparsely Vegetated Upland

- ### BASE FEATURES
-  Township and municipal boundaries
 -  Streams
 -  Lakes
 -  Dowagiac River Watershed
 -  County Lines





Land Use Change

This map was derived from 1978 and 1996 land use maps provided by Western Michigan University.

**LAND USE CHANGE FROM 1978 TO 1996
(by type gained)**

-  Urban
-  Agriculture
-  Forested Fields
-  Forest
-  Wetlands

characteristics with current zoning districts. What future changes do you expect to see?

In the U.S. Census for 2000, the estimated population of the watershed was 38,598. You can use the CD's mapping tool to see how this population is distributed across the watershed. Maps of the Census data can also show population distribution by age, housing status, and other statistics.

Based on the recent Census figures, the most dramatic increases in population and housing units are found along the I-94 corridor and the numerous lakes in the areas surrounding the Village of Decatur and the townships of Decatur, Hamilton, Silver Creek, and Keeler. All of these areas are located in the northern portion of the watershed - the headwaters of the Dowagiac River. Since everyone downstream is affected by actions of people upstream, this population increase presents some real concern for watershed planners.

Growth is also projected to occur in the southern portion of the watershed, in Pokagon and Howard Townships. This area is home to three sensitive high-quality tributaries of the Dowagiac River, Pokagon, Peavine, and McKinzie Creeks.

When considering growth, it is also important to understand the trend toward rural living. Rather than being developed at urban densities of 3-5 units per acre, rural housing construction can average between 1 unit per acre to 1 unit per 3 acres. As a result, even if the total number of housing units rises at a modest rate, it is likely that much more land will be consumed, and at a much faster rate.

Residential developments do not typically grow food and lawns do not provide healthy wildlife habitats. Impervious surfaces (those areas that do not allow water to infiltrate into the ground, including roads, parking lots, sidewalks and rooftops) have a tremendous impact on stream quality, frequency of flooding, erosion, pollution, and habitat destruction.

Household chemicals, fertilizer, road salt, nutrients from septic systems, herbicides and pesticides, and soil erosion may all damage water quality. These contaminants may be carried to our lakes and streams by surface water runoff. They can also be transported into our aquifers by rain or melting snow that seep through the soils and eventually travel to our water wells or discharge into our streams, rivers and lakes.

Pollution entering the Dowagiac River upstream will impact communities down river. This is why it is so important to address these issues on a watershed or sub-watershed scale rather than from the perspective of an individual municipality or jurisdiction.

A Tool For You

Over the past two years, the Cass County Conservation District and the Dowagiac River Watershed Stewardship Team held many meetings with residents, decision makers, property owners, and other stakeholders throughout the watershed. In these meetings, a long list of issues important to the quality of life within the watershed were raised. These stakeholders remain concerned about the dropping populations of native plants, animals, and insects. They noted specific concerns about sediment and runoff. This group also recognized that development is having a dramatic impact on the quality of resources in the area.

They collectively decided that several steps would be necessary to protect what is valuable to them. These include the preservation of certain types of land and water resources, including:

- Rivers and creeks
- Floodplains
- Wetlands
- Woodlands
- Agricultural lands
- Distinctive topography

This group emphasized that community members need to get more involved in decision-making and the conservation of natural resources and open space. Everyone can be an effective participant, whether a business leader, a homemaker, a realtor, or a hunter. Farmers, in particular, need community support to remain viable and functioning.

Given the interdisciplinary nature of the issues coupled with a widespread lack of understanding and miscommunication, the group recognized the need for more education about issues relevant to the quality of the watershed - issues such as water quality, farmland preservation, and impervious surfaces. This booklet and CD-ROM are part of that educational package and it is our hope that you will carefully explore the information contained within and then share it with friends, neighbors, family, schools, city managers, township supervisors, contractors and builders, and children.

Better Decisions with Better Information

No matter what your job or role in the community is, it is important to understand the issues that affect your community. It takes the collective work of scientists and students, planners and developers, educators and designers to make an effective plan for a community. A holistic perspective and effective tools empower you to work to improve the quality of life in your community.

Use the CD-ROM, this booklet, the Watershed Resource Papers, and the resource map atlas provided to jump-start your path toward understanding a wide variety of important subjects ranging from controlling non-point source pollution, to the preservation of open

space, to intergovernmental cooperation. This CD contains other powerful tools including maps that can help you find answers to questions about a specific location including:

- Are there wetlands or other protected areas within the area?
- Where are nearby surface waters, such as lakes, rivers, streams, and ponds?
- What school district is it located in?
- Which County Commission district is it in and who is the Commissioner?

Farmland Preservation

In Michigan, agriculture and food processing contribute about \$15 billion directly to the economy and another \$22 billion indirectly through support and related services. This is the second largest industry in the state. Cass County alone contributes close to \$70 million in agricultural revenues annually (Census of Agriculture 1997: Bureau of the Census). This vital sector of Michigan's economy and the people who are employed by it depend on the availability - and therefore the preservation - of active farmland. The Dowagiac River Watershed is blessed with a very high proportion of Prime Farmland, in fact about 65,400 acres. Prime Farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops.

The preservation of farmland can be a controversial issue. Many rural, non-farm residents want to preserve the farmlands essential to the rural feel of their community. Many farmers also want to preserve the land while retaining the option to sell. However, as sprawling residential development increases and agricultural commodity prices decline, the challenges to preserving farmland become greater.

In Michigan, there is a continuing shift of populations out of urban areas and into rural and semi-rural areas. More and more people are building homes out "in the country," contributing to a trend often called urban sprawl. This low-density development in rural areas can damage the rural character.

Preserving farmland often draws a fine line between private property rights and the obligations of a community to protect and preserve land resources for future generations. The time to preserve farmland is now; each year there are fewer farms and farmers. Between the years of 1987 and 1997, Cass County lost more than 15% of its farms (Census of Agriculture

1997: Bureau of the Census).

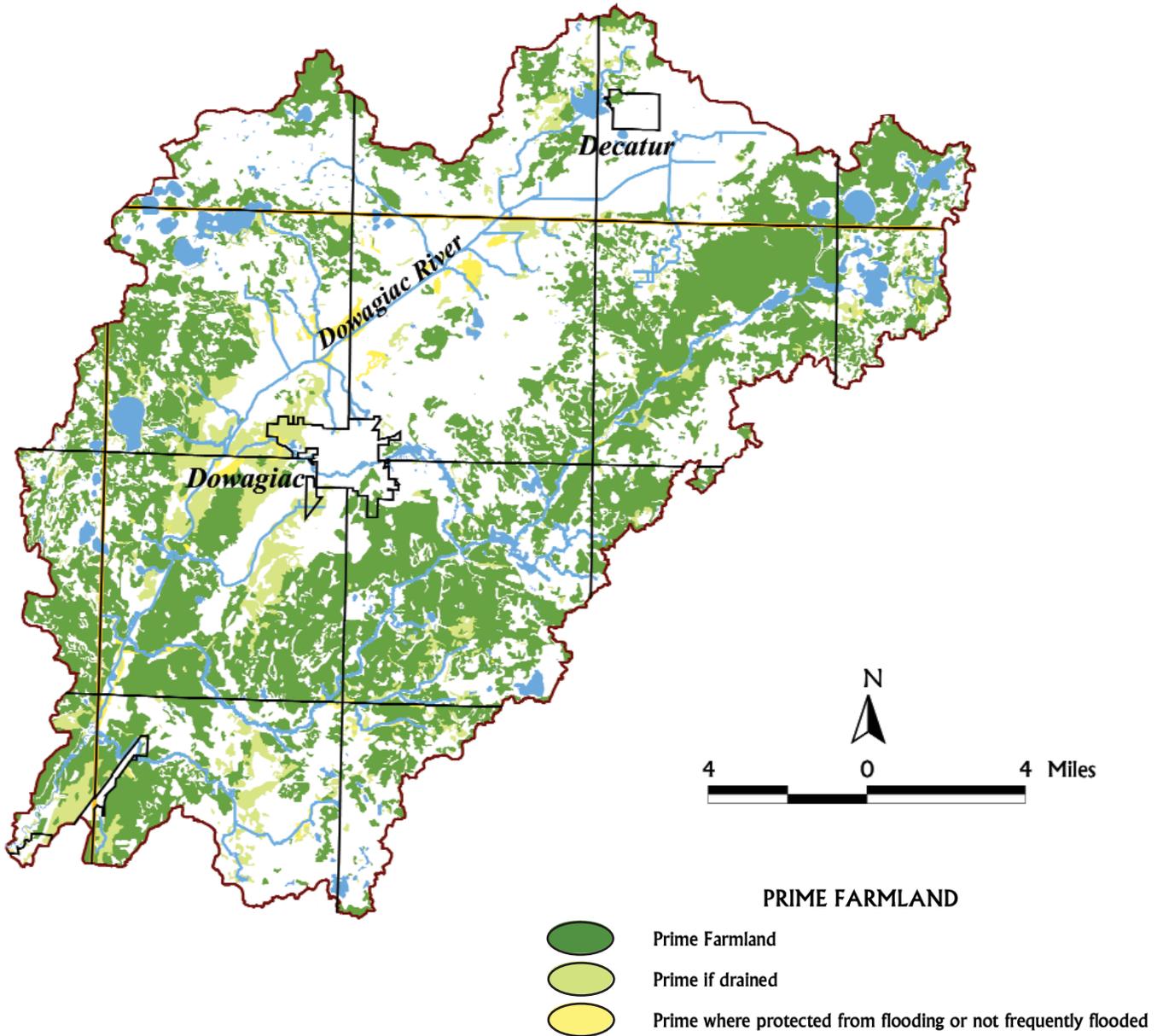
The effects of non-agricultural development on existing farm operations is a particularly troublesome issue. New development can make daily farming operations difficult and sometimes dangerous. Examples range from complaints about odors emanating from the care of livestock to liability issues. New residents in farming areas may not understand basic farming needs, such as manure handling. Farmers may be forced to contend with increasing traffic and nuisance complaints as new neighbors object to slow moving vehicles on roadways, noise, dust, odors, and late hours of operation. As development pressures build, so will additional complaints regarding agricultural practices.

State tax assessment guidelines and many local land use regulations are generally not conducive to protecting farmland. In many rural areas this has caused rapid development of single family homes on large lots, land fragmentation, and increased farmland property values (beyond its agricultural worth).

Nation-wide, we need to become better informed about the problems associated with farmland preservation. This work begins at your local community level.

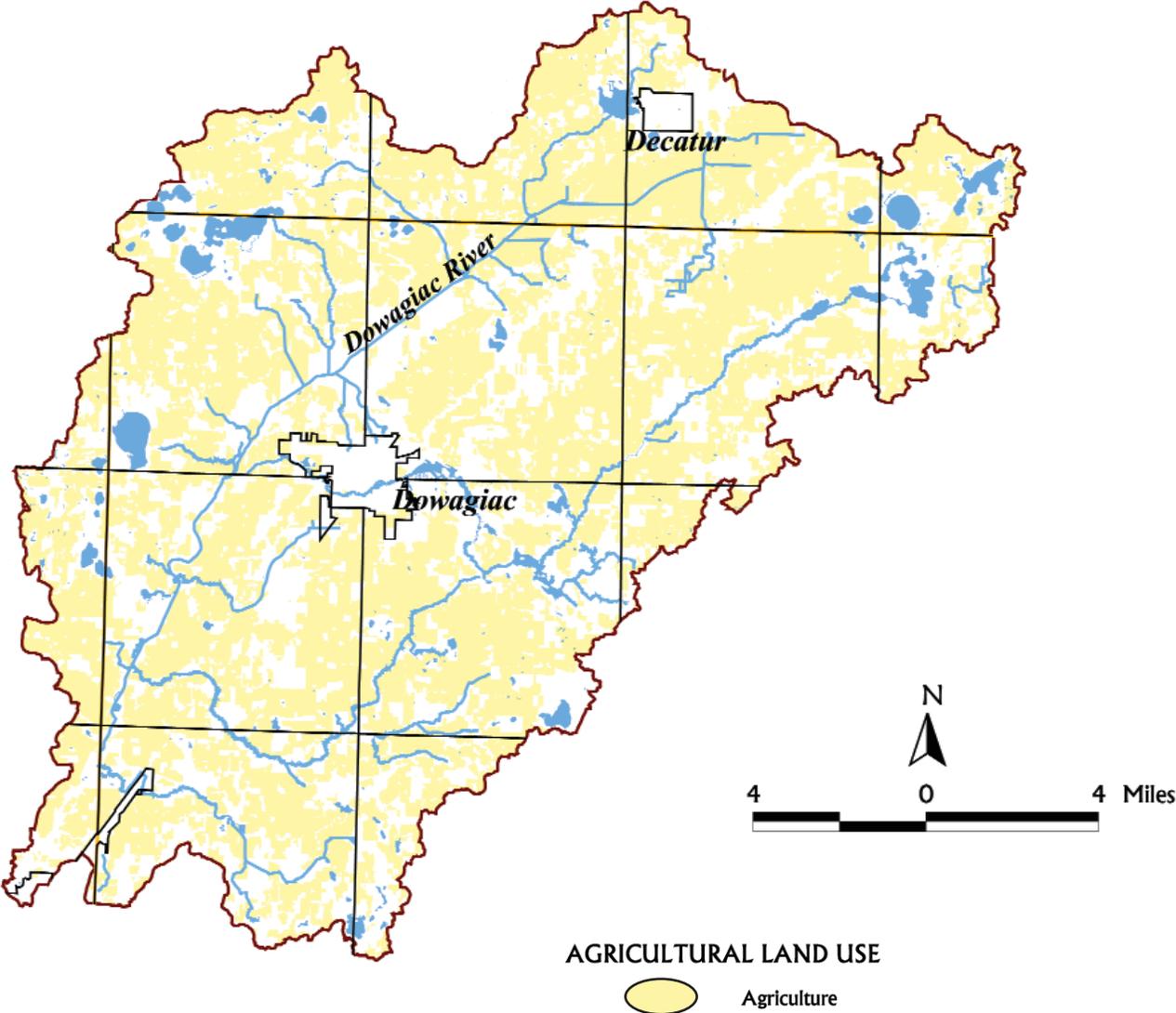
Use the accompanying CD ROM to learn about agriculture in the Dowagiac River Watershed. Maps are provided that show where prime farmlands are located and recent property assessment data. Also included are some suggested actions you can take in your township, city, or village to preserve the farmland most important to you.

PRIME FARMLAND



The Dowagiac River Watershed is blessed with an abundant amount of prime farmlands. This map shows areas that are best suited to food, feed, forage, fiber, and oilseed crops based on soil characteristics. Prime Farmland areas include soils capable of producing the highest yields with the smallest inputs of energy and economic resources.

AGRICULTURAL LAND USE



This map shows areas used for agriculture (from 1996 Land Use). Notice the large percentage of the watershed classified as agricultural land use. This trend may change as the rate of development increases. As land uses change, the character of the affected communities also changes.

Open Space Protection

Open spaces can serve several purposes. Before deciding how and where to protect open spaces, we need to clearly understand the different ways open spaces are used and influence a community's character. Many people move to an area because they like the rolling hills, open fields, wetlands and lakes, as well as vistas unobstructed by buildings. They like to go hiking, hunting, fishing, and boating in these same spaces. Open spaces provide places for people to congregate, recreate, and relax.

People are not the only beings that require open spaces. Wetlands, floodplains, forests, and fields often provide valuable habitat for wild animals and a diversity of plants. These natural areas also improve water quality and air quality.

We need, first, to understand how important these resources are, then we can act to protect the quality of life in our own communities for future generations. Below we will describe two types of open spaces and their characteristics.

Cultural Open Space

Cultural open spaces are those that are clearly created by humans and are generally carefully maintained. These may range from large open spaces around institutional or other large facilities, down to the well-manicured lawns found in suburban housing developments. This category includes city parks, playgrounds, and agricultural fields. These open spaces are intended to be aesthetically appealing, highlight or call attention to specific uses, define locations, and provide space for specific recreation purposes.

Natural Open Space

Natural resources within open spaces can encompass many elements including, but not limited to, wetlands, areas of dramatic topography, forests, and water bodies. The map images [on page 12] show a variety of land uses

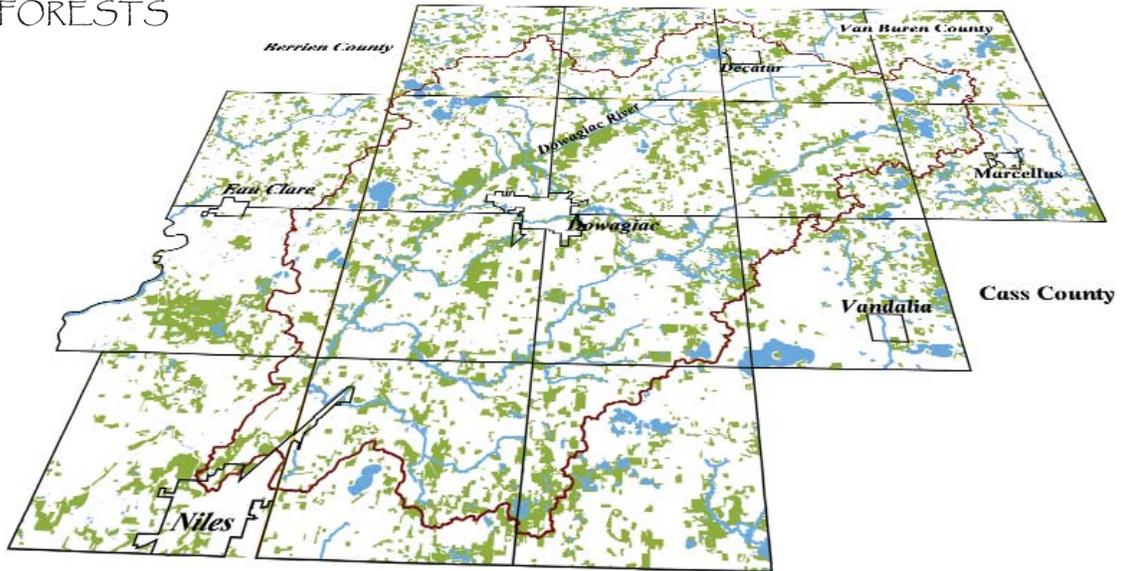
that are considered 'open space' and where they are located in the watershed. By combining these different characteristic areas, one sees the total amount of forested, recreation and wetland open space in the region. Notice how these spaces tend to form boundaries around some rivers and lakes and also how they are largely non-existent inside city and village boundaries. The wealth of natural features contained within open spaces in the Dowagiac River Watershed is a valuable community resource, not only for the role they play in maintaining the area's rural character, but also for tourism and its contribution to the state's economy. Where are they valued or needed in your community?

Natural open spaces also have positive environmental effects by helping to protect ground and surface waters through the reduction of soil erosion, flooding, and nutrient overloading in water bodies. Further environmental benefits of these open spaces come in the form of the preservation of wildlife habitat, improved air quality, and noise reduction.

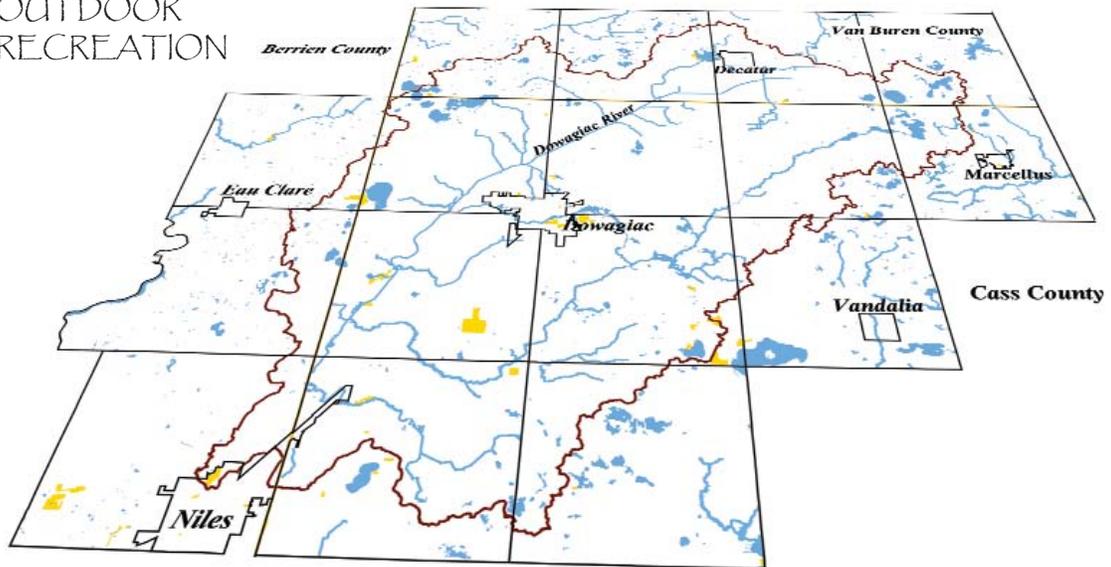
Learn more about the benefits of open space on the accompanying CD.

We suggest you take the Self Test provided on the CD under the topic *Tools and Techniques for Effective Planning*. This exercise will lead you to a variety of measures available to help preserve your most important open spaces.

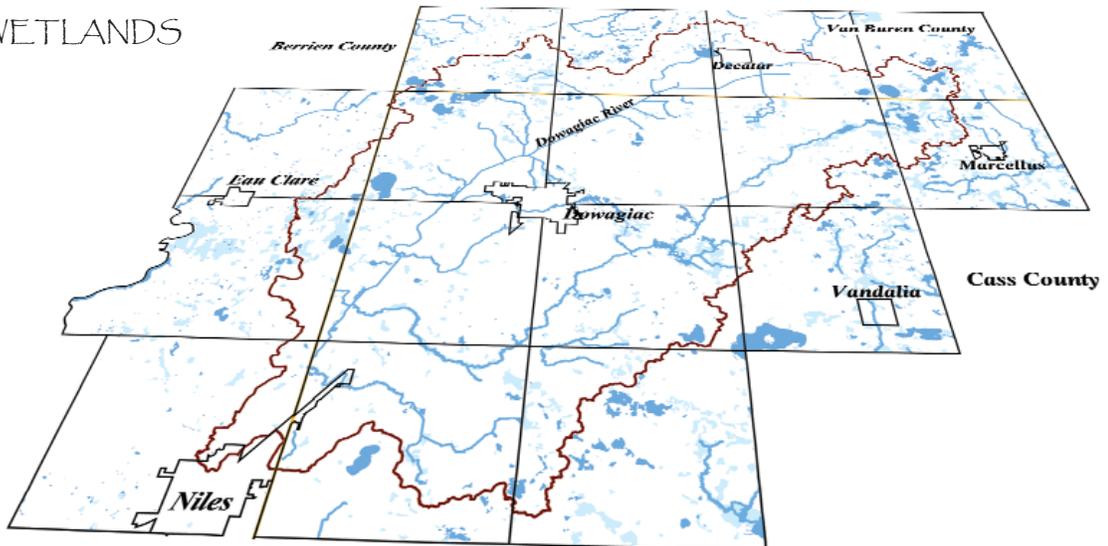
FORESTS



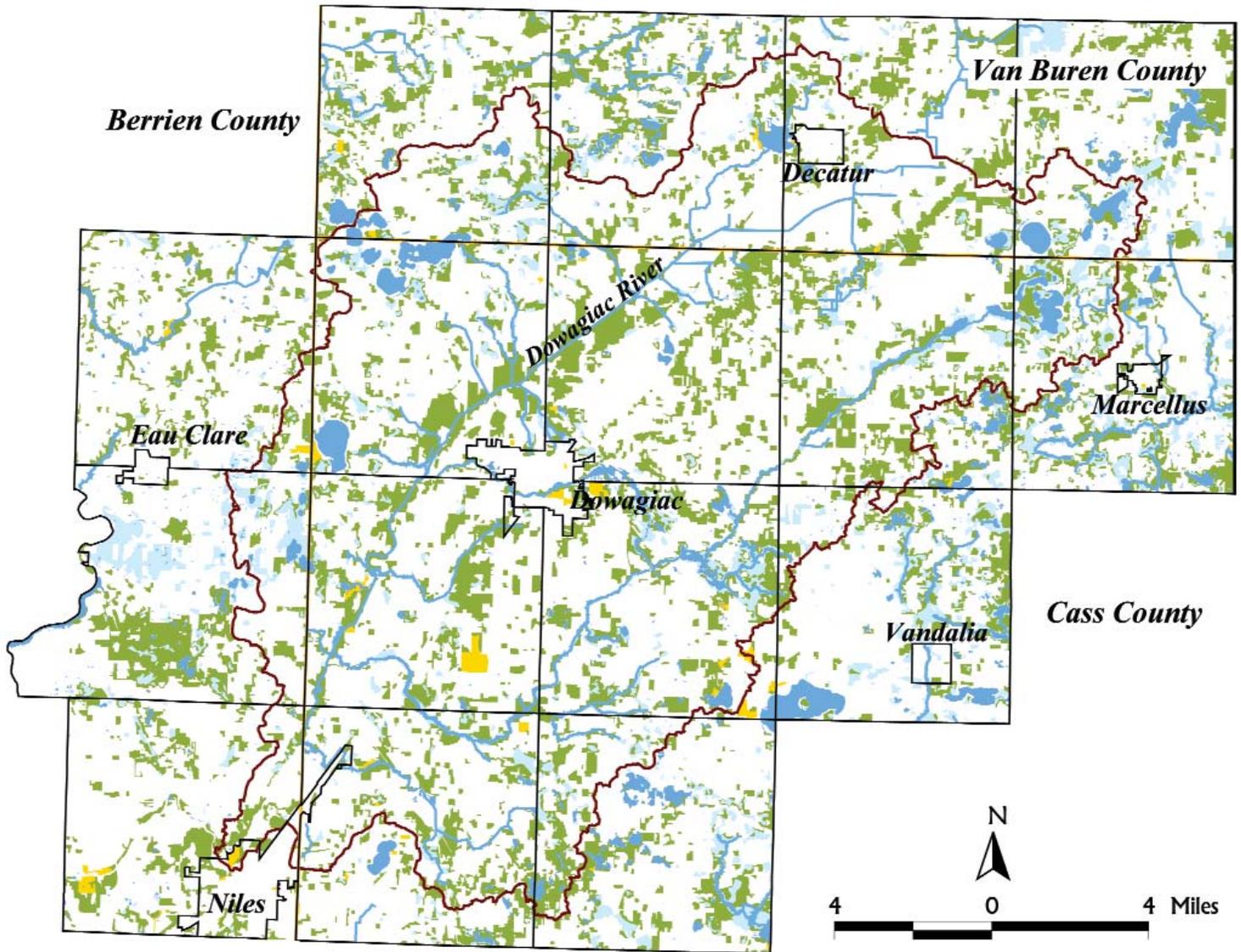
OUTDOOR RECREATION



WETLANDS



COMBINED OPEN SPACE



OPEN SPACE

-  Forested
-  Outdoor Recreation
-  Wetlands

This map shows all of the forested, outdoor recreation and wetland open spaces in the watershed as shown on the 1996 Land Use map. Notice how often open spaces border lakes and rivers and how rare they are within city and village boundaries.

Water Quality Protection

Our surface water and ground water resources are part of a larger flow system that is often at risk. Generally, protection and/or improvement of water quality takes place in two

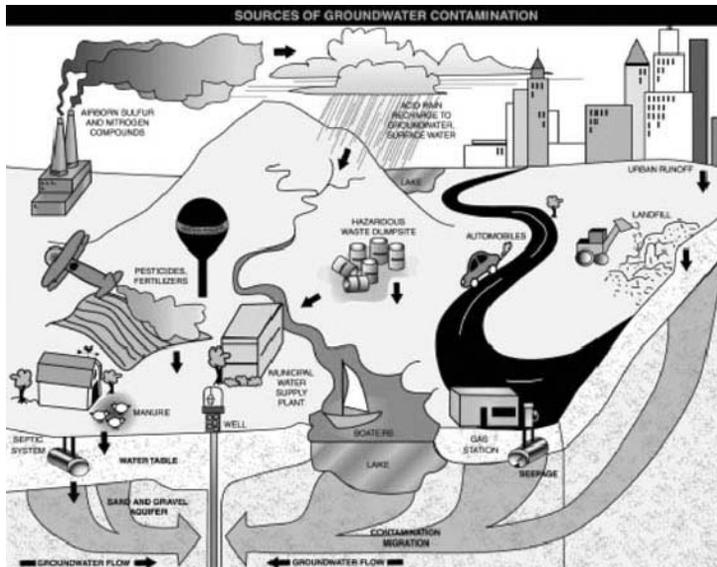


Illustration courtesy of *Watershed Resource Papers*, Langworthy, Strader, LeBlanc & Associates, Inc. 2001.

arenas: surface water quality (lakes, streams, rivers, and ponds) and groundwater quality. However, it is critical that the links between the two are clearly understood. The Dowagiac River, a surface water feature, is one of the most heavily groundwater fed rivers of its size in Michigan. Because of this, it exhibits cold year-round temperatures and stable year-round flows.

If placed on or injected into the ground, many different substances have the potential to degrade groundwater quality. Businesses such as dry cleaners, photography studios, and gas stations serve as examples of potentially hazardous land uses due to the types of chemicals they routinely use. If these businesses use on-site wastewater disposal systems, accidental spills can present

Threats To Groundwater Quality:

- **On Site Wastewater Disposal Systems** ("septic" systems) are underground and often ignored. Not all sites are suitable for septic systems. An improperly sited, designed, installed, or operated septic system can pollute groundwater and surface water. Maintaining appropriate densities of development and proper disposal of sanitary sewer wastes are critical factors in ensuring water quality.
- **Point-Sources** of pollution include accidental spills or leaks of contaminants from: industrial operations that use hazardous chemicals, landfills, gasoline filling stations, and other operations that handle potential pollutants. For the most part, these sources are controlled by state and federal regulations.
- **Non-Point Sources** of pollution have no single point of origin (like a pipe), but come from a collection of many small activities or from a generalized problem area like an eroded hillside. Non-point pollution can include lawn care chemicals as well as oil and gas residues from parking lots (and other "impervious surfaces") that seep into soils and groundwater.

Threats to Surface Water Quality:

- **Non-Point Sources** of Pollution pose one of the greatest threats to surface water quality. Rather than occurring from one major source, like a water treatment plant discharge pipe, non-point source pollution results from rainfall or snowmelt moving over and through the ground. This runoff can pick up and carry natural and human-made pollutants into lakes, rivers, wetlands, ponds, and groundwater. Sources of non-point source pollution may include a combination of agricultural practices, lawn chemicals, soil erosion, and stormwater runoff.

- **Impervious Surfaces** (such as parking lots and roofs) may cover anywhere from five to ten percent or more of a developed area. Some sites may have significantly higher coverages, particularly commercial and industrial uses with large parking areas.

These surfaces may both increase the quantity and decrease the quality of runoff from normal precipitation. Increased runoff can lead to increases in erosion and sedimentation and the loss of fertile top soil. These sediments can fill in and pollute lakes and streams. Increases in runoff can also increase flooding, damage to aquatic habitat and animals, and cause structural damage to buildings and roads.

particularly high risks of groundwater contamination. Other land uses such as golf courses and highly fertilized lawns can also threaten groundwater quality. The fertilizers, herbicides, and pesticides often applied to turf grasses for golf courses and other highly manicured lawns can penetrate the soils to degrade groundwater quality. Where irrigation or other high-capacity wells are used, groundwater levels can be lowered, increasing potential problems to wells nearby.

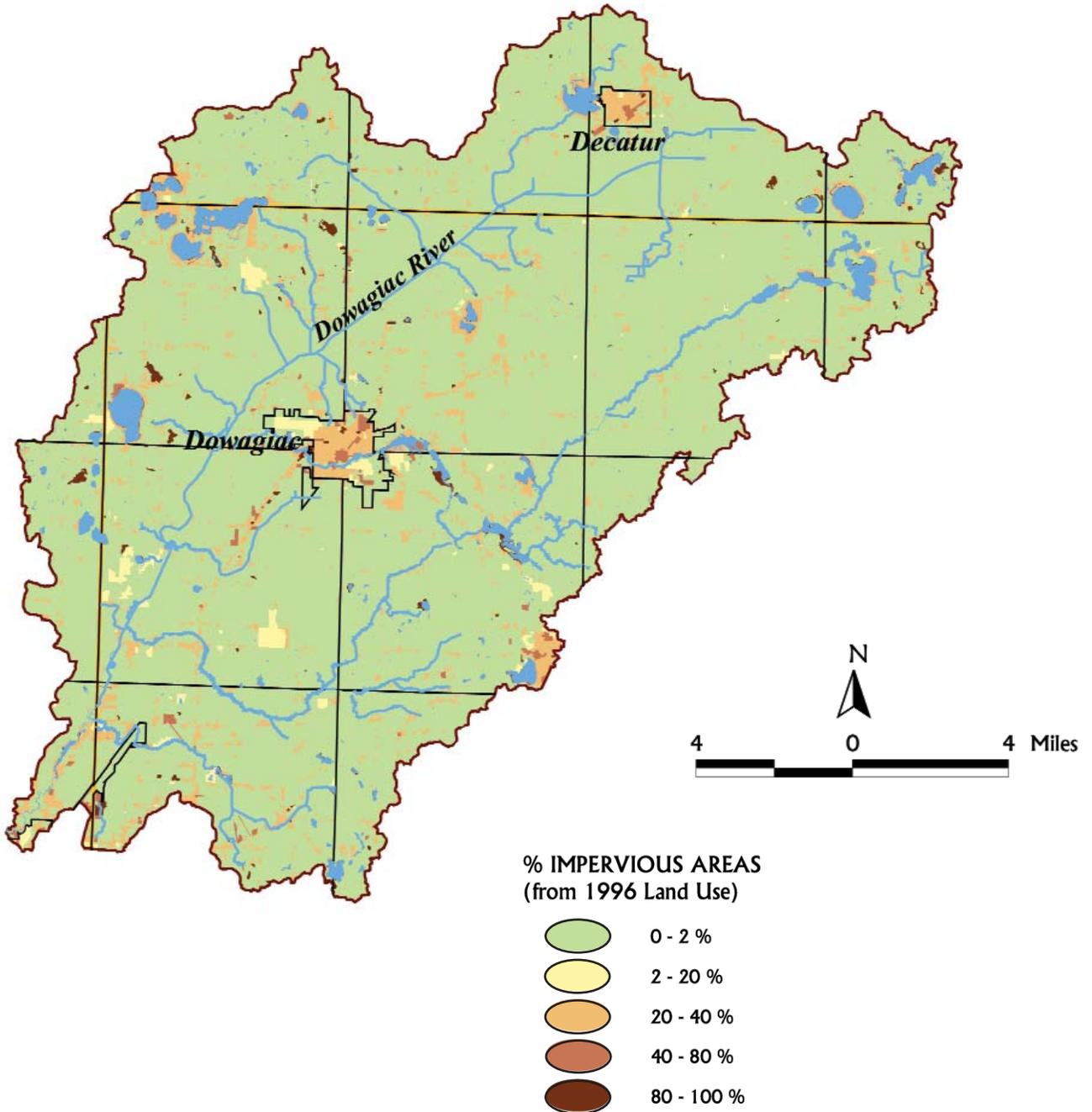
Because we live in a state where fresh water surrounds us, it is easy to ignore how critical water quality issues are. Even if the lakes are clean enough to swim in and the fish are thriving and even if the groundwater is clean enough to drink and there is plenty for irrigation now, this can change all too easily. People have a tremendous effect on their environment. As we build in natural areas and develop in open spaces, we can degrade the quality and quantity of water resources. The preservation of water quality is important for plant and animal life, tourism, and drinking water supplies.

The CD accompanying this book provides information on the importance and fragility of water resources as well as a number of methods available to improve protection. The CD also contains information to help you with understand community planning and zoning processes in Michigan.

Please use the CD to:

- Identify areas of particular concern using the geographic analysis tools in the map section.
- Identify protection measures outlined in the Self Test area.
- Select model ordinance language for improving and protecting your local jurisdiction.

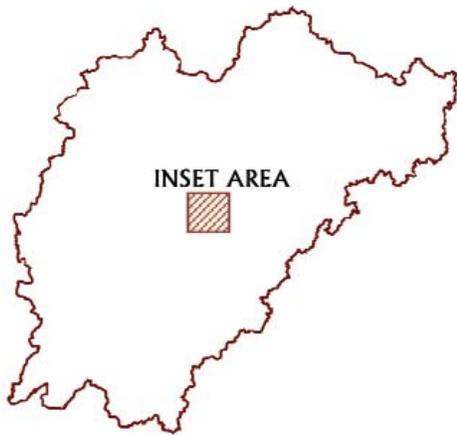
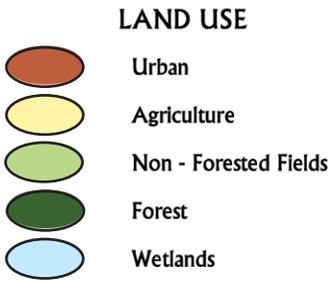
IMPERVIOUS AREAS



This imperviousness map was derived from 1996 Land Use information developed by Western Michigan University. The imperviousness values represent an average amount of land area by percent that is typically found to be impervious for each land use type. (J. Warbach, Planning & Zoning News, Vol. 16, No. 1).

Impervious surfaces may both increase the quantity and decrease the quality of runoff from normal precipitation. Increased runoff can lead to increases in erosion and sedimentation and the loss of fertile top soil. These sediments can fill in and pollute lakes and streams. Increases in runoff can also increase flooding, damage to aquatic habitat and animals, and cause structural damage to buildings and roads.

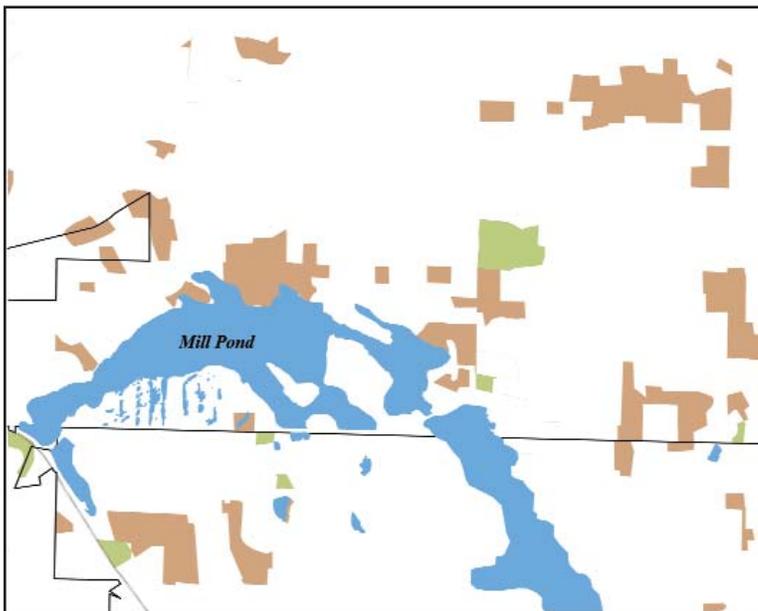
CHANGE IN IMPERVIOUSNESS



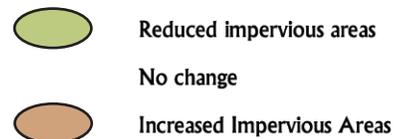
1978 Land Use



1996 Land Use



**CHANGE IN IMPERVIOUSNESS
(from 1978 to 1996)**



As shown in these illustrations, changes in land use from 1978 to 1996 in the central portion of the watershed have increased the amount of impervious areas. Please refer to the CD-Rom to see how land uses have changed across the entire watershed and resulting changes in impervious area.

Preserving Rural Character

Michigan's diverse landscapes, including its shorelines, rivers, streams, wetlands, open fields, forests, and farmlands draw residents to a variety of rural areas throughout the state. This combination of natural features, farms, and open spaces is what many people call *rural character*. Rural character is often cited as a valuable contribution to a high quality of life. However, the perception of rural character is an individual and subjective thing. One person may interpret rural character as having a low density of development; another may recognize it where there is complete absence of man-made features, such as signs and buildings.

Regardless of individual interpretations, preserving the unique rural character of an area may be a very important objective for community residents. Often, people have moved into an area or stay in the community because they value the rural character. Of course, the attraction of rural communities can work against efforts to preserve them as more and more people are drawn to the area. In any case, efforts to protect rural character must be based on a clear understanding and general community agreement on just what elements or characteristics need to be preserved.

Rural Character can include things like,

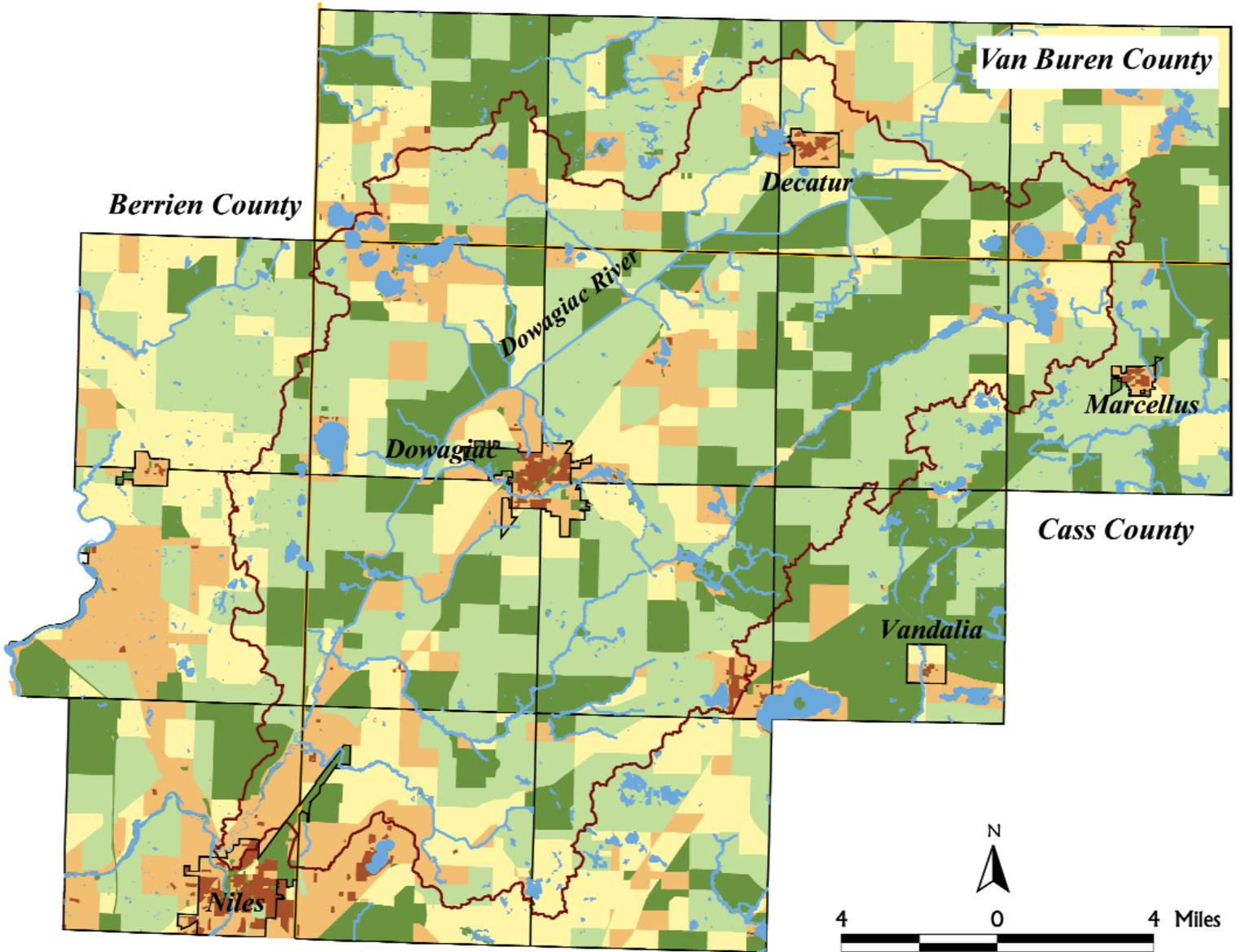
- Tree lined streets
- Farmlands
- Woodlands
- Clean air and water
- Undeveloped open space
- Natural stream banks
- Natural lake shorelines
- Opportunities for outdoor recreation
- Small villages and communities

Preserving rural character and preserving the quality of life in the watershed are closely linked.

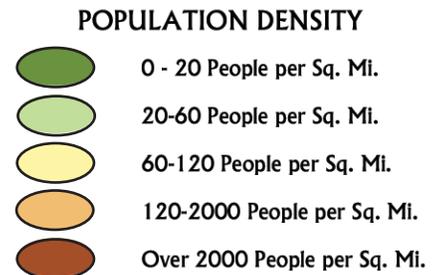
Unlike larger watersheds, which may contain a wide range of urban and rural land uses, the Dowagiac River Watershed is largely rural with relatively small, but growing, pockets of urbanized land uses. Comments from planning commissioners and residents alike consistently address the desire to maintain the rural character of the area. Existing open spaces help maintain the feeling of openness and tranquility prized by area residents. Careful open space planning can also enhance the ability of each of the Townships to limit traffic impacts and environmental problems associated with more intensive development.

Look to the accompanying CD for more information on how zoning and land use planning can help your community maintain and improve its rural character. Use the CD to explore the close relationships between rural character, open space, and farmland as well as the environmental benefits of healthy ecosystems and high water quality.

POPULATION DENSITY

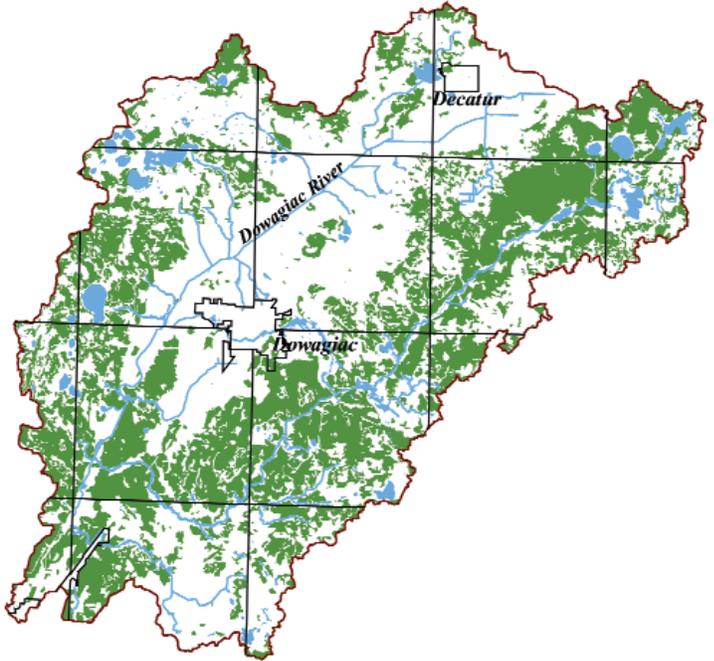
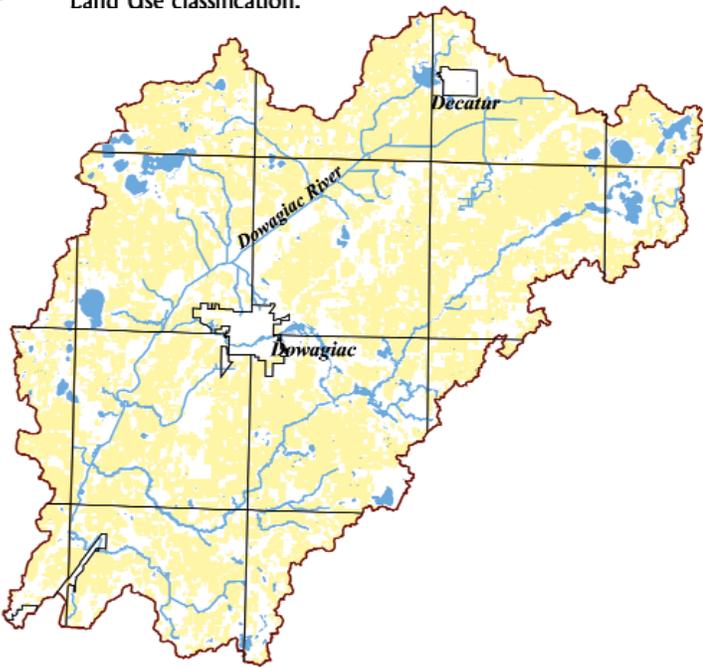


This population density map was derived from Michigan's Census 2000 Redistricting Data Summary File (Table PL1) released in March, 2001. Note how much of the watershed has only a moderate population density. Is sprawl an issue in your community?

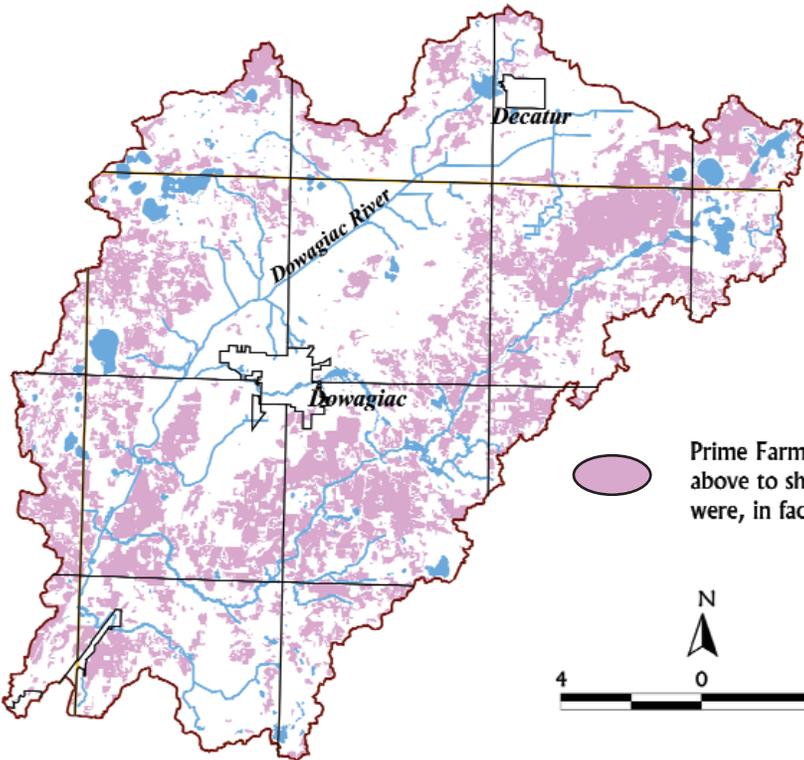


PRIME AGRICULTURAL LAND USE

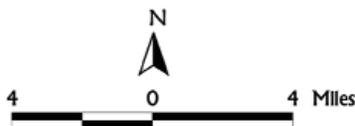
 Agricultural Land Use: Areas designated as agricultural on the 1996 Land Use classification.



 Prime Soils for Agriculture : These areas have high agricultural production potential according to the soils classification. Notice that not all of these areas are used for agriculture.



 Prime Farmland Soils in Agricultural Use: This map combines the two above to show where lands that are considered prime for farming were, in fact, being used for farming on 1996.



Environmentally Sensitive Areas Protection

The Dowagiac River Watershed is blessed with a wealth of environmentally significant and sensitive features. To protect water quality and preserve a high quality of life, many of these sensitive areas should be protected. However, it may not be practical to protect all of these areas given the pressures of population growth and development in the region. Therefore, citizens and public officials need to evaluate the potential impacts of land use change on these sensitive resources and find a proper balance between development and sensitive resource protection.

Environmentally sensitive areas can either enhance or restrict development, depending on the type and extent of the feature. Using natural features to accent a development can substantially increase the marketability of a project and enhance its value to the developer. Below, four types of environmentally sensitive areas are discussed.

Wetlands

"Wetland" is the collective term for marshes, swamps, bogs, and similar areas often found between open water and upland areas. In the past, these areas were often viewed as wastelands - sources of mosquitoes, flies, and unpleasant odors. This negative view combined with the demand for more developable land resulted in the destruction of large areas of wetlands. Of the estimated 11 million acres of wetlands in Michigan 150 years ago, only 3 million acres remain.

Attitudes toward wetlands have changed as we have learned that wetlands are valuable natural resources that provide many important benefits to people and the natural environment. Wetlands help improve water quality and provide important fish and wildlife habitat. They also contribute to the quality of other natural resources such as inland lakes, groundwater, fisheries, rivers, and wildlife. Acre for acre, wetlands produce more wildlife and plants than any other Michigan land cover type. Wetlands reduce flooding, filter pollutants, recharge groundwater stores, and provide commercial and recreational value.

Woodlands

Often, woodlands go unnoticed despite their benefits to the public. Wooded areas provide varied and rich environments for plants and animals, moderating the effects of winds and storms, stabilizing soils, and slowing runoff. Additionally, woodlands serve as buffers to the sights, sounds, and odors of civilization by muting noise and filtering air pollution.

Topography

Rapid changes in elevation such as hillsides and steep slopes are not always readily identified as natural resources. However, these areas of rapid topographic change can be both very aesthetically appealing and quite fragile. Maintaining stable slopes helps prevent non-point source pollution of water resources (particularly soil erosion) while preserving a distinctive feature of the local landscape.

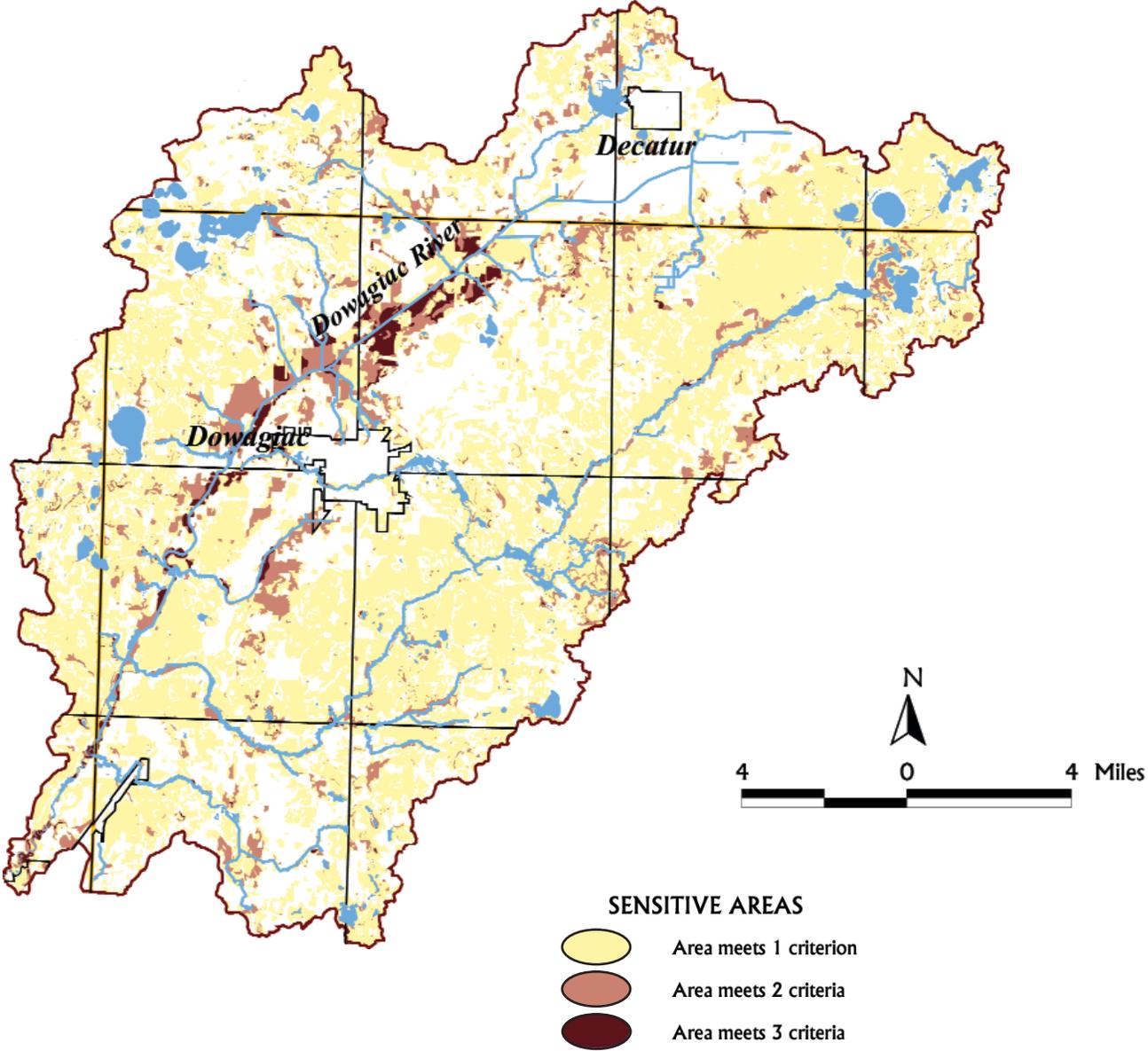
Wildlife Habitat

Michigan's wildlife is one of its most precious resources. Wildlife habitat offers feeding, roosting, breeding, nesting, and refuge areas for a variety of animal species native to the region. Surveys consistently show that residents value wildlife as part of their quality of life. In addition, wildlife is valued throughout Michigan for the contribution it makes to tourism, recreation, hunting, and fishing. Housing developments that include natural greenbelts, wildlife corridors, stream corridors, wetlands, and open space into their plans are in response to buyers who are willing to pay for those amenities.

As with other environmental effects, it is important to remember that wildlife does not respect jurisdictional boundaries. As a result, it is important to coordinate activities with other local governments on the basis of biological or geographical boundaries rather than on purely political ones.

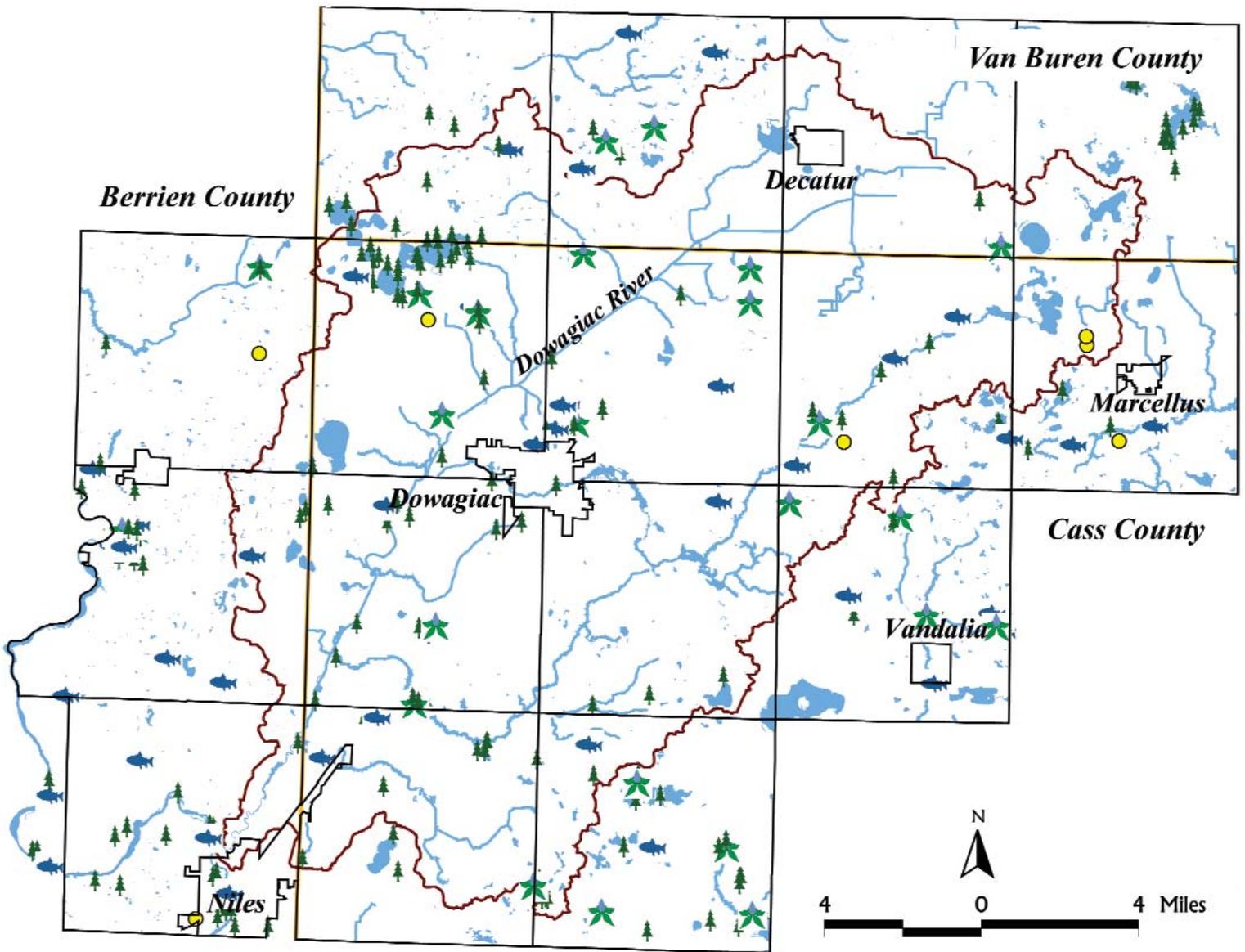
From floodplain management to setback requirements to septic system placement - use the accompanying CD to explore how land use and planning impacts the environment. Look for regulatory measures and model ordinances that you can implement in your community.

SENSITIVE AREAS



This map depicts areas that are sensitive to development. These areas meet one or more of the following criteria: steep slopes (greater than 18%); prime farmland soils that are in agricultural use; flood prone areas; forested areas; and wetlands. As you can see the 'most' sensitive areas are in riparian areas, or areas near a river.

NATURAL FEATURES INVENTORY



This information represents a recent snapshot of the elements of biodiversity identified in the watershed, including: animal species, plant species, natural communities, geologic features, and champion trees. This information was compiled by the Michigan Natural Features Inventory (MNFI) using established Natural Heritage Methodology developed by the Association for Biodiversity Information (ABI) and The Nature Conservancy (TNC).

NATURAL FEATURES INVENTORY

-  Animal Species
-  Natural Community
-  Plant Species
-  Other

As you can see, many of these elements are found in riparian areas (areas along lakes, rivers and streams). Land use planning that protects these riparian areas by creating low impact “buffering” zones around them makes sense. Use the maps on the CD to view different buffering widths around the water bodies in the watershed where development might be limited or regulated.

Inform Your Decisions...

You Have The Tools!

5 Things You Can Do to Minimize the Negative Impact of Your Development:

1. Find the most suitable location for building on the designated property given soil types, flooding potential, erosion potential, and existing wildlife habitats.
2. When using heavy equipment or machinery, find the location on the designated property that will be easiest to access.
3. You may find that the designated property is not well suited for the use you intended. Be flexible, look at other properties or other areas of the designated property and adjust your designs and uses accordingly.
4. Take design measures to minimize runoff - decrease the acreage of impervious surfaces, create swales and retention ponds.
5. Take design measures to minimize erosion - keep native vegetation especially around water bodies, use climate appropriate plantings.

The time to ask important questions of developers, community decision makers, and citizens is during public forums (like Planning Commission meetings) and during Site Plan Review processes. The Site Plan Review process is the time set aside specifically to examine the relevant issues surrounding a proposed development or land use change.

Without thoughtful and consistent review processes, important questions may remain unanswered in development and planning decisions, such as:

- Will the change affect existing infrastructure by changing demand or requiring new facilities?
- Is the site well suited or poorly suited for a septic system?
- How is drainage currently being dealt with on-site? What are the implications of the desired change or development?
- What are the current setback requirements? Does the proposed change or development take these into consideration?

Much of this information can be found by looking at the maps provided on the accompanying CD. Explore the many different types of base map themes including wetlands, septic suitability, prime farmland, and land use. Zoom in to see details about the specific area in question. Add overlays to the map and see soil data, zoning lines, parcel data, water body buffers, census information and more. Be sure to use the mapping "Search Options" to generate a list of pertinent information about a particular site. Find parcel data by searching for parcel #, owner name, or location.

Use the following excersizes to help you familiarize yourself with the mapping tools and features.

Step-by-Step Exercises

To make effective and beneficial choices, it is important for local stakeholders to know about their community. It is worth knowing the current landscape, the shared vision of the community's future, and how regulations and the built or developed environment affect the landscape.

The following exercises will take you step-by-step through parts of the Dowagiac River Watershed CD, showing you how to find the information you are looking for including detailed maps and background information. Try the scenario that best fits you...better yet, try all three!

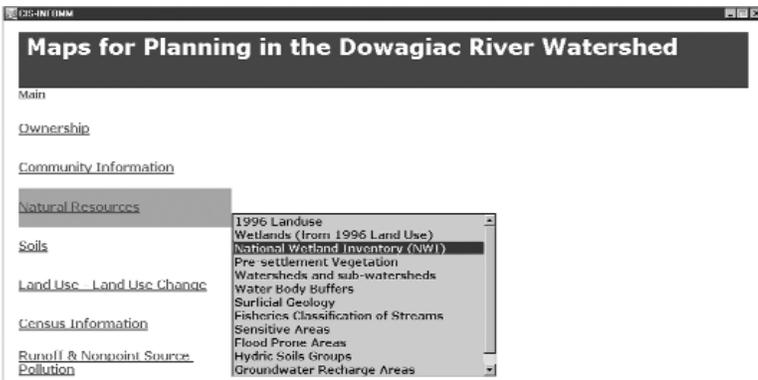
Planning Commissioner

Suppose you are a Planning Commissioner in Howard Township and you have received a new site plan to review. By loading the Dowagiac River Watershed CD onto your computer, you will find a plethora of information that will help

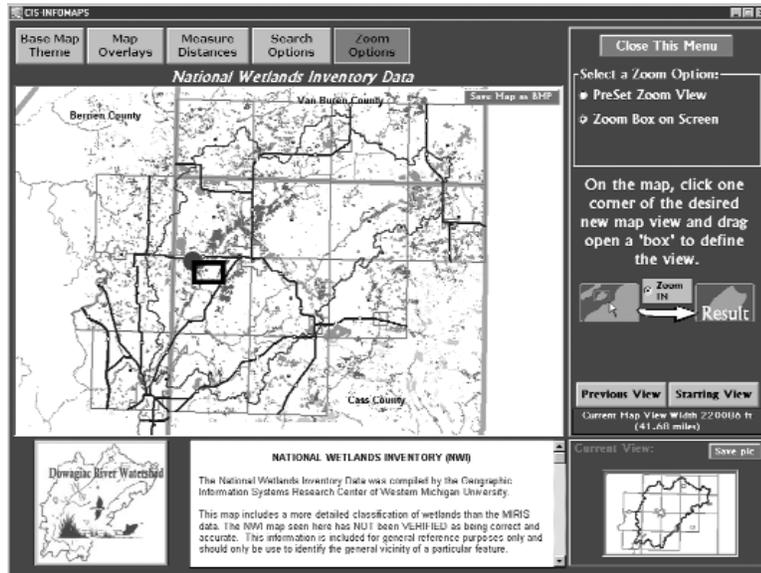
you decide whether to approve or deny this request. Try the following exercise to navigate this CD-ROM.

Begin by entering the system and click the *Maps for Planning in the Watershed* button on the main page. A list of map categories will appear including one for Natural Resources. Click on *Natural Resources* and

choose the National Wetland Inventory (NWI) map. The text at the bottom-center of the screen explains that this map shows detailed classification of wetlands and was originated by



the U.S. Fish and Wildlife Services Inventory Project. This text box will often show useful information as you click on different mapped features.

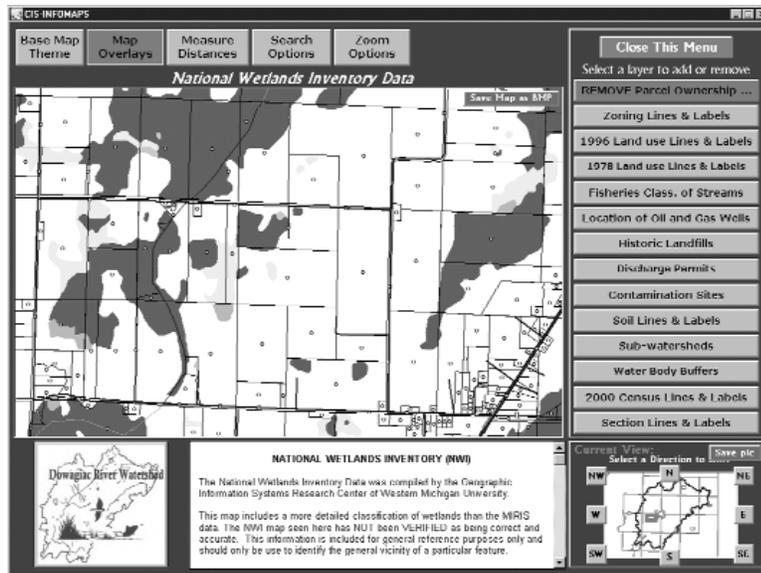


Notice the row of buttons at the top of the page. When you click on one of these, more choices will appear on a menu to the right (where the legend is located).

Click on *Zoom Options*. On the menu to the right, you will have the option to zoom to a preset view or zoom in on a box you create on the screen. Choose *Zoom to a Box on the Screen* by using your mouse to click on the small circle just to the left of the words. Follow the

directions on the screen and use your mouse to make a small box around the general area involved in the site plan review. The computer will then redraw the map at the scale you requested, 'zooming in' to this area to give a more

detailed view including road lines and water bodies. Click on *Map Overlays* to add more information to this map such as Parcel Ownership Lines and Zoning Lines and Labels.



As you add layers, you will also see a variety of small squares and circles. By clicking on these, you will see more information such as the name of the road, the zoning classification, and parcel data.

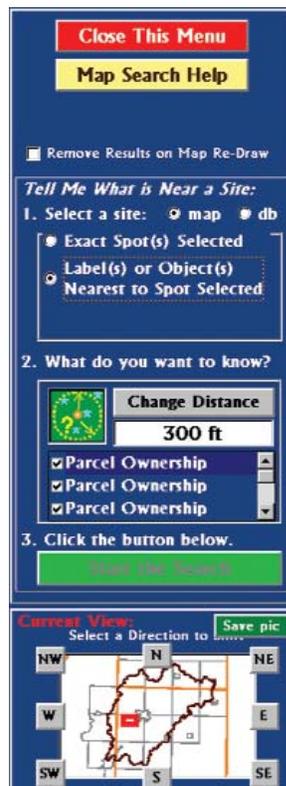
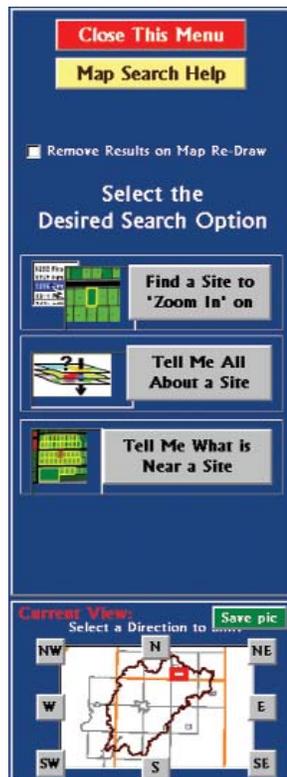
These maps give important information for consideration in your site plan review process. For example, you can

determine if the project proposal fits within the current zoning or whether it is close to any wetland areas. Ask a lot of questions of the site plan and the property in question (see the next section of this booklet for more questions), and

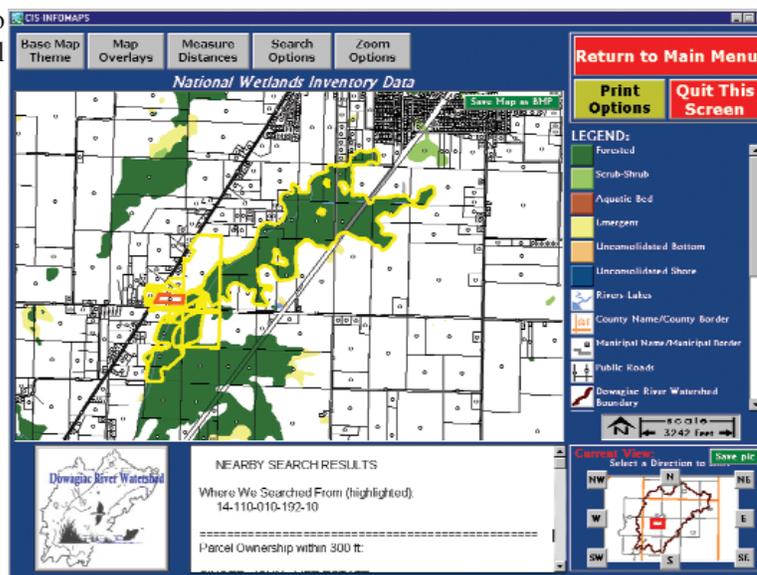
use different base map themes and map overlays to find the answers. Remember, however, that these maps are only a reference and the property must be analyzed in person to finally determine if wetlands as legally defined are truly present.

Often, you will need to contact all the property owners surrounding a particular parcel. This CD also allows you to find the property owners within a designated radius surrounding the parcel in question (for example everyone within 300'). Please note that the property ownership information on the CD was obtained from the Equalization Departments of each county in 2001. You should contact the county for more up-to-date data.

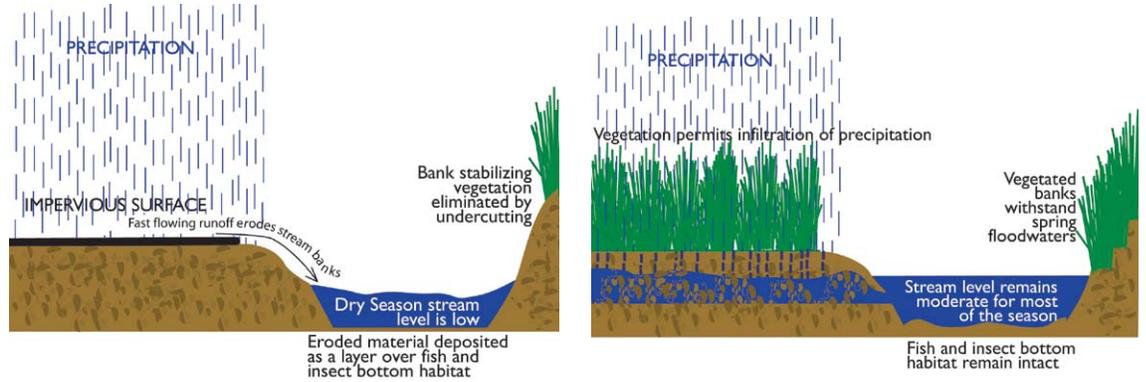
At the top of the map click *Search Options*, then choose *Tell Me What is Near a Site*. Next choose the option to select the 'label(s) or object(s) nearest to spot selected'. Use your mouse to select a parcel on the map, then *Start the Search*. You should now see the property you have chosen highlighted along with the surrounding parcels. The text box shows names and addresses for those property owners.



You can also use this tool to search for the location of a parcel by owner's name or address.



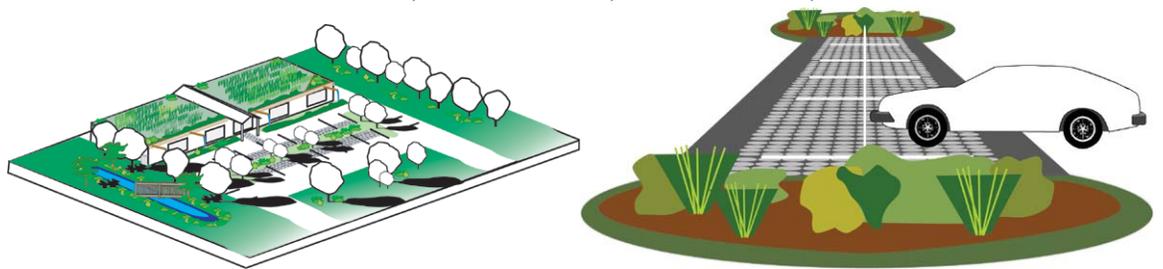
Impervious Surfaces Example



Farmland Preservation



Low Impact Development Examples



Self-Test



More Features Available

In addition to interactive maps and tools, this CD provides very extensive multimedia information about planning, zoning, and resource management at the local level. Dont miss informational sections on:

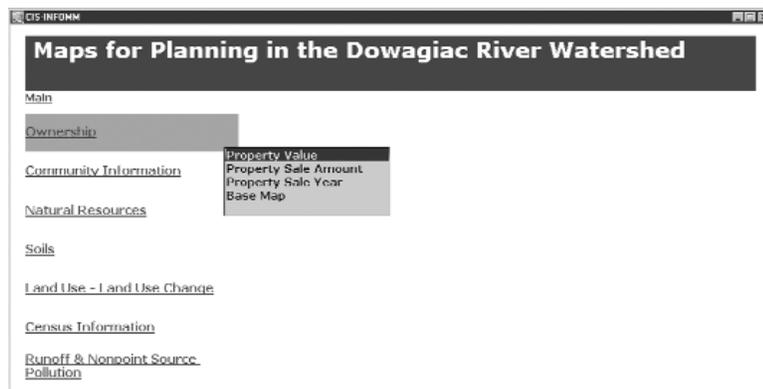
- How impervious surfaces, such as roads, parking lots, and rooftops impact water quality.
- Why farmland preservation is such a hot topic.
- Tools and Techniques to help explain what Low Impact Development is and why it is a good idea.
- Understanding Planning and Zoning in Michigan, which contains a Decision Process Guide, a step by step guide through the site plan review process.
- Review Sample Ordinances and Regulatory Measures.
- Take the Self Test to help you determine what you cando next about an issue important in your community.

When navigating through these informational pages, notice the row of words at the top-left corner of the page below the shaded title bar. This will show you where you are in the system and you can click on any of the words to revisit a page you have come from.



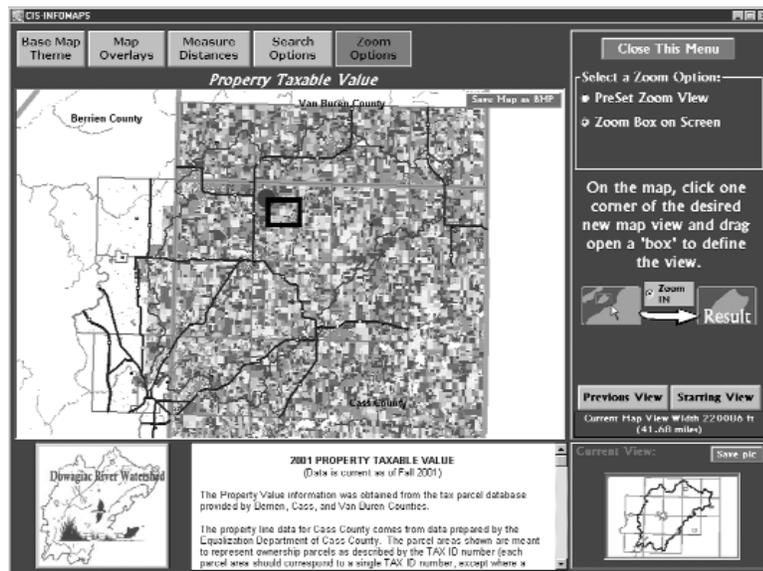
Developer

Suppose you are a Developer interested in building a new subdivision in a growing area. By loading the Dowagiac River Watershed CD-ROM onto your computer, you will find a plethora of maps that show everything from tax assessment data to topography to septic suitability. You will also find background information and tips on how to ensure that your development does not adversely affect the natural and economic environment of the community - and how to take advantage of the unique and wonderful features in the Dowagiac River Watershed. Try the following exercise to navigate this CD.



Begin by entering the system and click the *Maps for Planning in the Watershed* button on the main page. A list of map categories will display including one for Ownership. Click on *Ownership and Community Information* and choose the *Property Value* map. The text at the bottom-center of the screen explains that this

map shows property values from 2001 and was obtained from the tax parcel database provided by Berrien, Cass and Van Buren counties. This text box will often show useful information as you click around the maps.



Notice the row of buttons at the top of the page. When you click on one of these, more choices will appear on a menu to the right (where the legend is located). To get a closer look, choose *Zoom Options* from that row of buttons. On the menu to the right, you will have the option to *Zoom to a Box on Screen* by using your mouse to click on the small circle just to the left of the words. Follow the directions on the screen and use your mouse to make a small box around the area you are

interested in. Click on *Map Overlays* to add more information to this map such as 'Parcel Ownership Lines' and 'Zoning Lines and Labels'.

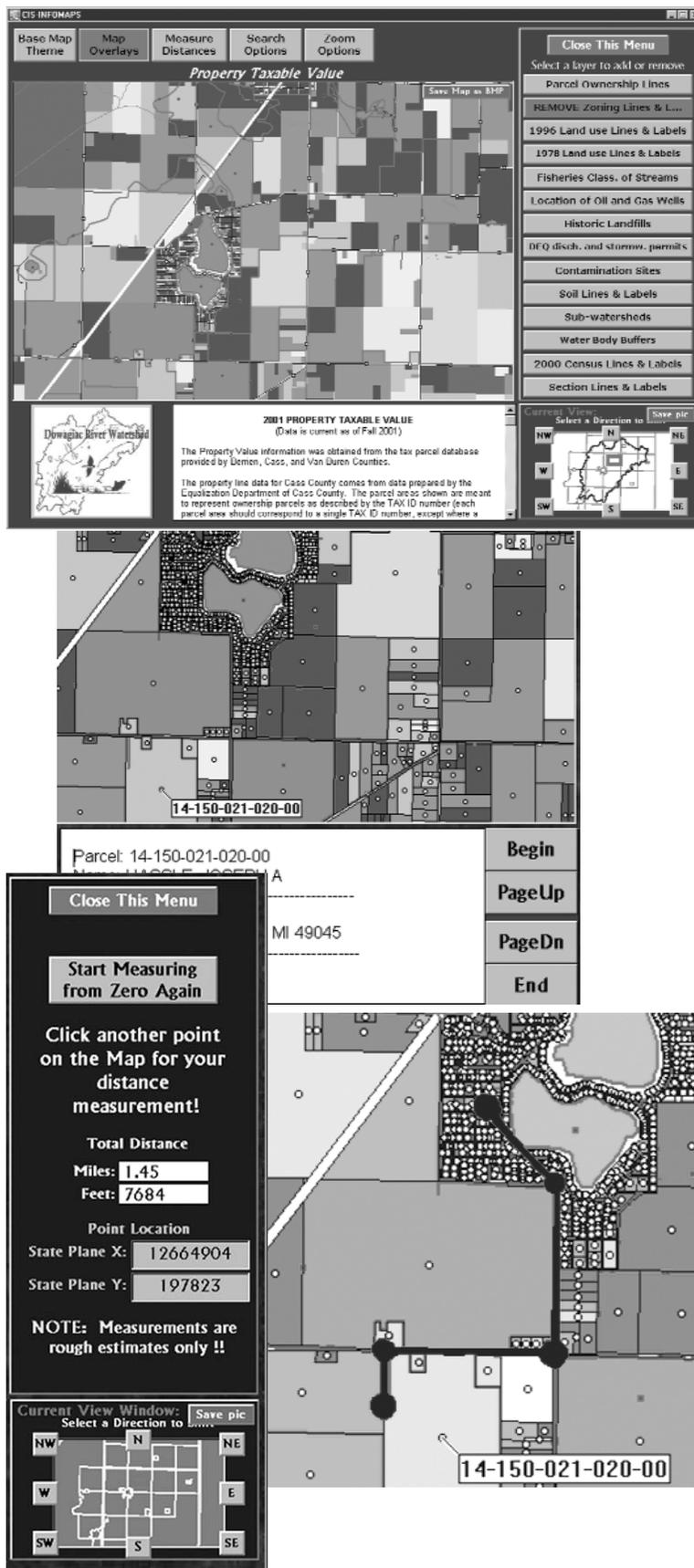
As you add layers, you will also see an increasing variety of small squares and circles. By clicking on these, you will see more information such as the name of the road, the zoning classification, and parcel data.

These map options give you information that you can use to analyze and evaluate your project such as whether the project will fit within the current zoning regulations. Use other base maps and overlays to gather more information about the area. Will the project impinge any wetland areas? Is it located within a water body buffer? Is your site suitable for a septic system? Remember, however, these maps are for reference and general analysis only. They do not replace a site visit.

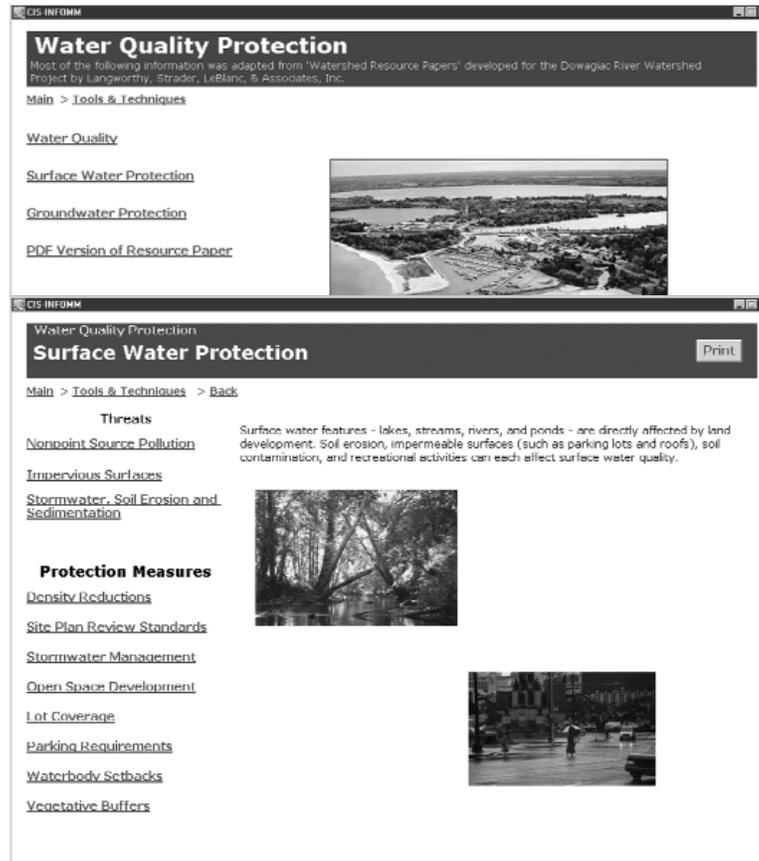
Use the *Measure Distances* button at the top of the map screen to determine how far the parcel is from a city center, public utilities, a lakeshore, or other amenities. Simply click on the screen and the computer will begin calculating the total distances between the points you designate.

This CD does not just include maps, however. Don't miss informational sections on how impervious surfaces, such as roads, parking lots, and rooftops impact water quality and how construction can cause erosion.

There are also *Tools and Techniques* to help explain what Low Impact Development is and why it is a good idea. Don't forget to visit the section on *Understanding Planning and Zoning in Michigan*, which contains a Decision Process Guide, a step-by-step guide through the site plan review process. When navigating through these informational pages, notice the row of words at the top-left corner of the page. This will show you where you are in the system and you can click on any of the words to revisit a page you have come from.



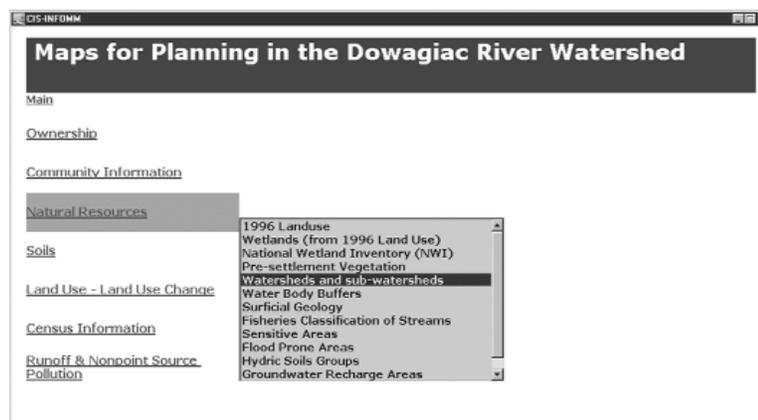
Suppose you teach 7th grade in the headwaters area of the Dowagiac River and you are creating a lesson plan on water quality. Once you load the Dowagiac River Watershed CD-ROM onto your computer, you will find a plethora of information that will help you understand the issues related to water quality as well as many maps of the area surrounding your school. Try the following exercise to navigate this CD.



Begin by entering the system and click the *Tools and Techniques for Effective Planning* button on the main page. The section called *Water Quality Protection* can give you and your students important background information on the subject. When navigating through these informational pages, notice the row of words at the top-left corner of the page under the shaded title bar. This will show you where you are in the system and you can click on any of the words to revisit a page you have come from.

Use the maps to look at the land around your school or neighborhood. Click on the word 'Main' in that top left row of words to go back to the Main Page of the

Main > Tools & Techniques > Self-Test > Water Protection



system. From here, click the *Maps for Planning in the Watershed* button.

A list of map categories will appear including one for Natural Resources. Click on *Natural Resources* and choose the *Watersheds and Sub-watersheds* map. The text at the bottom-center of the screen explains how this map was compiled what a

watershed is and how the map was made. This text box will often show useful information as you click around the maps.

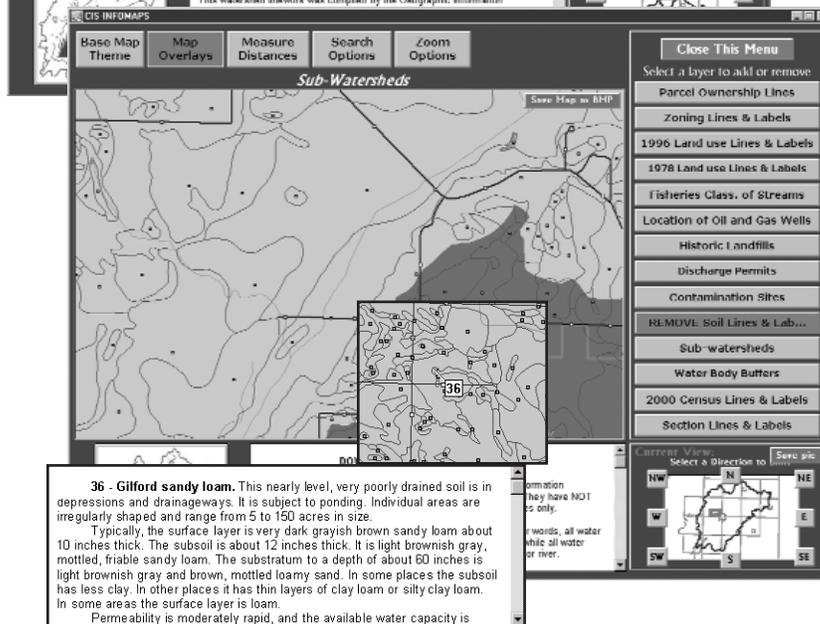
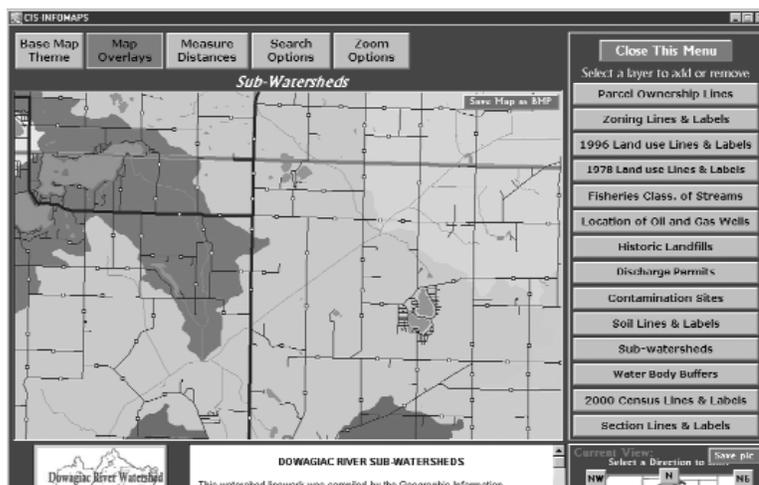
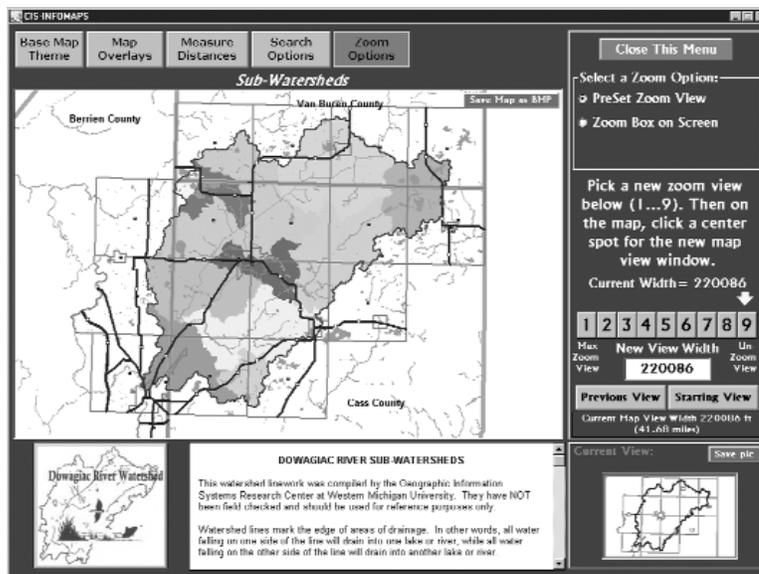
Notice the row of buttons at the top of the page. When you click on one of these, more choices will appear on a menu to the right (where the legend is located).

Click on the *Zoom Options* on the menu to the right, you will have the option to zoom to a preset view or zoom in on a box you create on the screen. Choose *Zoom to a Box on the Screen* by using your mouse to click on the small circle just to the left of the words. Follow the directions on the screen and use your mouse to make a small box around the area where your school is located. The computer will then zoom to this box to give you a more detailed view including road lines and water bodies.

Finally, try clicking on the *Map Overlays* to add more information to this map. Select *Soil Lines & Labels* to overlay outlines of the areas of soil types mapped by U.S. Department of Agriculture (USDA) scientists.

With this layer as well as most other overlays, you will see a variety of small circles or squares to indicate where there are “clickable” labels. Click on one of these “label anchor points” to see the name of the soil type. When you click on the soil type label, you will also see the published soil description in the text box.

Feel free to use the information on this CD to create lesson plan materials for your students. Better yet, let your students navigate around the system for themselves to create reports, maps, and answer questions.



More Land Use Questions

Explore the maps provided here to learn about other natural and culture features that are present on and near the area you are interested in. The following questions can help you standardize a site plan review process or a thoughtful development plan.

Many answers may be found on the maps provided on this CD. The answers you find might lead you to ask more questions. Asking questions and searching for answers leads to more thoughtful and effective decision-making. These decisions are not simple ones. Many factors are involved - and more are added all the time. The more information you have the better able you will be to determine whether a development or land use change will be beneficial or detrimental to your community.

Is the planned development safe or could it be a hazard to others in the community?

- Does the plan conform to health and safety laws and building codes?
- Will the plan protect or endanger community resources such as water and air?

Are there any regulated environments or habitats on the property in question (such as wetlands, dunes, natural rivers)?

- Are there any rare, threatened, or endangered species located on or near the property in question?
- Are there any bodies of surface water on the property in question (rivers, lakes, streams, etc.)?

Is the soil on the property in question suitable for the type of development proposed?

- Are there any highly erodible areas?
- Is it well suited for construction?
- Is it suited for a septic system?

Where does stormwater drain on the property in question?

- Is any part of the property located within the 100-year floodplain?
- What is the capacity of existing stormwater detention/retention areas?
- What is the load on existing detention/retention areas?
- Will the discharge be increased by the proposed development due to increased use or impermeable surface areas (such as parking lots)?
- Does the development plan provide for adequate drainage and/or retention?

Could the proposed development be a costly burden for the community to provide services?

- How far from emergency services will the development be?
- Will it connect with existing sanitary and sewer lines or will new ones be required?
- Will it connect with existing utilities (such as electric, gas, phone, cable, etc.)?

Is the planned development compatible with surrounding land uses?

- Is the plan consistent with the community's vision and Master Plan?
- Does it meet any special use, height, design or aesthetic requirements?
- Would the development interfere with any scenic viewsheds or viewpoints?
- Does it minimize negative impacts (such as dust, noise, odor, light, vibrations)?
- Does it conform to existing setback requirements?

Conclusion

The Dowagiac River Watershed Project has helped to focus the attention and energy of many citizens and organizations on the protection and improvement of the Dowagiac River - a key cultural and natural resource for the entire region. Participating organizations and public agencies have helped many local units of government re-evaluate and update their master plans and zoning ordinances over the past two years to assure the long-term health and vitality of the river. However, much more needs to be done. We hope you will use the information and guidance provided by the Dowagiac River Watershed Project to participate in guiding land use change and development in your community.

The CD-ROM provides a wealth of ideas, suggestions, and factual information for your use. Some of the participating agencies and organizations that may be able to help you and your community address land use change in the future are listed below. Please review the section on resources to see the full range of organizations and agencies that can assist you and your community in addressing land use change.

Southwestern Michigan Commission

185 E. Main St., Suite 701
Benton Harbor, MI 49022
269/925-1137

269/925-0288 (fax)

Web: www.swmicomm.org

** Land use and comprehensive planning assistance*

** Digital mapping (GIS)*

** Housing and demographic information*

Cass County Conservation District

1127 E. State St.
Cassopolis, MI 49031
269/445-8643

269/445-0619 (fax)

Web: <http://users.beanstalk.net/casscons>

E-mail: cassconservation@beanstalk.net

** Provides education and technical assistance for all types of natural resource concerns including water quality, soil conservation and forestry*

** Houses MEANDRS (www.meandrs.org) which provides technical assistance and volunteerism for improvement of fish and wildlife habitat of the Dowagiac River system*

St. Joseph and Galien River (Berrien County) Conservation District

334 Edgewood Rd.
Berrien Springs, MI 49130
269/471-9111 Ext. 103

269/471-3773 (fax)

** Provides education and technical assistance for all types of natural resource concerns including water quality, soil conservation and forestry*

Van Buren County Conservation District

212 Paw Paw St
Paw Paw, MI 49079
269/657-4030

269/657-4925 (fax)

** Offers assistance with well closures and agricultural management practices such as integrated pest management and irrigation scheduling (to minimize run-off effects)*

Southwest Michigan Land Conservancy

6851 S. Sprinkle Rd.
Portage, MI 49002

269/324-1600

269/324-9760 (fax)

Web: www.swmlc.org

** Works to maintain the scenic character of SW Michigan*

** Obtains land and conservation easements from willing landowners*

** Assists local governments in obtaining open space and parks*

** Offers field trips to the public*

GEM Regional Center, Institute for Water Sciences

3361 Rood Hall
Western Michigan University
Kalamazoo, MI 49008-5150

269/387-4936

269/387-5513 (fax)

Web: www.wmich.edu/geology/gem/

** Promotes the protection of ground-water and surface-water resources*

** Fosters these goals through education, community outreach, technical consultation and research on issues related to water resources, land use and growth management*

Michigan Dept. of Environmental Quality, Water Division

7953 Adobe Rd.
Kalamazoo, MI 49009
269/567-3500

269/567-9440 (fax)

Web: www.michigan.gov/deq

** Offers limited assistance in land use planning and protection through clean water grants*

** Serves as a link between people and technical resources*

Michigan Dept. of Natural Resources

Plainwell District Headquarters

621 N. 10th St.
Plainwell, MI 49080
269/685-6851

269/685-1362 (fax)

Web: www.michigan.gov/dnr

** Technical assistance to communities for species management and habitat improvement*

** Financial assistance in the form of purchase of development rights*

** Can benefit watershed by securing open lands and forests as well as rehabilitating wetlands, lakes and streams*

Environmentally Sensitive Areas

Water Protection

Farmland Protection

Open Space Protection

