

HRWC, based in Ann Arbor, is a professional staff of 9 who work in 3 program areas: scientific research, technical assistance and education. With volunteers corps of more than 400 people. Member organization supported by member contributions, grants from foundations and federal agencies. Pitch membership

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Local Governments Protecting Water Quality



I'm going to talk about how local governments are involved in protecting water quality and drinking water.

Why is it important for local governments to get involved in water protection?

Land Use Planning in Michigan

83 counties
1240 townships
275 cities, 258 villages

Each unit of government
has land use planning
responsibility

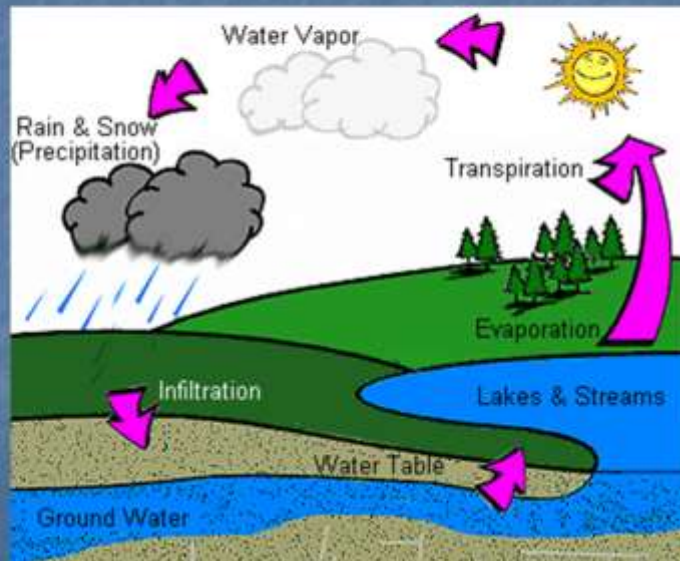


Many units of government. With Home Rule, each unit has its own responsibilities for activities within borders. County has some authority, but most lies with townships, cities, and villages. Locals have jurisdiction over land use activities, which in turn, as I'll explain, impact water quality.

Why is land use important for water protection?

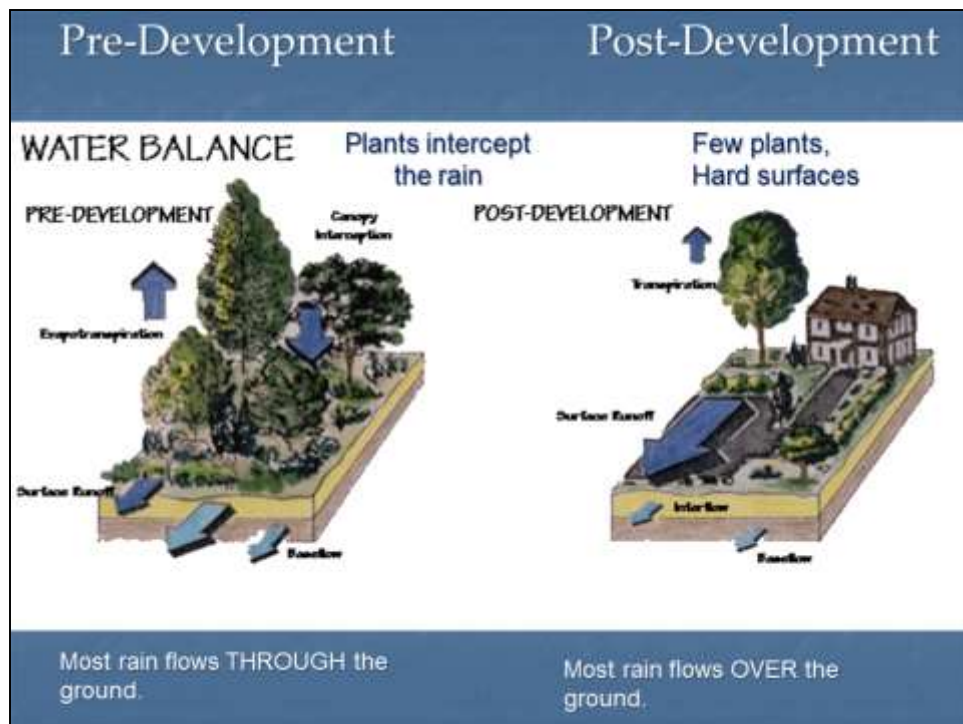
All the water we have is all the water we will ever have.

Surface water turns into groundwater and back.



Each local government is in charge of where land use activities go and how those activities happen – how they are built and operated, what happens to their waste, what happens to water they use and water that falls on and flows off of their land.

Water that eventually goes to our drinking water wells, reservoirs, lakes, streams, swimming holes, fishing spots.



Let's look at what land activities can do to the water cycle.

Under 10% Impervious Surface

- Low banks
- Natural buffer
- Good habitat
- Cool water
- Clear water



Between 10 and 25% Impervious Surface

- Higher, undercut banks
- sediment
- Less diverse habitat
- Warmer water



Over 25% Impervious Surface

- Steep, eroded banks
- Little buffer
- Very little habitat
- Warm water
- flashy



Benefits of Natural Areas



- Filter & Cool Runoff
- Water supply
- Groundwater Recharge
- Storm and flood damage protection
- Erosion control
- Store and cycle nutrients
- Conserve and generate soils
- Pollinate crops and other plants
- Pest control
- Forest and food products
- Wildlife Habitat
- Recreation
- Scenery
- Biodiversity/ Genetic library
- Clean Air
- Regulate climate

We go over why we want to protect natural areas...

What are Ecosystem Services?



Ecosystem Services

Benefits people obtain directly or indirectly from ecological systems.

Provisioning Services

Goods provided or produced by ecosystems.

- ❖ Food Production
- ❖ Raw Materials
- ❖ Fresh Water Supply

Regulating Services

Benefits obtained from regulation of ecosystem services.

- ❖ Erosion Control
- ❖ Water Regulation

Cultural Services

Non-material benefits from ecosystems.

- ❖ Aesthetics
- ❖ Recreation

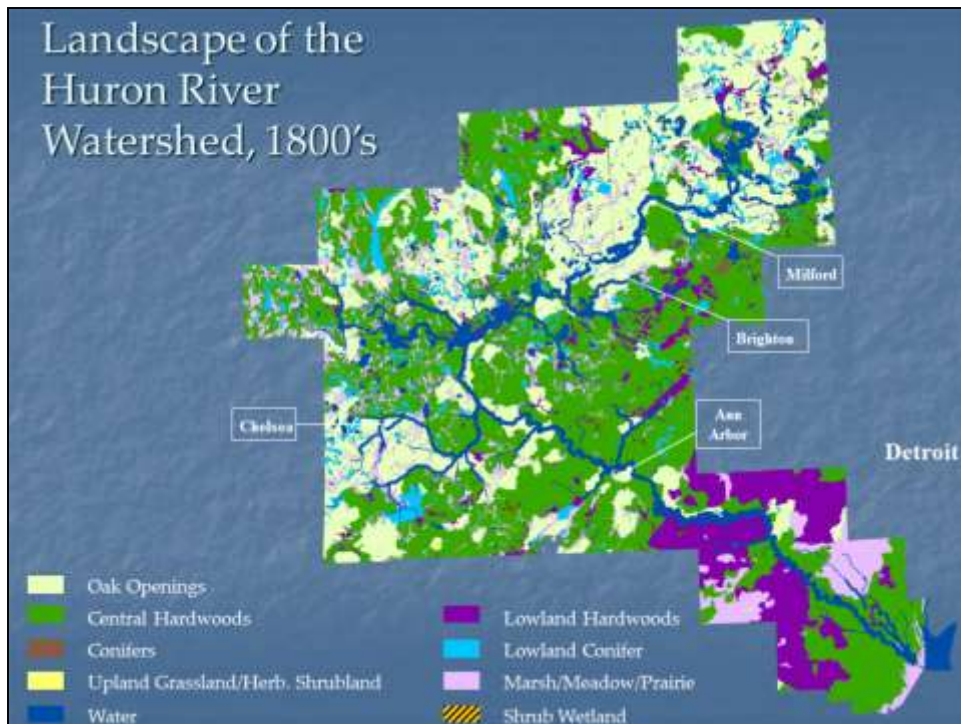
Supporting Services

Services necessary for production of other ecosystem services.

- ❖ Habitat
- ❖ Pollination
- ❖ Nutrient Cycling
- ❖ Waste Assimilation

\$1.8 billion/year in West Michigan





So, how are our natural areas the provide all these services doing? Let's look at what they used to look like, We show them the landscape before all the development. So, ecologically, this is what the watershed would look like.



We zoom in on their community, and I show some pretty pictures of each type of ecosystem (which we'll skip)dfwef

Trends



Then we go over trends.



We zoom in on their community, and I show some pretty pictures of each type of ecosystem (which we'll skip)



Looking at what's happened to all the natural green infrastructure

Natural area trends in the Huron

- Fragmentation
- Loss of wetlands (about 50%)
- Loss of oak barrens, prairies, wo
wetlands, tamarack swamp

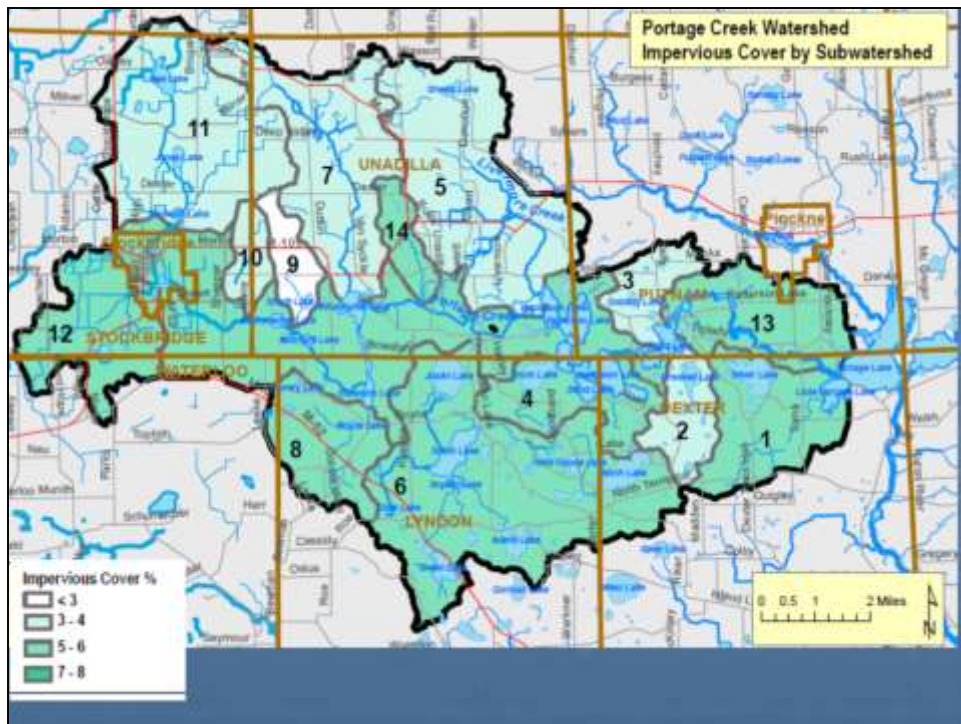


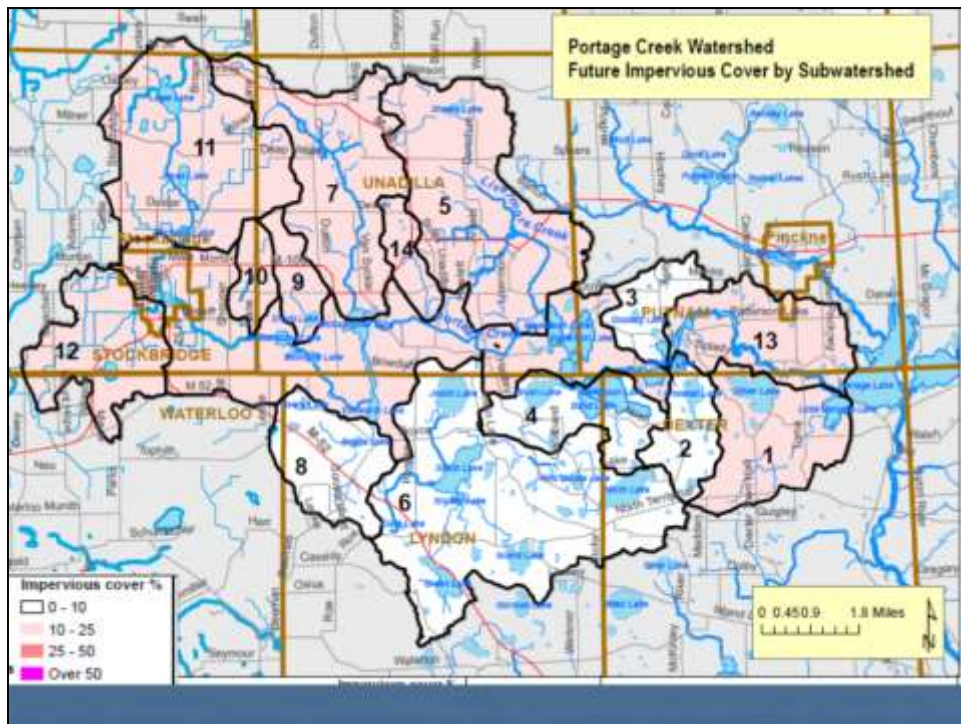
And some details



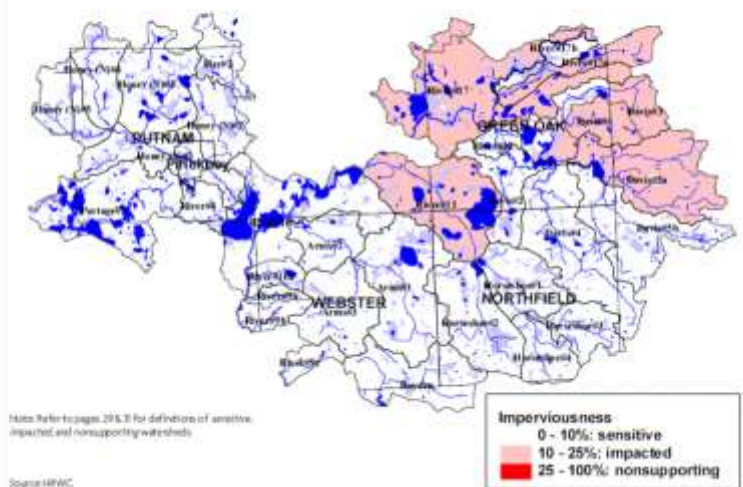
Future Trends

- 40% of the remaining open space is projected to be developed in the next 20 years
- Master Plans and Zoning Ordinance build outs show little designated natural area
- Almost all natural areas in private ownership and designated for some kind of use
- Current development patterns are low density = more natural area converted per new person





Map 10-2. Current Imperviousness Calculated for the Subwatersheds in the Host Communities.



HRWC Key Message

To maintain the Huron River watershed's health:

- I. Encourage higher density where infrastructure already exists.
- II. Preserve natural areas so they can continue to provide the ecological services necessary to maintain quality of water, air, land, and life.



So what can we do? Here's our key message.

What you can do

- Design higher density, livable neighborhoods
- Live in a walkable community
- Plant trees, native plants in your yard
- Keep water on your land
- Control stormwater runoff
- Leave natural buffers around creeks, wetlands, and ponds



- Keep natural lands natural
- Permanently preserve larger, intact, natural lands
- Join us in assessing the river and its landscapes

Master Plan

- Statement of community's goals for future
- Guidance in day-to-day decision making by community
- Basis for zoning decisions

Future Land Use Map - Pleasant Lake Area Detail



Future Land Use Map - Freedom Township



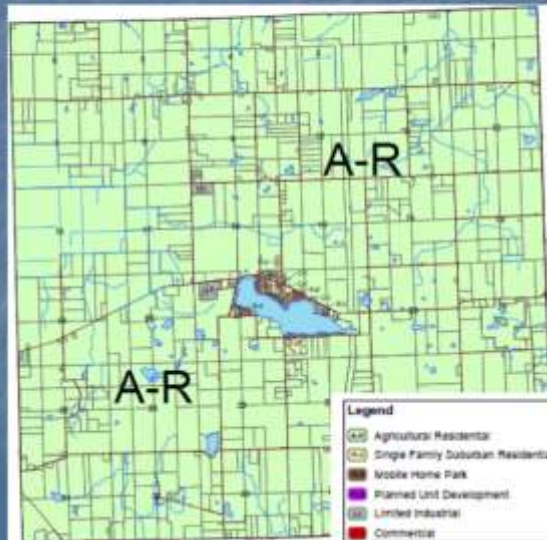
This is where local governments come in. Through two main tools:
Master Plan

Zoning Ordinance

WHERE: Determines pattern of development – types of land use allowed where

HOW: Rules for how individual sites are developed

Goal: to promote and protect health, safety and general welfare of a community.



Zoning Ordinance



We are going to do this David Letterman style, from 10 to 1.

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

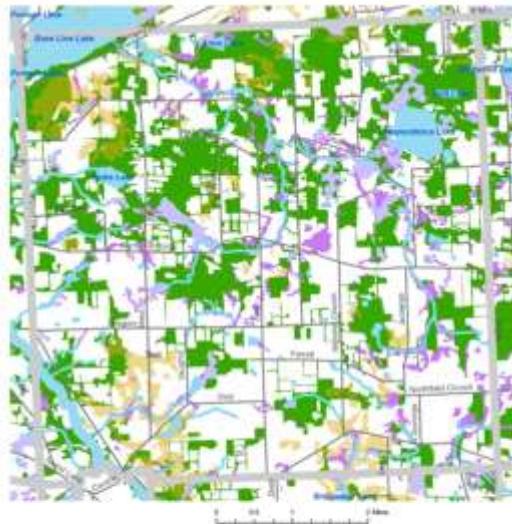
A master plan can address imperviousness by including a goal that sets a limit for the total amount of impervious surface in the community. Studies have shown that water quality begins to decline in creeks and rivers when

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.

Zoning Ordinance:

Minimize impacts on water cycle on the site level:

10. Include natural features in zoning map



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Date Sources: SEMCOS,
NRCS Soil Survey,
WRWC, Washington
County
Map created 2015

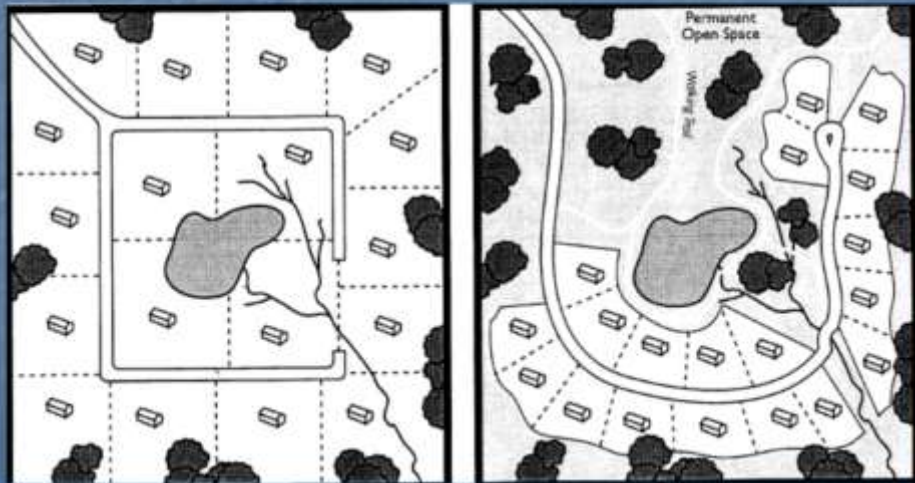
Webster Township Natural Features

- Rivers and streams
- Lakes
- Natural River Zone
- Floodplains/Riparian area
- Woodlands
- Wetlands
- Hydric soils
- Slopes over 12%

Zoning Ordinance:

Minimize impacts on water cycle on the site level:

9. Open space zoning



Zoning Ordinance:

Minimize impacts on water cycle on the site level:

8. Overlay districts



Zoning Ordinance:
Minimize impacts on water cycle
on the site level:

7. Setbacks and buffers



Zoning Ordinance:

Minimize impacts on water cycle on the site level:

6. Stormwater



Zoning Ordinance:
Minimize impacts on
water cycle on the site
level:

5. Wetlands ordinance



Zoning Ordinance:

Minimize impacts on
water cycle on the site
level:

4. Site Plan Review to
reduce Impervious
surface:

Best Management
Practices

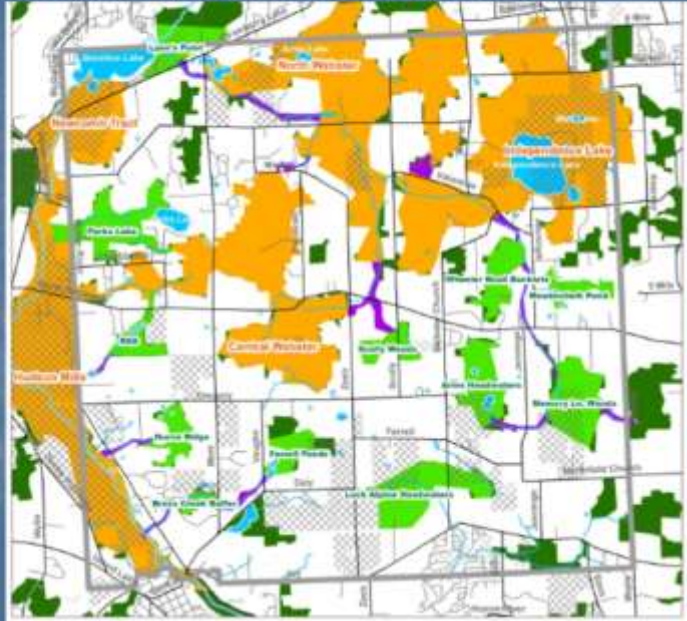
Site Design for Low
Impact Development



Master Plan:

Minimize impacts on water cycle at the landscape level

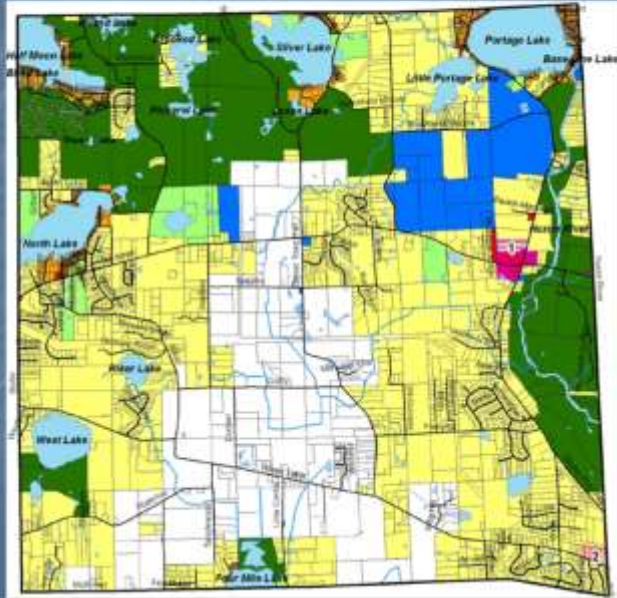
3. Green Infrastructure Planning



Master Plan:

Minimize impacts on water cycle at the landscape level

2. Future land use map determines pattern of land use





- Including natural features

Local decision makers refer to the zoning map routinely to make decisions about whether a certain use for a piece of land is acceptable.

- Adding open space zoning

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

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

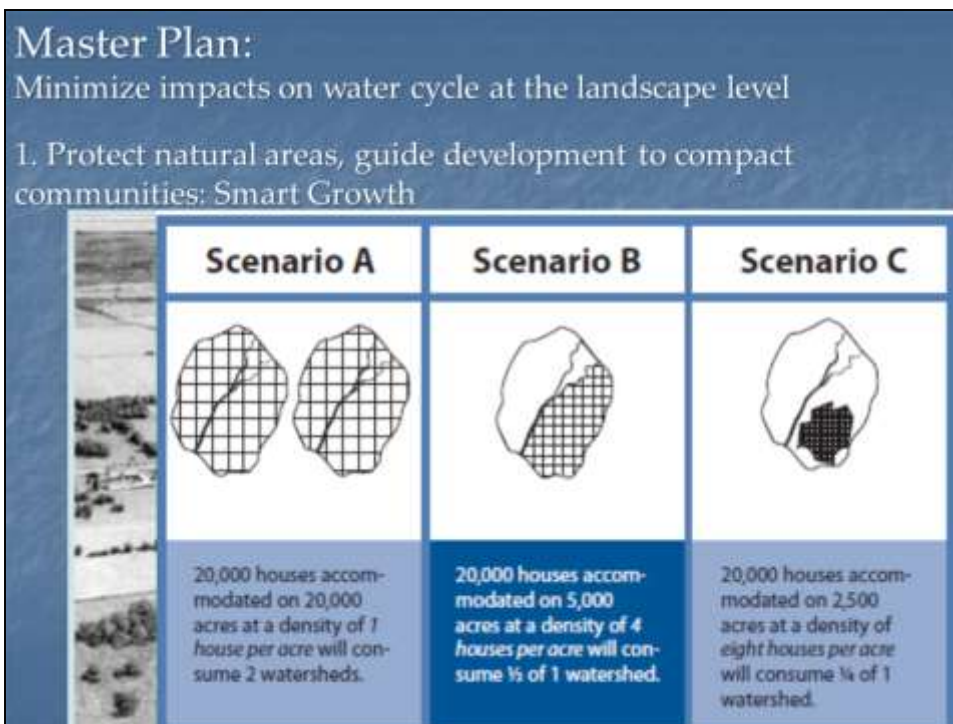


Illustration 1 Kane County/Gilberts Present Day

Illustration 2 Kane County/Gilberts Build Out Under Conventional Planning

Illustration 3

Kane County/Gilberts Build Out Under Smart Growth Planning and Development

As Exhibit 9 demonstrates, Scenario A, developing at one house per acre, requires another whole watershed to accommodate the additional growth. Scenarios B and C, developing at higher densities, can accommodate the additional growth within the same watershed. Moreover, by developing at higher densities within the watershed, ample open space or otherwise undeveloped land remains to perform critical watershed functions. No such land exists in Scenario A, and, as previously discussed, lawns typically associated with one house per acre are not able to provide the same type of watershed services as forests, meadows, or other types of unconverted land

Resources

Huron Watershed Communities:
Green Infrastructure Workshops
Ordinance and Master Plan Review and Recommendations

Others:
MSU Extension
See Resources on Table

