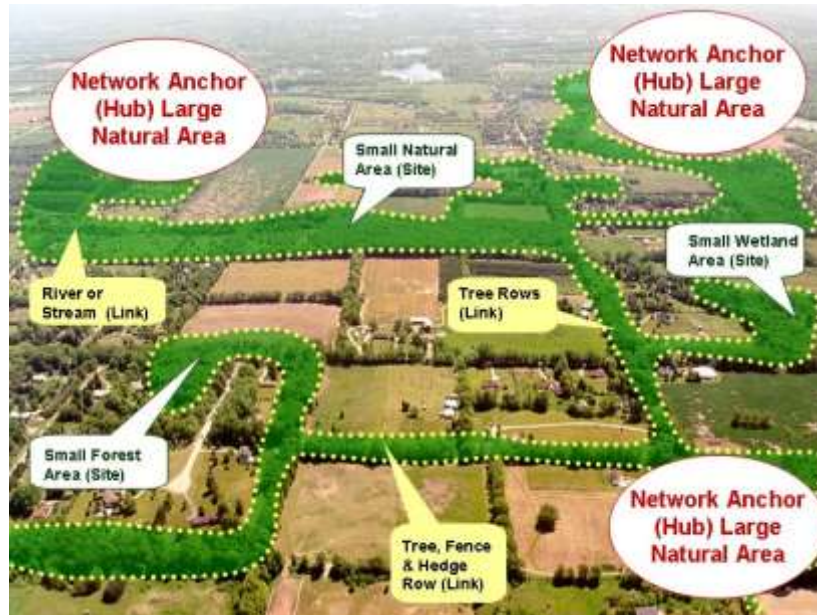


# Northfield Township Green Infrastructure Session

May 20, 2015



- Introduction
- Background Resource Maps
- Process for Hands-on Assessment
- Draft Design Session Green Infrastructure Map
- Next Steps – Community Planning for Green Infrastructure
- References



# INTRODUCTION

## Project Description

The Huron River Watershed Council (HRWC) and Northfield Township have partnered to create this document as part of the township’s Master Plan update process.

Green infrastructure networks consist of the following components:

**Hubs:** Hubs anchor the network and provide an origin or destination for wildlife. Hubs range in size from large conservation areas to smaller parks and preserves. Hubs provide habitat for native wildlife and help maintain natural ecological processes.



**Sites:** Smaller ecological landscape features that can serve as a point of origin or destination or incorporate less extensive ecological important areas.

**Links:** The connections that hold the network together and enable it to function. Links facilitate movement from one hub to another.

## What is Green Infrastructure?

Green infrastructure is the interconnected network of large natural areas, wildlife habitats, riparian corridors and areas that reflect key elements of our biological diversity. This network supports native species, maintains natural ecological processes, sustains air and water resources, and contributes to our health and quality of life. The Green Infrastructure outlined in this document is a proposed network to link the Huron River watershed’s remaining ecologically valuable lands. The goal is to maximize the effectiveness of public and private land conservation efforts, and to ensure land development occurs in concert with Green Infrastructure.

## What are the benefits of Green Infrastructure?

Green infrastructure provides a mechanism to identify and blend environmental and economic factors creating a multitude of social, economic, cultural and environmental benefits.

- Provides a sense of place and a unique identity
- Decreases cost of public infrastructure (e.g. stormwater management & water treatment systems)
- provides active and passive recreational opportunities
- Increases property values
- Helps preserve our unique quality of life
- Maintains naturally functioning ecosystems
- Helps to attract new businesses and well-qualified workers

### **What is in this document?**

This document is a result of a workshop at the May 20, 2015 Northfield Township Planning Commission meeting. At the breakout session, township officials, residents, and other stakeholders studied the maps shown on pages 7 - 12 and then created Hubs, Sites, and Links, drawing onto transparent mylar sheets laid over those maps (pages 13 – 15). HRWC took those sheets and created the Green Infrastructure Map (page 16).

### **Next steps**

Page 17 lists next steps Northfield Township and its partners can undertake to ensure that the township's Green Infrastructure continues to provide habitat, recreation, water quality, clean air, and other benefits.



# Northfield Township's Green Infrastructure

Mostly undeveloped

31% intact natural areas ("bioreserve" sites)

Only 5% of natural area is publicly owned

Low impervious surface (about 5%) (creeks and wetlands begin to become degraded in areas where impervious surfaces make up more than 10% of their watersheds)

25 species of threatened, endangered or special concern animals and plants and 1 ecosystem (oak barrens).



# Background Resource Maps

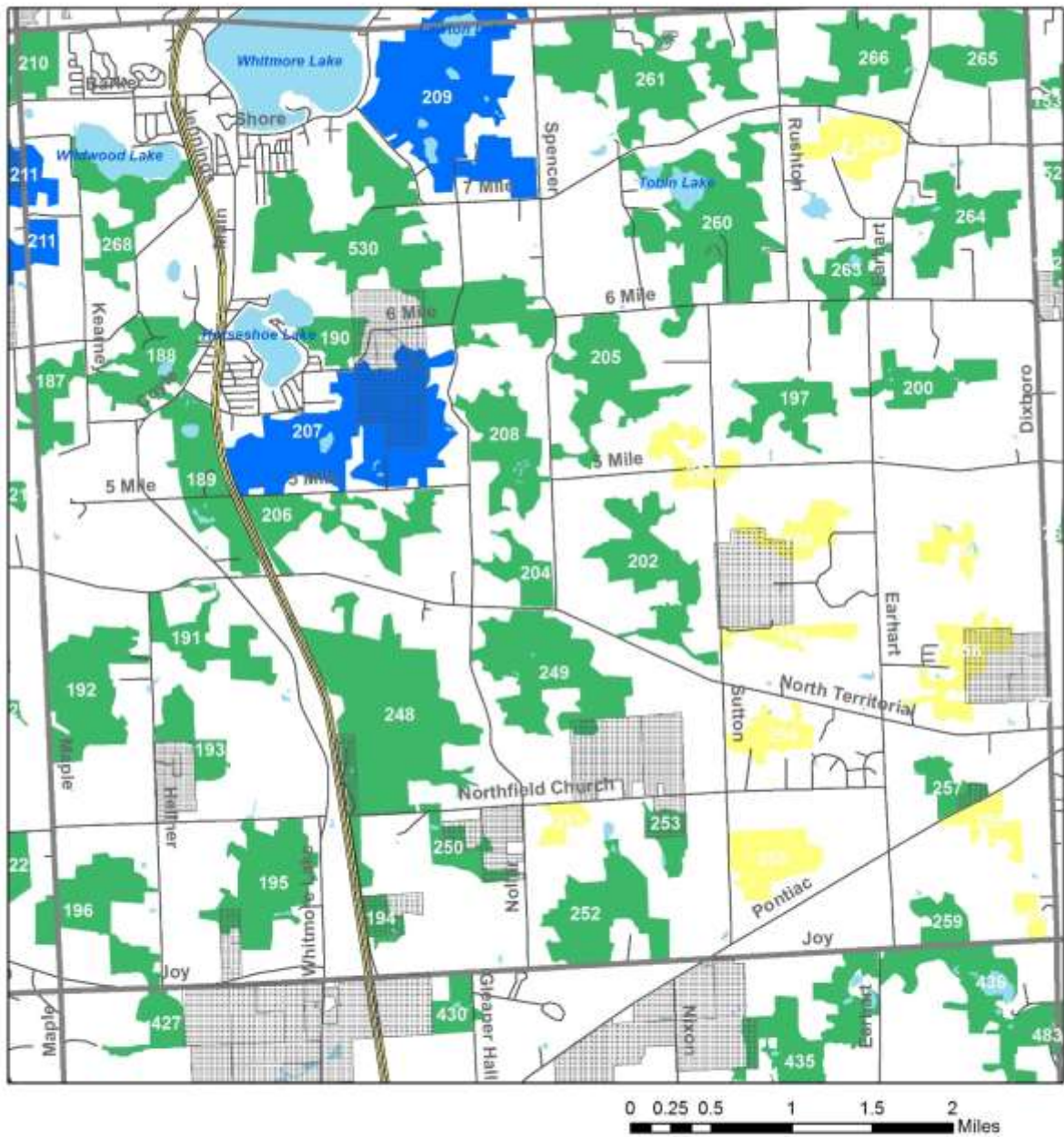
- HRWC Bioreserve Map
- Environmentally Sensitive Areas
- 2000 Land Use
- Topography
- Green Infrastructure Planning Map





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### Northfield Township's Remaining Natural Areas



**Priority**

- Lower
- Medium
- Highest


Conservation and Recreation Lands

Sites delineated from digital orthophotos circa 2000, ranked based on 15 ecological factors, including: size, presence of water, presence of wetlands, groundwater recharge potential, potential for rare remnant plant community, topographical diversity, glacial diversity, connectivity to other natural areas, restorability potential, and quality of vegetation.

For more information, contact Kris Olsson, Huron River Watershed Council  
734-769-5123, kolsson@hrwc.org

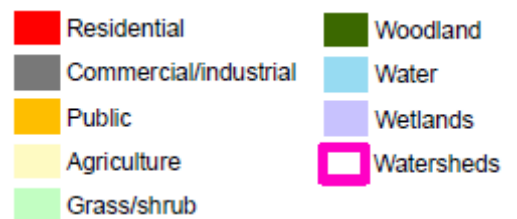
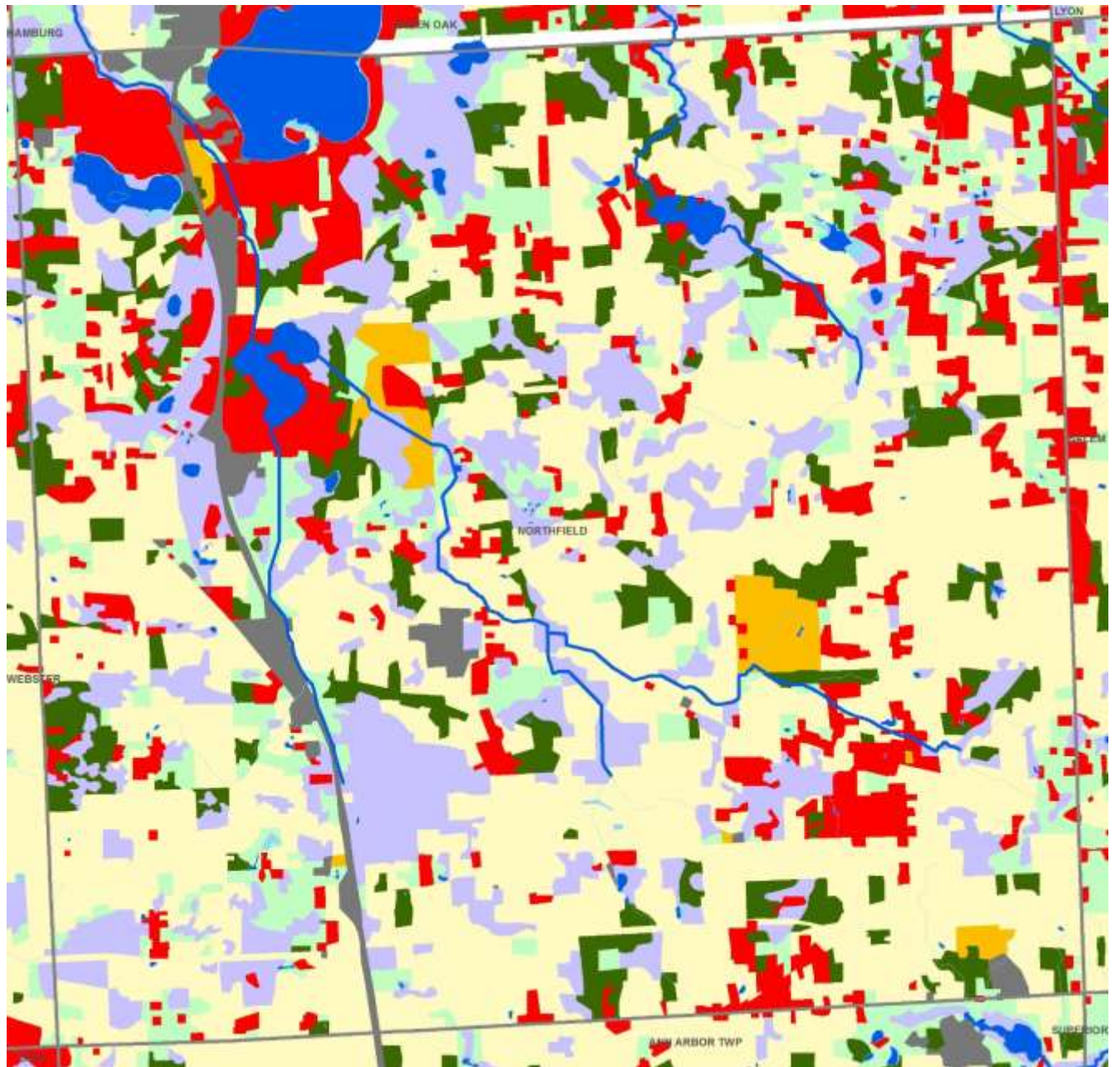
# Environmentally Sensitive Areas



- |   |   |
|---|---|
|  Floodplains/Riparian area | <b>Endangered/threatened:</b>   |
|  Woodland                  |  Animal    |
|  Wetlands                  |  Community |
|  Slopes over 12%           |  Other     |
|  Hydric soils              |  Plant     |



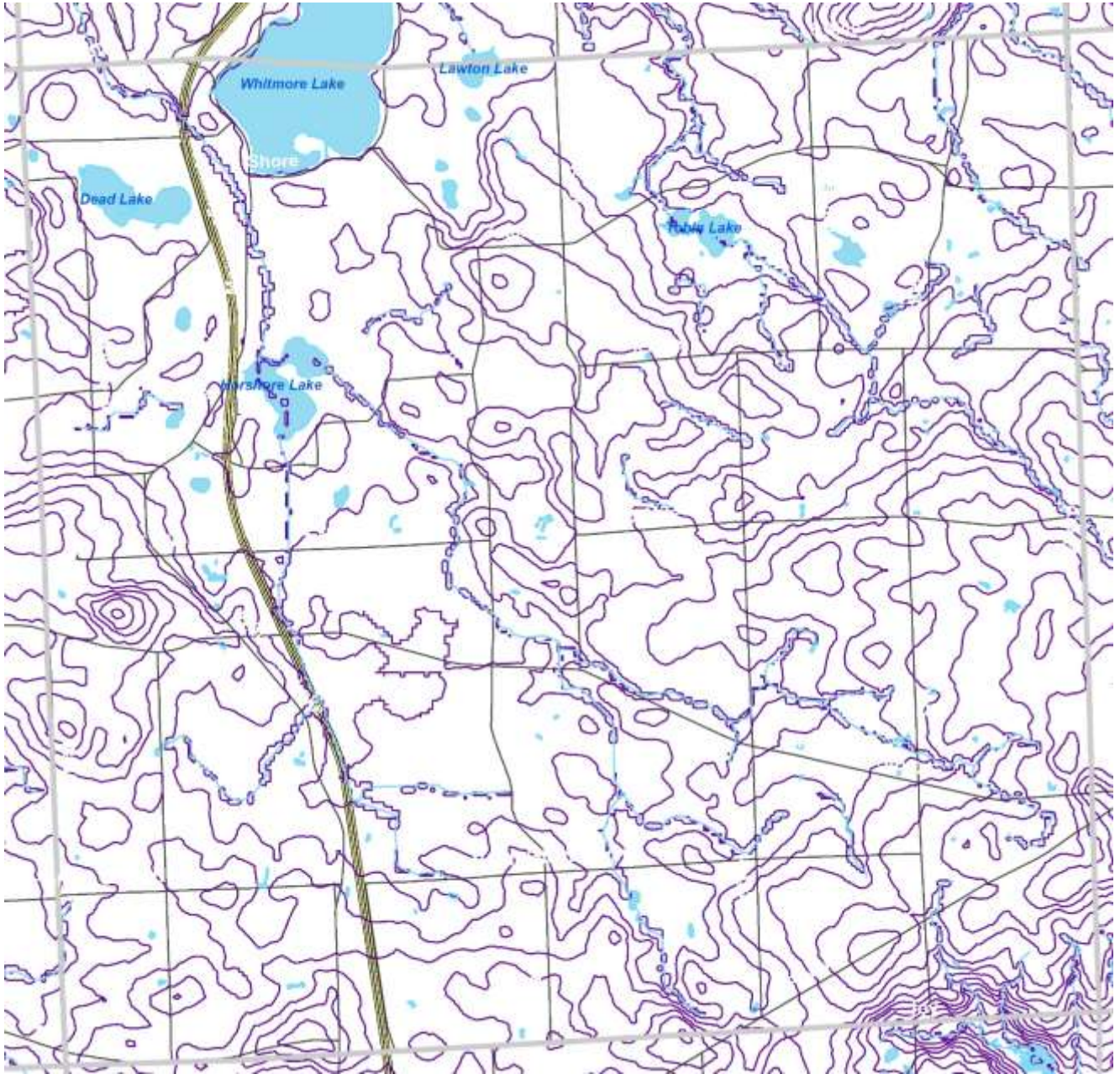
# 2000 Land Cover



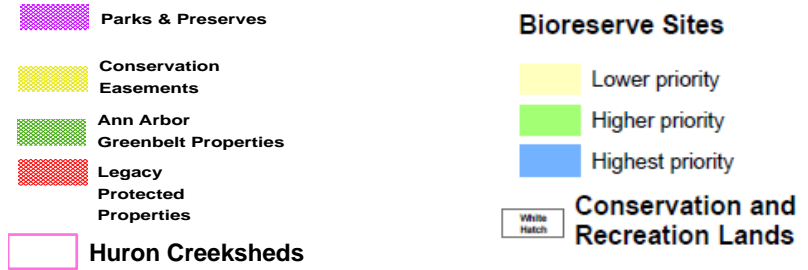
# U.S.G.S. Topography



# Topography: Lines (10 ft)



# Green Infrastructure Planning Map

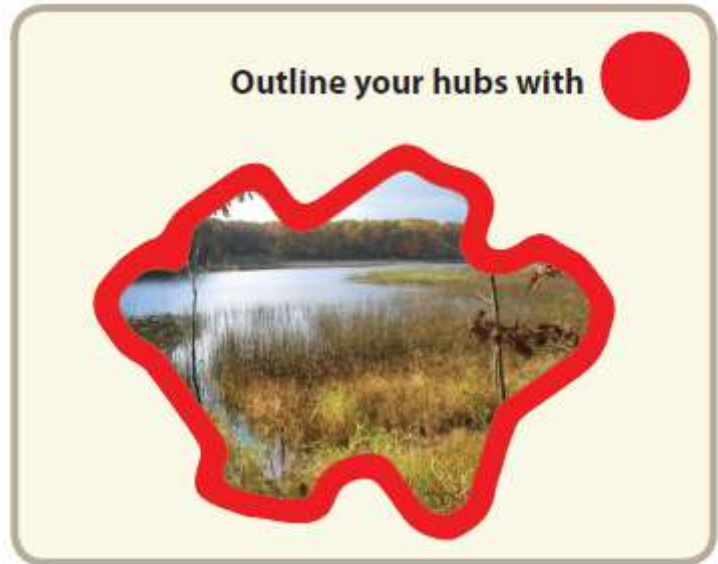


# Process for Hands On Assessment

1. Examine Maps
2. Determine habitat hubs, and outline on map with red ink.

## Hint

Hubs anchor the network and provide an origin or designation for wildlife. The Bioreserve Map provides a good place to start



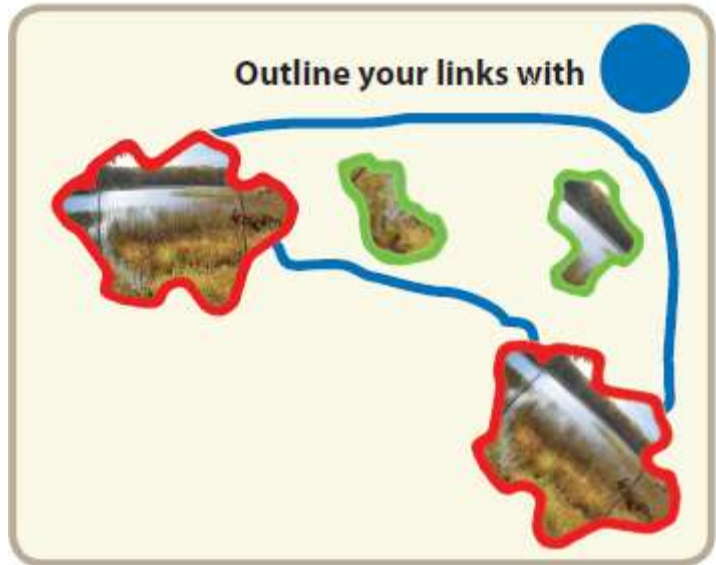
3. Identify smaller ecological landscape features (sites) that can serve as a point of origin or detination or incorporate less extensive ecologically important areas.

## ~Hint~

Look for lower ranked Natural Areas (Priority Two or Priority Three) along with smaller woodlots and wetlands.

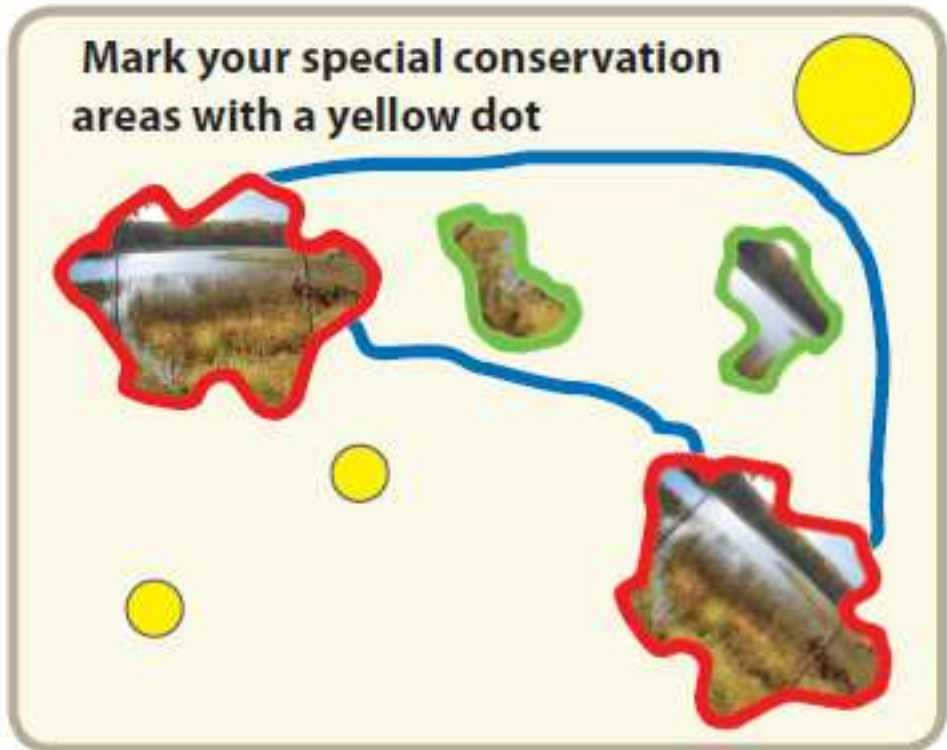


4. Create the best possible connections between hubs using the smaller ecological landscape features (sites) as stepping stones. Use riparian linkages whenever possible.



**~Hint~**  
In general, the wider the corridor the better and the longer the corridor the wider it should be.

5. Identify Special Features that fall outside the system or have unique connection or importance within the community.

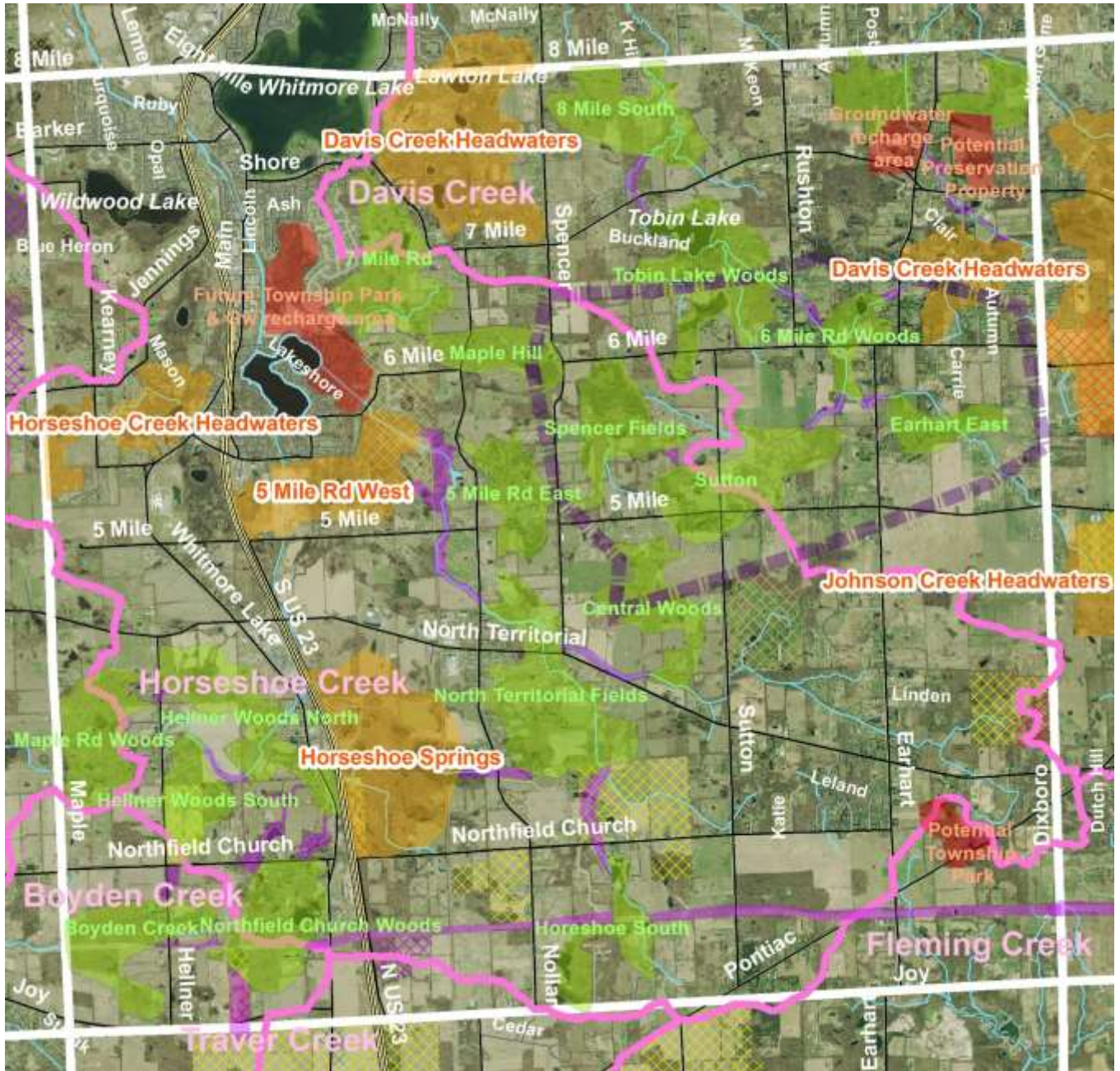


**~Hint~**  
Appropriate areas may be a wetland, pond, woodlot stream or wildflower patch known only to local residents.

6. Label your system (hubs and links) and add names that help identify the site locally.



# Draft Green Infrastructure Map







## Next Steps – Community Planning for Green Infrastructure

- Verify the draft Green Infrastructure Vision Map
- Determine best land management tools
- Review master plans, ordinances, and related planning documents
- Establish conservation goals, funding options, and tracking mechanisms
- Amend Master Plans to favor preservation of green infrastructure, and encourage green development proposals and better site design
- Adopt Local Ordinances for Resource Protection woodland, wetland, riparian, stream, and floodplain ordinances
- Revisit community Regulations & Development Standards for lot sizes, setbacks, parking and street standards, drainage regulations
- Offer Incentives to developers to integrate green development design density compensation, buffer averaging, stormwater credits, transferable development rights, etc.
- Adopt regulations and policies that guide development within a framework of ecological structure and function.
- Educate home buyers & community residents about the open space conservation concept

# References

The Conservation Fund. Green Infrastructure: A Strategic Approach to Green Space Planning and Conservation Train-the-Trainer. 2002.

Livingston County Department of Planning. Livingston County's High-Quality Natural Areas. 2003.

The Conservation Fund website. [www.greeninfrastructure.net](http://www.greeninfrastructure.net)

Oakland County Planning & Economic Development Services. 2002 Oakland County Potential Conservation/Natural Areas Report. Jul. 2002

Oakland County's Environmental Stewardship Program. [www.oakgov.com/es](http://www.oakgov.com/es)

SEMCOG. Best Practices for Sustainable Development. Mar. 1999.

SEMCOG. Land Use Tools and Techniques A Handbook for Local Communities. Mar. 2003.

SEMCOG. Opportunities for Water Resources Protection in Local Plans, Ordinances, and Programs. Aug. 2002.

# Northfield Township Green Infrastructure Planning Map

Hubs are large natural areas that anchor the Green Infrastructure Network and provide origin and destination for wildlife.

Sites are smaller areas that provide habitat and ecosystem services.

Links connect hubs and sites.

HRWC created the map with the help of Northfield Township community members who drew hubs, sites, links and special areas onto a draft green infrastructure map.

July, 2015

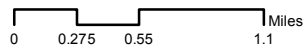
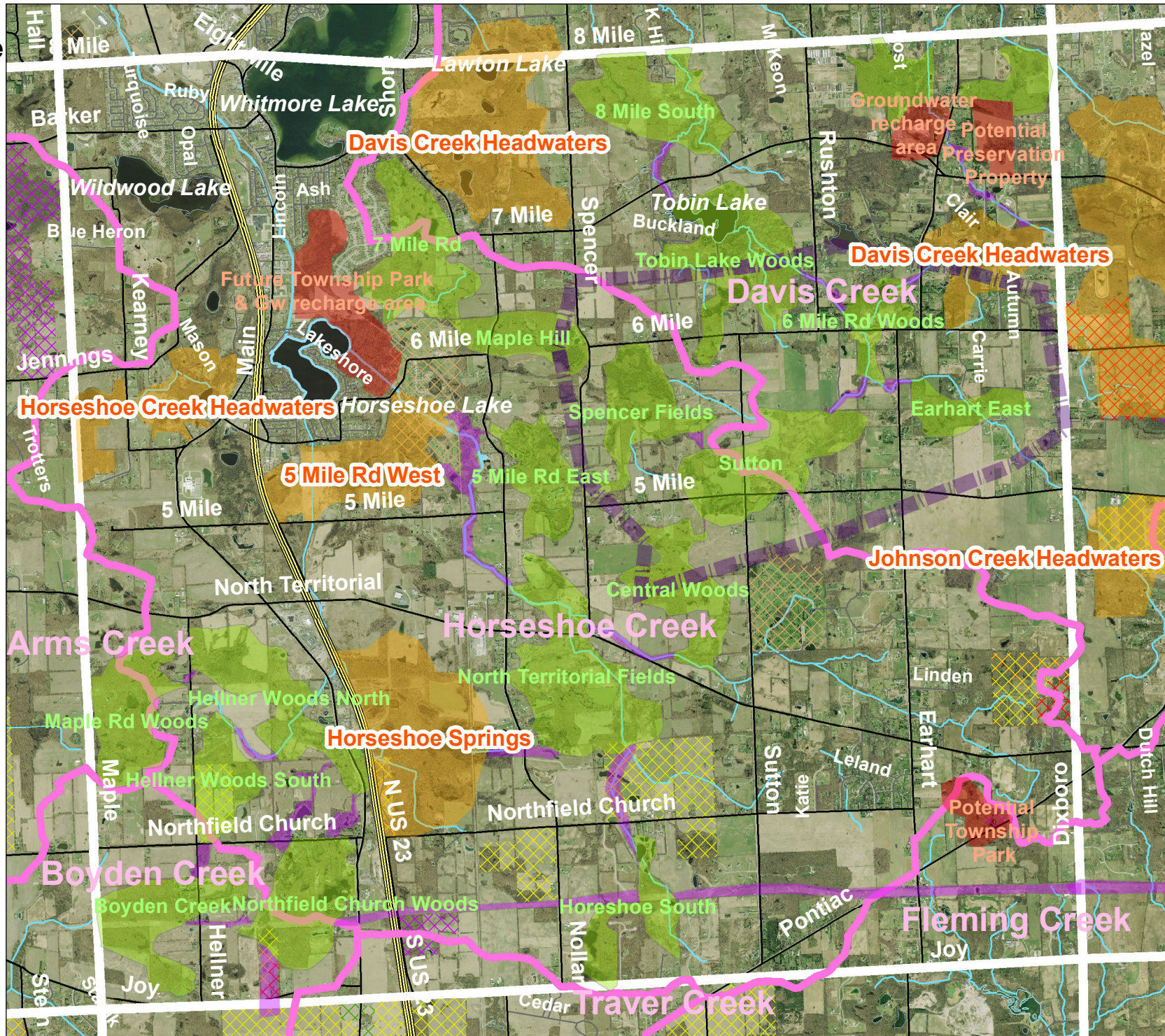
-  Hub
-  Site
-  Link
-  Special Feature
-  Horseback riding areas
-  Parks & Preserves
-  Conservation Easements
-  Ann Arbor Greenbelt Properties
-  Legacy Protected Properties

 Other Conservation and Recreation Lands



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## HRWC Recommended Master Plan Elements

### For Northfield Township

Element:	Description:	Is element in Northfield's Master Plan?
Natural areas and green infrastructure	Include language discussing the municipality's Green Infrastructure (natural areas and natural corridors that provide ecological services necessary for quality of life). Include text and a map, if available.	<b>Yes.</b> Does not specifically mention the term, but discusses natural area corridors, and implementation section calls for developing a greenway plan
Natural features listed and mapped	Describe the presence and importance of the following natural features: waterways, wetlands, forests, steep slopes, groundwater recharge areas, endangered and threatened species.	<b>Yes, but could enhance.</b> Included in Background Summary. Does not specifically mention steep slopes or groundwater. See "Environmental Conditions" p 15) in Ann Arbor Township sample language
Impervious capacities/watersheds	Include language discussing current and future impervious surfaces in the municipality, giving figures for each creekshed in the municipality. Include maps if available	<b>No.</b> See "Environmental Conditions" (p. 14) in Ann Arbor Township sample language. HRWC can provide analysis for creeksheds in Northfield Township (see map)
Current conditions of agriculture	Include language about the current state of agriculture in the municipality.	<b>Yes.</b> Included in Background Summary
Non-Motorized Transportation	Describe nonmotorized transportation opportunities.	<b>Yes.</b> Includes non-motorized transportation plan
Land Use patterns	Include a statement supporting the municipality's desired pattern of growth: HRWC recommends promoting land use patterns that provide compact development in areas with infrastructure, with natural	<b>Yes.</b> Many statements discuss desired pattern to separate urban and rural land uses.

	area and agricultural uses in surrounding rural areas.	
Statement of support for agricultural preservation	Include a statement supporting agricultural preservation.	<b>Yes.</b> Statements in support for agricultural preservation occur numerous times, including promoting of local agriculture and agricultural tourism.
Statement of support for natural features preservation		<b>Yes, but could enhance.</b> In Goals and Policies section. See “Natural Features Polices” (p. 57) in Ann Arbor Township sample language for possible language to strengthen this section.
Statement of support for open space/natural areas	Include statements supporting preservation of natural areas and open space.	<b>Yes.</b> Goals and policies for preserving open space, agriculture and natural areas in Goals and Policies section and in the rural Sub Areas sections
Statement of support to preserve watershed conditions	Include statements supporting preservation of watershed conditions.	<b>No.</b> See sample language from An Arbor Township master plan (p. 59), consider adding similar language
Smart Growth principles	Adopt the 10 Smart Growth Principles: <ol style="list-style-type: none"> <li>1. Mix land uses</li> <li>2. Take advantage of compact building design</li> <li>3. Create a range of housing opportunities and choices</li> <li>4. Create walkable neighborhoods</li> <li>5. Foster distinctive, attractive communities with a strong sense of place</li> <li>6. Preserve open space, farmland, natural beauty, and critical environmental areas</li> <li>7. Strengthen and direct development towards existing communities</li> </ol>	<b>Yes.</b> All principles mentioned in goals section. Sub Areas 4 and 5 called out for encouraging well-designed development. Form based code development is planned.

	<p>8. Provide a variety of transportation choices</p> <p>9. Make development decisions predictable, fair, and cost effective</p> <p>10. Encourage community and stakeholder collaboration in development decisions</p>	
Natural features policies	Include policies the government intends to enact to preserve natural features.	<b>Yes, but could enhance.</b> See “Natural Features Polices” (p. 57) in Ann Arbor Township sample language for possible language to strengthen this section.
Stream corridor policies	Include policies the government intends to enact to preserve stream buffers	<b>Yes, but could enhance.</b> See sample language from Ann Arbor Township master plan (p. 58), consider adding similar language to expand on these policies.
Open space/natural areas policies	Include policies the government intends to enact to preserve natural features.	<b>Yes, but could enhance.</b> See sample language from Ann Arbor Township master plan (p. 57); consider adding similar language to expand on these policies, as well as Green Infrastructure map (see map in sample language)
Watershed policies	Include policies the government intends to enact to preserve watershed quality.	<b>Yes, but could enhance.</b> See sample language from Ann Arbor Township master plan (p. 59); consider adding similar language to expand on these policies.
Urban Services District	Include policies the government intends to enact to create or maintain an urban service district.	<b>Yes.</b> Includes statements that township will not extend water and sewer beyond growth areas.
Stormwater policies	Include policies the government intends to enact to properly manage stormwater runoff	<b>Yes, but could enhance.</b> Includes statements promoting LID and LEED for each sub area. See sample

		language from Ann Arbor Township master plan (p. 54); consider adding similar language to expand on these policies.
Agriculture preservation policies	Include policies the government intends to enact to preserve agriculture.	<b>Yes.</b> Statements in support for agricultural preservation occur numerous times, including promoting of local agriculture and agricultural tourism.
Purchase/Transfer of Development Rights and other innovative land use planning policies	Include policies the government intends to explore to encourage compact patterns of development	<b>No.</b> Many communities have a PDR program with a designated millage. See example language and consider adopting similar program (p. 19). Other communities are considering adopting TDR programs. See example language from Spring Lake township.
Rural zoning outside of urban areas	Consider down zoning to lower densities in Agriculture and Rural Residential areas	Agricultural lot sizes are 5 acres. To truly preserve agricultural uses, lower densities would be more conducive.



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## HRWC Recommended Zoning Ordinance Elements

Element	Recommendation
Land Use Pattern	
Policies encouraging infill	Township encourages mixed use development in its Whitmore Lake Districts. Encouraging mixed use development and livable neighborhood design in already-developed areas is the best way to preserve Green Infrastructure landscapes and maintain water quality. Northfield Township is on the leading edge in the Huron watershed region with these provisions.
Policies limiting development to where infrastructure exists (eg urban service area)	Township limits urban development to its sewer service area.
Mixed use/transit oriented development planned	Township encourages transit oriented development in its Whitmore Lake Districts. Consider adding more transit oriented development provisions in other districts in the sewer service area.
CIP for urban areas	No Capital Improvement Program mentioned in zoning ordinance
Development standards tailored for infill areas to remove hurdles	yes
Accessory dwelling units allowed (even if increased density)	Consider exploring allowing accessory dwelling units.
TDR program	Consider allowing transfer of density between parcels as part of PUD provisions (several communities are doing this. HRWC is currently working with Webster Township on this).
Site Plan review requirements:	
Site Plan requires description of all existing natural features and endangered and threatened species	yes
Requires review by other agencies where applicable	yes
Site plan requires stormwater management plan	Requires description of stormwater drainage, but not a plan
Site plan requires soil erosion and sedimentation control plan (or coordination with county program)	Soil erosion control plan required site condominiums, but it is unclear where the adopted standards are (are they township or county?) Site Plan Review Criteria require development to meet soil erosion requirements, and soil erosion control measures required as part of natural features preservation plan, but unclear what the requirements and measures are.



Open space/land conservation provisions:	
Land preservation program	Consider adopting land preservation program, such as the one in Ann Arbor Township or Webster Township.
Key natural areas for protection identified (eg parks or open space plan, or GI plan)	Consider adopting recent Green Infrastructure plan or modified version.
Incentives for open space or cluster designs; open space design review is as easy to meet as conventional design	There are several open space preservation provisions, but no incentives. Consider adding density bonuses or other incentives to encourage cluster designs.
Allowable uses in open space restricted to agriculture or low impact uses	yes
Open space protection through easements	yes
PDR program	Consider adopting a PDR program
Zoning for large blocks of very low density (80 acres)	Consider increasing allowable lot sizes in agricultural area, although the current lot size (10 acres) is largest in the immediate area.
Natural features requirements:	
Waterways setbacks ( $\geq 100'$ or floodplain)	Township requires 50 foot setback. Recommendation: expand to 100-foot setback. This matches setbacks used by the township's surrounding communities. Setbacks of at least 100 feet have been shown to be necessary to allow watercourses to continue to function.
Waterway vegetated buffers ( $\geq 25'$ )	Township requires 25 foot vegetated buffer
Wetland protection ordinance	Wetlands are considered a natural feature and are protected as part of the zoning ordinance. Recommendation: Expand protection to wetlands under 5 acres that are not contiguous to waterbodies if the *township* (not MDEQ) determines it is essential. Note: state law requires local communities to protect wetlands through a stand alone wetland protection ordinance. HRWC can assist in converted the current ordinance provisions to a stand-alone ordinance.
Wetland setback required ( $\geq 25'$ )	Township requires 50 foot vegetated buffer from MDNR-regulated wetlands (note: it is now the MDEQ).
Groundwater recharge areas protected	Township has provisions for groundwater protection
Prohibition of direct and indirect discharge of hazardous substance to groundwater	Natural Features section prohibits. Consider adding environmental permits checklist
Steep slope protection	Steep slopes are defined as a natural feature.
Woodland and landscape trees protection	Township requires tree removal outside of Agriculture District and aside from removal in order to build structures to be reviewed by planning commission. The woodlands section of the ordinance

	encourages tree protection and requires mitigation for tree removal.
Resource protection/Natural Environmental Areas Overlay	Consider language protecting natural areas. See Macomb County, Brighton Township sample language
Impervious surface reductions:	
Flexible lot coverage standards to allow creative approaches that limit impervious surfaces	Yes, in PUD and open space districts
Yard setbacks <sup>1</sup>	See table below for recommended yard setbacks. Consider reducing yard setbacks to reduce impervious surface
Allow bioretention, rain gardens, filter strips in setback and common areas	Consider allowing these features in parking lot and commercial landscaping areas.
Flexible parking standards to reduce impervious surface <sup>2</sup>	HRWC can share recommended spaces for each of the township's allowable land use if desired
Private road ordinance?	Yes – HRWC can share ordinance provisions that further reduce impervious surfaces if desired.
If yes, flexible standards to reduce impervious surface <sup>3</sup>	Consider reducing right-of-way widths. See standards below.
Stormwater:	
Required review by county drain or water resources commissioner	Yes
Township stormwater ordinance <sup>4</sup>	Consider adopting township stormwater ordinance. Ann Arbor and Green Oak townships both have very good ordinances.
Other:	
Soil Erosion and Sediment Control program: coordinated with county	Yes, it appears so, but it is unclear
SESC: permit required for developments within 500' of a waterway	Could not find language referring to this element
Septic system >100' from a wetland or waterways	Consider this requirement
Point of sale septic inspection	Consider this requirement
Native vegetation encouraged	Consider removing invasive species from Plant Materials list for transition strips and landscaping, especially Russian Olive and Honey Suckle. Consider requiring landscape plants to be native to Michigan.

1. Recommended yard setbacks: front < 20; side <8; rear < 25; frontage < 80
2. Recommended parking standards: bioretention allowed in parking lots; landscaping required in parking lots; ratio for professional office <3 per 1000 sq. ft.; single family homes <2; shopping centers <4.5 per 1000 sq. ft.; shared parking promoted; parking reduced if mass transit nearby; stall width <9'; stall length <18'; compact car area; pervious pavement encouraged; structures promoted; flexibility for shared and off-site parking

3. Recommended street standards: shared driveways, reduced driveway width, 2-track driveways; rear garages, etc., encouraged; ROW widths < 45'; utilities can be under pavement; Cul-de-sacs < 45', landscaping required; if curb and gutter required, perforated curbs required/encouraged; road widths btw 18 – 22'
4. Recommended stormwater requirements:
  - Preservation of natural vegetation encouraged
  - Site designs that limit impervious surfaces
  - Infiltration of first flush (inch) of rainfall
  - Effective design criteria for BMPs in place for 100 year storm, maintaining  $\leq .15$  cfs discharge
  - Stormwater management facilities must be designed to prevent flooding and protect surface and groundwater;
  - Green Infrastructure Stormwater BMPs encouraged (infiltration basins/beds, bioretention areas, rain gardens, pervious pavement, infiltration trenches, etc.)
  - Rooftop runoff disconnection encouraged
  - Pre-treatment required before stormwater discharges to wetlands
  - Stormwater runoff must be controlled to a non-erosive velocity;
  - Regular evaluation and maintenance required
  - Off-site stormwater facilities allowed
  - Stormwater requirement reduced for project that decrease total imperviousness on redeveloped sites;

Documents consulted:

Better Site Design: A Handbook for Changing Development Rules in Your Community. Center for Watershed Protection. The "COW" 1998

Charlevoix County Local Ordinance Gaps Analysis. Tip of the Mitt Watershed Council. 2011.  
(Resources\LUPPY\ordinances&policies\xx Other non-Huron ordinances\  
Antrim\_gaps\_analysis\_final\_web.pdf and ...../charlevoix gaps analysis-web.pdf)

From Policy to Reality: Model Ordinances for Sustainable Development. Minnesota Planning. September 2000

Opportunities for Water Resource Protection in Local Plans, Ordinances, and Programs. SEMCOG 2002

Citizen's Guide to Land Use Planning. HRWC 2001

Smart Growth Guideline for Sustainable Design and Development. US EPA 2009