

CHAPTER 9: NATURAL RESOURCES

Introduction

The region's natural resources are a complex system of individual components and physical characteristics that serve specific ecosystem functions and fulfill part of the region's economic and social needs. The wealth and variety of resources available within the region not only provided for its initial settlement and development, but now, hundreds of years later, still furnish its residents with the basic needs of life: food, water, power, and raw materials for human consumption. Most natural resources can be categorized as being either renewable or exhaustible and must be managed accordingly. Natural resources often act as both a physical constraint to development, as well as a commodity that enhances rural and urban environments by providing recreational, social, and economic opportunities. Individually and collectively, these resources also contribute to the region's overall 'sense of place' and 'quality of life' that is beloved by most of its residents.

Smart Growth statutes [66.0295(2)(e)] define the Natural Resources element as being comprised of the 17 sub-elements, of which 15 are addressed in the context of the regional plan. It should be noted that although they are technically part of this element, 'productive agricultural areas' and 'historical and cultural resources' are addressed separately in Chapters 8 and 10, respectively. The 15 sub-elements are:

1. Groundwater
2. Forests
3. Environmentally sensitive areas
4. Threatened and endangered species
5. Stream corridors
6. Surface waters
7. Floodplains
8. Wetlands
9. Wildlife habitat
10. Metallic and nonmetallic mineral resources (Note: No significant metallic resources exist in region)
11. Parks (regional)
12. Open spaces
13. Community (regional) design
14. Recreational (regional) resources
15. Other natural resources

Statements Interaction with Other Planning Elements

The generalized subject of Natural Resources, from a land use planning perspective, relates to all eight remaining 'smart growth' plan elements. Table NR-2, contained in Milestone Report #2 – Issues & Opportunities (see www.eastcentralrpc.org), illustrate the many natural resource relationships that exist between the individual sub-elements and the major plan elements, including the two items which were separated from the natural resources element - agriculture and cultural/historic resources. Most of these relationships and their associated issues are based on their geographic proximity to development or some aspect of the resources function. A successful and meaningful plan will document and address these relationships appropriately.

Vision Statement for Natural Resources

In preparation for forming a vision statement, the individual Technical Advisory Committees were asked to consider three questions: "What would you like to see preserved in the region?", "What would you like to see changed in the region?" and "What would you like to see created in the region?". Committee members generally envisioned a future where the region's natural resources are placed high on the list of individual and community values. They had recognized that these resources are an integral part of the economy and quality of life and that much of the variation in character and identity of the region is due to the natural environment. Major river and lake systems, large blocks of natural areas, woodlands and wetlands, and even the smaller isolated or unique features were all identified as being part of a well functioning ecosystem that, if preserved and managed correctly, can provide the region with benefits associated with their inherent 'natural capital'. The resources themselves would provide both environmental services and economic value in the form of tourism and quality of life.

It was also recognized that the region's resources are used on a daily basis to support the actual development of the region. The region's mineral, wood, and water resources are all prerequisites to development and are a necessary commodity for urbanizing environments. It is also an accepted fact that natural resources are often considered as a major factor in locating development in the first place. Rural development occurs largely because of the individual's desire to have open space and a natural environment surrounding them, but usually at a cost to the community overall. The TAC recognized that these demands need to be balanced with the ecological needs of the region and that a move towards sustainability is warranted.

The vision expects that natural resources are meaningfully integrated into regional, county, and local level plans as a foundational element from which to build the rest of the plan upon. The TAC's acknowledge that each resource is not only an independent system, but is also functional part of a larger ecosystem. Each resource needs to be planned for in a manner which is best suited to its particular values and functions, as well as for its role and value within region overall.

Identifying and acknowledging these relationships, along with the impacts of development, will lead to more sustainability within the region. Most importantly, the envisioned future relies on coordinated regional planning efforts which go beyond political boundaries and more closely match the natural boundaries of the environment. New tools and techniques for implementing the vision, such as watershed management and green infrastructure, will ensure that the region retains and improves its ecological 'sense of place' and moves towards sustainability.

Lastly, the vision assumes that state agency and local government entities would be responsible for more efficient and coordinated decision-making, but that the general public plays a large role in the management and stewardship of our region's resources. These concepts and ideas are summarized in the following Natural Resources Vision Statement:

"In 2030, the importance of natural resources, including their link to the regional economy, quality of life, and cost effective service provision is recognized. Natural resource planning is sustainable, consistent and coordinated in order to protect and build a strong sense of ecological place. The Winnebago Pool Lakes

and the Fox/Wolf River systems are recognized as the backbone of the region's ecological resources. Geologic resources that are significant from an aesthetic, scientific, cultural, historic, educational, or commercial extraction purpose, have been identified, inventoried, preserved and protected to meet the development and societal needs of the region. The region has proactively addressed public access, recreation, open space, and trail facilities in order to meet the needs of its citizens; enhance the quality of life and environment; realize tax savings and other economic benefits; and to maintain and improve the region's tourism economy. The region is comprised of well-defined urban and rural spaces which improve the individual's perception of 'sense of place', while communities within the region have maintained their individual character and identity. Within the region, surface water resources are planned for in a watershed-based manner that embraces and encourages the use of 'green infrastructure' concepts. The proactive protection of natural features not only contributes to water quality, but also to the long term sustainability and economic benefit of the region".

Goals, Strategies and a Plan for Action (Plan Guidelines)

The various natural resources' Technical Advisory Committees assisted East Central staff in creating the overall plan element vision and goals. For the most part, these statements were based on previously conducted focus group meetings which identified issues and opportunities. The identified issues and opportunities fall into five major categories: geologic and non-metallic mining resources; groundwater; surface waters, flooding, and watershed planning; wildlife habitat, forestry, and ecological resources, and; regional open space and recreation. The following plan guidelines summarize the key facts, discussion, current activities and programs associated with the agriculture plan element. As in Milestone Report #2, the element's vision statement and core goals are listed, however; Milestone Report #3 now includes the addition of more specific regional strategies and specific recommendations which will assist the region in meeting these goals.

Based on the advisory nature of the Commission, as well as its regional coverage, many of the recommendations are geared toward its own potential involvement in achieving the established vision. The recommendations exist, in part, to meet a portion of the State's smart growth planning requirements to address the implementation of the plan, but even more so....many are written in a manner which is 'action oriented'.

The recommendation statements are written in three general ways:

1. (e.g. "*the Commission should...*") – providing specific direction, role, or set of tasks/activities that the Commission itself can conduct, often times at a regional level. These activities will serve to assist member counties and communities directly or indirectly and, as an additional benefit, will improve the consistency and objectivity by which multi-jurisdictional land use issues are addressed.

2. Other recommendations are written so that they serve as a general 'policy'. Items that should or may be considered and applied in future decisions or opinions rendered by the Commission or its staff.
3. Still others are written as statements which 'support or encourage' certain outcomes, many of which require the leadership or assistance of other agencies and entities.

The recommendations are an important part of this planning document as they will serve to guide the Commission in its future activities. These will eventually serve as the basis for the Commission's future Strategic Plan and its current Annual Work Program planning and evaluation process. These are important tools that are used in communicating the Commission's mission and value to member units of government and the citizens of the region. More information and recommendations for plan implementation can be found in Chapter 12 – Regional Plan Implementation.

The 'policy links' section of the fact sheet is essentially a summary of the "*Statement of Interaction with Other Planning Elements*" portion of this chapter and is present so that the user of the document can keep these key linkage points in mind.

Geologic Resources & Non-Metallic Mining
PLAN GUIDELINE: NR-1
Year 2030 Regional Comprehensive Plan

Key Facts

During the Pleistocene period, between 15,000 and 25,000 years ago, several separate glacial advances and retreats took place over northeastern and central Wisconsin. These glaciers deposited large amounts of unsorted tills and stratified gravel, sand and clay materials throughout the region. Lying below these glacial sediments is a series of much older bedrock layers ranging from highly fractured limestones and sandstones, to shales and granite.

The bedrock geology of the region provides high quality materials - stone and aggregates - which are used in road construction, housing and commercial developments, as well as agricultural products. Approximately 400 active and inactive stone quarries, sand and gravel pits, and topsoil/clay borrow areas exist within the region. These areas are important sources of the raw materials necessary for continued development, and these sites are typically located in close proximity to the major urban centers of the region due to the high transportation costs.

As a result of encroaching urban and rural development, it has become increasingly difficult for existing mining operations to expand or site new operations, due to real or perceived conflicts such as noise, traffic, dust and private well impacts.

Many of the glacial and bedrock features which provide these materials also exist within landscapes that are somewhat unique to the region and give it much of its character, thereby threatening some of the social values.

So What!

Access to aggregates is critical to Wisconsin and the region's economy. While there are literally hundreds of uses of aggregates, most are used as a raw material for construction. Over 90 percent of asphalt is aggregate. In addition, about 80 percent of concrete - a key component of homes and commercial buildings - is aggregate. Approximately 38,000 tons of aggregate are used in building one lane mile of interstate and 400 tons are used in constructing the average new home.

Because they are heavy and bulky, it is often cost prohibitive to transport these materials long distances. Consequently, high transportation costs generally dictate that the material source be near the market where it is actually used.

While most agree that these materials are important to society, the mining industry is still facing major challenges in protecting access to these deposits. Currently, it appears that the permitted non-metallic resources are being used faster than approvals can be obtained for opening new resource deposits. Some areas containing significant deposits are being re-zoned to prevent mining or are being built over, which effectively prohibits their extraction in the future.

In the absence of long-term comprehensive planning for non-metallic resources, it is possible, and perhaps even likely that zoning or growth will prohibit the use of these materials when they are needed.

Current Action

Other than local zoning regulations and the WDNR's new NR-135 Non-Metallic Mining Reclamation and Mineral Registration Program, little if any action is being taken to ensure that the remaining, marketable deposits will be available for use in the future development of the region. Zoning approvals are typically given in the form of 'conditional uses' rather than as a 'use by right' which makes siting or expanding a quarry somewhat difficult and time consuming - although these procedures do allow for significant oversight by the community. The NR-135 Mineral Registration Program is voluntary and allows sites with marketable deposits to be protected from development by recording of a deed notice in the county register of deeds office.

The Wisconsin Geologic & Natural History Survey (WGNHS), an advisory academic agency, has done much work in this field and is one of the agencies being relied upon to inform and educate decision makers so that social needs and land use conflicts are balanced. Private educational efforts are, also becoming more common as the annual 'Quarry Quest' event and Menasha's Weis Earth Science Museum provide hands-on venues for children to learn about these materials and needs. East Central staff will be working with these agencies, other academic institutions, industry, and county representatives to further assess these issues and find balanced solutions through the regional planning process.

Year 2030 Vision for Geologic Resources

As drafted by the Geologic Resources Technical Advisory Committee, the following vision statement for geologic resources within the region was established:

The East Central Region has inventoried and identified the significant geologic resources which are to be preserved and protected for aesthetic, scientific, cultural, historic, educational, and commercial extraction purposes. Local and county plans have adequately, and realistically, addressed the future local and sub-regional needs for non-metallic minerals, while balancing the concerns of its citizenry. Plans will incorporate non-metallic mining uses as a transitional land use - one which is critical to the future economic development of the region and may add value to the site, once reclaimed. Mining sites will be operated and managed in an environmentally sound and sustainable manner, with long-term reclamation of sites integrated into the planned needs of the community and region. Local plans have clearly identified existing sites, expansion areas, and future marketable deposits so as to reduce future conflicts in rural and urbanizing areas. The access to these resources has been preserved and enhanced to aid in their removal and transport within, and outside of, the region. Decisions re-garding the siting of new mines, or expansion of existing sites, will be: 1) sensitive to the environment; 2) more uniform throughout the region, and; 3) based upon factual and objective information this vision was achieved through improved intergovernmental coordination, communication, and education of local officials citizens and the minina

Goals, Strategies and Recommendations

The goals, strategies and recommendations that were developed for this section are intended to encourage the identification, protection, preservation and planning for the development

of geologic resources to insure an adequate supply is always available within the region.

GOAL NR-1.1: Preserve and protect unique geologic sites within the region for aesthetic, cultural/historic, scientific, and educational purposes.

STRATEGY NR-1.1.1: Identify all unique geologic sites within the region with the potential for preservation or enhancement.

- ◆ *RECOMMENDATION NR-1.1.1.1: Acknowledge the following sites in the region for potential preservation or enhancement.*

Calumet County

- *Niagara Escarpment cliff face and associated features*
- *Ledgeview Caves*

Fond du Lac County

- *Niagara Escarpment cliff face and associated features*
- *Eureka Moraine*
- *Drumlin Fields (i.e., Campbellsport, Eden, Empire, etc.)*

Green Lake County

- *Mitchell Glen*
- *Mount Tom*
- *Manadnock Outcropping*

Marquette County

- *Observatory Hill*
- *Montello Quarry*
- *Lohrville Quarry (Flynn's)*

Menominee County

- *Wolf River Dells*

Outagamie County

- *Duck Creek Esker*
- *Mosquito Hill*

Shawano County

- *Tigerton Dells*
- *Granite & Anorthosite Outcrop*

Waupaca County

- *The Ledge*
- *Cactus Rock*
- *New London Esker*
- *Navarino Esker*
- *South Little Wolf Outcrop*
- *North Little Wolf Outcrop*

Waushara County

- *Redgranite Quarry*
- *Mt. Morris*
- *Lohrville Quarry (Flynn's)*

Winnebago County

- *Eureka Moraine, Radio Tower Hill*

- ◆ *RECOMMENDATION NR-1.1.1.2: Periodically review the list of unique geologic features and update this document as required.*

- ◆ *RECOMMENDATION NR-1.1.1.3 Consistently discourage new aggregate extraction areas in the region which will negatively impact regionally significant resources, including key green spaces, their natural and hydrologic features, habitat and corridors.*

STRATEGY NR-1.1.2: Work with local and state governments to identify programs, funding sources, and methods for long-term protection of unique geologic resources.

- ◆ *RECOMMENDATION NR-1.1.2.1: The Commission should develop an informational report geared toward communities that identify programs, funding sources and methods for long-term protection of these, or similar, resources.*

- ◆ *RECOMMENDATION NR-1.1.2.2: The Commission should continue its involvement as a leader in the Niagara Escarpment Resource Network (NERN) efforts in order to more specifically provide guidance and information to local units of government containing this feature.*

STRATEGY NR-1.1.3: Local units of government should identify opportunities to incorporate educational programs associated with unique geologic features.

- ◆ *RECOMMENDATION NR-1.1.3.1: Local units of government should work with school districts, county and municipal staffs, UW-Extension and other state agencies as appropriate to develop, maintain or expand educational opportunities for these sites for both young and old populations.*

GOAL NR-1.2: Preserve and protect mineral resources within the region to meet projected short and long-term needs.

STRATEGY NR-1.2.1: Work with local and state governments to identify important mineral resources within the region and inventory various characteristics of the mining industry.

- ◆ *RECOMMENDATION NR-1.2.1.1: The Commission should conduct an in-depth, region-wide study on the available aggregate resources in comparison with the population trends and projections to insure that an adequate supply is available in the future.*
- ◆ *RECOMMENDATION NR-1.2.1.2: Conduct a more detailed study of the current transportation system and the aggregate industries existing and future transportation needs.*
- ◆ *RECOMMENDATION NR-1.2.1.3: The Commission should seek additional funding for the development of new GIS mapping data creation and analysis which will assist in the planning for the region's future aggregate resource needs.*

STRATEGY NR-1.2.2: To better identify methods for which to inform communities and

residents of programs, funding sources, and methods for long-term protection of mineral resources.

- ◆ *RECOMMENDATION NR-1.2.2.1: The Commission should work with state agencies (WDNR, WisDOT, and WGNHS) and other partners to educate and inform communities on subjects related to mineral planning.*

STRATEGY NR-1.2.3: Highly suitable non-metallic mining sites should be prioritized for the region, as a guide for communities, using the following recommendations as the basis for assessment.

- ◆ *RECOMMENDATION NR-1.2.3.1: Communities should seek to preserve the short and long-term accessibility to mineral resources. This includes consideration of:*
 - *the property ownership;*
 - *its long term land use;*
 - *its access to road infrastructure;*
 - *its proximity to existing or future development (to limit conflicts).*
- ◆ *RECOMMENDATION NR-1.2.3.2: Communities should preserve existing infrastructure which allows for better access to mineral resources and their transport.*
- ◆ *RECOMMENDATION NR-1.2.3.3: Due to road damage associated with mining activities communities should direct access to county or state road facilities with higher design standards where possible. Trans 233 does apply in mining activities.*
- ◆ *RECOMMENDATION NR-1.2.3.4: Communities should preserve and protect critical geologic resources within close proximity (approx. 10 miles) of existing urban (ized) areas.*

- ◆ *RECOMMENDATION NR-1.2.3.5: Communities should consider preserving areas not suitable for development based on geologic properties.*

STRATEGY NR-1.2.4: Communities and counties should create policies to promote the preservation of existing non-metallic mining sites, expansion areas, and future marketable deposits.

- ◆ *RECOMMENDATION NR-1.2.4.1: Local and county level plans should clearly identify existing mine sites as well as their planned expansion areas (whether approved or not) in order to ensure improved public awareness and to enhance decision-making.*
- ◆ *RECOMMENDATION NR-1.2.4.2: Promote NR-135 land registration program as a method to preserve resources.*

STRATEGY NR-1.2.5: Preserve non-metallic mining as a normal land use that is compatible with rural areas. Suggestions for communities to consider as part of their planning/regulatory strategies include:

- ◆ *RECOMMENDATION NR-1.2.5.1: Zoning districts and plans similar to concepts of agricultural preservation plans/zoning.*
- ◆ *RECOMMENDATION NR-1.2.5.2: Creation of Aggregate Resource areas where intensive land use should be strongly discouraged, including residential subdivision of land into lots of less than 35 acres.*

GOAL NR-1.3: Emphasize non-metallic mining activities as a 'transitional' and 'interim' use of the land and achieve maximum benefits from the reclamation of these sites.

STRATEGY NR-1.3.1: County and local plans should emphasize non-metallic mining activities as a transitional land use.

- ◆ *RECOMMENDATION NR-1.3.1.1: Local units of government should consider allowing for the extraction of a resource just prior to the site's re-use as a different land use - a use which is planned for as part of an overall land use scheme for the community.*

STRATEGY NR-1.3.2: Create and evaluate opportunities to better integrate the reclamation of existing/future non-metallic mining sites into other community needs or plans.

- ◆ *RECOMMENDATION NR-1.3.2.1: Communities should encourage creative uses of reclaimed sites (i.e. recreational geology, parks, stormwater management, etc.).*
- ◆ *RECOMMENDATION NR-1.3.2.2: The basic provisions of the NR-135 reclamation program should be maintained as a mechanism to ensure coordination of land use changes.*
- ◆ *RECOMMENDATION NR-1.3.2.3: The Commission should continue to implement the NR-135 Program on behalf of the counties of Calumet, Outagamie, Winnebago, Shawano, and Waupaca.*
- ◆ *RECOMMENDATION NR-1.3.2.4: The Commission should continue to develop its abandoned mine sites study in order to assess the extent and need for future program and incentive options to ensure their eventual reclamation.*

GOAL NR-1.4: Develop County and local plans which support and emphasize the regional context associated with non-metallic mining activities and needs.

STRATEGY NR-1.4.1: Encourage local and county plans to acknowledge regional factors that are associated with non-metallic mining activities.

- ◆ *RECOMMENDATION NR-1.4.1.1: Communities need to budget sufficient time and financial resources to properly address non-metallic mineral resources.*
- ◆ *RECOMMENDATION NR-1.4.1.2: Communities should ensure that they look at, and evaluate, the regional impacts of zoning decisions related to non-metallic mines (i.e., land use, economy, groundwater, etc.).*

GOAL NR-1.5: Non-metallic mining activities should be regulated and operated in a manner which balances the needs of the region while minimizing the effects on the environment and maximizing compatibility with nearby land uses.

STRATEGY NR-1.5.1: Local plans and zoning regulations should be developed in a manner that provides clear goals and objectives regarding non-metallic mining while leaving flexibility in their implementation.

- ◆ *RECOMMENDATION NR-1.5.1.1: Create better notification procedures for planning and zoning decisions related to non-metallic mining that reaches out to industry representatives and other potentially impacted parties (i.e. neighboring jurisdictions).*
- ◆ *RECOMMENDATION NR-1.5.1.2: Evaluate the possibility of a regional zoning/implementation option for communities and counties for non-metallic mining permits.*
- ◆ *RECOMMENDATION NR-1.5.1.3: Create a model zoning ordinance for extraction that balances the health and environmental impacts with the needs of industry and the public.*

STRATEGY NR-1.5.2: Educate zoning officials so they don't create additional, inadvertent, restrictions on non-metallic resources or

operations (i.e., setbacks from existing structures, zoning to exclusive ag., etc.).

- ◆ *RECOMMENDATION NR-1.5.2.1 More education and assessment of non-metallic mining issues by a neutral, third party (i.e. a standard group of experts than can be used during the permitting process for advisory review and evaluation).*

STRATEGY NR-1.5.3: Better management of non-metallic mining sites (i.e. more effort to improve/maintain aesthetics during operations).

- ◆ *RECOMMENDATION NR-1.5.3.1: A requirement for companies to maintain a citizen's advisory committee that would meet quarterly to respond to community opinions on the mine site and forward those opinions to company staff and local officials.*
- ◆ *RECOMMENDATION NR-1.5.3.2: Existing mine operations throughout the region should consider the development and adoption of 'green gravel' concepts, including the 3 R's (reduce, re-use, and recycle) as a method to reduce costs, energy usage, and material consumption.*

GOAL NR-1.6: Collect, develop and distribute regional level information to assist counties and communities on non-metallic mining issues.

STRATEGY NR-1.6.1: The Commission should serve as a more localized clearinghouse for regional mineral resource data and information.

- ◆ *RECOMMENDATION NR-1.6.1.1: Create a regional resource information/inventory web site.*
- ◆ *RECOMMENDATION NR-1.6.1.2: The Commission should seek to provide each member County within its region with a*

minimal level of consistent GIS data on geologic resources.

- ◆ *RECOMMENDATION NR-1.6.1.3: The Commission should collaborate with other entities (WGNHS, UW-Extension, and WLIA) to develop a program which educates planners on GIS data availability and uses.*
- ◆ *RECOMMENDATION NR-1.6.1.4: Annually update the inventory of 'unique' geologic sites and post it on the Commission's website to increase awareness.*

STRATEGY NR-1.6.2: Improve the public's accessibility to existing data sources so to foster improved decision-making.

- ◆ *RECOMMENDATION NR-1.6.2.1: Encourage the acceleration of geologic mapping projects for the East Central region and move the distribution of their data from an academic level to a more commercial level.*
- ◆ *RECOMMENDATION NR-1.6.2.2: Conserve and maintain geologic cores and samples that may be in jeopardy due to funding for archival space needs. This could eliminate the need to gather more/new information for future projects that affect land use.*

STRATEGY NR-1.6.3: Efforts to develop new geologic GIS data should be considered wherever practical.

- ◆ *RECOMMENDATION NR-1.6.3.1: The Commission should encourage State to look deeper than just soils when providing resources or support to GIS data information projects.*
- ◆ *RECOMMENDATION NR-1.6.3.2: Part of any sub-regional or site-level inventory*

project should also incorporate/identify geologic hazards (i.e. karst features).

- ◆ *RECOMMENDATION NR-1.6.3.3: The Commission should facilitate the development of a more accessible information and tracking system on private properties which have leases held by non-metallic mining industries.*

GOAL NR-1.7: Achieve better communication and intergovernmental coordination, and cooperation amongst local officials, citizens, and operators on non-metallic mining issues.

STRATEGY NR-1.7.1: Promote any community plans or ordinances which are considered 'good' and 'working'.

- ◆ *RECOMMENDATION NR-1.7.1.1: Tax-base and revenue sharing concepts need to be applied and thought about for managing the region's non-metallic mining resources.*
- ◆ *RECOMMENDATION NR-1.7.1.2: Change community perceptions - local plans need to be flexible and should be re-visited and modified as necessary regarding geologic resource issues.*

STRATEGY NR-1.7.2: Communities need to better diffuse the emotions, and reduce 'personality conflicts' (local politics) that affect the decisions in approving new or expanded non-metallic mines.

- ◆ *RECOMMENDATION NR-1.7.2.1: Communities need to better balance community vs. individual needs when making decisions on non-metallic mining issues.*
- ◆ *RECOMMENDATION NR-1.7.2.2: Encourage better intergovernmental cooperation on planning for, regulating, and protecting geologic resources across jurisdictions.*

- ◆ *RECOMMENDATION NR-1.7.2.3: Improve communication and coordination relating to active mineral extraction operations that cross, or are adjacent to, municipal boundaries.*
- ◆ *RECOMMENDATION NR-1.7.2.4: Communities should improve their abilities to transfer information on non-metallic mining sites and mineral resource information/issues when governing board members change.*

GOAL NR-1.8: Educate the region's local officials and citizens on distribution of, access to, uses of, and the extraction process of non-metallic mineral resources.

STRATEGY NR-1.8.1: Provide regional platforms/forums for continued discussion and education on non-metallic mining and mineral resources.

- ◆ *RECOMMENDATION NR-1.8.1.1: The Commission should collaborate with other entities to establish regular education/training forums that would focus on the following aspects of mineral resources:*
 - *Illustrate that mineral resources are, in fact, limited, and the over-reliance on existing sources needs to be addressed;*
 - *Awareness and uses of mineral registration;*
 - *Creation of more uniformity in planning based on scientific knowledge;*
 - *Addressing public's misconceptions about the mineral industry;*
 - *Training of mine operators on land use planning and public participation methods;*
 - *Creative ways to tie mineral resources and extraction to other opportunities*

(i.e. economic development, recreation, community plans);

- *Site reclamation information and issues.*

- ◆ *RECOMMENDATION NR-1.8.1.2: As a companion to the educational forums, the Commission should collaborate to develop a general framework and guidance document for local communities on geologic and mineral resource issues.*

STRATEGY NR-1.8.2: Decrease complaints related to existing operations by taking a proactive approach with neighboring residents and citizens.

- ◆ *RECOMMENDATION NR-1.8.2.1: Mining operators should host periodic 'open houses' (educational opportunities) that can make the site and its operator a part of the community and inform residents of the historical importance of the site or activity.*

STRATEGY NR-1.8.3: Develop improved access to resources for local units of government, citizens and mine operators.

- ◆ *RECOMMENDATION NR-1.8.3.1: The Commission should create a technical advisory committee, or list of diverse and informed individuals, that can be contacted to assist counties, communities, and operators within the region. This would be done by providing consistent and objective opinions and information on non-metallic mine siting and operational issues.*
- ◆ *RECOMMENDATION NR-1.8.3.2: Counties and RPC's should consider providing more support to producers on local zoning issues. The larger scale value of minerals to the community or county needs to be emphasized during the zoning review process.*

STRATEGY NR-1.8.4: Develop and disseminate new or updated information to communities and non-metallic mining interests on common, or new, land use related issues.

- ◆ *RECOMMENDATION NR-1.8.4.1: The Commission should assist in the development of a general education program that can be used by mine operators and communities to assist in dispelling myths about non-metallic mining activities.*
- ◆ *RECOMMENDATION NR-1.8.4.2: The Commission should assist in the development of a list of 'planning and information tools' as well as information sources for mining operators and communities.*
- ◆ *RECOMMENDATION NR-1.8.4.3: The Commission should seek to develop a study/methodology for assessing impacts to property values associated with non-metallic mining activities.*
- ◆ *RECOMMENDATION NR-1.8.4.4: Information and case studies on the impacts of blasting should be developed and shared with communities and operators. The Mine Safety and Health Administration (MSHA) and The Wisconsin Department of Commerce (WDCOM) should seek to create the tools to work with and inform the general public on blasting issues.*

Policy Links

The issues identified in the sub-element are related to other plan elements within the comprehensive planning effort. The elements underlined below represent these policy links.

Once local plans have clearly identified marketable mineral deposits within the region, access to transportation has to be preserved or

enhanced to aid in the removal of these materials.

Mining activities are an interim land use. Reclamation of existing/future mine sites should be integrated into community land use plans. Communities should encourage creative uses of the reclaimed sites (i.e. recreational geology, parks, stormwater management, lakes, etc.). Reclaimed sites can provide a stimulus for housing and other economic development or enhance the regions natural resources.

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Groundwater & Water Supply
PLAN GUIDELINE: NR-2
Year 2030 Regional Comprehensive Plan

Key Facts

Groundwater represents one of the most abundant and treasured resources within Wisconsin as it used not only for domestic consumption, but also to serve the needs of industry and agriculture, as well as tourism associated primarily with recreational fishing activities. The region is comprised of a system of five distinct groundwater aquifers which and are recharged through surface runoff or the movement of groundwater between aquifers. The numerous bedrock layers and compositions cause many variations in both the vertical and horizontal flow of this groundwater throughout the region.

According to a recent report by the U.S. Geological Survey (USGS), Wisconsin has approximately two quadrillion (2×10^{15}) gallons, or about one-third the volume of Lake Superior, stored as groundwater. Groundwater use in Wisconsin has increased steadily overall for most use categories since 1950. Irrigation water use more than doubled between 1980 and 2000 as irrigated acreage increased. In general, groundwater use has increased within the region as urban areas continue to grow and require significant quantities of water for residential, commercial, and industrial users. The use of groundwater within the region has reached an upper end estimate of more than 170 million gallons per day (this figure soars to 253 million gallons per day if surface water sources - such as Lake Winnebago - are taken into consideration for municipal water supplies). In 1990, the Fox Cities was estimated to withdraw approximately 5.6 million gallons per day.

In general, the quality of the groundwater used for domestic purposes is relatively good throughout the region, although specific

locations may have localized problems due to the geologic or aquifer characteristics. Some areas within the region are subject to certain types of natural and artificial contaminants such as arsenic, radon, total dissolved solids, nitrates, and bacteria. Many of these problems are of a highly serious nature.

For example, the WDNR has recently identified portions of the central part of the region in Winnebago, Outagamie, and Shawano Counties as an "Arsenic Advisory Area" and special casing regulations exist which call for stronger, deeper wells with extra steel casing that can reach as deep as 260 feet where necessary. Ingested arsenic is a known cause of cancer, including cancer of the skin, lungs, bladder and kidneys. It was recently determined that about 18 percent of all private wells in Outagamie and Winnebago County exceed the Federal EPA's 10 parts per billion limit which applies to all municipal water supplies!

Many of the region's areas are considered to be highly susceptible to aquifer contamination based on conditions such as sandy soils, thin soils or fractured bedrock.

So What!

Groundwater availability and quality are essential to the health, welfare and quality of life of region's residents. Local, state and federal standards exist for different aspects of groundwater and the development review process can insure compliance with these standards. However, unforeseen problems with contamination, whether from direct industrial sources or from polluted surface runoff, has the potential to impact the region's precious groundwater supplies. Because of their relationship to public health and safety,

drinking water sources should be provided the highest achievable levels of sustainability and environmental protection.

Groundwater resources can be significantly altered or damaged by human influence on the land. Over the years, more and more research has shown that land use activities affect groundwater quality and quantity. Some impacts occur in a relatively short period of time, while others may take years or decades to show up. These impacts fall under three general categories: quality, quantity, and surface/groundwater interactions:

- **Quantity** - While the amount of available water is not of concern immediately, the future supply is being diminished rapidly due to continued urbanization. A report produced in 1998 by the U.S. Geological Survey estimated that the deep sandstone aquifer system which serves the Fox Cities is being lowered by two feet per year, mostly as a result of increased pumpage by municipalities and industry, but also as an effect of interfering cones of depression from high capacity wells. The main recharge areas for this aquifer system lie in the western portion of the region, and in some cases, outside of the region; thereby stressing the importance of future regional development patterns and intergovernmental cooperation. Municipal and private well placement, density, and pumping rates contribute to these drawdown levels as well as to groundwater quality problems. These concerns may be temporarily averted in the short-term as the connection of the Green Bay metropolitan area to a Lake Michigan water source in 2007 has already had positive impacts on aquifer levels as they have already rebounded approximately 70 to 100 feet near Allouez and DePere.

- **Quality** - Groundwater quality and susceptibility to contamination is of concern in numerous parts of the region due to the presence of highly fractured bedrock deposits and karst topography. Arsenic, nitrate, and bacteria contamination negatively affect the health of individuals and therefore, may also have long term impacts on both the economy and quality of life associated with the region.
- **Surface/Groundwater Interaction** - The addition of impervious surfaces as a result of development and urbanization can negatively affect groundwater recharge as well as stream-base flow and horizontal/vertical groundwater flow. With many streams being used for recreational fishing and other recreation activities, a portion of the region's economic future (tourism) may be at risk strictly due to our desire for accommodating development.

The East Central region has great extent and variety of groundwater problems and as such, its residents should be concerned about the future of this resource.

Current Action

The Regional Plan's focus is on quantity issues, as quality is typically a function of drawdowns, usage from a broad perspective and regional solutions will be necessary. Most quality problems a function of land use or site-specific contamination sources and many local and statewide programs are available to assist or educate. Most can be prevented locally, but some broad, regional level recommendations specifically regarding land use are contained as part of this plan.

Numerous activities are currently underway by the State and other entities to address groundwater issues. Of note is the State's creation of Wisconsin Act 310 which identifies

Groundwater Management Areas, or GMA's (the Fox Cities and Brown County is one!) and sets forth rule-making authorities. Rules are currently being discussed under the auspices of the WDNR and are being developed by an appointed Groundwater Advisory Committee (GAC). More locally, several water protection conservation initiatives have been initiated by communities (such as the Village of Kimberly) and continued collaboration has spawned one regional effort, the Fox Communities Groundwater Partnership, which is co-lead by the Wisconsin Rural Water Association (WRWA) and the Commission. At a much broader level, even federal level activities, such as the Great Lakes Compact is important to groundwater as this bi-national agreement has a water conservation component (*See Chapter 7, Plan Guideline CF-3: Public & Private Water Supply for more information and details on recommendations pertaining to water conservation*).

Year 2030 Vision for Groundwater

As drafted by the Groundwater & Water Supply Technical Advisory Committee, the following vision statement for groundwater was established.

The groundwater resources of the East Central region are managed, planned for, preserved, protected and/or enhanced to meet the current and future needs of its citizens and the environment.

Goals, Strategies and Recommendations

The goals, strategies and recommendations developed for this plan sub-element are intended to encourage proactive measures for the consideration and protection of the region's groundwater resources.

GOAL NR-2.1: To preserve and protect the quantity and quality of the region's groundwater supply through the use of sustainable planning, preservation, and development concepts and management techniques.

STRATEGY NR-2.1.1: Encourage the continued development and improvement of local smart growth Comprehensive Plans to address groundwater issues.

- ◆ *RECOMMENDATION NR-2.1.1.1: Communities should continue to review, study, and address local groundwater issues in a regional context. Good information on how to incorporate groundwater into local plans can be found at <http://www.wi.water.usgs.gov/gwcomp/>.*

STRATEGY NR-2.1.2: Preserve unique geologic and natural features, such as the Niagara Escarpment, wetland areas, surface waters that are potentially impacted by groundwater use (recharge & discharge).

- ◆ *RECOMMENDATION NR-2.1.2.1: Areas which contribute to, or are affected by, groundwater recharge/discharge should be better identified and incorporated into regional and local land protection strategies.*
- ◆ *RECOMMENDATION NR-2.1.2.2: Wetlands should be better protected and preserved as an essential component of the hydrologic system (groundwater recharge and discharge).*

STRATEGY NR-2.1.3: Develop improved methods to alleviate the regional impacts of growth and development on aquifer systems.

- ◆ *RECOMMENDATION NR-2.1.3.1: The Commission should facilitate the development of updated regional, and sub-regional groundwater demand and supply*

information for both the shallow and deep aquifer systems of the region (Note, this requires an up to date groundwater flow model. **See Recommendation NR-2.6.1.7**).

- ◆ **RECOMMENDATION NR-2.1.3.2:** Areas with known groundwater quality/quantity problems should limit or re-direct growth as necessary so as not to exacerbate local or regional groundwater issues and reduce the number of people affected by water quality problems.
- ◆ **RECOMMENDATION NR-2.1.3.3:** The Commission should work with State agencies and educators to develop and utilize better methods to assess local growth and development plans as well as the impacts of densities of development on groundwater resources.

STRATEGY NR-2.1.4: Incorporate 'true costs' (i.e. potential for groundwater contamination and clean-up) into economic development projects and the evaluation process.

- ◆ **RECOMMENDATION NR-2.1.4.1:** The Commission should develop and share better methods to look at short and long-term impacts and cost of groundwater needs/public improvements as related to land use and economic development.

STRATEGY NR-2.1.5: Create more sustainability of the groundwater resource by improving methods of, and participation in, groundwater conservation activities (Note: See Chapter 7, Plan Guideline CF-3 regarding Public & Private Water Supply issues for specific recommendations regarding water conservation).

GOAL NR-2.2: Support existing state, regional and local level groundwater programs and regulations so as to improve protection of groundwater resources in a consistent manner.

STRATEGY NR-2.2.1: Examine and consider the development and use of stronger local regulations with respect to groundwater/private wells within the region's karst prone areas (Calumet and Fond du Lac [for the Niagara Escarpment area] as well as southern Outagamie and eastern Winnebago Counties).

- ◆ **RECOMMENDATION NR-2.2.1.1:** The Commission should facilitate additional discussion between these counties and State Legislators and state agency staff.

STRATEGY NR-2.2.2: Preserve local planning, control, input mechanisms and authorities to deal with groundwater issues in a consistent method across the region.

STRATEGY NR-2.2.3: Encourage separation of regulations on which groundwater issues can/should be dealt with locally versus needing to be addressed regionally (i.e. eliminate local control issues).

STRATEGY NR-2.2.4: Promote the development of new programs and regulations which reduce the risk of groundwater contamination. (**See Chapter 7, Plan Guideline CF-3: Public Water Supply**).

- ◆ **RECOMMENDATION NR-2.2.4.1:** The state or local units of government should require the assessment and mitigation of any negative impacts on groundwater flow systems (discharge and flow directions, impacts on wetlands, etc.) by existing and future high capacity wells.
- ◆ **RECOMMENDATION NR-2.2.4.2:** The Commission should support the development and operation of local, county-wide and regional 'clean sweep' programs to prevent contamination of groundwater sources.
- ◆ **RECOMMENDATION NR-2.2.4.3:** Consider the adoption of statewide or local (outright) bans on certain substances that

can easily contaminate groundwater (i.e. MTBE).

- ◆ *RECOMMENDATION NR-2.2.4.4: The State should improve upon the concepts of the PECFA program by creating new laws which deal better with multiple site problems.*
- ◆ *RECOMMENDATION NR-2.2.4.5: The Commission should foster the development of a 'required' regional testing and monitoring program which is cost-shared by communities for arsenic and other contaminants within known areas of concern.*

STRATEGY NR-2.2.5: Develop rules/guidelines based on 'economic forces' versus strict regulations to get better buy-in from development and realty community.

GOAL NR-2.3: To identify, protect and integrate aquifer recharge areas into the development patterns of the region.

STRATEGY NR-2.3.1: Better identify groundwater recharge and discharge areas within the region.

- ◆ *RECOMMENDATION NR-2.3.1.1: The Commission should facilitate the development of a regional hydraulic conductivity map so as to better identify local and regional aquifer recharge areas.*
- ◆ *RECOMMENDATION NR-2.3.1.2: The Commission should assist communities in the improved incorporation of groundwater recharge areas into local development and conservation plans.*
- ◆ *RECOMMENDATION NR-2.3.1.3: Continue to support ongoing research in the central part of the region by the WGNHS on 'fine-grained lake sediments as an aquitard' so as*

to better understand this area's recharge capabilities and development limitations.

- ◆ *RECOMMENDATION NR-2.3.1.4: Communities should utilize urban and rural stormwater controls which, to the extent possible, as groundwater recharge mechanisms as allowed by State requirements.*
- ◆ *RECOMMENDATION NR-2.3.1.5: The Commission should evaluate and facilitate the development of a regional purchase of development rights (PDR) or transfer of development rights (TDR) program which is used to protect land with significant groundwater recharge potential.*

GOAL NR-2.4: To support existing and foster new efforts to improve multi-jurisdictional planning, assessment, and management projects for the region's aquifers.

STRATEGY NR-2.4.1: Actively participate and provide input in the development of any programs which result from Wisconsin Act 310 and the State's Groundwater Advisory Committee (GAC).

- ◆ *RECOMMENDATION: NR-2.4.1.1: The Commission, in conjunction with the Bay-Lake Regional Planning Commission, should facilitate cooperation and collaboration for the implementation of the future GMA rules/requirements.*

STRATEGY NR-2.4.2: Encourage the cooperation and collaboration of communities in the development of local and regional groundwater conservation programs and agreements (*See Chapter 7, Plan Guideline CF-3: Public & Private Water Supply*).

STRATEGY NR-2.4.3: Appropriately plan land uses and densities (within a given sub-region) to

improve the overall management and oversight of groundwater resources.

- ◆ *RECOMMENDATION NR-2.4.3.1: The Commission should continue to work with state agencies and local officials on the development of density standards for both urban and rural communities with respect to the availability of, and impact upon, groundwater resources.*

GOAL NR-2.5: To support the development and use of existing and new programs to educate landowners and decision-makers within the region on groundwater issues and solutions.

STRATEGY NR-2.5.1: Change public perceptions on the significance and extent of Fox Valley groundwater problems and the impacts of development on these aquifers.

- ◆ *RECOMMENDATION NR-2.5.1.1: The Commission should work with local units of government to develop a proactive program which notifies existing and future landowners or developers on localized groundwater issues (possibly through the subdivision platting / building permit process).*
- ◆ *RECOMMENDATION NR-2.5.1.2: The Commission should continue its active participation on the Fox Communities Groundwater Protection Partnership (FCGEPP).*

STRATEGY NR-2.5.2: Provide more education and increased communication efforts geared toward local officials and citizens on groundwater issues that encourage action.

- ◆ *RECOMMENDATION NR-2.5.2.1: The Commission should facilitate development of additional 'comparison' studies to evaluate and illustrate current conditions, threats and trends in groundwater issues.*

- ◆ *RECOMMENDATION NR-2.5.2.2: The Commission should encourage and develop information that will assist people in visualizing and predicting the impacts of private, high capacity wells on local and regional aquifer systems.*

- ◆ *RECOMMENDATION NR-2.5.2.3: The Commission should encourage and develop information that will assist people in having a better sense of private well and on-site waste systems (contamination and infiltration) on local aquifer systems.*

STRATEGY NR-2.5.3: Support the development of a regional management system for municipal/private high-capacity wells within the Fox Cities urbanized area in order to optimize the pumping times/rates which, in turn, could reduce aquifer drawdown and maintain well yields.

- ◆ *RECOMMENDATION NR-2.5.3.1: The Commission should continue to work with the Fox Cities Chamber of Commerce and its affected communities to co-lead an effort, involving continued education, which revisits the need for a regional high-capacity well management system.*

STRATEGY NR-2.5.4: Develop and implement a coordinated media campaign to better inform citizens and officials on regional and local groundwater issues.

- ◆ *RECOMMENDATION NR-2.5.4.1: The Commission should encourage water utilities to collaborate with the WDNR so as to better utilize the required Consumer Confidence Report (CCR) as a method for distributing consistent information about regional/local groundwater issues.*

GOAL NR-2.6: To assist in the coordinated development and distribution of new data, GIS mapping, and other information pertaining to the region's groundwater resources.

STRATEGY NR-2.6.1: Create more additional data and information which will improve knowledge of, and solutions to, current groundwater issues (*Also see Strategy NR-2.3.1*).

- ◆ *RECOMMENDATION NR-2.6.1.1: All contamination data (i.e. nitrates) should be put into a statewide GIS system to establish better correlations with soil properties and land use.*
- ◆ *RECOMMENDATION NR-2.6.1.2: The Commission should seek to map all of the region's public and private high capacity well locations.*
- ◆ *RECOMMENDATION NR-2.6.1.3: The Commission should facilitate the update of a regional contamination (existing and susceptibility) map based on new geologic and other scientific data.*
- ◆ *RECOMMENDATION NR-2.6.1.4: The Commission should seek and facilitate improvements in 'groundwatershed' mapping at a regional level (i.e. flow direction and divides).*
- ◆ *RECOMMENDATION NR-2.6.1.5: The Commission should support and/or cost-share in the development of a new potentiometric surface map of the St. Peter's Sandstone Aquifer for use in planning.*
- ◆ *RECOMMENDATION NR-2.6.1.6: The Commission should support and/or cost-share in the development of a new depth to bedrock map for Outagamie and Winnebago Counties.*
- ◆ *RECOMMENDATION NR-2.6.1.7: The Commission should support and/or cost-share in the development of a new/updated regional groundwater study and flow model*

for areas surrounding, and west of the Fox Cities and Oshkosh.

- ◆ *RECOMMENDATION NR-2.6.1.8: The Commission should evaluate and educate on the potential effects of more pumping on deeper sandstone aquifer as it relates to quality and quantity (arsenic) problems in upper sandstone aquifer (St. Peter) as arsenic could be pulled down to this deeper aquifer.*
- ◆ *RECOMMENDATION NR-2.6.1.9: The Commission should work with appropriate entities to develop a regional/sub-regional groundwater budget to be used as a tool for education and analysis of groundwater issues.*

Policy Links

The issues identified in this sub-element are related to other plan elements within the comprehensive planning effort. The elements underlined below represent these policy links.

Groundwater resources are heavily impacted by housing development and other land use activities such as agriculture and transportation. The impacts of municipal drinking water demands on groundwater resources are issues that need to be addressed in a regional manner through the coordinated planning for community facilities. The available groundwater resources serve as a foundation for the ability of our region to maintain and improve local and regional economic development. The future conservation of open space areas for groundwater protection is critical to the management of this resource.

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WATER QUALITY, FLOODING & WATERSHED MANAGEMENT
PLAN GUIDELINE: NR-3
Year 2030 Regional Comprehensive Plan

Key Facts

Watershed management is defined as an ongoing process of integrated decision-making regarding uses and modifications of lands and waters within a geographic drainage area so as to balance diverse goals and uses for environmental resources, and to consider how their cumulative actions may affect long-term sustainability of these resources. Stormwater management is often a sub-component of any watershed-based plan that is typically carried out by individual governmental entities. Stormwater management is typically defined as addressing functions associated with planning, designing, constructing, maintaining, financing, and regulating the facilities (both constructed and natural) that collect, store, control, and/or convey storm water. Stormwater management deals with both water quantity and water quality issues.

Within the region, numerous areas are subjected to seasonal flooding. Many of these areas are located within urban environments and, to some degree, are caused by the displacement of water due to development. Examples of flooding resulting from development have been apparent in the Fox Cities over the years. Stream flows through ravines in the Village of Combined Locks, for example, have been exacerbated by the 'upstream' development that occurred in the Darboy area. Flooding problems also occur in smaller, rural communities, particularly the older developed portions as floodplain zoning practices may not have been adhered to.

Surface water quality problems also exist within the region, but vary drastically. Many of the smaller 'headwater' streams in the northern and western portions of the region have good to excellent water quality, while the main river and lake systems (Fox River, Wolf River & Winnebago Pool Lakes) have serious water quality problems related to sediment and nutrient loadings. These problems are often referred to as 'non-point source pollution' which stem from contaminated runoff generated by agricultural lands and urban areas. These loadings can have significant impacts on stream and lake systems.

The health of the region's sixty watersheds have been measured and monitored to varying degrees over the years and the most prominent impairments are related to elevated levels of phosphorus, sediments and toxins. For example, it is estimated that sediment loadings to Green Bay from the Fox-Wolf Basin are in excess of 165,000 tons per year, or more than 27 dump trucks per day (UW-Sea Grant, 2003)! Another example is that 55% of the phosphorus load (a common nutrient responsible for algae blooms) at the mouth of the Lower Fox River originates above the Menasha Dam, in the 'upstream' sub-basins of the Upper Fox and Wolf Rivers (UW-Sea Grant, 2004).

Of additional note, the topography of the region is such that nearly all surface waters eventually drain into Lake Michigan via Green Bay, with the exception of southwestern Fond du Lac County and northwestern Waushara County, which flow to the Wisconsin/Mississippi River system. The Fox-Wolf River Basin is, in fact, the largest

tributary to Lake Michigan and 3rd largest to Great Lakes. Unfortunately, it is also the largest source of total pollutants to Green Bay and Lake Michigan.

So What!

The water quality of the region's streams and lakes are directly linked to the economy and quality of life. Without clean water, recreation and fishing opportunities would be limited for both residents and visitors. In some cases, when surface waters are used as a public drinking water source, the concerns magnify even more.

In the future, as development and the associated impervious (non-absorbent) surface areas increase, cumulative negative effects on water quality will occur and can influence natural system functions drastically. According to studies by the Center for Watershed Protection, as little as 10% impervious cover (streets, roofs, parking lots, etc.) within a watershed can negatively impact fish habitat, while 25% cover overloads the natural functions of the watershed and can permanently degrade stream quality. If stormwater is not managed properly, the streams and lakes will become choked with algae due to excessive nutrient inputs, or they will resemble 'chocolate milk' due to sedimentation problems. Fisheries and habitats will also become unproductive. This in turn will affect a significant sector of the tourism economy within the region.

Watershed planning and stormwater management is an expensive, but necessary, activity that addresses problems created by nearly every person and entity within the region. The future of water quality within the region is dependent on solutions at every level, from the individual to the federal government. Communities of the region must also remember that a majority of their water

drains to Lake Michigan and, therefore; they must be particularly conscious of the fact that they are part of a larger scale system and larger-scale water quality problems.

Current Action

Stormwater management, watershed planning, and surface water quality/quantity issues have recently gained more attention as an environmental concern. As such, numerous actions are being taken by all levels of government to address problems.

At the federal level, efforts continue to be made in re-authorizing the Great Lakes Compact, a joint agreement between the U.S. and Canada which addresses numerous management issues associated with Lake Michigan and the Great Lakes System. This includes consideration of potential future water withdrawals and diversions from the system by communities and areas outside of the basin.

An EPA sponsored effort to assist in implementing the broader Great Lakes Water Quality Agreement (compact) is the Lake Michigan Lakewide Management Plan (LaMP). The LaMP provides a status report on the health of the Lake Michigan ecosystem and a summary of related activities based upon the vision, goal and subgoals of the LaMP. The LaMP's vision is *"a sustainable Lake Michigan ecosystem that ensures environmental integrity and that supports and is supported by economically viable, healthy human communities"*.

The above note activities also provide a foundation for the development and promotion of sub-regional collaborative efforts such as the Lake Michigan Stakeholder Forum; The Lake Michigan Monitoring Coordinating Council; and the Lake Michigan Watershed Academy (the last of

which focuses on the improvement of land use plans to assist in achieving lake-wide water quality objectives).

Also at the Federal level, EPA's Phase I & Phase II Stormwater regulations were developed and are being currently implemented to varying degrees by the WDNR through Wisconsin Administrative Codes NR 216, NR 151, and Trans401. As part of the state-level permitting process, municipalities primarily associated with the Fond du Lac, Oshkosh, and Fox Cities urbanized areas are required to have programs in place to meet the following municipal permit requirements: (1) Public Educational Outreach; (2) Public Participation And Involvement; (3) Illicit Discharge Detection & Elimination; (4) Construction-site Runoff Control; (5) Postconstruction Runoff Controls; and (6) Pollution Prevention & Good Housekeeping.

At the state level, WDNR Basin Plans and 'Partnership' Teams exist for each basin (Upper Fox, Lower Fox, and Wolf River) and information regarding inventories, assessments, and rankings, of individual watersheds for both surface and groundwater quality and impairments were generated as part of these efforts. The State also continues to fund Priority Watershed Projects, however; the program is scheduled to sunset in 2009. A new effort by the WDNR also exists to renew and implement the concept of Total Maximum Daily Loads (TMDL's). The TMDL process effectively reduces both point and non-point source pollution by establishing pollutant limits for the waterway(s) and allocating pollutant loadings to certain broad or specific land use activities.

A number of regional efforts have also been made to control and manage stormwater runoff resulting from urbanization. Two such

examples include the Garner's Creek Stormwater Utility - a watershed based utility - and the Northeastern Wisconsin Stormwater Consortium (NEWSWC) which is leading efforts on consistent information and education for citizens and officials.

At the local level, many county and local level ordinances have been developed which begin to address both urban and rural stormwater issues. While individual communities have done much already along the path of stormwater management, many have done so only within the defined area of their own municipality. While several multi-jurisdictional watershed plans have been created in recent years, much more needs to be done in terms of linking the region's land use and development decisions with water quality at the watershed level. Collaborative, multi-jurisdictional efforts will be needed in the future if the expectation is to have, and implement, a true 'watershed plan'.

Year 2030 Vision for Water Quality

As drafted by the Watershed and Wastewater Technical Advisory Committee, the following vision statement for surface waters was established:

In the east central region surface water resources are planned for in a comprehensive, watershed-based manner that embraces and encourages the use of 'green infrastructure' concepts. This has been achieved by improving intergovernmental cooperation, creating more uniform and cost-effective programs for water resource management, which include the proactive protection of natural features that not only contribute to water quality, but also to the long-term sustainability and

economic benefit of the region. This occurs through a comprehensive and targeted educational strategy that emphasizes 1) local responsibility and investment; 2) the need to look at the whole picture and not just special or individual interests when making decisions related to water quality, and; 3) the need for improved and maintained monitoring programs in order to gauge water quality changes over time.

Goals, Strategies and Recommendations

The goals, strategies and recommendations developed for this plan sub-element are intended to encourage proactive measures for the planning and improvement of water quality related issues within the region.

GOAL NR-3.1: Maintain and enhance surface water quality within the region's streams, rivers, and lakes.

STRATEGY NR-3.1.1: Support the continued development, and future adoption and implementation, of the Great Lakes Compact as this is an important framework for States to ensure that water diversions from the basin, among other issues, are adequately addressed.

- ◆ *RECOMMENDATION NR-3.1.1.1: The Commission should actively review, comment and offer support to the State and Federal government on the Great Lakes Compact.*
- ◆ *RECOMMENDATION NR-3.1.1.2: The Commission should actively participate in the implementation and future updates of the Lake Michigan Lake Management Plan (LaMP).*

- ◆ *RECOMMENDATION NR-3.1.1.3: The Commission should actively participate in the Lake Michigan Stakeholder's Forum as an avenue to seek changes which benefit the region's water quality.*

- ◆ *RECOMMENDATION NR-3.1.1.4: The Commission should actively participate in the Lake Michigan Academy, sponsored by EPA as a method to learn, and foster education about Lake Michigan (and regional) water quality issues.*

STRATEGY NR-3.1.2: Actively seek and promote the development of a quantifiable goal and timeframe for the 'de-listing' of regional waterways from the State's 303d Impaired Waters list. (Note: the State's Priority Watershed Program sunsets in 2009).

- ◆ *RECOMMENDATION: NR-3.1.2.1: The region's Communities should consider meaningful land use practice changes which would assist in the region in meeting the State's goal of reducing phosphorus by 40 percent (.12 mg/l) and Total Suspended Solids (TSS) by 60% (to 16 mg/l) in the Fox River.*

STRATEGY NR-3.1.3: Take advantage of existing opportunities, as well as create additional opportunities, to establish and maintain 'nutrient trading' programs.

- ◆ *RECOMMENDATION NR-3.1.3.1: The Commission should support the development of a pollutant trading program within the Fox/Wolf River system as a method to improve water quality. This is statutorily allowed within the Lower Fox River, but would need to be expanded to include the Upper Fox River and Wolf River basins.*
- ◆ *RECOMMENDATION NR-3.1.3.2: The Commission should support and actively*

participate in the continued development of an equitable Total Maximum Daily Load (TMDL) approach to solving the region's water quality issues. See Appendix G for more information on this concept/approach.

- ◆ *RECOMMENDATION NR-3.1.3.3: The Commission should support the development of legislation which allows for the creation of a Total Maximum Daily Load (TMDL) provision for the Upper Fox and Wolf River Basins, consistent with the Lower Fox River.*

STRATEGY NR-3.1.4: To promote the development of non-traditional forms of regulation which assist in maintaining or improving the region's water quality.

- ◆ *RECOMMENDATION NR-3.1.4.1: The Commission should assist communities in the assessment and development of 'watershed-based zoning' by providing technical support in the following areas:*

- *Conducting stream inventories;*
- *Measurement of existing impervious cover;*
- *Verification of impervious cover/stream quality relationships;*
- *Projection of future levels of impervious cover;*
- *Classification of subwatersheds;*
- *Adoption of specific watershed protection goals and strategies;*
- *Incorporation of watershed management priorities from larger watershed units/plans;*
- *Modification of comprehensive plans/zoning to correspond;*
- *Implementation of long-term monitoring provisions.*

- ◆ *RECOMMENDATION NR-3.1.4.2: Communities should consider adopting performance standards or guidelines for*

new development which will ensure the minimization of individual and cumulative impacts of development on water quality in the following specific areas:

- *Maintain adequate oxygen to support fish and aquatic life;*
 - *Increase water clarity to provide for safe swimming;*
 - *Increase water clarity to increase rooted aquatic vegetation;*
 - *Reduce algae to improve water clarity and reduce nuisance conditions;*
 - *Reduce total phosphorus concentrations and loads to reduce algae;*
 - *Reduce suspended solids loads to reduce sedimentation, increase water clarity and improve aquatic habitat;*
 - *Reduce bacteria levels to meet state standards for swimming and recreational use;*
 - *Maintain lacustrine, palustrine and riverine wetlands;*
 - *Increase submergent vegetation.*
 - *Protect shorebird habitat;*
 - *Protect other important habitat for fish, aquatic life, wildlife, and endangered species;*
 - *Achieve desired fish populations per WDNR standards.*
- ◆ *RECOMMENDATION NR-3.1.4.3: Counties and communities within the region should consider the development and adoption of an ordinance which would prohibit the use of fertilizers containing phosphorus in order to improve surface water quality.*
 - ◆ *RECOMMENDATION NR-3.1.4.4: The Commission shall work with the WDNR and the Region's Counties ensuring that private on-site sewer systems located along the Region's shorelines are functioning as designed.*

GOAL NR-3.2: Preserve and protect the region's natural resources, and their related programs, which directly, or indirectly relate to the protection and enhancement of surface water quality.

STRATEGY NR-3.2.1: An emphasis should be placed on water quality and resource protection activities on the Fox River/Winnebago Pool Lakes and the Shawano Lake/Wolf River systems.

- ◆ *RECOMMENDATION NR-3.2.1.1: All Communities along this corridor should develop comprehensive local programs and policies which protect wetlands, particularly those within 1,000 feet of shoreland areas.*
- ◆ *RECOMMENDATION NR-3.2.1.2: Local units of government should keep, or improve upon, the existing 20-foot vegetated buffer requirements for agricultural drainage-ways.*
- ◆ *RECOMMENDATION NR-3.2.1.3: Local units of government should preserve and protect natural buffers (i.e. native vegetation, topography, etc.) along the Region's floodways and floodplains.*
- ◆ *RECOMMENDATION NR-3.2.1.4: The Commission should continue to work with the Region's Counties to ensure that floodplain ordinances are up to date meet WDNR standards.*

STRATEGY NR-3.2.2: Preserve, maintain, and support existing government and non-profit watershed-based planning groups and activities within the region.

- ◆ *RECOMMENDATION NR-3.2.2.1: The Commission should actively participate in the following groups and organizations regarding water quality:*

- *WDNR Basin Partnerships (Upper Fox, Lower Fox, Wolf River);*
- *Green Bay Remedial Action Plan;*
- *Priority Watershed Programs (scheduled to sunset in 2009);*
- *County Land & Water Conservation Departments;*
- *Fox Wolf Waters Association (FWWA);*
- *Winnebago Lakes Association;*
- *Northeast Wisconsin Stormwater Consortium (NEWSC).*

- ◆ *RECOMMENDATION NR-3.2.2.2: The Commission should seek to actively participate in the efforts of the aforementioned groups so as to assist in the coordination of activities and the implementation of objectives contain in this plan.*
- ◆ *RECOMMENDATION NR-3.2.2.3: The Commission should continue to participate in the EPA's Lake Michigan Academy training program (administered by Chicago Metropolitan Area Planning) as a method to explore/exchange land use policy ideas as they pertain to water quality and the health of the Great Lakes System.*

STRATEGY NR-3.2.3: To recognize importance of surface waters as major source of drinking water by the Region's urbanized areas.

- ◆ *RECOMMENDATION NR-3.2.3.1: The Commission should continue to work with the WDNR and local organizations to ensure that local and state programs work to preserve, protect, and enhance the water quality of the Lake Winnebago Pool.*
- ◆ *RECOMMENDATION NR-3.2.3.2: State and local policies should be developed to*

better address groundwater withdrawals and their impacts on surface water base flows.

GOAL NR-3.3: Invest in, and promote water quality management activities that are cost-effective and obtain significant, short-term and long-term improvements.

STRATEGY NR-3.3.1: Modify development patterns and types in the region to minimize impacts to surface water resources.

- ◆ *RECOMMENDATION NR-3.3.1.1: The Commission should encourage rural, developing, Towns to form stormwater utility districts and fee structures which address the large amounts of scattered development.*
- ◆ *RECOMMENDATION NR-3.3.1.2: The Commission should continue to promote and assist the use of cluster/conservation subdivisions in rural areas to reduce water quality impacts.*
- ◆ *RECOMMENDATION NR-3.3.1.3: Locally prepared comprehensive plans should identify and incorporate more specific 'greenway' and open space corridors which are needed to support water quality.*
- ◆ *RECOMMENDATION NR-3.3.1.4: Funding for the development of local 'greenways' should be considered on a regional basis.*

GOAL NR-3.4: Achieve better integration of watershed planning concepts and existing watershed-based plans into local/county smart growth comprehensive plans.

STRATEGY NR-3.4.1: Promoting and develop a regional, watershed-based approach to land use planning by the region's communities.

- ◆ *RECOMMENDATION NR-3.4.1.1: The Commission should work with Counties and*

communities as necessary to assist in the development of improved 'watershed-based' planning components into their respective 'smart-growth' plans and implementation mechanisms. As promoted by the Center for Watershed Protection (Maryland), the following eight tools should be considered and incorporated:

1. *Watershed Planning;*
2. *Land Conservation;*
3. *Aquatic Buffers;*
4. *Better Site Design;*
5. *Erosion & Sediment Control;*
6. *Stormwater BMPs;*
7. *Non-Stormwater Discharges;*
8. *Watershed Stewardship Programs.*

- ◆ *RECOMMENDATION NR-3.4.1.2: Communities that have not yet initiated, or will be updating, their comprehensive plans should evaluate the results of locally prepared Phase II Stormwater Management Plans and analyses to determine the most appropriate areas for development based on stormwater management infrastructure needs.*

STRATEGY NR-3.4.2: Counties and communities should develop comprehensive plans which adequately assess and mitigate their non-point source pollutant contributions to the Fox-Wolf Basin.

- ◆ *RECOMMENDATION NR-3.4.2.1: Local plans should quantify the runoff and pollutant loading impacts of proposed land plan scenarios to aid in evaluating stormwater infrastructure requirements and development alternatives. Computer models such as L-THIA are easy to use and available on-line for free (www.lgean.org).*
- ◆ *RECOMMENDATION NR-3.4.2.2: The Commission should conduct future*

inventory and mapping analyses within the region to better identify which subwatersheds are capable of absorbing future impervious cover.

- ◆ *RECOMMENDATION NR-3.4.2.3: Local plans and ordinances should allow for alternative, low-impact, development techniques to reduce runoff amounts and pollutant loadings.*

GOAL NR-3.5: To promote consistency amongst communities' and counties' stormwater management regulations and programs.

STRATEGY NR-3.5.1: Create multi-jurisdictional efforts to address stormwater planning and implementation.

- ◆ *RECOMMENDATION NR-3.5.1.1: The Commission should support the development of additional entities similar to NEWSC throughout the region.*
- ◆ *RECOMMENDATION NR-3.5.1.2: The Commission should support the development of mid-level (i.e. regional) lakes and/or rivers associations which can provide coordination, prioritization and funding. This may be achieved, in some cases, by the consolidation of local, smaller entities which may have limited capacity.*

GOAL NR-3.6: To improve inter-governmental coordination to reduce stormwater impacts and management costs.

STRATEGY NR-3.6.1: Improve communication within watersheds that cross multiple jurisdictions on all aspects of stormwater management.

- ◆ *RECOMMENDATION NR-3.6.1.1: The State and communities should simplify the process and reduce the number of*

entities involved in the review of stormwater/watershed management permits/projects.

- ◆ *RECOMMENDATION NR-3.6.1.2: More local responsibility and investment needs to be taken for stormwater management reviews due to DNR budget/staffing cuts.*

STRATEGY NR-3.6.2: Reduce parochialism amongst entities regulating stormwater and better illustrate that they are all working towards the same goals.

- ◆ *RECOMMENDATION NR-3.6.2.1: Communities within specific watersheds should meet and collaborate to achieve consistency in development plans and regulations so as to ensure implementation of any adopted water quality/quantity issues and targets.*
- ◆ *RECOMMENDATION NR-3.6.2.2: The Commission should seek the assistance of the State in providing closer scrutiny on transportation projects and their primary/secondary impacts on the watershed as a whole.*

GOAL NR-3.7: To improve education efforts on stormwater and water quality planning issue for communities and landowners.

STRATEGY NR-3.7.1: Reduce the level of disconnect amongst individuals in seeing the difference between 'public good' and 'private interest' (at all levels).

- ◆ *RECOMMENDATION NR-3.7.1.1: Communities should improve education efforts to landowners on stormwater management maintenance requirements and legal authorities of entities to conduct such maintenance.*

- ◆ *RECOMMENDATION NR-3.7.1.2: Change public perceptions and attitudes regarding 'one person/property does not affect water quality' (some confusion exists on impacts of point vs. non-point source contributions).*
- ◆ *RECOMMENDATION NR-3.7.1.3: Educational programs on stormwater impacts/management and water 're-use' and conservation methods.*
- ◆ *RECOMMENDATION NR-3.7.1.4: By developing more, better, information on the economic (tourism) impacts and benefits of natural resources and good water quality throughout the region.*
- ◆ *RECOMMENDATION NR-3.7.1.5: Improve relationships amongst government entities and landowners regarding stormwater issues & watershed-based planning. (See Recommendation NR-3.1.1.4 - Note: a project will be developed for consideration in the summer of 2008 with a funding level of approximately \$15,000).*
- ◆ *RECOMMENDATION NR-3.7.1.6: The Commission should develop a regional map of urbanized areas which illustrates both on-the-ground and proposed stormwater management controls (i.e. detention basins, etc.) to facilitate discussions amongst communities and to look for opportunities to reduce duplication and improve cost-effectiveness.*

GOAL NR-3.8: Increase water quality monitoring for streams that are, and are not, impacted by wastewater discharges.

STRATEGY NR-3.8.1: Support the development and maintenance of an improved, basin-level water quality monitoring program.

- ◆ *RECOMMENDATION NR-3.8.1.1: Improve coordination of water information*

within the region and identify key research and monitoring needs.

- ◆ *RECOMMENDATION NR-3.8.1.2: Communities and the State should show a commitment to water quality monitoring by developing cost-effective, well-organized systems for collecting and analyzing water monitoring data.*
- ◆ *RECOMMENDATION NR-3.8.1.3: An interactive, web-based repository of water data should be developed to facilitate gathering and analyzing of water information in a collaborative manner.*

STRATEGY NR-3.8.2: Encourage the expansion of water quality monitoring by both public and private entities throughout the region.

- ◆ *RECOMMENDATION NR-3.8.2.1: The region should work to expand, improve and coordinate volunteer, citizen-based water quality monitoring programs.*
- ◆ *RECOMMENDATION NR-3.8.2.2: Improve and assist in the monitoring and enforcement of agricultural buffers. (See Recommendation NR-3.2.1.2).*
- ◆ *RECOMMENDATION NR-3.8.2.3: Communities should provide resources for better installation and maintenance, monitoring and enforcement of stormwater Best Management Practices (BMPs).*

Policy Links

The issues identified in this sub-element are related to other plan elements within the comprehensive planning effort. The elements underlined below represent these policy links. Surface water resources are heavily impacted by housing development and other land use

activities such as agriculture and transportation. The impacts of development affect various natural resources, such as wetlands and stream corridors which serve to mitigate flooding and improve/protect water quality. The available resources serve as a foundation for the ability of our region to maintain and improve local and regional economic development. The future conservation of open space areas for surface water protection is critical to the management of this resource.

WILDLIFE HABITAT, FORESTS, & ECOLOGICAL RESOURCES
PLAN GUIDELINE: NR-4
Year 2030 Regional Comprehensive Plan

Key Facts

The region's ecological resources are made up of many individual, yet inter-related, aquatic (water-based) and terrestrial (land-based) features and habitats. Ecological resources include forests, woodlands, wetlands, stream corridors, savannas, prairies as well as other unique habitats, sensitive areas, and their associated common and unique species of plant and animal life.

The region contains seven distinct ecological landscape types with each landscape type having numerous smaller 'natural communities' defined by the presence of certain types of common and rare plant and animal species. Each natural community has different characteristics and as such, different issues associated with their management and protection. Within the region's remaining habitats, a total of 2,317 'known occurrences', representing 615 different species and natural community types, had been listed in 2003 by the WDNR as 'endangered' or 'threatened' within the region. The highest concentrations, in terms of both number of species types and occurrences, are located in Marquette, Waupaca and, Waushara Counties. Four of these species types, with 87 'occurrences', have been listed as federally endangered or threatened within the region.

So What!

An important component of identifying habitat and developing management plans for development is human/wildlife interactions. As the urban-wildland interface continues to be developed, encounters with wildlife occupying those areas are increasing. The result has been predation on and by human pets, damage to

vegetation and property by feeding animals, concerns about disease transmission, and increasing calls by the community for the removal or destruction of wildlife.

Every type of animal and plant needs certain things from its home in order to prosper. If people convert too much of an animal or plant's habitat to other uses, it may not be able to adapt to its new circumstances. It may leave, or worse - become threatened or endangered, or even extinct.

Forest fragmentation can be costly, as it increases the risk of property damage from wildlife. Fragmentation also affects wildlife, water and air quality. Forests generate little runoff and certain species of trees remove environmental contaminants from the soil. Forests are also part of the carbon sequestration cycle, which means that they reduce carbon emissions in our atmosphere.

But preserving large chunks of land for habitat is only part of the story. Many animals need to migrate between favorite feeding and nesting grounds, and; as such, it is equally important to identify and protect "connections" between the two areas. If freeways and shopping centers develop between the two areas, they are effectively cut off and animals cannot safely move from one area to the other. However, this often-overlooked aspect of open space preservation is not easy to solve because available information on wildlife movement patterns is scarce in most cases.

In addition to considering the resources existing on a potential development site and the impacts that development might have on them, it is important to address cumulative impacts on resources. One subdivision in an area may have a

negligible impact on wildlife habitat. Yet as subdivisions accumulate on nearby parcels, the habitat may become so fragmented that it no longer supports some species. In general, there are two aspects of cumulative impacts: temporal and spatial. Temporal cumulative impacts are those that accumulate over time. Spatial cumulative impacts, in this context, consider impacts beyond a given development site.

The spatial aspects of cumulative impacts generally require considering an area larger than the individual development parcel. For some resource types the necessary area is so large that a regional planning approach is needed to assess cumulative impacts. For many resources, however, such as habitat and wetlands, knowledge of the system off-site can lead to better resource protection through site design.

Many ecological resources are also related directly or indirectly to sectors of the regional economy. Large and small-scale commercial forestry and silviculture remain a prominent land use and economic activity within the northern and western portions of the region, while significant areas of remaining woodlands provide ideal habitats which contribute to recreational hunting activities. The forest products sector, for example, contributes 6% to Wisconsin's economy¹. Local forest products may also reduce costs within other industrial sectors, such as paper, furniture manufacturing and construction.

Current Action

No specific responsibility exists for 'ecological management' within Wisconsin, however; within the state and region, the WDNR has taken much of the lead in this arena. Coupled with Federal agency regulatory programs through

the U.S. Environmental Protection Agency (USEPA) and U.S. Fish & Wildlife Service (USF&W), these efforts are being directed to sustainable forestry, public ownership and management, fisheries management, endangered species, and habitat restoration. These programs often complement the many wildlife related projects which occur at the local level, mostly through volunteer efforts of sportsman's clubs and civic organizations and private land stewards.

Some county and local level land use plans have not adequately addressed these types of issues and much more needs to be done to achieve a better balance between the ecological and wildlife needs with those of the region's human population.

Year 2030 Vision for Ecological Resources

As drafted by the Regional Ecology Technical Advisory Committee, the following vision statement for these resources was established:

The East Central Region has planned for and protected its ecological resources through the implementation of balanced regional land use concepts such as corridors and buffers, for both private and public lands. The integrity of the region's biodiversity and the preservation of unique natural areas and features have been addressed from a natural systems standpoint and are closely linked to the region's economy and quality of life. The consistent incorporation of planned greenspaces and natural areas, including agricultural lands, by the region's counties and communities serve the needs for wildlife and recreation as, well as contribute to the region's ecological sense of place. The Winnebago Pool Lakes and

¹ DNR Forest management plan.

the Fox/Wolf River systems are recognized as the backbone of the region's ecological resources and are planned for and managed through coordinated efforts, using incentives wherever possible.

Goals, Strategies and Recommendations

The following goals, strategies and recommendations were developed to promote the conservation and appropriate management of the region's ecological resources.

GOAL NR-4.1: Protect the integrity and biodiversity of the region's main ecological corridors.

STRATEGY NR-4.1.1: Improve the manner in which the region addresses spatial cumulative impacts to ecological resources.

- ◆ *RECOMMENDATION NR-4.1.1.1: The Commission should assist in creating and improving maps of wildlife habitats and other ecological resources, so that communities better understand the connections between individual ownership parcels.*
- ◆ *RECOMMENDATION NR-4.1.1.2: Communities should utilize resource protection as the primary criterion for designing comprehensive plans and developments in order to protect ecological resources both on and off-site.*
- ◆ *RECOMMENDATION NR-4.1.1.3: Communities should better define and implement management practices for ecological resource protection that consider both on and off-site impacts.*
- ◆ *RECOMMENDATION NR-4.1.1.4: The Commission should initiate and participate in regional studies and implementation*

strategies concerned with ecological resource protection.

- ◆ *RECOMMENDATION NR-4.1.1.5: Where feasible and appropriate, local units of government should identify specific high-priority resources and long-term plans for managing and protecting them.*

STRATEGY NR-4.1.2: Address temporal cumulative impacts through the monitoring and evaluation of the generalized impact of development on the natural and cultural environment.

- ◆ *RECOMMENDATION NR-4.1.2.1: The Commission should develop an improved system for examining the status of indicators for wildlife, forestry, and other ecological resources as they exist and function in the region over time.*
- ◆ *RECOMMENDATION NR-4.1.2.2: The Commission should encourage communities to monitor development in a manner to ensure that it complies with adopted performance standards and conditions of approval designed to protect the resources.*

STRATEGY NR-4.1.3: Significantly reduce the area of habitat disturbance resulting from development.

- ◆ *RECOMMENDATION NR-4.1.3.1: The Commission should work with agencies and entities in developing improved GIS mapping of high priority habitat areas within the region based on five basic criteria:*
 1. *Rare vegetation types;*
 2. *Areas known to contain rare and threatened species;*
 3. *Areas supporting unusually large numbers of species;*

4. *Areas providing habitat (migration corridors) for common species of importance to the people of the region (i.e., ducks, turkey, deer, fox, neotropical migrant birds, etc.), and;*
5. *Threats from development (i.e., proximity to urbanizing areas);*

- ◆ *RECOMMENDATION NR-4.1.3.2: The Commission should initiate the development and local implementation of a consistent set of specific conservation and development standards for habitat and species protection, based on the priorities established in the aforementioned habitat mapping project.*

STRATEGY NR-4.1.4: Focus conservation efforts on significant ecological areas within the region.

- ◆ *RECOMMENDATION NR-4.1.4.1: The Commission should support and assist communities and entities in conservation planning activities for the following general areas within the region:*
 - *The Niagara Escarpment corridor;*
 - *The Winnebago Pool Lakes;*
 - *The Wolf River System;*
 - *The Upper Fox River System;*
 - *The Northern Forests (Menominee and Shawano Counties).*

STRATEGY NR-4.1.5: Protect large, intact blocks of woodlands and forests within the region.

- ◆ *RECOMMENDATION NR-4.1.5.1: The Commission should promote the protection of woodland areas which are contiguous and more than 100 acres in size in order to preserve biodiversity (See Map LU-1: Regional Framework Map).*
- ◆ *RECOMMENDATION NR-4.1.5.2: The Commission should conduct a more detailed*

analysis of the local and regional impacts of forest fragmentation within the region.

- ◆ *RECOMMENDATION NR-4.1.5.3: Communities within the region should consider development policies which limit the ability to fragment large blocks of woodlands and forest lands.*

STRATEGY NR-4.1.6: The region should adopt and implement a more comprehensive definition for Environmentally Sensitive Areas (ESAs).

- ◆ *RECOMMENDATION NR-4.1.6.1: The Commission should continue its efforts in re-examining and updating its definition for ESAs as part of sewer service area planning process. For the purposes of this advisory comprehensive plan the Commission should consider the following resource features in its region-wide definition of ESAs:*

- *All WDNR identified wetlands and their associated 50-foot wetland buffers;*
- *Lands within 75-feet of navigable waterways;*
- *FEMA identified 100-year floodplains;*
- *Areas of steep slope (12% or more within riparian areas and 20% or more outside of riparian areas);*
- *Upland woodland areas of 20 acres or more in size.*

GOAL NR-4.2: Preserve and enhance the region's remaining natural shorelines along lakes and river corridors.

STRATEGY NR-4.2.1: Strengthen state and local level controls pertaining to shoreland areas.

- ◆ *RECOMMENDATION NR-4.2.1.1: Local comprehensive plans should consider the inclusion of a more specific riparian protection component.*

- ◆ *RECOMMENDATION NR-4.2.1.2: Communities should emphasize the need for restoration of habitat along developed shorelines and the preservation and enhancement of remaining natural shorelines. Several specific items which can be addressed include:*
 - *The conversion of existing manicured lawn areas to natural vegetation;*
 - *A reduction in the amount of rip-rap along shorelines which can serve as a barrier to certain animals;*
 - *The creation of new on-shore or near-shore wildlife habitat;*
 - *A reduction in the amount of impervious surface (roofs, pavement, etc.).*
- ◆ *RECOMMENDATION NR-4.2.1.3: Communities should consider limiting the size of new lakeshore buildings and the effectiveness of any stormwater runoff mitigation that may be required.*
- ◆ *RECOMMENDATION NR-4.2.1.4: The Commission should assist in long-term monitoring of shorelines from a land use change perspective by periodically gathering and reviewing data for the region.*

GOAL NR-4.3: Preserve existing quasi-public lands and the ability to access and use them in the future and/or bring them into public ownership.

STRATEGY NR-4.3.1: Minimize or prevent impacts to existing public lands by address land uses adjacent to them.

- ◆ *RECOMMENDATION NR-4.3.1.1: Communities and counties should consider the identification and purchase of 'buffer' areas surrounding public and quasi-public natural lands.*

- ◆ *RECOMMENDATION NR-4.3.1.2: Communities and counties should consider the development of regulations which would limit the proximity of new development to existing public and quasi-public natural lands.*

GOAL NR-4.4: Promote the protection and enhancement of urban wildlife areas and corridors.

STRATEGY NR-4.4.1: Better identify areas within urban landscapes that have opportunities for use as habitat and/or wildlife corridors.

- ◆ *RECOMMENDATION NR-4.4.1.1: The Commission should work with urbanized area communities to identify and map local and regional wildlife corridors and isolated habitats.*
- ◆ *RECOMMENDATION NR-4.4.1.2: Communities should incorporate urban wildlife concepts into their comprehensive plans.*

GOAL NR-4.5: Promote additional non-consumptive, nature-based tourism (eco-tourism) development programs.

STRATEGY NR-4.5.1: Market the region's ecological resources for passive recreation and educational purposes.

- ◆ *RECOMMENDATION NR-4.5.1.1: The Commission should work with appropriate environmental and economic development entities to market and showcase the following regional resources:*
 - The Niagara Escarpment corridor in Calumet and Fond du Lac Counties;
 - The Lake Winnebago / Pool Lakes system;
 - The Terminal Moraine and Ice Age Trail;
 - The forestlands of Shawano and Menominee Counties;

- The individual/collective nature centers and nature education areas in the region.

GOAL NR-4.6: Create and promote more comprehensive efforts on controlling exotic and invasive species.

STRATEGY NR-4.6.1: Improve local efforts to monitor and control the spread of invasive species.

- ◆ *RECOMMENDATION NR-4.6.1.1: Communities should develop and actively control/enforce the spread of terrestrial invasive species.*
- ◆ *RECOMMENDATION NR-4.6.1.2: The Counties should consider the adoption of ordinances which would regulate aquatic invasive species.*
- ◆ *RECOMMENDATION NR-4.6.1.3: The Commission should work with the WDNR and other stakeholders to develop a standard model terrestrial and aquatic invasive species ordinance for consideration by its counties.*

GOAL NR-4.7: Better integrate wildlife habitat protection and enhancement with storm-water management planning activities.

STRATEGY NR-4.7.1: Protect natural areas critical to providing stormwater management functions.

- ◆ *RECOMMENDATION NR-4.7.1.1: Communities and counties should consider the addition of a 50-foot protected wetland buffer surrounding ALL wetlands in order to better filter stormwater runoff.*
- ◆ *RECOMMENDATION NR-4.7.1.2: Communities should incorporate more analysis/assessment of stream protection*

and habitat during the planning phases of stormwater management.

- ◆ *RECOMMENDATION NR-4.7.1.3: Communities should consider the use of 'natural' stormwater retention methods such as a 'treatment train' system using natural wetlands over constructed retention/detention ponds where applicable.*

GOAL NR-4.8: Better emphasize the creation / maintenance of the local and regional 'ecological sense of place'.

STRATEGY NR-4.8.1: Emphasize local or regional features that contribute to 'sense of place' within Comprehensive Plans.

- ◆ *RECOMMENDATION NR-4.8.1.1: The Commission should promote the development and use of 'greenprinting' as a method to better emphasize and build awareness on 'ecological sense of place'.*

GOAL NR-4.9: Better incorporate ecological issues and opportunities associated with agricultural uses and activities.

STRATEGY NR-4.9.1: Better recognize limits to the amounts, intensity, and location of agricultural activities in terms of their effect on the environment (carrying capacity).

- ◆ *RECOMMENDATION NR-4.9.1.1: Communities should place emphasis and education on voluntary methods by the agricultural community (i.e. rotational grazing) that enhance and protect the environment.*
- ◆ *RECOMMENDATION NR-4.9.1.2: Communities should recognize and consider agricultural areas and grasslands as being important for sensitive species such as prairie grouse.*

- ◆ *RECOMMENDATION NR-4.9.1.3: The Commission should support the development of natural vegetated buffers along agricultural drainageways.*
- ◆ *RECOMMENDATION NR-4.9.1.4: The Commission should support the creation of natural roadsides which utilize native vegetation for wildlife and nesting cover in agricultural areas.*

GOAL NR-4.10: Promote more coordinated planning efforts to reduce the effects of development on natural areas.

STRATEGY NR-4.10.1: Neighboring jurisdictions should work together to assess wildlife and habitat issues.

- ◆ *RECOMMENDATION NR-4.10.1.1: The Commission should encourage communities to adopt wildlife management and protection policies that are coordinated with neighboring communities and based on sound science.*
- ◆ *RECOMMENDATION NR-4.10.1.2: Groups of communities should consider more utilization of WDNR's Urban Wildlife Program.*

STRATEGY NR-4.10.2: Endorse various Department of Natural Resources programs and pilot programs that are geared toward mitigating effects of land use change.

- ◆ *RECOMMENDATION NR-4.10.2.1: The Commission should support the development, updating, and implementation of various state level plans for use as guidance within the region, including but not limited to:*
 - *Forest Legacy Program;*
 - *Managed Forest Law;*
 - *Healthy Forests Initiative;*
 - *Glacial Habitat Restoration Program;*

- *Land Legacy Program.*

STRATEGY NR-4.10.3: Limit or prevent habitat fragmentation to protect the long-term health of wildlife populations.

- ◆ *RECOMMENDATION NR-4.10.3.1: Communities should develop and implement efforts on ecological restoration in order to regain historic losses of important communities.*

GOAL NR-4.11: Promote wildlife habitat preservation and enhancement through additional public/private partnership.

STRATEGY NR-4.11.1: Continue the use and funding of existing incentive programs for habitat conservation.

- ◆ *RECOMMENDATION NR-4.11.1.1: The Commission should support programs and legislation that encourages landowners to protect their forests, savannas, grasslands, and wetlands.*
- ◆ *RECOMMENDATION NR-4.11.1.2: The Commission should improve communities' knowledge of, and applications for, private land trust organizations as a method to protect key parcels of important, intact plant communities or other habitats.*
- ◆ *RECOMMENDATION NR-4.11.1.3: The Commission should support the continued provision of programs and incentives for private landowners, including:*
 - *Conservation Reserve Program (CRP);*
 - *Wetland Reserve Program;*
 - *Managed Forest Law;*
 - *Continuation of the funding for the Knowles-Nelson Stewardship Fund;*
 - *Local land trust organizations;*
 - *Exemption of capital gains for sale of land for conservation purposes;*
 - *Expansion of use-value property taxation.*

GOAL NR-4.12: Create and support adequate levels of programming and funding for education regarding ecological features and land use issues for elected officials and other decision-makers throughout the region.

STRATEGY NR-4.12.1: Better educate, inform, and involve traditional and non-traditional entities in wildlife and ecology issues.

- ◆ *RECOMMENDATION NR-4.12.1.1: Target educational efforts to the following groups:*
 - *Local decision-makers;*
 - *the realty and development community;*
 - *the business community;*
 - *local grade schools.*

- ◆ *RECOMMENDATION NR-4.12.1.2: Priority areas for future targeted education efforts on land use and ecological impacts should include:*
 - *Exotic / invasive species control;*
 - *Design with Nature principles;*
 - *More emphasis on how passive recreation opportunities can help move us towards overall ecological goals.*

STRATEGY NR-4.12.2: Provide adequate funding levels for ecological education programs.

- ◆ *RECOMMENDATION NR-4.12.2.1: Communities should consider providing financial support to local or regional nature centers which provide educational opportunities.*

- ◆ *RECOMMENDATION NR-4.12.2.2: Communities should partner with school districts or nature centers to secure and protect ecological areas adjacent to existing or planned sites so as to provide hands-on education opportunities.*

Policy Links

The issues identified in this sub-element are related to other plan elements within the comprehensive planning effort. The elements underlined below represent these policy links.

Wildlife habitat and ecological resources are comprised of numerous individual and collective natural resource components. Ecological resources are impacted by many land use activities including housing, agriculture and transportation. The region's ecological resources also contribute greatly to the overall tourism and recreation economy and provide opportunities for a strong quality of life as well as future economic development.

REGIONAL OPEN SPACE & RECREATION

PLAN GUIDELINE: NR-5

Year 2030 Regional Comprehensive Plan

Key Facts

About 125,000 acres of public recreation and open space lands are available within the region (excluding local parks) to meet the needs of its existing 610,000 residents. There is also an excellent distribution of public open space throughout the region, even though the largest tracts are resource-based. All counties except Menominee, which is heavily forested, have at least 5,800 acres of regional open space.

These lands equate to about 200 acres per 1,000 residents, which is twice the standard that was adopted in the *Open Space and Outdoor Recreation Plan for East Central Wisconsin* in 1977. However, if the 91,000 acres of WDNR wildlife and fisheries areas, along with the 3,000 acres of federally owned lands (Horicon Marsh and Fox River National Wildlife Areas) are removed from this total, it effectively leaves only 31,000 acres to accommodate some of the most common recreational activities. This lowers the average to about 50 acres per 1,000 persons - far below the current adopted standard.

Based on the standards, and with the addition of the numerous local recreation facilities, the East Central region has a fair to ample amount of recreation opportunities for its current residents.

So What!

Regional recreation and open space areas serve many purposes, but a prime reason that many of these sites exist in public ownership is to ensure that important scenic features, natural and cultural resources, and habitat areas are

preserved for the enjoyment of both present and future generations of Wisconsin residents and visitors. With minor exception, the vast majority of available recreation/open space acreage is virtually undeveloped, providing opportunities for passive (less intensive) forms of recreation; i.e., activities such as hunting, fishing, and hiking, which typically do not seriously tax the resource base.

Many forms of active recreation (ballfields, biking, soccer, etc.) occur within the region and demands are expected to increase in the future. Gaps in lands availability for such uses may be of concern in the future, but mostly at a local level. The ever-increasing mobility of the large 'baby-boomer' sector of the population, coupled with the projected addition of 147,000 residents (by 2030), will also change the types and locations of recreational activities. Recreational features have become an important amenity to those that live within the region as well as those who may move here in the future.

Although the standards indicate no measurable deficiency at current or projected levels, continued demands for public open space and recreation areas, as well as trails, will continue to occur throughout the region, particularly within and near areas of more dense population. At a time when demand is increasing, the opposite is occurring due to a decline in funding for such facilities. Declining levels of funding from all sources will need to be overcome in order to provide and maintain existing open space and recreational opportunities and continue to develop new sites and facilities.

Lastly, many of the remaining opportunities which capitalize on larger tracts of

undeveloped/natural areas may be in jeopardy due to the high levels of rural development occurring throughout much of the region. As equally important are the regional networks which have been, or need to be, created that link individual features. Identifying and preserving these suitable sites and network linkages until the 2030 plan horizon will be critical if they are to remain as an option to server longer-term (40-50 year) needs.

Current Action

At the State level, funding continues to be available through the WDNR to assist counties and communities in the acquisition of lands for recreation and open space purpose. However, as with most programs, these funding levels have been decreasing and more burdens are being placed on county and local units of government to fund these activities.

The WDNR recently released its 'Land Legacy' report which utilized significant state-wide public input in order to identify major natural resource areas and recreation opportunities that should be considered for preservation or incorporated into recreation and open space plans by county and local units of government.

In 1977 the Commission adopted the Open Space and Recreation Plan for East Central Wisconsin. This report outlined the master plan for the development of regional park and (trail) facilities throughout the 10 county area based on a number of factors, including population distributions / projections; assessments of existing regional facilities, and; natural resource characteristics. Many of this plan's recommendations were implemented since its creation and the new Regional Plan will replace this document once completed.

County and local park/open space plans are prepared and updated regularly throughout most of the region. These plans, however, are typically directed to locally driven needs,

although some local recreation facilities draw users from extensive distances and, in some ways, may be considered 'regional' in nature, particularly those located along water features.

Year 2030 Vision for Regional Open Space & Recreation

The Open Space, Recreation, and Regional Character Committee developed and approved the following vision statement pertaining to regional open space and recreation needs. Regional and community character issues are summarized in Plan Guideline LU-2.

The East Central Region will proactively address future public access, recreation, open space, and trail facilities in order to meet the needs of its' citizens; enhance the quality of life and environment; realize tax savings and other economic benefits through the usage of natural systems (natural capital), and maintain and improve the region's tourism economy. Future public and private open space and trails will focus on the physical connectivity of the existing natural resource base and the expansion of local and regional trail links. The region's open space and recreation system will be enhanced through continued education; the application of consistent recreation standards; the promotion of coordinated planning; the recognition for local responsibility in providing such facilities; the maintenance of existing funding sources, and; the application of creative financing techniques.

Goals, Strategies and Recommendations

The following goals, strategies and recommendations were developed to guide the Commission and its communities in the protection of open spaces and provision of regional recreation opportunities. Please note that Chapter 6 - Transportation, Plan Guideline

T-5: Alternative Modes of Transportation & Mobility; Chapter 8-Agricultural Resources, Plan Guideline AG-1: Farmland Preservation; Chapter 9- Natural Resources, Plan Guideline NR-4: Wildlife, Habitat, and Ecological Resources, and; Chapter 11-Land Use, Plan Guideline LU-2: Regional and Community Character all contain related content and information pertinent to the discussion in this document. Therefore, many specific items were not included in this plan guideline due to their duplicative nature.

GOAL NR-5.1: Preserve and protect the region's important and unique parklands, natural features and open spaces in order to maintain and enhance the quality of life within the region.

STRATEGY NR-5.1.1: Preserve unique regional features within the region.

- ◆ *RECOMMENDATION NR-5.1.1.1: The Commission should continue to acknowledge and seek to protect those features which were noted in Open Space and Recreation Plan for the East Central Region (1977).*
- ◆ *RECOMMENDATION NR-5.1.1.2: The Commission should undertake efforts to update information in the above noted plan and identify any additional parkland for future regional facilities (150+ acre sites).*

GOAL NR-5.2: Create a common vision for a highly accessible regional trail network which includes both land and water features.

STRATEGY NR-5.2.1: Improve 'connectivity' of regional and local trails.

- ◆ *RECOMMENDATION NR-5.2.1.1: Preserve environmental corridors and railways for future trails and utilities.*
- ◆ *RECOMMENDATION NR-5.2.1.2: Preserve existing snowmobile trails and programs within the region.*

STRATEGY NR-5.2.2: Encourage the adoption and consistent application of open space and trail planning by counties and communities within the region. The following areas are specifically noted for consideration:

- ◆ *RECOMMENDATION NR-5.2.2.1: Preserve and expand public access to all waters within the region. (See Chapter 7, Local Parks and Recreational Facilities, Strategy CF-8.6.1)*
- ◆ *RECOMMENDATION NR-5.2.2.2: Preserve existing private marinas on L. Winnebago Pool in hopes of conversion to public sites if/when sold.*
- ◆ *RECOMMENDATION NR-5.2.2.3: Counties should be leaders in providing for nature-based recreation (due to state constraints).*
- ◆ *RECOMMENDATION NR-5.2.2.4: Create more primitive campsite/campground facilities along regional trails and waterways.*
- ◆ *RECOMMENDATION NR-5.2.2.5: Create additional (transient) RV camping parks within the region, particularly in Outagamie County.*

GOAL NR-5.3: Develop creative solutions for the funding and implementation of park, recreation, and trail facilities.

STRATEGY NR-5.3.1: Develop and promote creative financing techniques for open space preservation and acquisition. (See Chapter 7, Local Parks and Recreational Facilities, Strategy CF-8.4.5)

- ◆ *RECOMMENDATION NR-5.3.1.1: The Commission should work with communities and counties on the further development of a regional or sub-regional purchase-of-development rights program to preserve*

open space and recreation lands within the region.

- ◆ *RECOMMENDATION NR-5.3.1.2: The Commission should support the development of a 'silent sports' user fee system similar to motorized recreation facilities (i.e. excise taxes, etc.).*
- ◆ *RECOMMENDATION NR-5.3.1.3: Create separate state funding sources for 'active' recreation improvements while maintaining the existing 'nature-based' recreation funding.*
- ◆ *RECOMMENDATION NR-5.3.1.4: The Commission should support efforts to increase opportunities for public/private partnerships in recreation and trail areas.*
- ◆ *RECOMMENDATION NR-5.3.1.4: The Commission should provide a forum for the preservation of dialogue and cooperative spirits regarding the connection of trails between communities.*

STRATEGY NR-5.3.2: Encourage the implementation of broad open space recreation strategies through multi-jurisdictional efforts.

- ◆ *RECOMMENDATION NR-5.3.2.1: The Commission should seek to level the playing field on development of open, rural areas on the fringes of the Fox Cities communities as the metro area falls in three different counties, each with their own rules.*
- ◆ *RECOMMENDATION NR-5.3.2.2: The Commission should continue to support the creation of a standardized boat launch fee program for Winnebago Pool Lakes and Fox and Wolf Rivers.*
- ◆ *RECOMMENDATION NR-5.3.2.3: Communities and counties should communicate their specific needs with local and regional*

open space/recreation organizations in hopes of developing new partnerships and collaborative efforts.

GOAL NR-5.4: Inform and educate the general public and elected officials on the financial and social benefits of open space and recreation.

STRATEGY NR-5.4.1: Create better educational programs regarding the benefits of trails.

- ◆ *RECOMMENDATION NR-5.4.1.1: The Commission should seek to modify/improve the attitudes of communities and developers on trails and their financial/social benefits.*
- ◆ *RECOMMENDATION NR-5.4.1.2: Communities should place more emphasis on education for projects 'up-front' in the process in order to gain local buy-in (i.e. public relations improvements).*
- ◆ *RECOMMENDATION NR-5.4.1.3: Communities should place more emphasis / acknowledgement on tourism needs/benefits related to recreation in the region.*
- ◆ *RECOMMENDATION NR-5.4.1.4: The Commission should work with the State to improve access to information on funding sources for acquisition and improvements of recreational and open space lands.*

Policy Links

The issues identified in this sub-element are related to other plan elements within the comprehensive planning effort. The elements underlined below represent these policy links. Open space and recreation within the region is a necessity in terms of continued quality of live. Economic development within the region is strongly connected to the availability of recreational opportunities. Impacts to open

space and recreation facilities can occur in almost any environment from a variety of land uses, including: housing development, transportation improvements, agricultural activities, and the extension or expansion of community facilities. Natural resources play a large role in the further development of the region's open space and recreation network.

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