Misissippi River - Winona Watershed Landscape Stewardship Plan

December 2014
Prepared for the Partners in the Mississippi River-Winona Watershed

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MISSISSIPPI RIVER-WINONA WATERSHED PROJECT

Minnesota Forest Resources Council

Minnesota Forest Resources Council (MFRC)

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Part 1. Purpose and Context: Where have we been and where are we today?

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Section 1. Introduction

This section of the Plan provides background information on how this project got started and funded, the landscape stewardship planning process, and how partners can use this plan to concurrently promote sustainable forest management and improve and/or protect water quality and water quantity in the Mississippi River – Winona watershed located in southeast Minnesota.

A. Project Background

The Mississippi River – Winona watershed covers 419,200 acres of Southeastern Minnesota which drain intro the Mississippi River roughly between the city of Wabasha, MN, to the North, and Trempealeau, WI, to the South. It is an area of numerous trout streams, important biodiversity, and beautiful scenery. Several small streams form in heavily farmed uplands in the West of the watershed, and cut through deeply dissected valleys towards the Mississippi River.

Outdoor recreation and beautiful scenery are features of not only the many rural communities of the Watershed, but also the cities of Winona and Wabasha. These small river towns on the Mississippi attract visitors with diverse recreational opportunities, and support budding arts communities inspired in part by the surrounding scenery.

The Whitewater River, the largest river system in the watershed, and several smaller streams north of it flow through valleys that are important hot spots for biodiversity in the state. Southeast of the City of Winona, stream valleys are occupied by many scattered residences, but also forest communities that provide important habitat and ecosystem services. The myriad natural resources of the landscape, occurring on both public and privately owned land, face many threats including development, fragmentation, and agricultural run-off.

Protecting and managing those resources so they continue to benefit the community will take a coordinated effort from multiple groups, agencies, and the community at large, using a variety of strategies. This landscape stewardship plan (LSP) will describe those strategies, set common goals and objectives for natural resource protection, and provide a framework for collaboration in implementing them.

B. Landscape Stewardship: Collaboration that Works

The "***landscape approach to forest stewardship***" focuses on the needs and objectives of communities of place and communities of interest, which define a "landscape" as much as any geographical boundary. Landscape stewardship plans are developed to take into account a broader or "all lands" perspective that includes both shared community objectives and individual management activities. To be successful, landscape stewardship must be strategic and collaborative, it must appeal to stakeholder motivations and needs, it must manage for results, and it must encourage flexibility in all activities. Successful landscape stewardship builds agency, organizational, and community capacity through collaboration, increases landowner trust of agencies and organizations through streamlined management and communications, motivates landowners using messages and activities that resonate with their needs, and supports the application of science and knowledge through well informed policies and practices. Taken together, these activities work to make service delivery to private landowners more effective and efficient.

C. The Landscape Stewardship Planning Process

The general process used to develop this plan included:

- Assemble a planning team – Mississippi River – Winona Landscape Stewardship Steering Committee.
- Inventory and assess the resources in the watershed in technical support documents.
- Gathering of input from planning team members through a series of meetings.
- Building a strategic policy framework based on resource knowledge assembled and input from the planning team.
- Identify potential priority areas within the watershed and prioritize potential conservation projects to improve forest and water resources.
- Identify ways to enhance the effective delivery of conservation services on both private and public lands.
- Develop a 10-year project list that will implement the goals and objectives in the Plan.
- Establish a procedure to monitor, evaluate and report progress made in implementing the Plan.

A team of resource professionals was assembled in 2014 to guide the development of this Plan. Members of the planning team are listed in Appendix A. Their mission was to review data and scientific information gathered for the planning process and to provide input into the content of the Plan. The Planning Committee also reviewed and commented on various draft plan documents.

D. Organization and Uses of the Mississippi River - Winona Landscape Stewardship Plan

Strategic planning asks three fundamental questions: 1) *Where have we been?* 2) *Where do we want to go?* and 3) *How do we get there?* The *Mississippi River - Winona Landscape Stewardship Plan* has been organized into a three-part format to address these basic questions and compliment the strategic nature of the landscape stewardship planning process. This format complies with the framework established by the USDA Forest Service in the document entitled, "*Landscape Stewardship Guide*." The three parts of this Plan are:

- **Part 1 – Plan Background**: addresses the fundamental questions of "where are we?" as presented in the context of "where have we been?"
- **Part 2 – Strategic Policy Framework**: outlines the vision in a written framework to help answer the question of "where do we want to go?
- **Part 3 – Plan into Action**: focuses on "how will we get there?" and is the portion of this Plan that establishes how the goals and objectives outlined on part 2 will be enacted. It outlines a framework for coordinating efforts relating to the plan and encouraging collaboration.

This landscape stewardship plan can be used to inform:

- Forest Stewardship Plans and Implementation
- Water Resource Management Plans and Implementation
- Fish & Wildlife Management Plans
- Community Land Use Planning and Implementation
- Collaborative Project and Funding Development
- Connections to the Forest and Water Resource Policy Decision Makers

These are just a few of the Plan's applications and uses. This Plan is not intended to incorporate other planning efforts; it is meant to supplement and inform those efforts in a manner that promotes increased and improved collaboration among current and future partners and stakeholders to achieve plan's vision for the watershed.

E. Coordination with the WRAPS Process

This plan was written while the Mississippi River – Winona Watershed was undergoing the Minnesota Pollution Control (MPCA) Watershed Restoration and Protection Strategies (WRAPS) process. The focuses of the two planning processes were not identical, however, they shared several key goals and they helped inform each other in several ways. Data developed in the WRAPS process was used in the Landscape Stewardship planning and COA selection processes, and the WRAPS document and table are encouraged to consider many of the protection strategies that affect water quality outlined in this document.

F. Relationship to the Minnesota Forest Resources Council (MFRC) Southeast Landscape Plan

In 2014, the Southeast Landscape Committee of the Minnesota Forest Resources Council (MFRC SELC) completed the ten-year revision process for the Southeast Landscape Plan. This plan identifies goals and objectives for conservation in the Southeast Region of Minnesota, organizes collaboration in implementation, and provides recommendations to local governments, agencies, and conservation organizations. The goals and objectives of this plan are specific to the Mississippi River – Winona Watershed, but are consistent with the goals and objectives of the broader Southeast Landscape Plan. The successful implementation of the activities called for in this plan will help advance the goals of the region, and make the Mississippi River – Winona Watershed an ecologically healthy part of the regional ecosystem.

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Section 2.
Natural Resources Inventory and Analysis

The Mississippi River - Winona watershed (HUC-07040003) covers 419,200 acres of Southeast Minnesota in Winona, Olmsted, and Wabasha counties. It is made up of the Whitewater River Watershed, Garvin Brook, and numerous other single stream tributaries, all of which feed into the Mississippi River. It includes the cities of Winona and Wabasha, as well as the towns of St. Charles, Plainview, Altura, Elba, and Eyota.

On the eastern side of the watershed, the Mississippi River is lined by steep bluffs, which elevate to a gently rolling plateau dissected by streams and deep, forested valleys. There are areas where rural residential development is common, especially in the stream valleys near the City of Winona. Much of the watershed, however, is relatively undeveloped. The gently rolling lands on the western portion are dominated by agricultural use of cropland with hay and pasture, whereas most of the hillsides of the eastern blufflands are forested.

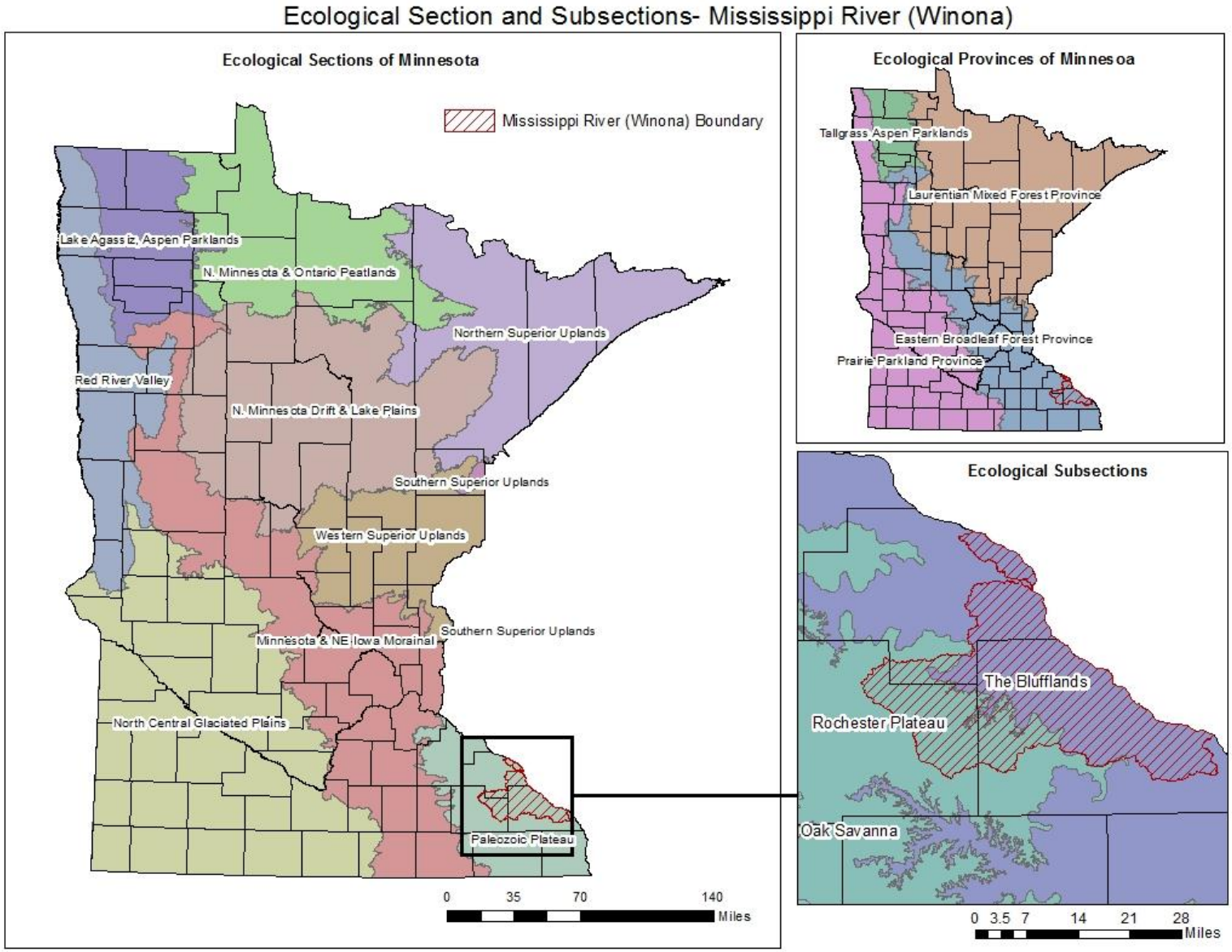
A. Ecological Setting

The watershed occurs within the Paleozoic Plateau section of the Eastern Broadleaf forest province of Minnesota. It includes portions of two subsections: the Blufflands and the Rochester Plateau (figure 1).

Rochester Plateau:

The Rochester Plateau subsection is a level to gently rolling plateau of bedrock overlain by loess in the east and pre-Wisconsin age glacial till in the central and west. Tallgrass prairie and burr oak savanna were the major pre-settlement vegetative communities. Presently the majority of the unit is heavily farmed. Before its suppression, fire was an important component of the disturbance regime.

Figure 1. The Mississippi River (Winona) watershed occupies areas of the Blufflands and Rochester Plateau subsections within the Paleozoic Plateau section of Minnesota.



The Blufflands:
The Blufflands subsection is a transition area between the Rochester Plateau and the Mississippi River. The loess-covered Plateau is deeply dissected by dendritic stream networks that cut down through bedrock on their way to the Mississippi River, forming bluffs and deep stream valleys. Pre-settlement vegetation varied by landform. On ridge-tops and dry upper slopes, burr oak savanna and tallgrass prairie were major vegetation types. Moister slopes supported red oak-white oak-shagbark hickory-basswood forests, and red oak-basswood-black walnut forests occupied protected valleys. Presently, roughly 30% of the Blufflands is cropped, 20% is in pasture, and 50% is woodland.

B. Geology

The bedrock that underlies the Mississippi River - Winona watershed was deposited in the Paleozoic Age, when the region was covered by a shallow sea. During this time coarse grained sandstone was deposited as beaches or off-shore sand bars, and finer grained sandstone, shale, and siltstone formed in quieter water on near shore tidal flats or deeper water offshore. This resulted in many thin, widespread layers of sandstone, shale, and limestone or dolomite. Differences in resistance to weathering and erosion help to give the region it characteristic topology of rolling to flat plateaus deeply dissected by the many streams that flow into the Mississippi River. This topography has an overall west-to-east trend, with the elevated plateau lying on resistant limestone or dolomite on the western side, and the Mississippi River floodplain and associated terraces along the eastern edge. Where streams have broken through the limestone, streams were able to erode the soft Jordanian Sandstone underlying it much more rapidly, forming the steep bluffs and hillsides that surround them.

The watershed lies in an area known as the driftless zone that was not covered by ice during the last, Wisconsinan, glaciation. Because of this, 500,000 years of erosional processes have been at work since the region was last covered by ice. The driftless region is characterized by steep, scenic valleys. Bedrock layers are often exposed or near the surface. The wide variety of physical conditions possible from varying combinations of slope position, aspect, bedrock, and soil type give rise to an impressive diversity of habitats.
Though it was not covered by the most recent glacial advance, glaciation during that period still had a significant effect on the watershed as glacial winds deposited a thick mantle of loess on the landscape derived from dust from outwash plains. At this time, the Mississippi Valley was also filling up with outwash from upstream glaciers, causing the tributaries to backfill as well. Cycles of backfilling and downcutting by the Mississippi and its tributaries deposited the outwash terraces common in valley floors. As a result of these processes, the surficial soils of the watershed generally follow a pattern of loess deposits overlaying the limestone plateaus with alluvial sand outwash and terraces lining streams in the valleys.

The layers of limestone and dolomite underbedding much of the landscape in the watershed are vulnerable to dissolution by rainwater containing carbonic acid. This dissolution leads to the formation of karst features, such as caves, springs, sinkholes, and disappearing streams. Areas such as seeps and sinkholes, where surface water quickly filters down into groundwater, make groundwater particularly susceptible to contamination from pollution. Springs provide an outlet for groundwater to return to the surface, and can provide cold groundwater to streams to help maintain coldwater trout habitat.

A critical zone for this hydrogeological system is found at the edges of confining layers between aquifers, such as the Decorah shale layer or St. Lawrence formation. Water moves vertically through the aquifers until it hits a confining layer, which then directs it laterally. Where the steep, forested hillsides of the region cut down through these layers creating an edge, water emerges. Many spring form at these edges,

feeding cool water to area trout stream. Water also runs down through the soil to recharge the aquifer below. The soils in these areas act as a natural filter for water passing between the upper and lower aquifers.

C. Hydrology

The drainage network of the watershed is well developed and highly dendritic. The Mississippi is the largest river, and forms the eastern boundary of the (Minnesota portion of the) watershed. The rest of the watershed consists of streams and rivers in Minnesota that feed the portion of the Mississippi flowing roughly 50 miles from the outlet of Lake Pepin in Wabasha County to the confluence of the Black River, which enters from Wisconsin to the East. There are two main stream networks, the Whitewater River and Garvin Brook. The larger of the two is the Whitewater. It has three main branches, the North Fork, Middle Fork, and South Fork, which converge near the town of Elba. The rest of the Mississippi River - Winona watershed is composed of smaller tributaries draining directly into the Mississippi River. These include East Indian Creek, Snake Creek, Gorman Creek, Pleasant Valley Creek, Gilmore Creek, Pickwick Creek, and Cedar Creek.
Average regional precipitation ranges from 31-33 inches annually. The past 20 years have shown no significant trend in precipitation levels for Southeast Minnesota. However, the region has seen a significant trend of increasing precipitation over the past century.

Groundwater monitoring in the watershed has detected the presence of naturally occurring minerals like iron, calcium, and magnesium that may cause discoloration, odors, or hardness, but are not health concerns for human consumption. The major withdrawals of groundwater in the watershed are for municipal, irrigation, and industrial use. Major groundwater withdrawals are permitted through the Minnesota DNR and have been steadily increasing since at least 1988. The geology of the region complicates protection of these groundwater resources, and overall groundwater susceptibility to contamination is high. Karst features provide surface water rapid routes to near-surface groundwater aquifers, making them more vulnerable to surface pollutants. A holistic approach to reducing surface contaminants through agricultural best management practices (BMPs) and targeting common sources, such as failed septic systems, abandoned wells, and animal feedlot operations, is important to protect groundwater resources in the region.

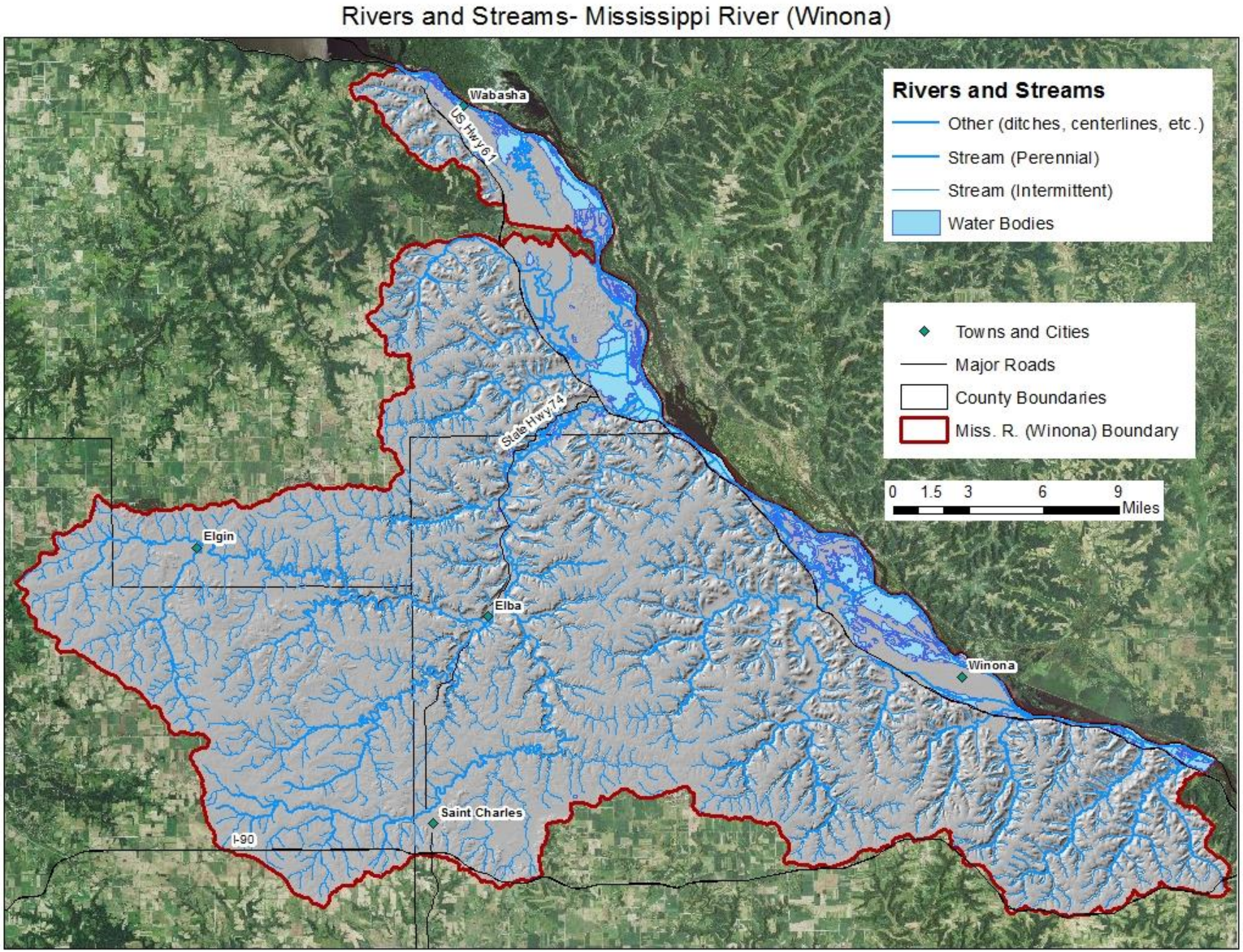


Figure 2. Stream networks of Mississippi River - Winona watershed.

Water quality impairments for the watershed are widespread. Across the watershed, nitrate, bacteria, and turbidity levels are the main stressors. Of roughly 334 miles of streams assessed for the support of aquatic life by the MPCA, 209 miles were found to be not supportive, and only 75 miles (from 12 of 28 assessment units) were assessed as fully supportive of aquatic life (Figure 3). High nitrate levels caused segments of both the Middle and South Forks of the Whitewater River to be listed as non-supportive for drinking water use. The impairments are further complicated by karst features, which can provide rapid pathways for contaminants, especially nitrates, from surface to groundwater. While catastrophic erosion in the watershed has been moderated over the past 50 years, high turbidity levels continue as streams cut into streambank deposits left by the erosion of upland soils in the early 20th century.

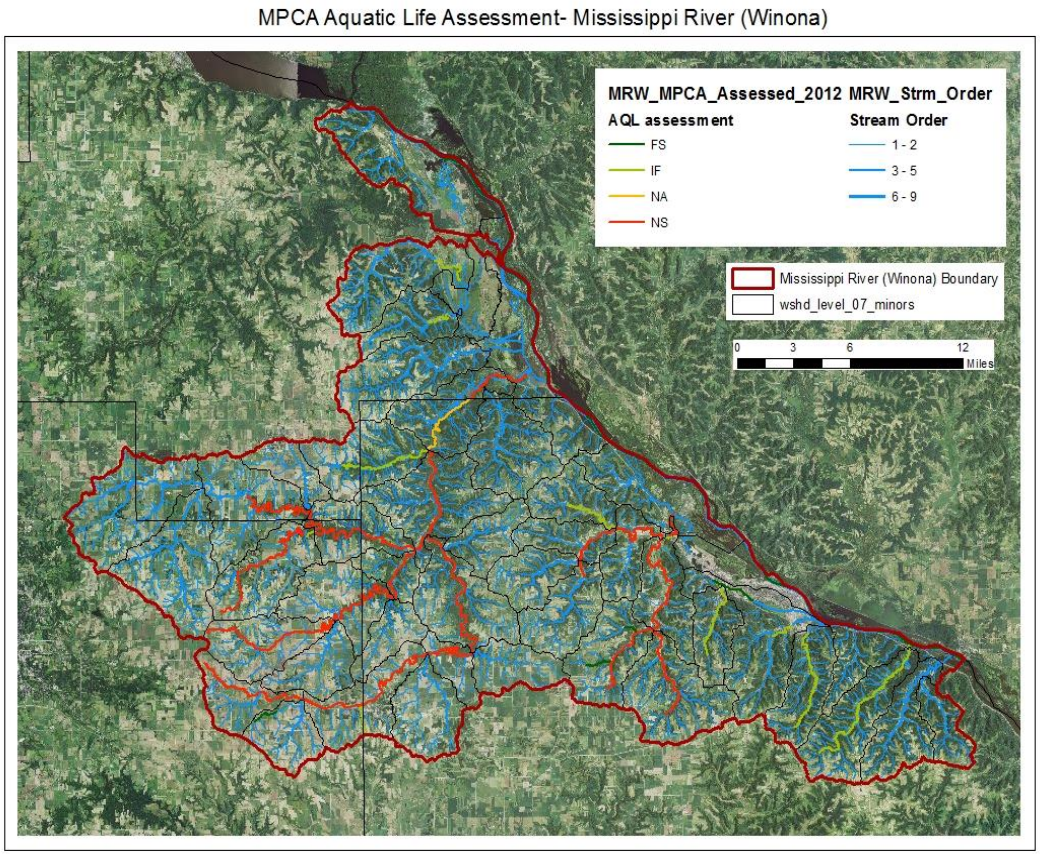


Figure 3. Aquatic life assessment of streams in Mississippi River - Winona watershed

D. Soils

Derived principally from loess (windblown) and alluvial (water-transported) deposits, soils in the area are dominated by sands and silts (figure 4). Loamy fine sands cover 79% of the watershed. The majority of these sands were deposited as loess from strong glacial winds during the Wisconsinan glaciation. On many steep hillsides geologic erosion has resulted in areas of exposed bedrock and thin loess cover. With the predominance of coarser soil textures, soil drainage in the watershed is typically high. 76% of the soils in the watershed are classified as well drained. Excessively and somewhat excessively drained soils occur on steep hillsides or sandy outwashes. Areas of moderately well to very poorly drained soils can be found, typically in valley floors at the bottom of hills or near streams (figure 5).

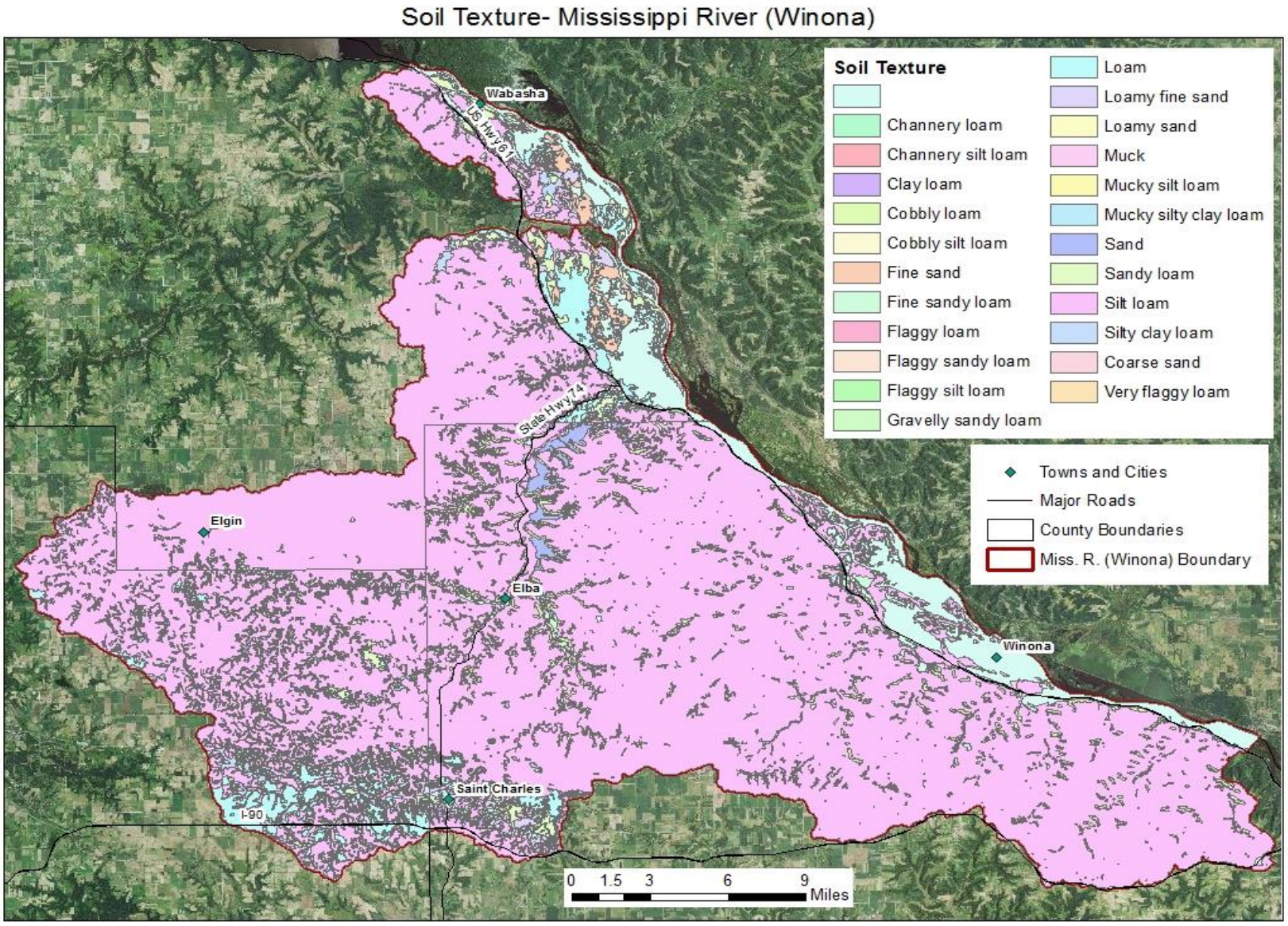


Figure 4. Soil textures in the Mississippi River - Winona watershed

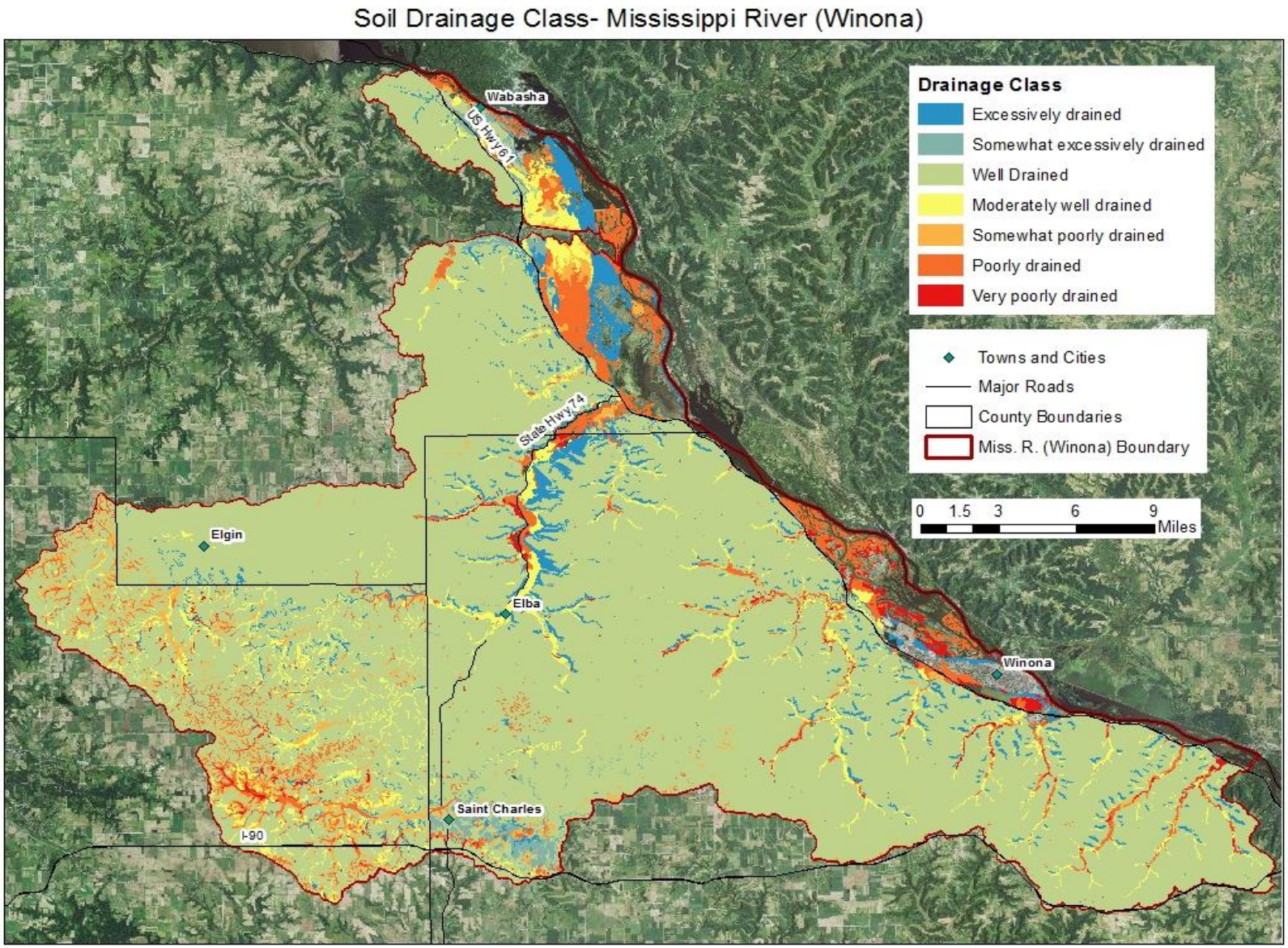


Figure 5. Soil drainage classes in the Mississippi River - Winona watershed

E. Vegetation

The Mississippi River - Winona watershed has long supported a diversity of vegetation. Prior to European and American settlement, frequent fires, started by both natural events and native Americans, maintained large areas of prairie and oak savanna (called oak openings and barrens in map below). Where topography or moisture provided shelter from fires, communities of deciduous hardwoods developed. Floodplain forests inhabited floodplains and terraces that experienced wetter conditions and regular flooding.

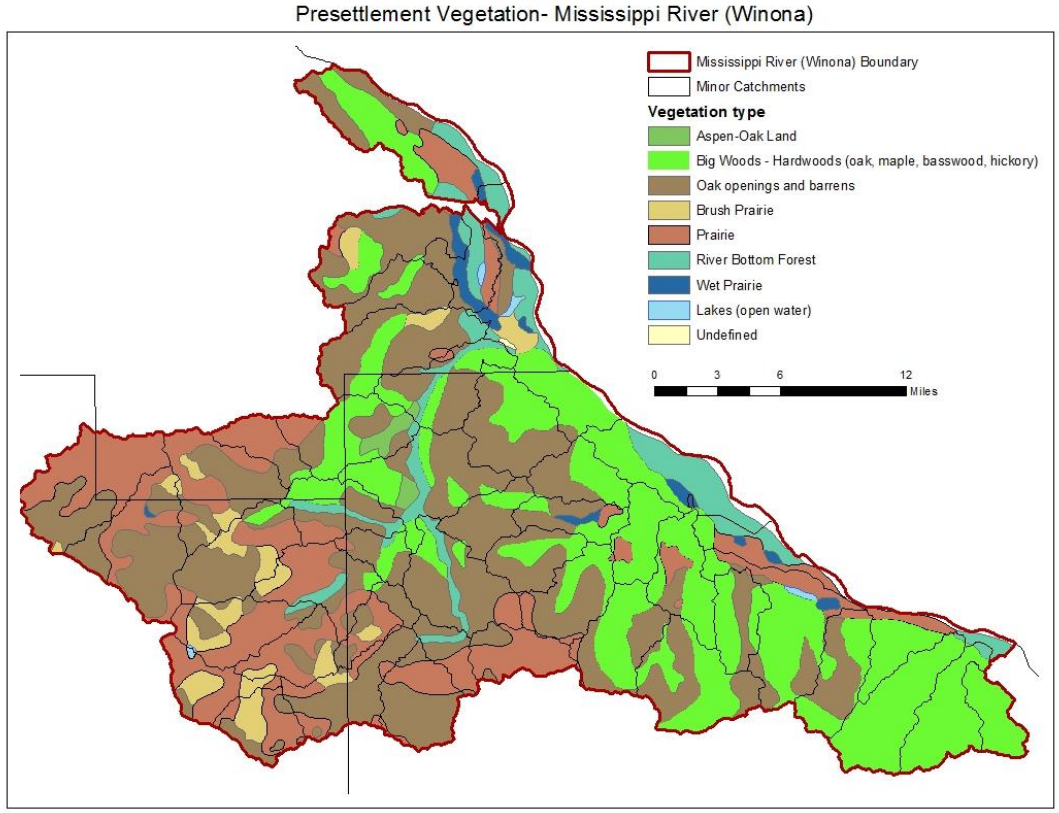


Figure 6. Presettlement vegetation types in the Mississippi River - Winona watershed

Today, much of the land in the Rochester Plateaus is planted in row crops or kept as pasture. In the Blufflands subsection, the floodplains of the Mississippi River, Whitewater River, and several larger streams support significant wetlands, as well as floodplain forest communities of silver maple, cottonwood, green ash, and American elm (among others). The steep hillsides of the bluffs are generally dominated by mesic hardwood forests, with upland prairies and fire dependent woodland systems such as oak savannas occurring on dry south or west facing upper slopes. Species composition is often influenced by aspect and slope position. Sheltered, north to northeast facing sites support stands of maples, basswood, oaks, and elms. Crests and upper slopes with north-facing aspects or middle to upper slopes of east or west-facing aspects tend to support drier communities dominated by oaks with basswood and shagbark hickory. Fire dependent communities such as prairies and oak savannas occur on steep, south- and west-facing slopes.

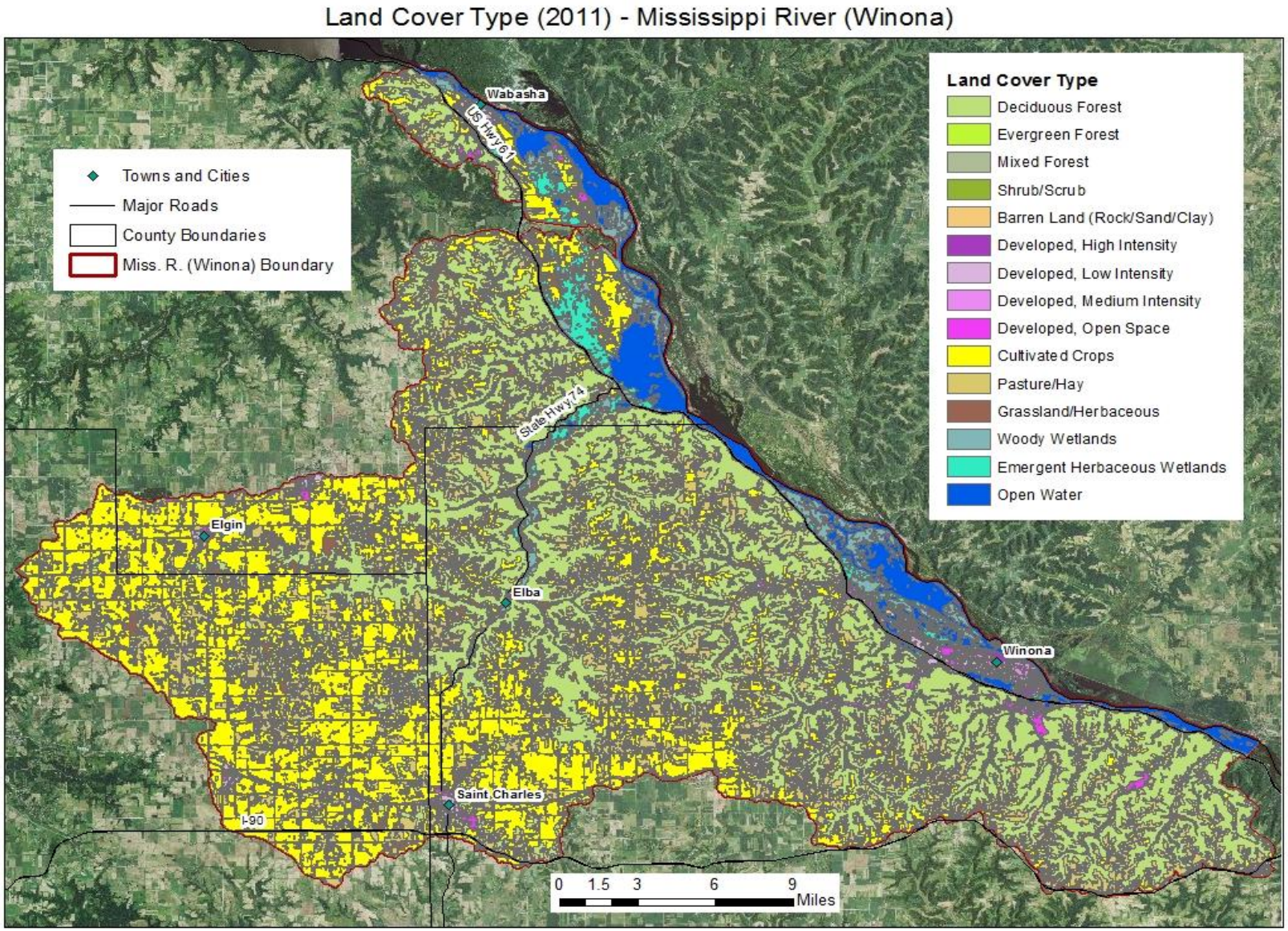


Figure 7. Land cover data from National Land Cover Dataset (NLCD) for the Mississippi River - Winona watershed

Several sites in the Mississippi River - Winona watershed have been mapped and identified as examples of native plant communities (NPCs) by the Minnesota Biological Survey (MBS) (Figure 8). The MBS collects, interprets, and distributes information on the ecology and distribution of rare plants and animals, native plant communities and functional landscapes. A list of the ecological systems identified in the watershed is presented in Table 1. Descriptions of the different ecological systems can be found in the *Field Guide to the Native Plan Communities of Minnesota: The Eastern Broadleaf Forest Province* produced by the Minnesota DNR and available at: http://www.dnr.state.mn.us/npc/index.html. A listing of NPC classes and types is available in Appendix E.

Table 1. Ecological Systems of Native Plant Communities in the Mississippi River - Winona watershed.

System Name	Area (ac)	System Name	Area (ac)
Mesic Hardwood	15767.6	Marsh	1204.8
Floodplain Forest	6051.7	Cliff/Talus	204.3
Upland Prairie	3780.3	Wet Forest	53.5
Fire Dependent Woodland	2848.2	Wetland Prairie	26.6
Wet Meadow/Carr	1489.0	N/A	41.5

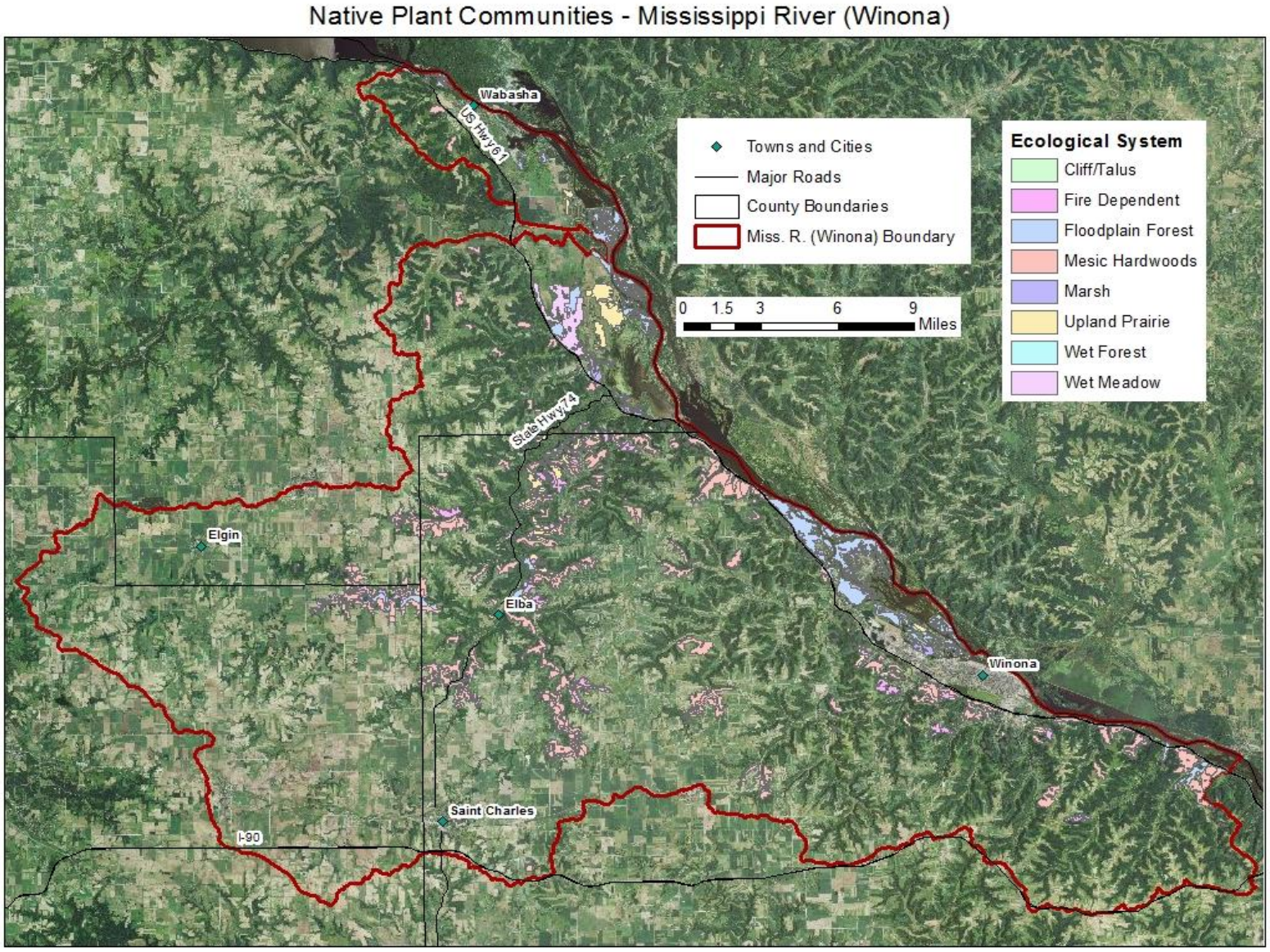


Figure 8. Native Plant Communities in the Mississippi River - Winona Watershed

Several invasive species are a concern in the Mississippi River - Winona watershed. The most common species are reed canary grass, wild parsnip, thistle species, exotic honeysuckle, and buckthorn. Table 2 presents the number of occurrences of invasive species recorded by monitoring efforts on public lands. It is important for management of both private and public lands to address the control of these problem species.

Table 2. Invasive Species Occurrences

Species	Total	Species	Total	Species	Total	Species	Total
Grass, Reed canary	724	Vetch, Crown	7	Maple, Amur	27	Knapweed, Spotted	3
Parsnip, Wild	613	Peashrub, Siberian	6	Grass, Smooth brome	21	Creeping Charlie	2
Thistle spp.	474	Elm, Siberian	5	Buckthorn, Glossy	16	Knotweed, Giant	2
Honeysuckle, Exotic	393	Thistle, Sow	4	Mullein, Common	13	Thistle, Musk/Nodding	2
Buckthorn, Common	338	Grass, Cheat	4	Sweetclover, White	11	Butter and Eggs	1
Vetch, Cow	172	Olive, Russian	4	Mustard, Garlic	10	Trefoil, Birdsfoot	1
Tansy	96	Barberry, Japanese	4	Loosestrife, Purple	10	Vetch, Hairy	1
Locust, Black	55	Thistle, Bull	3	Thistle, Canada	9	Foxglove, Grecian	1
Spurge, Leafy	31	Sweetclover, Yellow	3	Alyssum, Hoary	8		
Thistle, Canada	9	Foxglove, Grecian	1				

F. Rare Natural Features

The unique geology of the Driftless Zone and variable topography of the Blufflands region provide conditions for a diverse array of plant communities and habitats, often in close proximity. This helps to make Southeastern Minnesota, including the Mississippi River - Winona watershed a biodiversity hotspot. The Whitewater Watershed is a particularly important area, harboring a concentration of intact natural communities and presence of numerous rare plant and animal species that give the area statewide significance for biodiversity conservation.

The Mississippi River - Winona watershed contains nearly 90,000 acres of land that the Minnesota Biological Survey (MBS) delineated as potential sites of biodiversity significance (Figure 9). Field assessments of those sites ranked roughly 13,000 acres as Outstanding, 20,000 acres as High, 37,000 acres as Moderate, and 19,000 acres as Below. These rankings are based on presence of rare species populations, size and condition of native plant communities, and the landscape context of the site. Additional information about the process, as well as descriptions of the four biodiversity significance ranks can be found at: http://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html

MBS Biodiversity Significance Rank	Area (acres)
Outstanding	12662.5
High	20272.44
Moderate	37467.92
Below	19390.34
Total	89793.2

The watershed lies in an important region for rare plant and animal species. The Blufflands subsection contains a higher number of state-listed rare species than any other. It is the most important subsection for reptiles and one of the most important for mollusks. The Mississippi River corridor is an important migratory flyway, and the section is an important area for birds such as Henslow's sparrow, prothonotary warbler, Louisiana waterthrush and red-shouldered hawks. Key habitats such as prairie and oak savanna support high numbers of species, and have been severely reduced on the landscape since European settlement. In 2006, the Minnesota DNR had identified 156 species in greatest conservation need (SGCN) that are known or predicted to occur within the Blufflands, including 82 species that are federally or state endangered, threatened, or of special concern. Appendix F contains a list of all rare, threatened, or endangered plants, animals, and communities. Loss or degradation of habitat is the greatest threat for SGCNs, affecting 82% of those found in the Blufflands. Habitat degradation is a problem for 88%. Both careful management of public lands and strategic protection and conservation efforts for private lands in the watershed are important to maintain and enhance habitat for these species.

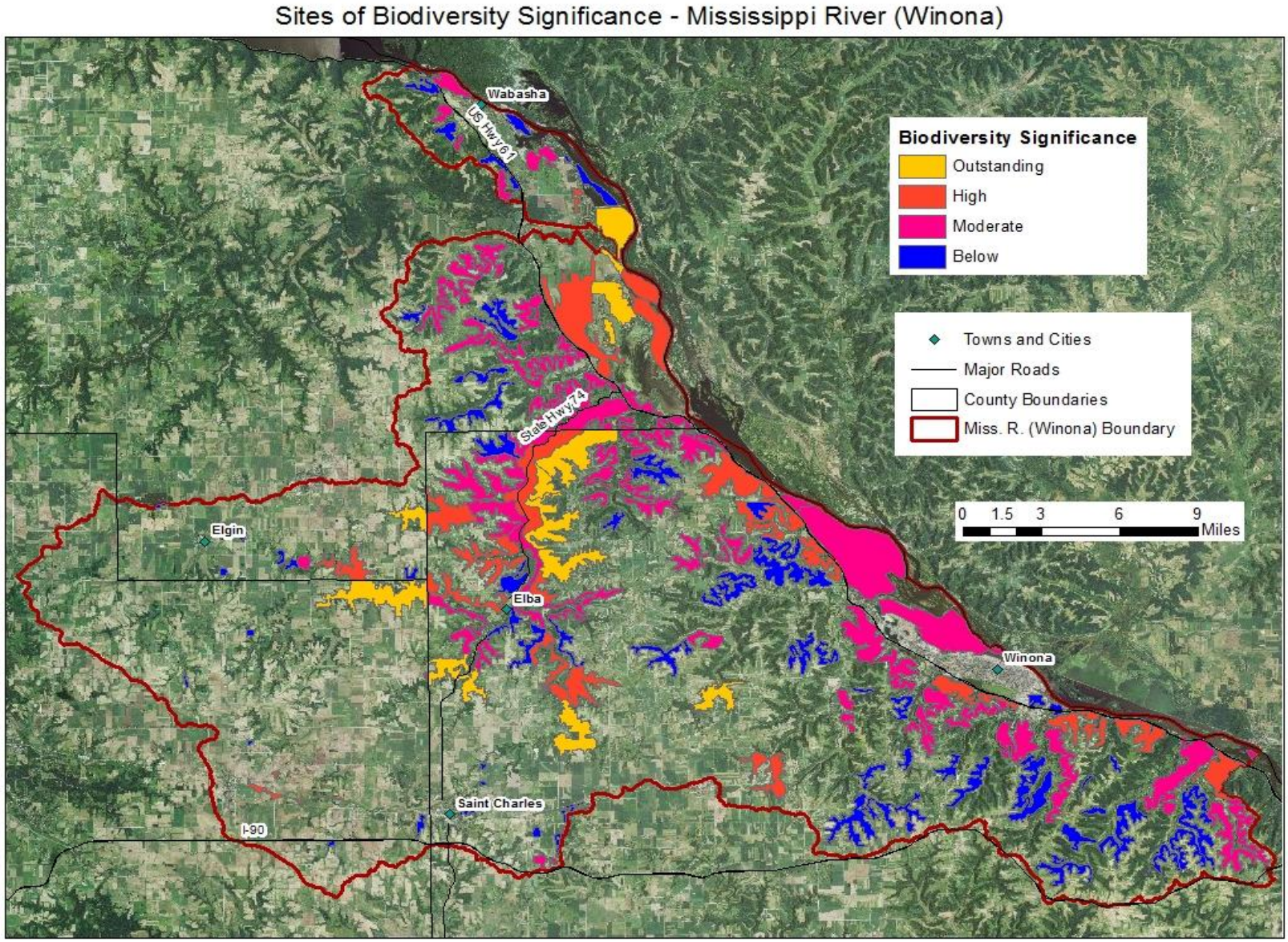


Figure 9. Sites of biodiversity significance in the Mississippi River - Winona Watershed, as mapped by the Minnesota Biological Survey.

G. Wildlife

A number of popular game and non-game wildlife species can be found in the Mississippi River - Winona watershed. White-tailed deer, turkey, pheasants, waterfowl, and doves, and small game can all be hunted in various sections of the Whitewater Wildlife Management Area (WMA). Bald eagles are common sights along the Mississippi River, which is also an important flyway for a large number of other popular large migratory birds like herons, egrets, and duck species. Mammals such as gray fox, red fox, coyotes, woodchucks, squirrels, and weasels occupy the hills and valleys. River otters and beavers are also present along forested river shores. Several snake species, as well as other lizards such as the skink and racerunner are present along bluffs and outcrops.

The Mississippi River, as well as other warm water streams and lakes, supports populations of walleye, northern pike, bass, catfish, sunfish, and crappies. The region is also renowned for its cold-water trout streams which support populations of both brook and brown trout popular with anglers.

H. Historic and Cultural Resources

The region in which the Mississippi River - Winona watershed is located has a rich history dating long before the appearance of Europeans on the American continent, and sites of archeological importance have been discovered in the watershed. Artifacts from Native American communities can be found in many places across the landscape, especially the tops of ravines or coulees, where hunters would wait for prey, high ridges dividing drainages which were useful transportation routes, and stream junctions or along streams where occupying sites were common.

During and after European settlement, the Mississippi River was an important transportation route, and brought commerce and economic resources to the region. The demands of that transportation, and the markets it led to, caused major changes to the land use and native communities, as native prairies were broken into farm fields, and the forested bluff sides to supply lumber and firewood to power steamboats. Evidence for the prosperity of the region during this period remains in much of the architecture in Winona, where many sizeable houses date to the late 1800s and early 1900s. The consequences of this land use are also an important part of the region's history, epitomized by the now abandoned town of Beaver. Located at the intersection of Beaver Creek and the Whitewater River, the town of beaver was a small successful community through the second half of the 1800s, but the floods and sedimentation caused by deforestation and upstream farming practices eventually forced its abandonment. Most of the abandoned farms were purchased by the State of Minnesota, beginning in 1932, and the area is now part of the Whitewater Wildlife Management Area and Whitewater State Park.

Today, the Mississippi River remains important for barge transportation, as well as boating and other aquatic recreation. The cities of Winona and Wabasha include growing art communities that support music, theater, and film festivals throughout the year, along with the Minnesota Marine Art Museum in Winona. Much more information on the history of the region can be found at the Winona County History Center, also in the City of Winona.

I. Land Use

History-

Prior to European settlement, Native American settlements existed predominantly in the river valleys. They farmed the rich alluvial soil of the terraces, gathered fruits, nuts, and other forest products from the forested blufflands, and set fires to maintain open prairies and savannas as hunting grounds. Initial European contact was with explorers and fur traders. The Mississippi River brought European traffic to the valley, and timber harvesting increased to fuel steamboats. In 1851, treaties opened up most of Southern Minnesota to European American settlement and the introduction of more intensive farming methods. Wheat farming became established in the area in 1853, and by 1859 130,000 bushels of wheat were shipped down the Mississippi River from Winona (for more, see: Whitewater River Watershed Project- "A History of the Whitewater Watershed in Minnesota").

As the fertile prairie soils were plowed and converted to agriculture, and forests were cleared for agriculture to the edges of the bluffs, the effect on the soils and hydrology of the region was severe. By the 1920s, farm fields were losing nutrients and topsoil at alarming rates, flooding had increased dramatically, and low lying fields and homes were buried under 15 feet of sediment transported from the fields above. Made urgent by the consequences of a half century of unsustainable farming practices, twentieth century conservation efforts and advances in farming and land use practices have helped to reduce the rates of erosion, flooding, and sedimentation.

Current-

In the western portion of the watershed, cultivated crops dominate the landscape. The most common are corn, forage for livestock, and soybeans. Pasture for livestock is also common in this area. In the eastern portion of the watershed, rangeland and forests increase. Outdoor recreation is popular in forested areas and on streams. Hiking, canoeing, kayaking, biking, cross country skiing, and snowshoeing are all popular, as well as hunting and fishing, especially in or near the Whitewater River, in the State Park and Wildlife Management Area. Many private lands are also kept for outdoor recreation and hunting, with occasional timber harvesting occurring as well.

Today, roughly 85% of the land in the Mississippi River - Winona watershed is privately owned. The area remains rural in character, with the only population center larger than 4,000 people being the city of Winona.

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Section 3.
Conservation Opportunity Areas

To help direct conservation efforts within the watershed in strategic and cost effective ways, three Conservation Opportunity Areas (COAs) have been identified where those efforts can have the greatest impact protecting habitat and water quality. These areas have not been seriously degraded or developed, and support quality natural communities and habitat, but lack much long term protection or management planning. Landforms which are more closely connected to the rivers and streams are also important to protect and improve, as these areas will play a larger role in maintaining water quality in the watershed.

The most important resource for identifying appropriate COAs within a landscape is the firsthand knowledge of local environmental resource professionals and stakeholders. There are also a number of available data sets produced by various state agencies that provide spatial environmental quality information. The best method for COA selection is one that appropriately analyzes the available spatial data for the landscape and uses them to support and enhance the local knowledge and perspectives of partners and stakeholders. This section will describe the data sets and methodology used to provide such an analysis for the Mississippi River - Winona watershed.

A. Overview- What to look for in a COA

Across a landscape, the quality of local areas in terms of habitat and ecosystem function is likely to be spread across a general continuum ranging from high-functioning intact ecosystems to heavily altered and degraded ones. In the most seriously degraded systems, their condition is practically irreversible, and mitigation of broader landscape impacts (e.g. pollution, energy use, water consumption) should be the focus of environmental policies. There will also be highly degraded areas for which restoration to functioning native plant community states could be possible, but would take unreasonably large investments. In the Mississippi River - Winona watershed many areas of agricultural row crops fall into this category. When these lands exist in places of remarkable importance in the landscape, restoration efforts may be appropriate. Over a large scale, however, restoration is not practical, and efforts should focus on sustainable practices to maintain soil fertility and prevent pollution and erosion.

On the other end of the spectrum, high functioning ecosystems exist which have avoided serious degradation or alteration from human activities, and which are most commonly publicly managed and protected from future development or degradation. The historical reasons for their preservation can vary. In the Mississippi River - Winona watershed, such areas are often found on steep forested hillsides which would have been impractical to plow, and where fire would not have been a crucial part of the disturbance regime prior to suppression. After several waves of renewed national and state interest in conservation over the past century, many of these areas have been protected in

some manner. Their impressive natural condition has made them preferred targets of conservation and enhancement activities, which has increased their overall quality relative to nearby areas.
Continued protection and proper management is important to preserve these special areas. However, the added benefit to the overall ecology of the landscape of additional funding or enhancement efforts is likely to be less than work done in areas with more room for improvement.

Between these two extremes will be the areas for which routine conservation efforts will have the greatest impact on the landscape scale. Examples could include existing high quality habitat that is not sufficiently protected from development, areas where natural conditions have recovered from historical abuse but important plant or animal populations have not yet returned, or areas that have not been degraded, but require additional management to maintain high levels of ecosystem function. This plan used GIS software to analyze landscape data and help identify such places within the Mississippi River – Winona Watershed.

B. Data Description

To identify areas of quality habitat most in need of protection, the Mississippi River - Winona watershed was divided into its constituent level 7 minors (as delineated by the MN DNR). Several publicly available data sets were then considered for inclusion in metrics ranking the watersheds according to their overall habitat quality and the ecological threat they are under.

Habitat Quality-

Data Set	Scoring Method	Maximum Possible Score (total = 25)
MBS Biodiversity Significance Rankings	Percent cover of minor watershed ranked as moderate significance or higher, divided by 20.	5
MBS Biodiversity Significance Rankings	Zonal mean of significance rankings scored so that Outstanding=5, High=4, Moderate=3, Low=1, not rated=0.	5
EBI Habitat Quality Index	Zonal mean of EBI habitat quality score. 100 point scale was divided by 10	10
Parcel Density	The natural log of density of parcel centerpoints lying within each minor watershed was subtracted from (5 + min score) so that lower densities were given higher scores.	5

The **Biodiversity Significance Rankings** from the Minnesota Biological Survey (MBS) provide categorical assessments of a sites importance in sustaining the natural biodiversity of Minnesota. A site's biodiversity significance rank is based on the presence of rare species populations, the size and condition of native plant communities within the site, and the landscape context of the site. Sites are ranked as either "Outstanding," "High," "Moderate," or "Below." (http://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html)
The **EBI Habitat Quality Index** is one of three component parts of the Environmental Benefits Index (EBI) compiled by the MNN Board of Water and Soil Resources (BWSR) and the University of Minnesota. It is developed using data from several datasets mapping habitat for biodiversity, game species, birds, and species of greatest conservation need.
Parcel Density was calculated from county parcel maps. Parcel density was calculated by dividing the number of parcels whose centerpoints lie within each minor watershed by the size of the minor watershed in square miles. This density was converted into a five point rating by taking its natural log, and subtracting it from the result of [(minimum density) + 5]. This forces the maximum score for the watershed to be 5, and gives minor watersheds with lower parcel densities higher scores.

Risk Level-

Data Set	Scoring Method	Maximum Possible Score (Total = 48.57)
FRAS Threats and Risk Index	Zonal mean of rating (1,2, or 3), multiplied by 10/3	10
GAP Stewardship 2008	Percent of minor watershed in private (non-conservancy) ownership, divided by 10	10
DoT Basemap Roads- All Types	Road density of minor watersheds in (km/sq. mi.)	8.57 (max observed)
EBI Water Quality Risk Index	Zonal mean of EBI water quality risk score. 100 point scale was divided by 10	10
EBI Soil Erosion Risk Index	Zonal mean of EBI soil erosion risk score. 100 point scale was divided by 10	10

The **FRAS Threats and Risk Index** was compiled by the Minnesota DNR Division of Forestry. It is the result of an overlay analysis of five data layers which project threats to Minnesota forests from wildfire, forest pests, development, and terrestrial invasive species. Wildfire data were created from the LANDFIRE 40 Fire Behavior Fuel Models. Forest pest data were taken from a national "risk mapping" effort by the U.S. Forest Service, Forest Health Technology Enterprise Team. Development risk was assessed from a subtraction of US Census

Burueau Block 2030 and 2000 datasets to predict future housing density, as well as a Wildland-Urban Interface (WUI) analysis using U.S. Census and USGS NLCD data. Terrestrial invasive species data were taken from an ongoing multi-divisional effort within the MN DNR to record GPS locations of selected terrestrial invasive plants. All layers were classified to low, medium, and high levels, then combined. The resulting combined map was again reclassified into scores of low, medium, or high risk (1, 2, or 3 respectively). More information is available at: http://files.dnr.state.mn.us/forestry/subsection/mnForestResourceAssessment.pdf

The **GAP Stewardship 2008** data layer is a map of land ownership in Minnesota. Attributes are available for both ownership and administrator. It was used to determine what percentage of each minor watershed is under private ownership, not counting non-governmental conservation organizations. Data layer documentation is available at:

http://deli.dnr.state.mn.us/metadata.html?id=L390005860201

The **DOT Basemap Roads- All Types** layer is a map of all roads which are depicted on the USGS 1:24,000 mapping series. It was used to determine the road density of minor watersheds. Data layer documentation is available at:

http://deli.dnr.state.mn.us/metadata.html?id=L300000052102

The **EBI Water Quality Risk Index** is one of three component parts of the Environmental Benefits Index (EBI) compiled by the MNN Board of Water and Soil Resources (BWSR) and the University of Minnesota. It uses an area's Stream Power Index (SPI) and its proximity to water to assess the likelihood of it contributing runoff from overland flow.

The **EBI Soil Erosion Risk Index** is one of three component parts of the Environmental Benefits Index (EBI) compiled by the MNN Board of Water and Soil Resources (BWSR) and the University of Minnesota. It uses a subset of the Universal Soil Loss Equation (USLE) to assess the potential for soil erosion in an area.

C. Analysis and Results

GIS software was used to calculate scores from the layers described above for the 45 minor watersheds within the Mississippi River - Winona Watershed. These were summed into minor watershed habitat quality and risk scores. Figure 10 demonstrates the framework used to interpret those scores, with habitat quality scores considered a measure of watershed health, and risk scores as the inverse of protection. Watersheds with poor health are in need of more difficult and costly restoration efforts. On the other hand, many of the watersheds with the highest environmental health are also protected through public ownership or private stewardship efforts. The most efficient use of resources will be focused on those areas that are currently healthy, but are less protected and may be at risk (the "protect" quadrant).

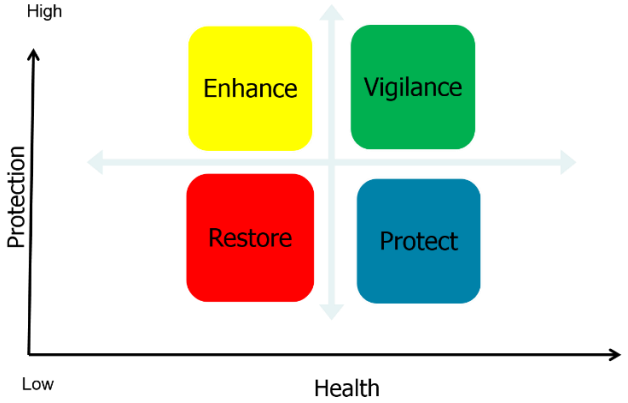

Figure 10. Framework for interpreting watershed quality and risk scores.

By plotting the habitat quality and level of protection for each watershed against each other, and setting the mean value for each metric at the origin, each minor watershed was placed into a quadrant similar to those in the figure above. These results are presented in the Figure 11, and the quadrant in which each watershed falls is noted on table 3. A map showing the conservation strategy assigned to each minor watershed is shown in Figure 12.

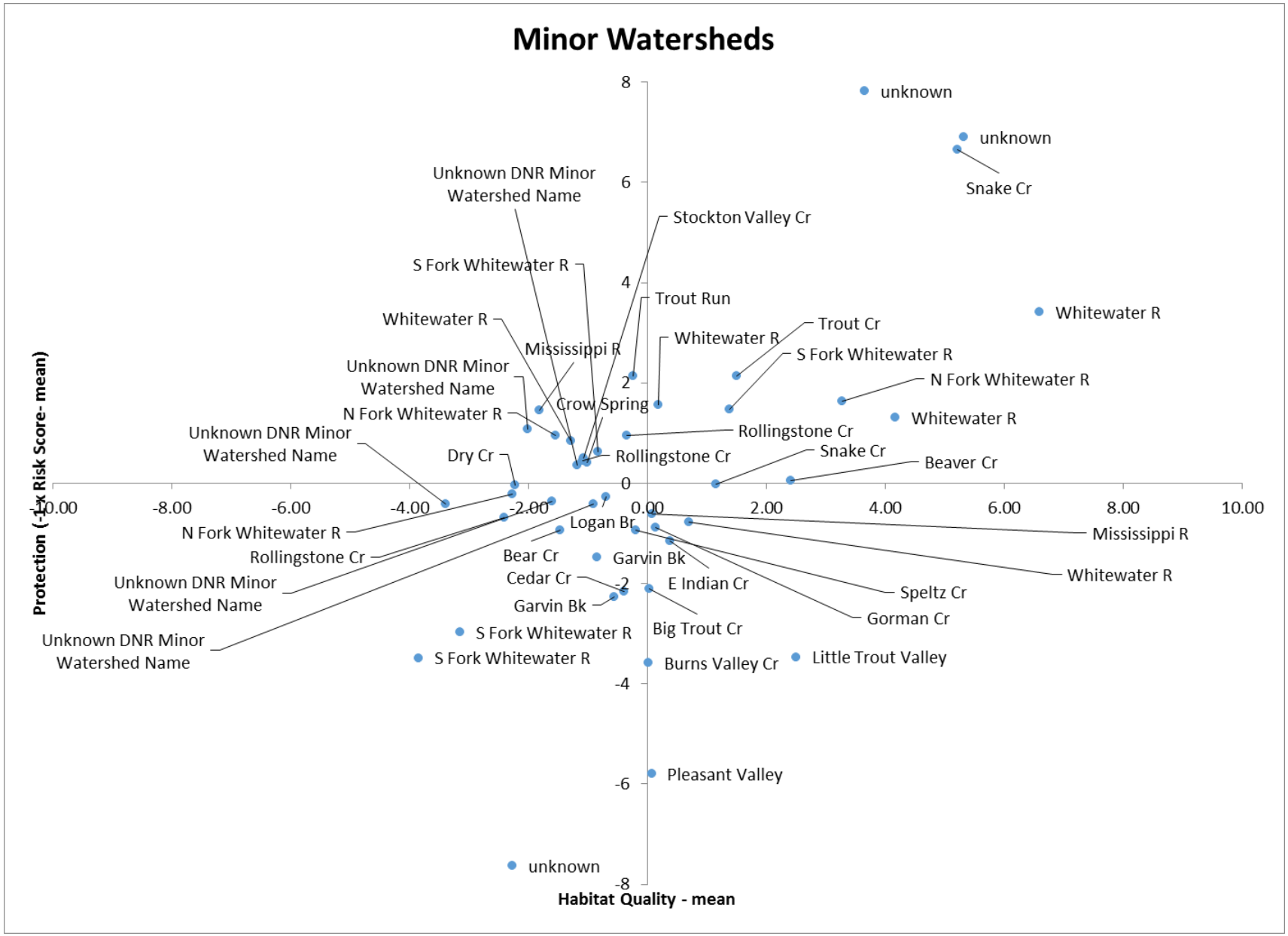

Figure 11. Conservation strategy quadrants for the level 7 minor watersheds.

Table 3. Scores and strategy quadrant for level 7 minor watersheds.

ID Number	Minor Watershed Name	Risk Score	Habitat Quality Score	Conservation Strategy
40001	Mississippi R	27.08	6.05	Enhance
40002	Little Trout Valley	32.00	10.37	Protect
40003	Big Trout Cr	30.64	7.90	Protect
40004	Cedar Cr	30.70	7.47	Restore
40005	Pleasant Valley	34.34	7.94	Protect
40006	Mississippi R	29.16	7.95	Protect
40007	Burns Valley Cr	32.12	7.88	Protect
40008	Garvin Bk	30.01	7.02	Restore
40009	Rollingstone Cr	28.09	6.78	Enhance
40010	Rollingstone Cr	29.22	5.46	Restore
40011	Speltz Cr	29.47	7.68	Restore
40012	Trout Cr	26.39	9.37	Vigilance
40013	Whitewater R	25.12	14.46	Vigilance
40014	E Indian Cr	29.69	8.25	Protect
40015	Beaver Cr	28.49	10.27	Vigilance
40016	Whitewater R	27.23	12.03	Vigilance
40017	N Fork Whitewater R	26.90	11.15	Vigilance
40018	Whitewater R	29.31	8.57	Protect
40019	Whitewater R	26.98	8.05	Vigilance
40020	Trout Run	26.40	7.63	Enhance
40021	S Fork Whitewater R	32.02	4.02	Restore
40022	Unknown DNR Minor Watershed Name	27.46	5.85	Enhance
40023	S Fork Whitewater R	27.91	7.04	Enhance
40024	S Fork Whitewater R	27.07	9.25	Vigilance
40025	Unknown DNR Minor Watershed Name	28.95	6.96	Restore
40026	Bear Cr	29.48	6.40	Restore
40027	Rollingstone Cr	27.59	7.52	Enhance

40028	Unknown DNR Minor Watershed Name	28.18	6.68	Enhance
40029	Garvin Bk	30.81	7.31	Restore
40030	Stockton Valley Cr	28.04	6.80	Enhance
40031	Dry Cr	28.57	5.64	Restore
40032	Snake Cr	28.55	9.02	Protect
40033	Gorman Cr	29.42	8.01	Protect
40034	N Fork Whitewater R	27.58	6.33	Enhance
40035	N Fork Whitewater R	28.76	5.59	Restore
40036	Snake Cr	21.89	13.08	Vigilance
40037	Logan Br	28.81	7.17	Restore
40038	Whitewater R	27.69	6.58	Enhance
40039	S Fork Whitewater R	31.50	4.72	Restore
40040	Crow Spring	28.13	6.86	Enhance
40041	Unknown DNR Minor Watershed Name	28.89	6.27	Restore
40042	Unknown DNR Minor Watershed Name	28.95	4.47	Restore
40043	unknown	36.17	5.59	Restore
40044	unknown	20.71	11.52	Vigilance
40045	unknown	21.63	13.19	Vigilance

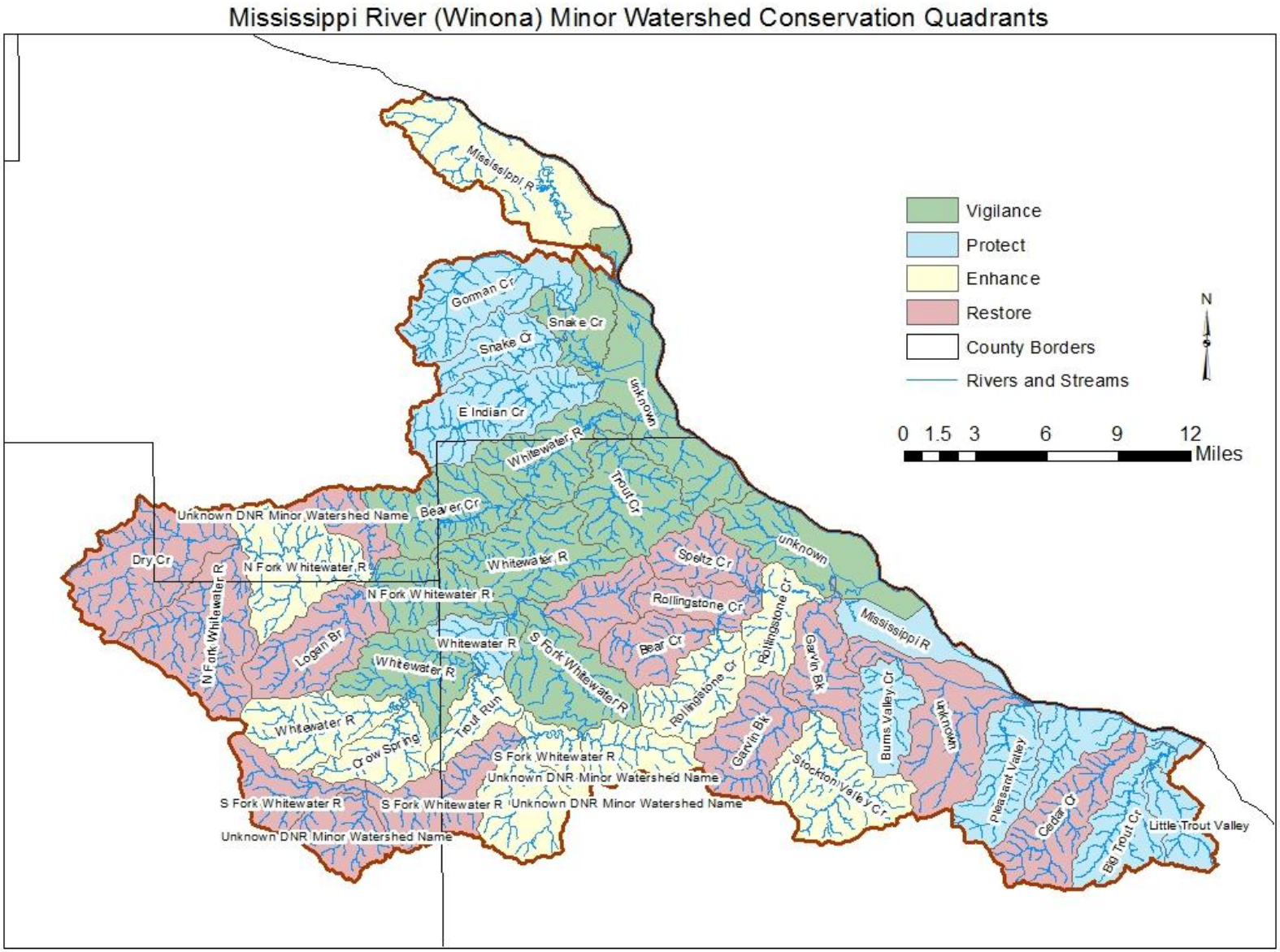

Figure 12. Geographic distribution of conservation strategy quadrants for each level 7 minor watershed.

D. Selected COAs

Three areas were selected as Conservation Opportunity Areas: the Weaver, Beaver, and City of Winona COAs. Their boundaries are shown on Figure 13. The Weaver COA covers 54,015 acres, and includes the drainages for East Indian, Snake, and Gorman Creeks, located North of the Whitewater Watershed, as well as the Section of the Mississippi River into which they flow. The Beaver COA covers 83,171 acres. It is made up of the predominantly forested portion of the Whitewater River Drainage, including Beaver Creek. The City of Winona COA is the largest of the three, covering 67,217 acres. It includes all the "butterfly" tributaries south of the Garvin Brook watershed, including Pleasant Valley, Cedar, and Trout Creeks, as well as the adjacent section of the Mississippi River.

These three COAs represent places of emphasis for the conservation actions outlined later in the plan. Individual stewardship plans for each COA will also be produced, focusing on the resources and needs of each, as well as the strategies that will be most appropriate to the different social resources and ownership patterns within them.

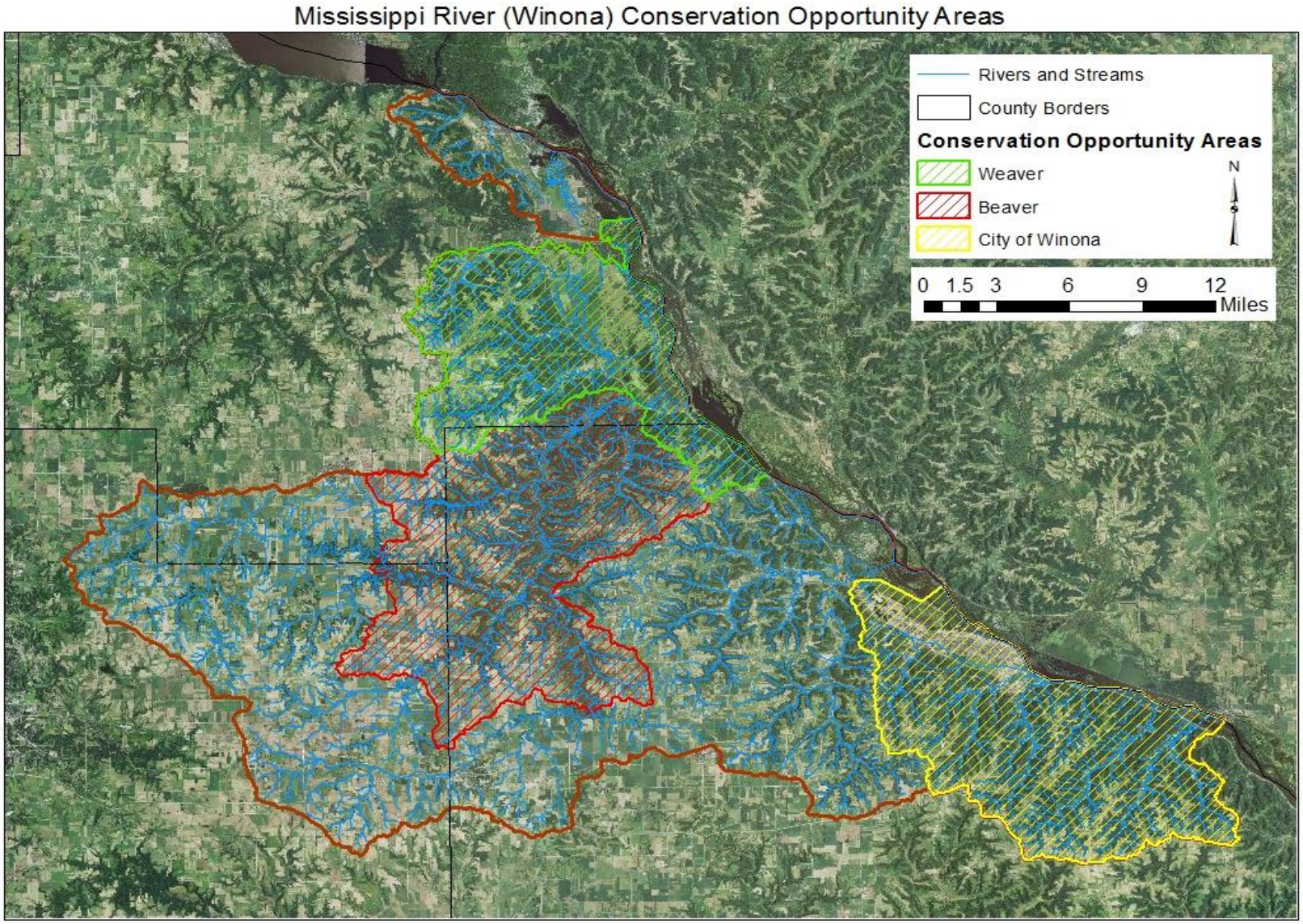

Figure 13. Selected Conservation Opportunity Areas within the Mississippi River - Winona Watershed.

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Part 2. Strategic Policy Framework: Where do we want to go?

Section 4.
The Vision

A. Vision Statement

This plan adopts for the Mississippi River - Winona watershed a vision developed by the Basin Alliance for the Lower Mississippi in Minnesota (BALMM).

It envisions:

Water resources with:	Land uses supporting:	Agricultural resources including:
• Safe drinking water from its aquifers • Surface water supporting thriving aquatic ecosystems	• Healthy, resilient, and diverse terrestrial ecosystems • Outdoor recreational opportunities	• Ruminant livestock • Local food production • Managed woodlands • Biomass production

All of which coexist to support vibrant rural communities.

B. Desired Future Conditions

The following Desired Future Conditions (DFCs) are intended to bring that vision into sharper focus. These are more specific attributes of the vision for the watershed. Like the rest of the plan, they are subject to revision and refinement by partner organizations. They include:

- Healthy streams with biotic integrity and native vegetation
- Streams that have rehabilitated banks and native floodplain vegetation
- Large habitat buffers and corridors around and between core biodiversity areas
- A restored natural fire disturbance regime
- Consistent funding for various landowner activities such as invasive species control and native plant community restoration
- A more robust hardwood timber market supporting sustainable private timber management
- A single point of contact for landowner education, cost share assistance, and marketing of services
- Active comprehensive conservation planning on priority sites
- Up-to-date county land use plans protecting rare features

In accomplishing this, the following water quality, ecological, economic, and social conditions will be met:

Water Quality

- All streams within the Mississippi River - Winona Watershed are removed from the Minnesota Pollution Control Agency (MPCA) Impaired Waters list.
- Native aquatic species are protected, and game fish populations are robust.
- Streams are buffered by riparian areas occupied by native plant communities.
- Invasive species are controlled through appropriate management and monitoring.
- Best Management Practices (BMPs) are emphasized in forest, agricultural, urban, and natural area management through outreach, education, and monitoring.
- Karst features are protected. Native plant community buffers reduce run off pollutants entering groundwater.

Ecology

- Native Plant Communities exist in numbers and sizes large enough to perpetuate these communities
- The full diversity of habitats native to the region is present on the landscape
- Protected native plant communities are buffered by a surrounding matrix of well managed private forest and grasslands. Connectivity is increased through habitat corridors.
- Invasive species are controlled through appropriate management and monitoring.
- Prescribed burns are used to imitate pre-suppression era fire-disturbance patterns. The presence of fire dependent communities is expanded.

Economy

- A diverse agricultural industry is a major contributor to the local economy, while featuring management practices that protect soil and water resources.
- Cost-share, incentive, and tax break programs that provide economically viable options to promote sustainable forest management are available and advertised. Outreach efforts engage private landowners in priority areas for water quality or habitat enhancement.
- Professional assistance is readily available to landowners for resource management. This results in management that optimizes resources, meets landowner objectives, and maintains ecological and habitat benefits.
- Local hardwood timber and forest product markets are reinvigorated, allowing landowners to benefit from sustainably managed woodlands.
- An outdoor recreation and tourism industry continues to flourish.

Social

- Increased education and awareness of the value of natural resources in the watershed.
- Community and citizen group participation in resource management, monitoring, and restoration is encouraged.
- A land ethic is fostered among land managers, community and citizen groups, and local communities.
- State and local agencies and nongovernment conservation organizations engage in productive coordination and collaboration to accomplish the goals and visions outlined in this plan.
- An integrated and coordinated service delivery system is implemented between service providers and landowners to provide appropriate assistance to individual landowners to further the desired future conditions outlined in this plan.

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Section 5.
Goals and Objectives

In support of the above vision, this plan offers four goals, along with objectives necessary to achieve them. Specific and measurable action items are then listed to help accomplish each objective.

Mississippi River - Winona Watershed Goals:

1. Protect and enhance existing biodiversity and watershed health
2. Educate and engage with local landowners, and stakeholders.
3. Support and coordinate additional ongoing conservation efforts
4. Monitor results of watershed conservation efforts and adapt this plan accordingly.

Goal 1 - Protect and Enhance Existing Biodiversity and Watershed Health

Objectives:

1.1. Protect and manage large blocks of native habitats
1.2. Protect critical landforms for biodiversity and watershed health
1.3. Restore natural fire regime in fire dependent communities
1.4. Prevent and control non-native species

Objective 1.1: Protect and manage large blocks of native habitats		
Action items:		Relevant Agency(ies)
A)	Hold and manage currently protected blocks of native habitats in their natural state	DNR Divisions; TNC
B)	Restore natural vegetation in floodplains	SWCDs; DNR Fisheries
C)	Contact landowners near important natural areas to assess interest in easements and level of engagement for Graduated Service Delivery (GSD)	DNR Forestry; MLT; SWCDs
D)	Encourage landowner participation in programs that promote the maintenance of native habitats	SWCDs; DNR Divisions; TNC
E)	Support and pursue opportunities for increased protection through public acquisition in strategically important areas according to this or similar plans (e.g. the 1979 Richard J Dorer Memorial Hardwood Forest Plan, "A Plan for Land Acquisition").	DNR Forestry; TNC

Objective 1.2: Protect critical landforms for biodiversity and watershed health		
Action items:		Relevant Agency(ies)
A)	Protect maderate cliff habitats, as well as upslope buffer areas, preferably through direct acquisition	DNR Divisions; SWCDs; Local Governments
B)	Protect native communities and habitats that increase connectivity, such as habitat corridors and riparian areas through direct acquisition, conservation easements, or incentive programs like SFIA	DNR Divisions; TNC; MLT; SWCDs; BWSR; Local Governments
C)	Increase presence of perennially vegetated stream buffers in upper and lower reaches	SWCDs; DNR Fisheries
D)	Preserve groundwater health by protecting karst features such as sinkholes, spring seeps and spring source areas	DNR Divisions; SWCDs
E)	Enforce state shore land ordinance	Local Governments; SWCDs
F)	Close State Highway 74 between County Rd. 30 and Weaver during spring and early summer to protect herpetofauna migration	MN Department of Transportation (MNDoT)

Objective 1.3: Restore natural fire regime in fire dependent communities		
Action items:		Relevant Agency(ies)
A)	Reintroduce fire to an increasing area, including larger scale burns where appropriate, and reestablish a disturbance regime of low intensity surface fires	DNR Forestry; DNR Wildlife

Objective 1.4: Prevent and control non-native species		
Action items:		Relevant Agency(ies)
A)	Support resource agencies' efforts to increase landowner awareness of invasive species and prevention and control methods	SWCDs; U of M Extension
B)	Distribute information to local officials in the watershed on prevention and control of invasive species	MFRC SELC; U of M Extension
C)	Maintain current and historical GIS records of invasive species	DNR Divisions
D)	Inventory private lands for presence of invasive species, track invasive species on private lands with Forest Stewardship Plans	DNR Forestry

Goal 2 - Educate and Engage Local Landowners and Stakeholders

Objectives:
2.1. Promote private conservation planning
2.2. Promote agricultural practices that improve water quality
2.3. Identify, connect, and engage current operational groups
2.4. Encourage Utilization of BMPs
2.5. Promote social benefits of ecosystem services and natural resources

Objective 2.1: Promote private conservation planning		
Action items:		Relevant Agency(ies)
A)	Increase frequency and use of comprehensive Property Habitat Stewardship Plans that include forest, prairie, riparian, and agricultural lands on private property	MFRC SELC; SWCDs;
B)	Educate landowners on and encourage proper management of mesic oak and hardwood/white pine communities	DNR Forestry; SWCDs; MFRC SELC
C)	Coordinate technical assistance from multiple agencies and stakeholders	WWJPB; MFRC SELC; SWCDs
D)	Establish single point of contact to assist landowners in learning about and applying for conservation and forest management incentive programs	WWJPB; Landscape Specialist

Objective 2.2: Promote agricultural practices that improve water quality		
Action items:		Relevant Agency(ies)
A)	Promote use of perennial vegetation throughout the watershed	SWCDs; DNR Divisions
B)	Encourage total land management	SWCDs; DNR Divisions

Objective 2.3: Identify, connect, and engage currently operational conservation groups		
Action items:		Relevant Agency(ies)
A)	Create a current list of operational service provider groups and their land management activities, including citizen action groups, agricultural groups, and wildlife groups	MRFC SELC; DNR Divisions

Objective 2.4: Encourage Utilization of BMPs		
Action items:		Relevant Agency(ies)
A)	Expand usage of PFMM database as a tool for service providers to determine guidelines for particular landowners	DNR Forestry; SWCDs

B)	Use the PFMM to determine BMPs ahead of site visits through training and support	DNR Forestry; SWCDs
C)	Promote local consulting businesses who meet CEU requirements and have local forest resource knowledge	DNR Forestry; SWCDs; U of M Extension

Objective 2.5: Promote social benefits of ecosystem services and natural resources		
Action items:		Relevant Agency(ies)
A)	Have landscape resources specialists available for field visits to communicate social benefits of forestry, prairies, buffers, and pastures	MFRC
B)	Provide education and workshops tailored to specific groups to inspire volunteer efforts led by citizen groups	U of M Extension
C)	Integrate information on social benefits of sustainable forestry, prairies, buffers, and pastures in outreach documents	MFRC SELC; DNR Extension

Goal 3 - Support and Coordinate Conservation Efforts

Objectives:
3.1 Support public conservation and protection
3.2 Support sustainable forest products markets and management
3.3 Support information management for private conservation planning
3.4 Coordinate management of ecological and water resources

Objective 3.1: Support public conservation and protection		
Action items:		Relevant Agency(ies)
A)	Work with landowners, local government, non-governmental conservation organizations and DNR divisions to support acquisition of new conservation land	DNR Divisions; TNC; SWCD
B)	Coordinate conservation practices and operations between public land managers and watershed stakeholders	WW Joint Powers Board; DNR Divisions

Objective 3.2: Support sustainable forest products markets and management

Action items:		Relevant Agency(ies)
A)	Establish a forest bank program in the region	MFRC SELC
B)	Work with DNR Division of Forestry to educate forest products businesses in the region about new technologies for under-utilized species and identify potential markets	MFRC SELC

Objective 3.3: Support information management for private conservation planning		
Action items:		Relevant Agency(ies)
A)	Conduct spatial analysis of past and existing forest patterns within the watershed	MFRC SELC
B)	Document the current number of stewardship plans in the watershed	MFRC SELC
C)	Develop inventory of privately owned properties in the watershed, and assess, summarize, and map parcels based on size, landowner tenure (to be determined for GSD and ranking purposes), landowner residency pattern, intersection with high biodiversity sites, public land proximity, and adjacency to water bodies including intermittent trout stream tributaries	MFRC SELC
D)	Compile a database of landowner information based on their interests and history of actions	SWCDs; MFRC SELC; DNR Forestry (CFM)

Objective 3.4: Coordinate management of ecological and water resources		
Action items:		Relevant Agency(ies)
A)	Integrate Landscape Stewardship Plan goals, objectives and actions into local Water Plans, land Use Plans, and other conservation plans in the watershed	MFRC SELC; SWCDs
B)	Provide coordination and technical assistance to programs and projects that promote biodiversity	MFRC SELC
B)	Target resources to COA areas	SWCDs; DNR Divisions

C)	Partner with local groups, including agricultural organizations to protect and restore watershed health	SWCDs; DNR Divisions; NRCS
D)	Hold annual stakeholder meetings to coordinate completed, ongoing, and planned activities	MFRC SELC

Goal 4- Monitor Results of Watershed Conservation Efforts and Adapt This Plan Accordingly

Objectives:

4.1. Monitor, assess, and report on ecological resources and water quality conditions and coordination activities
4.2. Monitor, assess, and report on social goals
4.3. Monitor, assess, and report on economic activity

Objective 4.1: Monitor, assess, and report on ecological resources and water quality conditions and coordination activities		
Action items:		Relevant Agency(ies)
A)	Monitor changes in: NPC and RNF within ECS Land Type Associations; Site-level Guidelines implementation; Stream water quality; Citizen stream monitoring; DNR Fisheries stream surveys	WWJPB; MPCA; MFRC SELC
B)	Summarize aquatic biological monitoring and update annually to establish trends where data allow	MPCA; DNR Fisheries; MFRC SELC
C)	Develop objective thresholds for land cover characteristics (e.g. proportion of perennially vegetated riparian area, percent forest cover) related to healthy aquatic communities and water quality	DNR, TNC, Other
B)	Report changes	All Above
C)	Revise goals and objectives as needed	MFRC SELC; WWJPB

Objective 4.2: Monitor, assess, and report on social goals		
Action items:		Relevant Agency(ies)
A)	Create outreach database with a landowner registry and citizen/community group registry that allows for easy tracking of outreach efforts, integrated with PFMM	MFRC SELC; WWJPB
B)	Track landowner and citizen group engagement and introduction path	MFRC SELC; WWJPB
C)	Track records of landowners at each GSD level and individual changes	MFRC SELC; WWJPB

Objective 4.3: Monitor, assess, and report on economic activity		
Action items:		Relevant Agency(ies)
A)	Develop annual Southeast Minnesota Forest Industry Survey for vendors and processors	MFRC SELC; DNR Forestry
B)	Track changes to Southeast Minnesota Forest Products Industry Directory	MFRC SELC; DNR Forestry; Forest industry groups
C)	Track changes to Southeast Minnesota consulting and vendor lists	MFRC SELC; DNR Forestry

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Part 3. Operationalizing the Plan: How will we get there?

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Section 6.
Coordination Framework

A. Overview

With the wealth of government agencies, non-profit organizations, conservation groups, and stakeholders working in the watershed, coordinating efforts between them can make more efficient use of both and time and resources, increasing the impact each group makes on the ecological health of the watershed.

Achieving the goals of this plan will require a wide variety of groups and agencies to provide seamless service to private landowners interested in managing their land, while also performing public land management in a manner and sequence that makes the biggest impact. All agencies involved should complement each other's efforts towards the common goal of implementing sustainable natural resource management.

B. Partners and Partnerships

Conservation and stewardship of natural communities, ecosystem health, and water quality require sustainable behaviors and attitudes from numerous private individuals and public agencies that affect economic, cultural, and recreational resources of the community. As such, it is an inherently collaborative effort. The potential partners for conservation in the Mississippi River - Winona watershed include a number of state and federal agencies, as well as non-governmental conservation groups. The list below includes many (but not necessarily all) such partners:

Federal Agencies:	**State Agencies:**
• U.S. Fish and Wildlife Service (USFWS) • NRCS **Non-governmental Groups and Organizations:** • BALMM • Consultants • MN Deer Hunters Association • Minnesota Land Trust • Pheasants Forever • The Nature Conservancy • Trout Unlimited • The Trust for Public Land • Land Stewardship Project	• BWSR • DNR Ecological & Water Resources • DNR Fisheries and Wildlife • DNR Forestry • DNR Parks and Trails • MDA • MFRC • MPCA • SE MN Water Resource Board • SWCDs • U of M

* See Appendix A for agency abbreviations

C. Implementation through Coordination

Useful, productive teamwork between agencies and stakeholders rarely happens automatically. Rather, it is the result of committed partners working together within structures that encourage and support collaboration. The continued use and implementation of this plan will depend on partners and stakeholders remaining committed to the goals and actions it outlines. This will be aided by the continued presence of a Landscape Specialist to serve as a single point of contact for coordination and monitoring, and a Landscape Stewardship Committee that will monitor progress and provide guidance on its implementation.

Landscape Stewardship Committee

The Landscape Stewardship committee will guide implementation of the plan through its tenure. It will follow through on plan goals and objectives, and evaluating programs and results to make necessary adjustments through adaptive management. Members will also be a resource for partners seeking input on implementation strategies or funding sources. It will oversee the Landscape Specialist.

Landscape Specialist

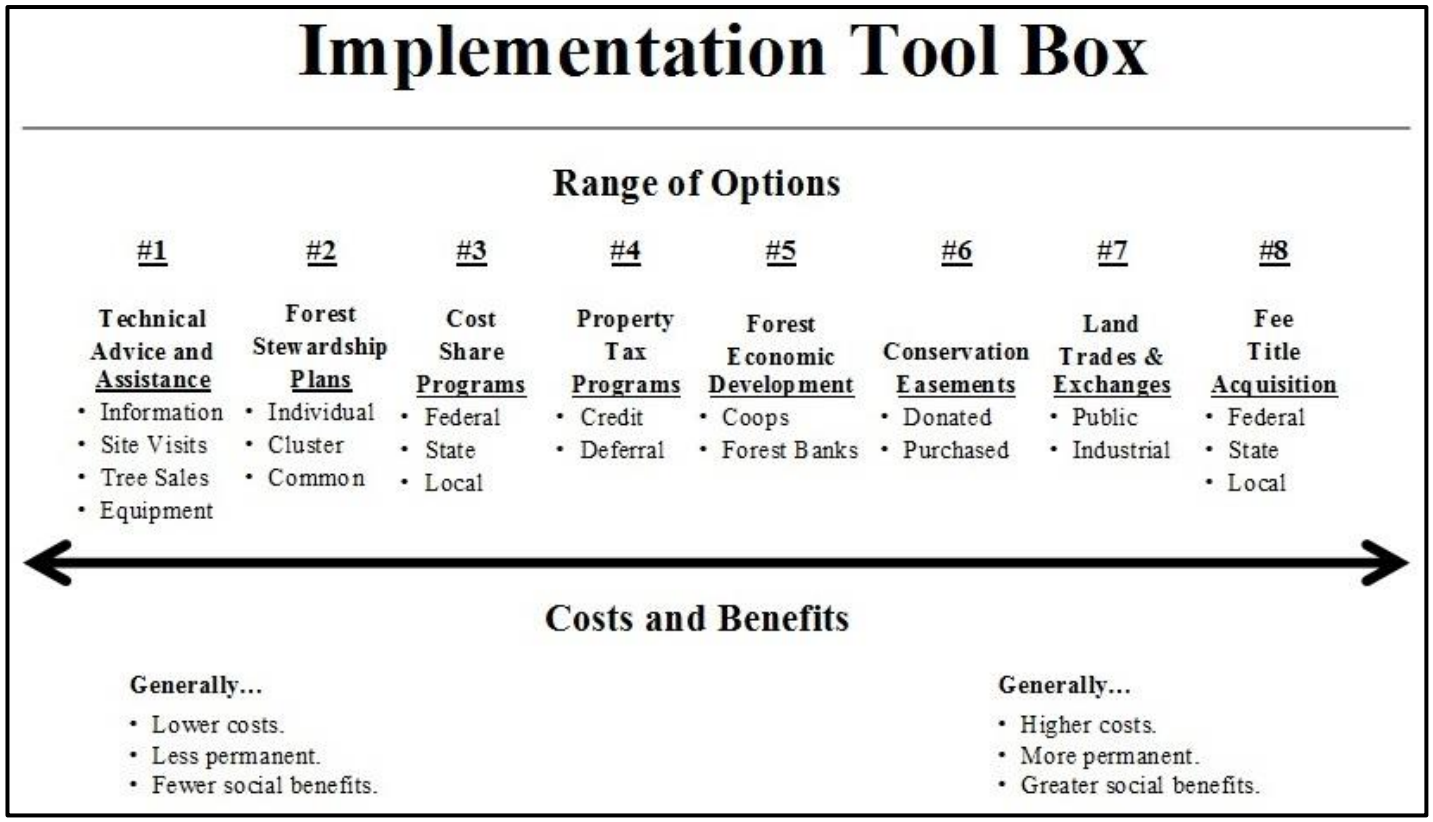
The Landscape Specialist will serve as the first point of contact for coordination efforts associated with the LSP, and will take charge of coordinating activities connected with it. Under the direction of the Landscape Stewardship Committee, s/he will oversee conservation

activities in the Mississippi River -Winona Watershed and the COAs outlined in the plan. Additionally, s/he will keep track of monitoring efforts and results so that improvements can be made and successes can be communicated to the public.

D. Implementation Strategies and Tools

The strategies and techniques for protecting and managing natural communities are broad and varied. Options range from providing information and advice to interested landowners to full fee title acquisition and management by a state or non-governmental conservation organization. The "Private Forest Management (PFM) Implementation Tool Box" illustrates how many of these options fall along a spectrum from least to most costly and least to most permanent and beneficial.

The "PFM Implementation Tool Box": Foundation to Service Delivery to Private Woodland Owners



Source: Dan Steward, Minnesota Board of Water and Soil Resources

As the diagram suggests, services provided to landowners on the left tend to be less costly, but are also less permanent in nature and less explicitly connected with societal benefits. In contrast, techniques listed further to the right side of the spectrum, while more costly, generally tend to have a greater degree of permanence and produce more easily recognized benefits to society. An efficient strategy recognizes that different options will be appropriate on different scales and in different places, depending on the human, economic, and natural communities involved. This is especially true in a landscape like the Mississippi River - Winona, where the majority of the land is privately owned. When working with private landowners, 5 categories of implementation strategies useful in most any resource management endeavor can be described as follows:

- **Outreach & Education- [SWCDs, DNR, U of M Extension]**
  The majority of landowners and the public value healthy natural communities, but may not be informed about the full benefits they provide to society, or the ways they can help protect and enhance them. Educating landowners on sustainable forest management, invasive species control methods, and best management practices for forestry and agriculture can help them take measures to protect and enhance the ecological health of their property. Informing the broader public on the value of natural communities, and ways to prevent the spread of invasive species can also be helpful.

- **Technical Assistance [DNR Forestry, WWJPB]**
  The adoption of sustainable forestry practices, and best management practices can be greatly improved when landowners are provided with technical assistance needed to properly implement them. This can be done directly by professionals within state agencies, such as DNR Forestry, or through local consultants and contractors with the necessary skills.

- **Financial Assistance [NRCS, BWSR/SWCDs, DNR]**
  Incentive programs provide technical and financial assistance that is designed to help achieve goals and policies established by Federal, State, and local agencies. Incentive programs have long been the foundation for promoting forest stewardship among landowners. Examples include EQIP and CRP programs from the NRCS. BWSR also provides financial assistance programs through local SWCDs.

- **Public Investments**
  Local, State, and Federal investments are made in all communities on a regular basis. Public investments are made to construct public facilities and support public lands, and their location and operation across the watershed can significantly impact, positively or negatively, private land use decisions. Roads, bridges, and waterways that provide a public good also encourage and support private investment. Partners and stakeholders concerned about conserving natural communities should consider strategies that help shape relevant decision-making processes related to public investments. This is especially critical in lean budget times.

- **Policy Integration**
  Forest resources in a given landscape can be directly impacted by management plans and policies that govern land use, economic development, transportation, utilities, water resources, forest resources and other natural resources. To better influence future policy and minimize issues, partners and key stakeholders must be aware of existing and proposed development policies and how they may impact

natural resources stewardship planning efforts. They must also be engaged early in policy discussions to integrate sustainable resource management into the planning process. Landscape stewardship can provide reliable and relevant information for local officials to help define the context and value of forest resources in a community.

In implementing the actions called for in this plan, partnerships between the agencies listed above and the Landscape Specialist will be crucial. When planning management on public or private lands within the COAs, agencies should consult the COA plans included at the end of this plan, as well as the Landscape Specialist, for direction and funding. Example partnerships and teams are listed below:

MFRC Southeast Landscape Committee

The MFRC Landscape Program fulfills the MFRC's charge to "encourage cooperation and collaboration between public and private sectors in the management of the state's forest resources." This grass-roots effort builds relationships, strengthens partnerships, and identifies collaborative forest management projects that address local needs and represent concrete steps in determining and reaching citizen-identified short-term and long-term goals for broad landscape regions. Committee members represent forest industry, natural resource agencies, individual landowners, non-profit organizations, educational institutions and concerned citizens. The Southeast Landscape Committee provides oversight to the Landscape Specialist.

The Landscape Specialist is to serve as the point of contact in connecting private landowners' needs to these more technical experts. Additionally, during slower periods of activity on private land, the Landscape Specialist could assist with the occasional overflow of work in these agencies. The multi-faceted interaction between the Landscape Specialist and these agencies would allow the Landscape Specialist to be available for multiple purposes.

Whitewater Watershed Project and Joint Powers Board

The Whitewater River Watershed Project exist to continue to nurture a land stewardship ethic amongst those that live, work, and recreate in the watershed. The project focuses on improving water-quality, reducing sedimentation and flooding, and improving habitat for all plants and animals. Through its programs, the project helps make technical assistance for design and installation of conservation practices available, provides education and outreach, and organizes a citizen stream monitoring program. Forestry services, such as tree planting, timber stand improvement, stewardship plans, and harvest recommendations, are provided with resources from the DNR Division of Forestry. The Whitewater Watershed is also a pilot area for the new Minnesota Agricultural Water Quality Certification Program.

E. Funding Strategies and Opportunities through Collaboration

How will the implementation of this landscape-scale forest stewardship initiative be funded? Experience has shown that landscape approaches to natural resource conservation tend to have a synergistic effect on funding. Partners that get involved in a landscape-scale project area do so because it meets some of their own resource or public relations goals. Because of this they can support efforts in the project area.

Landscape-scale, multi-partner, coordinated efforts often carry increased weight with foundations, trusts, and government agencies when it comes to applying for grants. Federal and state funding agencies as well as private foundations tend to look favorably on multi-partner

project applications. There is a considerable amount of money available through grants and other programs that landscape stewardship approaches can facilitate.

An often untapped reservoir of funding may come from local businesses that will benefit from the results of the resource management activities taking place. For example, a local canoe outfitter may see benefit in financially aiding efforts that will result in maintenance or improvement in water quality in a local river. There are also opportunities for financial support opening up as more and more businesses want to project a "green" image.

Landscape stewardship projects also seek to encourage and promote greater levels of private investments in ways to leverage public investments. Private woodland owners make significant investments in their own lands. These investments may not end up on the balance sheets of service provider agencies (although they sometimes do), but the investments private landowners make on their lands are no less important. The bottom line is that there will likely be more money and resources for coordination and implementation available in a more coordinated way for on-the-ground resource management work.

Individual Financial Assistance Programs Available to Landowners

NRCS Programs:

Conservation Reserve Program (CRP) and Continuous Conservation Reserve Program (CCRP)
The CRP and CCRP offer annual payments to landowners who set aside cropland or pasture adjacent to water, for the purpose of reducing erosion, increasing wildlife habitat, improving water quality, and increasing forest land. Cost-share for tree planting, grass cover, small wetland restoration, or prairie and oak savanna restoration may also be available.

Environmental Quality Incentives Program (EQIP)
EQIP is an NRCS program that provides financial and technical assistance to landowners for management practices. All properly implemented forest management practices are eligible, including timber stand improvement (TSI), site preparations, culverts, stream crossings, water bars, planting, prescribed burns, hazard reduction, fire breaks, silvopasture, fence, grade stabilization, plan preparation and more. Contracts last from one to 10 years.

Conservation Stewardship Program (CSP)
CSP encourages agricultural and forestry producers to maintain existing conservation activities and adopt additional ones in their operations. Annual payments of $8 to $12 an acre for five years are available for installing new activities and maintaining existing ones.

Wildlife Habitat Incentive Program (WHIP)
WHIP provides assistance for development or improvement of fish and wildlife habitat through prairie and savanna restoration and establishment, fencing, in-stream fish structures, livestock exclusion, tree planting, and more. Contracts last for five to 10 years and cover up to 75% of costs (maximum of $10,000)

State Programs:

Reinvest in Minnesota (RIM) Reserve Program

RIM is run by the Board of Water and Soil Resources (BWSR). The program compensates landowners willing to give the state a conservation easement to permanently protect, restore, and manage critical natural resources, in the interest of improving water quality. The RIM program is the primary land acquisition program for state-held conservation easements and restoration of wetlands and native grasslands. It is coordinated state wide by BWSR and administered and implemented locally by county Soil & Water Conservation Districts (SWCDs).

Erosion Control and Water Management Program

More commonly known as the State Cost Share Program, this program provides funds to SWCDs to share the cost of conservation practices for erosion control, sedimentation control, or water quality improvements with the land occupier. The primary purpose of activities is to assist with structural or vegetative practices to correct existing problems.

Grant Programs for Local Governmental Units or Non-Governmental Organizations

Clean Water Fund

Clean water fund grants are funded through Minnesota's Legacy Amendment. It provides funding for local governments or local government joint powers boards for projects that restore, enhance, and protect water quality. A non-state match of at least 25% of funds is required.

Lessard-Sams Outdoor Heritage Council (LSOHC)

The LSOHC is charged with making annual funding recommendations to the Minnesota Legislature on appropriations from the Outdoor Heritage Fund. Through these recommendations, funds raised through Minnesota's Legacy Amendment are provided to support programs to restore, protect, and enhance wetlands, prairies, forests, and habitat for fish, game, and wildlife.

F. Available Resources for Implementation

The following is a list of potential resources available to the Landscape Stewardship Committee to pursue in the project and funding development stage. The Landscape Stewardship Committee and the Landscape Specialist should maintain and grow this inventory of administrative, technical, financial, and political resources as tools to foster increased success in implementation of this Plan.

Administrative Resources
- Southeast Landscape Committee.
- Landowners
- Township Officials
- SWCDs – 3 counties, 3 sets of supervisors and staff.
- County Boards – 3 counties, 3 sets of commissioners and staff.
- Planning and Zoning – 3 different approaches to comprehensive planning and implementation.
- MN DNR Forestry

Administrative Resources
- BWSR
- MPCA
- Whitewater Watershed Joint Powers Board
- BALMM

Technical Resources
- Intern projects.
- GIS mapping – plan appendices, other sources.
- State agency personnel - DNR Division of Forestry, Division of Fish and Wildlife, etc.
- County staff – planning & zoning staff, county water planners, SWCD technicians, etc.
- Consulting foresters and Loggers.
- Winona State and St. Mary's Universities

Financial Resources
- MFRC seed money ($5,000 per year).
- Clean Water Land & Legacy Amendment funds.
- Cost share programs.
- State agency programs
- County Water Plans projects and programs.
- Foundations and organizations.
- Landowners - private investments.
- Federal and State agency budgets - staff assistance.

Political Resources
- Private landowners.
- Townships.
- Soil and Water Conservation Districts - supervisors and staff.
- County boards and staff and county water plan committees.
- MFRC.

G. Related Conservation Plans in the Watershed

This list highlights several conservation or development plans covering portions of the watershed whose goals or actions may impact conservation efforts:

- MFRC Southeast Landscape Plan
- MN DNR Blufflands/Rochester Plateau Subsection Forest Resource Management Plan (SFRMP) and Extension
- MN DNR High Biodiversity Area Management Plan- "Whitewater North Fork Area"
- MN DNR High Biodiversity Area Management Plan- "Whitewater Upper Beaver Creek"
- MN DNR State Wildlife Action Plan
- MN DNR Land Asset Management Plan for Rochester Forestry Area
- Lower Mississippi River Basin Fecal Coliform Implementation Plan
- MN DNR Division of Fisheries Strategic Plan for Coldwater Resources Management in Southeast Minnesota 2004-2015
- Basin Alliance for the Lower Mississippi in Minnesota 2001 Basin Plan Scoping Document
- Winona, Olmsted, and Wabasha Counties' Comprehensive Plans and Water Plans
- MPCA Mississippi River – Winona Watershed Restoration and Protections Strategies (WRAPS) Document and Table

H. Incorporation into the Watershed Restoration and Protection Strategies (WRAPS) planning process

Concurrent with the development of the Landscape Stewardship Plan, the WRAPS process was also being conducted for the Mississippi River – Winona watershed. The WRAPS process occurs on a 10 year cycle for each HUC8 watershed in the state. Periods of elevated water quality monitoring lead to analysis of collected data to determine the stressors and impairments of watershed streams. That information is then incorporated into a table and document outlining the water quality issues facing the watershed and necessary strategies to both restore impaired areas and protect healthy areas. Data collected during the early stages of the WRAPS process have been used in the development of this plan, and it is intended that the objectives and strategies it lists will inform the protection strategies outlined in the WRAPS process. Future water quality monitoring efforts connected with the WRAPS process will also be useful in assessing this plan and adapting it to future needs.

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Section 7.
Action Plan

The purpose of this section is to outline the steps required to implement the above action items and delineate an action plan for those items that call for measurable actions taken on the ground in the watershed. Action items that call for direct action on watershed conditions are listed with targets for the levels of action to be taken after 5 and 10 years. Other items will be implemented through structures of collaboration and data management and sharing outlined here. Finally, several objectives are listed which refer to social or legislative changes for which measurable actions are not immediately apparent, but which the plan nevertheless wishes to endorse as positive directions for the future health of native communities and water quality in the region.

A. Work Plan

In Section 5, the Objectives were listed with action items needed to bring them about. Many of those action items involve on the ground implementation in the form of conservation projects, land acquisition, landowner outreach and education, or information management and sharing. Those actions for which measurable goals can be set are listed below, along with five and 10 year targets for their implementation.

Goal 1. Protect and Enhance Existing Biodiversity and Watershed Health:

Objective 1.1- Protect and manage large blocks of native habitats

Action Item	Total Years to Goal	5-Year Target	10-Year Target	Strategies	Relevant Agencies											
					Whitewater JPB	County Govts.	LSP Coordinator	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Hold and manage currently protected blocks of native habitats in their natural state	Ongoing	-	-	Public Investment						**x**				**x**		
Restore natural vegetation in floodplains	-	700 ac	1500 ac	Technical Assistance, Financial Assistance, Public Investments					**x**					**x**		
Contact landowners near important natural areas to assess interest in easements and level of engagement for Graduated Service Delivery (GSD)	5*	142	-	Outreach and Education, Technical Assistance, Financial Assistance					**x**	**x**	**x**			**x**		
Pursue opportunities for increased protection through public acquisition in strategically important areas according to this or similar plans (e.g. the 1979 Richard J Dorer memorial hardwood Forest plan, "A Plan for Land Acquisition").	-	500 ac	800ac	Public Investment						**x**				**x**		

*Priority parcels have been identified in each COA- 69 in the City of Winona COA, 92 in the Beaver COA, and 44 in the Weaver COA. 142 different owners have been identified for these parcels. All owners of identified priority parcels should be contacted within 5 years.

Objective 1.2- Protect critical landforms for biodiversity and watershed health

Action Item	Total Years to Goal	5-Year Target	10-Year Target	Strategies	Relevant Agencies											
					Whitewater JPB	County Govts.	LSP	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Increase presence of perennially vegetated stream buffers in upper and lower reaches	20*	7,000 ac	15000 ac	Technical Assistance, Financial Assistance, Public Investments, Policy Integration					**x**					**x**		
Enforce state shore land ordinance	Ongoing	-	-	Policy Integration		**x**			**x**							
Close State Highway 74 between County Road 30 and Weaver to protect Herpetofauna migration	5	-	-	Policy Integration (Lobby MN DoT)		**x**		**x**						**x**		

*Within the COAs, There are currently an estimated 7,300 acres of cropland in floodplains, wetflats, or material contribution zones as identified in the Active River Area GIS analysis. An additional 23,000 acres of riparian area outside of the COA areas are estimated to be in cropland. In 20 years, the watershed should approach 100% perennially vegetated active river area for all perennial streams.

Objective 1.3- Restore natural fire regime in fire dependent communities

Action Item	Total Years to Goal	5-Year Target	10-Year Target	Strategies	Relevant Agencies											
					Whitewater JPB	County Govts.	LSP	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Reintroduce fire to an increasing area, including larger scale burns where appropriate, and reestablish regime of low intensity surface fires*	-	3,000 ac	5,000 ac	Technical Assistance, Financial Assistance, Public Investment										x		

*****The Minnesota Forest Resource Council's Southeast Landscape Plan calls for prescribed burns on eight sites of 200 acres or more. Within the Mississippi River – Winona Watershed, the Weaver Dunes area has two sites with 200 acres or more of upland prairie. There are approximately 6,600 acres of upland prairie and fire dependent systems (3,800 ac UP and 2,800 ac FD) identified by the Minnesota Biological Survey in the watershed. All of these areas could benefit from the use of prescribed fire as a management tool. In some areas close to cities or residences, however, prescribed fire may be difficult technically and politically.

Objective 1.4- Prevent and control non-native species

Action Item	Total Years to Goal	5-Year Target	10-Year Target	Strategies	Relevant Agencies											
					Whitewater JPB	County Govts.	LSP	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Maintain current and historical GIS records of invasive species*	Ongoing	-	-	Outreach and Education		x			x			X		x		
Inventory private lands for presence of invasive species, track invasive species on private lands with Forest Stewardship Plans*	Ongoing	-	-	Technical Assistance		x			x			x		x		

*GIS data on invasive species occurrences are strong for publicly managed areas, but generally lacking on private lands. DNR Forestry tracks occurrences on private lands when they are observed in preparation of private management plans. Increasing the knowledge and awareness of private landowners, and resources for control of invasive species on private land will support control efforts on public land by reducing source populations.

Goal 2. Educate and engage with local landowners and stakeholders:

Objective 2.1- Promote private conservation planning

Action Item	Total Years to Goal	5-Year Target	10-Year Target	Strategies	Relevant Agencies											
					Whitewater JPB	County Govts.	LSP	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Increase frequency and use of comprehensive Property Habitat Stewardship Plans that include forest, prairie, riparian, and agricultural lands on private property*	-	50 plans prepared	100 plans prepared	Technical Assistance, Financial Assistance				**x**	**x**					**x**		
Establish single point of contact to assist landowners in learning about and applying for conservation and forest management incentive programs**	1	-	-	Technical Assistance, Policy Integration			**x**									

*As of June 2014, the MFRC had 154 Private Stewardship Plans recorded in the watershed. These targets would roughly double that amount in 10 years.

**Support for a Landscape Specialist position, as discussed in Section 6, to serve as a single point of contact should be an immediate focus for the Landscape Stewardship Committee.

Objective 2.3- Implement Graduated Service Delivery (GSD) System

Action Item	Total Years to Goal	5-Year Target	10-Year Target	Strategies	Relevant Agencies											
					Whitewater JPB	County Govts.	LSP	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Include a GSD landowner classification in the landowner information database	5	-	-	Technical Assistance, Policy Integration					**x**					**x**		
Develop streamlined forest stewardship plan	1	-	-	Technical Assistance				**x**						**x**		

Objective 2.4- Identify, connect, and engage currently operational groups

Action Item	Total Years to Goal	5-Year Target	10-Year Target	Strategies	Relevant Agencies											
					Whitewater JPB	County Govts.	LSP	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Create a current list of operational service provider groups and their land management activities, including citizen action groups, agricultural groups, and wildlife groups	1	-	-	Technical Assistance, Outreach and Education			**x**	**x**								**x**

Objective 2.6- Promote social benefits of ecosystem services and natural resources

Action Item	Total Years to Goal	5-Year Target	10-Year Target	Strategies	Relevant Agencies											
					Whitewater JPB	County Govts.	LSP	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Have landscape resource specialists available for field visits to communicate social benefits of forestry, prairies, buffers, and pastures	1-2	-	-	Outreach and Education, Technical Assistance			**x**	**x**								**x**
Provide education and workshops tailored to specific groups to inspire volunteer efforts led by citizen groups	At least 2 workshops annually within 2 years	-	-	Outreach and Education												**x**

Goal 3. Support and coordinate additional ongoing conservation efforts:

Objective 3.2- Support sustainable forest products markets and management

Action Item	Total Years to Goal	5-Year Target	10-Year Target	Strategies	Relevant Agencies											
					Whitewater JPB	County Govts.	LSP	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Establish a forest bank program in the region	2016	-	-	Public Investment				**x**								

Objective 3.3- Support information management for private conservation planning

Action Item	Total Years to Goal	5-Year Target	10-Year Target	Strategies	Relevant Agencies											
					Whitewater JPB	County Govts.	LSP	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Conduct spatial analysis of past and existing forest patterns within the watershed	2	-	-	Policy Integration				**x**						**X**		
Develop inventory of privately owned properties in the watershed, and assess, summarize, and map parcels based on size, landowner tenure (to be determined for GSD and ranking purposes), landowner residency pattern, intersection with high biodiversity sites, public land proximity, and adjacency to water bodies including intermittent trout stream tributaries	5	-	-	Policy Integration, Technical Assistance				**x**						**X**		
Compile a database of landowner information based on their interests and history of actions	3	-	-	Policy Integration				**x**	**x**					**x**		

Objective 3.4- Coordinate management of ecological and water resources

Action Item	Total Years to Goal	5-Year Target	10-Year Target	Strategies	Relevant Agencies											
					Whitewater JPB	County Govts.	LSP	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Secure funding for and establish a Landscape Specialist position to coordinate implementation of LSP objectives and monitoring	1 to 2	-	-					**x**								
Hold annual stakeholder meetings to coordinate completed, ongoing, and planned activities	1	-	-	Policy Integration	**x**			**x**								

Goal 4. Monitor results of watershed conservation efforts and adapt this plan accordingly:

Objective 4.1- Monitor, assess, and report on ecological resources and water quality conditions and coordination activities

Action Item	Total Years to Goal	5-Year Target	10-Year Target	Strategies	Relevant Agencies											
					Whitewater JPB	County Govts.	LSP	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Develop objective thresholds for land cover characteristics (e.g. proportion of perennially vegetated riparian area, percent forest cover) related to healthy aquatic communities and water quality	2	-	-							**X**			**x**	**X**		

Objective 4.2 Monitor, assess, and report on social goals

Action Item	Total Years to Goal	5-Year Target	10-Year Target	Strategies	Relevant Agencies											
					Whitewater JPB	County Govts.	LSP	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Create outreach database with a landowner registry and citizen/community group registry that allows for easy tracking of outreach efforts, integrated with PFMM	5	-	-	Policy Integration, Outreach and Education, Technical Assistance	**x**			**x**						**x**		

Objective 4.3- Monitor, assess, and report on economic activity

Action Item	Total Years to Goal	5-Year Target	10-Year Target	Strategies	Relevant Agencies											
					Whitewater JPB	County Govts.	LSP	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Develop annual Southeast Minnesota Forest Industry Survey for vendors and processors	2	-	-	Outreach and Education, Technical Assistance				**x**						**x**		

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Section 8.
Monitoring and Evaluation

The purpose of this section is to provide an initial outline for monitoring and evaluating the implementation of this Plan over the next ten to twenty years. The Landscape Specialist, under the supervision of the Landscape Stewardship Committee, will work with partner agencies and conservation organizations to develop this monitoring program. The Landscape Specialist will periodically review progress made towards the implementation of this plan based on information provided by partners in the Watershed and report their findings to the Landscape Stewardship Committee and the Minnesota Forest Resources Council.

A. Overview

Monitoring is a critical phase of all management strategies. All landscape stewardship plans should include efforts to monitor what has been accomplished as well as evaluate the effectiveness of the project's approach to forest stewardship over time. The effects of plan implementation on ecological, economic, and social goals should all be tracked in an iterative process of assessing/identifying problems and recommending a series of solutions. Monitoring effects and adapting recommendations accordingly allows a plan to remain relevant in responding to the changes in landscape condition, scientific knowledge, and social needs over time.

The monitoring framework of this plan is based on the Vision, Goals, and Objectives listed in sections 4 and 5. Short term efforts will be focused on the action items listed for each Objective, and these will provide the basis for monitoring success in implementing the plan. Long term monitoring will focus on how effective implemented plan projects are being at bringing the condition of the watershed close to meeting the Goals and Vision.

B. Short-Term: Monitor Performance and Evaluate Process

Annual monitoring should focus on rates of implementation for recommended programs and actions. Different measurements and criteria will be appropriate for different activities. For some goals, especially those focused on creating data management networks or building community engagement, narrative descriptions will be the best reporting method. Management or restoration activities are best measured by acres affected or landowners assisted. An excel spreadsheet will be created for tracking annual results for each objective by action item, following the example below (for consistency, the spreadsheet format has been adapted from the MPCA WRAPS process):

Action Item	Progress	Strategies	Relevant Agencies											
			Whitewater JPB	County Govts.	LSP Coordinator	MFRC SLEC	SWCDs	TNC	MLT	MDA	MPCA	DNR	BWSR	UM Extension
Hold and manage currently protected blocks of native habitats in their natural state	Total acres managed	Public Investment	x				x	x				x		
Restore natural vegetation in floodplains	Acres restored	Technical Assistance, Financial Assistance, Public Investments					x					x		
Contact landowners near important natural areas to assess interest in easements and level of engagement for Graduated Service Delivery (GSD)	Landowners contacted	Outreach and Education, Technical Assistance, Financial Assistance			x		x		x			x		
Encourage landowner participation in programs that promote the maintenance of native habitats	Landowners contacted	Outreach and Education, Technical Assistance, Financial Assistance	x				x	x				x		
Pursue opportunities for increased protection through public acquisition in strategically important areas according to this or similar plans (e.g. the 1979 Richard J Dorer memorial hardwood Forest plan, "A Plan for Land Acquisition").	Acres acquired	Public Investment						x				x		

C. Long-Term: Assess Results and Evaluate Effectiveness

As the plan objectives are being implemented, periodic assessment of the progress being made towards the longer term goals and vision for the watershed also necessary. At least twice during the intended 10-year life of this plan, the Landscape Stewardship Committee should meet to discuss the state of the watershed relative to those goals, and determine what progress has been made, and what improvements could be made to the plan objectives or their implementation.

Goal:	Assessment Questions:
Protect and enhance existing biodiversity and watershed health	– What is the status of species and communities of concern within the watershed? – Is water surface water quality improving or degrading? – Is groundwater quality improving or degrading? – How has connectivity of natural communities improved across the watershed
Educate and engage with local landowners, and stakeholders.	– How has landowner engagement changed or improved? – Do landowners have access to necessary information, and do they know where to get it? – How are we tracking landowner involvement and reaching out to those with interest in conservation?
Support and coordinate additional ongoing conservation efforts	– How has collaboration improved between agencies and stakeholders within the watershed? – How has communication and collaboration helped make conservation efforts more effective?
Monitor results of watershed conservation efforts and adapt this plan accordingly	– Are the data necessary to fully assess watershed conditions being collected? If not, what additional data are needed? – What can be done to improve this plan, and conservation efforts overall within the watershed?

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Section 9.
Agency and Organization Recommendations

D. Recommendations to the MFRC

1. Landscape Specialist Position. Work to develop a Landscape Resource Specialist position to help in the ongoing implementation of this plan and coordination of its recommended activities.
2. Forest Bank. Continue to support development of a Forest Bank program for Southeast Minnesota.
3. Sharing and Communications. Support the increased sharing of ideas and experiences between the landscape committee as well as new and successful sustainable and natural resource management activities taking place with other watersheds.
4. PFM Funding. Find ways to increase funding support for the private forest management program administered by the DNR. Support activities on the 10 year Action Plan.

E. Recommendations to Local Officials

1. Reference Document. Local officials are strongly encouraged to use this Plan as a reference document when developing their resource management plans including county water plans, local land use plans, and state resource plans. They are further encouraged to adopt this landscape stewardship plan as an appendix to their plans to provide more detailed guidance on sustainable forest resource management and support more proactive and collaborative funding development.
2. Consider Forests, Prairies and Riparian Areas in Local Land Use Decisions. Local officials are encouraged to consider the values and benefits that natural areas can bring to their communities. Healthy and sustainable forests promote a high quality of life for citizens and can support increased economic opportunities as well. Forest and stream management should be included in the land use decision making process.
3. Resource-Based Planning. Local officials are encouraged to incorporate a more comprehensive consideration of natural resources into their land use planning process.
4. Alternative Development Options. There are alternative ways that land can be developed to provide for both economic growth and the protection of forest resources. Large lot developments are not always desirable or cost effective from the public sector or taxpayer perspective. Local officials are encouraged to use natural areas as a way to improve their communities and their future development. Forest fragmentation should be slowed through appropriate zoning.

F. Recommendations to Resource Agencies

1. Service to Landowners. Continue to improve the delivery of technical and financial assistance on forest and prairie management to private landowners. Find ways to increase funding for the private forest management program. Continue to promote native plant communities using the Ecological Classification System (ECS) as a guide to developing land management strategies when working with landowners and local officials. Refer to this Landscape Plan and its COA Plans.
2. Important and Critical Areas. Continue to identify and protect important or critical ecological areas such as the COAs and their plans. Follow their plans. Put an emphasis on Native Plant Communities and biodiversity in these areas.
3. Data Gathering. Support the collection, organization and evaluation of data collected relating to natural resources at the local level on private lands. Encourage the coordination and sharing of data with other resource agencies and local officials.
4. Fund Restoration Projects. Natural resource management is a long term commitment and requires long term funding to reach the desired future conditions. Contribute to staff time or direct funding to support projects on the 10 year action plan.

G. Recommendations to Conservation and Non-governmental Organizations

1. Reference Document. Conservation groups and NGOs are encouraged to use this Plan as a reference document when developing their plans and strategies.
2. Collaboration. Encourage the partnering of conservation and non-governmental organizations to address major resource management issues.
3. Fund Restoration Projects. Natural resource management is a long term commitment and requires long term funding to reach the desired future conditions. Contribute to staff time or direct funding to support projects on the 10 year action plan.
4. Connections. Support the connecting of citizens with their Landscape Resource Specialist and elected officials on sustainable natural resource management topics.

H. Recommendations to Education Groups

1. Connections through Education. Encourage the connection of elected officials with their constituent groups through education programs. Promote and support sustainable resource education programs that connect informed citizens with elected officials.
2. Use Existing Education Providers. All partners working in the watershed and the basin are encouraged to use existing education providers such as the U of MN Extension, Sustainable Forest Education Cooperative (SFEC), Minnesota Logger Education Program (MLEP), Minnesota Forest Association (MFA), the BWSR Academy, NRCS programs and others.
3. Collegial Connections. Colleges and universities throughout the state are encouraged to connect their students and faculty with DNR programs.

I. Recommendations to Private Landowners and Consultants

1. Become Informed. The organizations mentioned in this document have numerous programs and resources to help landowners become more informed about sustainable forestry and the benefits of forests to our communities. All landowners are encouraged to become more knowledgeable about forest resources. Learning about best management practices (BMPs) is one easy way to get started. Recognize that forestry is a long-term endeavor and that changes on the land will generally take several years to become realized.
2. Seek Technical Assistance. While there are numerous sources of information available, landowners are encouraged to seek technical assistance to help manage their forestlands. Often a landowner may need assistance from many technical service providers. Developers can benefit from working with the forest resources on their lands when designing their developments.
3. Get Involved. Local groups can have powerful impacts on land use and practices in their communities. All citizens and landowners are encouraged to get involved in their communities and help promote sustainable forestry.

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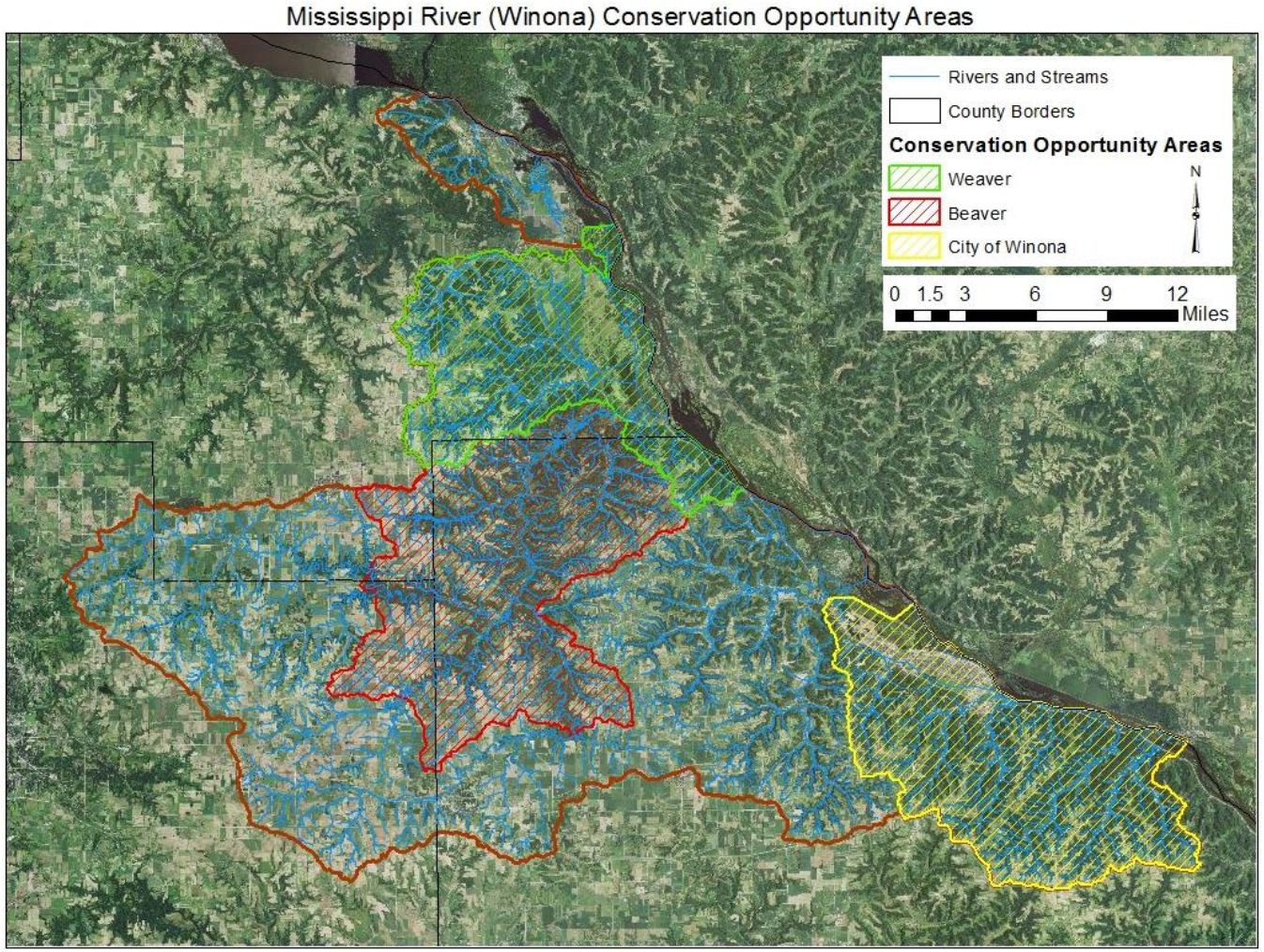
Conservation Opportunity Area (COA) Plans



To left: Map showing Conservation Opportunity Areas in the Mississippi River-Winona

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Section 10. Beaver COA

A. Overview

The Beaver COA is composed of nine minor catchments (DNR level 7 minor watersheds), covering over 83,000 acres of the Whitewater River drainage. The town of Elba is located near the center of the COA. Located outside and near the area are Plainview, to the West; Minnieska, to the Northeast; Altura, to the West; and Dover, St. Charles, Utica, and Lewiston to the South (Figure 1). It includes the most public land of the three COAs, including both Whitewater State Park and Whitewater Wildlife Management Area. The overall character of the landscape is typical of the Blufflands subsection: steep, predominantly forested bluffs flank a winding, dendritic network of scenic streams and river valleys cutting into heavily farmed uplands.

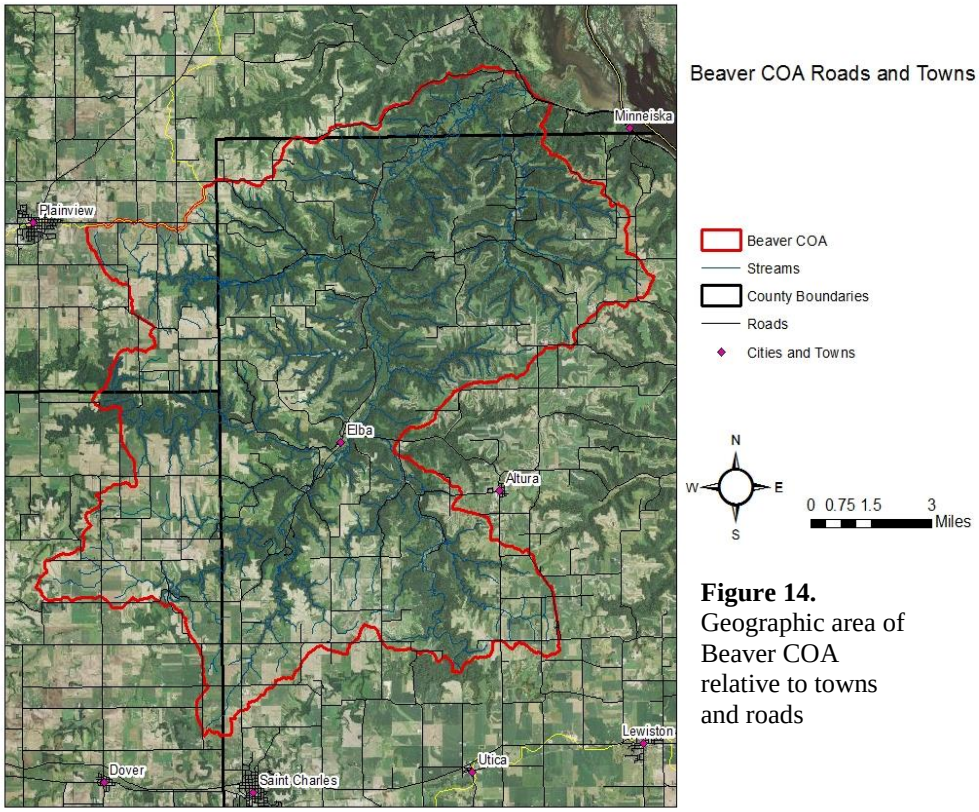

Figure 14. Geographic area of Beaver COA relative to towns and roads

This area, especially the Whitewater WMA and State Park, is a hotspot for biodiversity in the state. The complex network of streams and bluffs offer a diverse set of physical conditions that lead to numerous native plant community types in relatively small areas. Mesic hardwoods are common on hillsides and well drained portions of the valley floors. Fire dependent prairie and oak savanna communities occur on upper portions of south to southwest facing slopes. Where limestone or dolomite is exposed near the surface on north facing slopes, maderate cliffs or algific talus slopes may be maintained by the cool micro-climate caused by air and water emanating from subterranean ice. The dissected stream network and steep valley-sides give the terrain a rugged overall character (Figure 2).

With the prevalence of publicly owned land in the COA, the priority for private parcels should be placed on those in close proximity to protected land, in order to enhance to size and connectivity of those habitats.

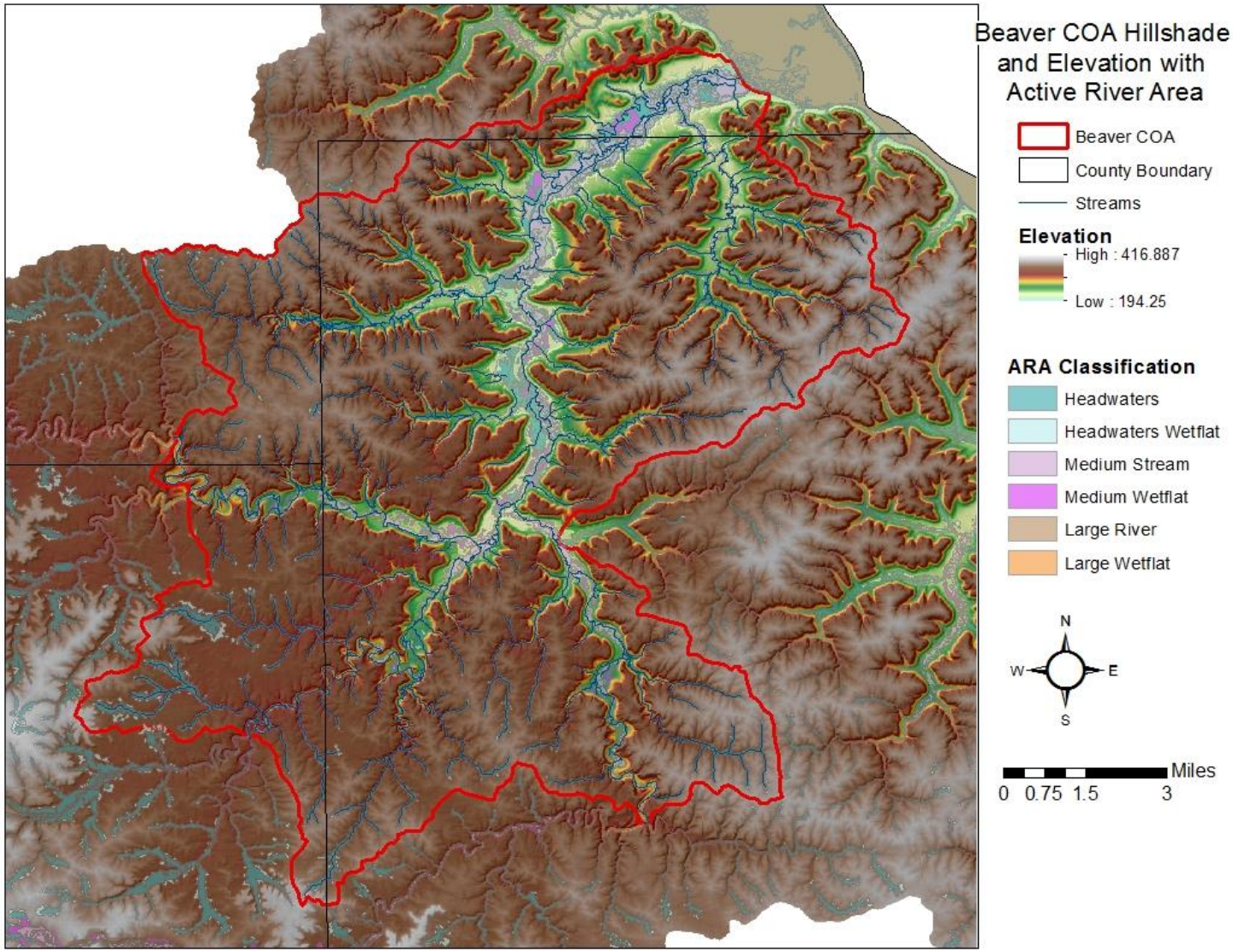

Figure 15. Topography of Beaver COA with Active River Area.

B. Natural Resource Assessment

Hydrology

The dominant hydrological feature of the Beaver COA is the Whitewater River. The river valley for the main stem of the Whitewater River cuts through the center of the COA, and the entire area lies in its watershed. Numerous smaller streams, including many trout streams popular with anglers, are fed by springs and seeps (Figures 3, 4). In addition to the main stem, the COA also includes small, downstream portions of the North, Middle, and South Forks of the Whitewater River. Other significant streams include Beaver Creek and Trout Valley Creek.

Table 4. Perennial steam lengths within the Beaver COA.

Perennial Streams	Mileage within COA	Trout Stream Designation
Whitewater River	16.63	Trout Stream
Whitewater River, Middle Branch	11.41	Trout Stream
Whitewater River, North Branch	11.12	Trout Stream
Whitewater River, South Branch	10.53	Trout Stream
Beaver Creek	9.92	Trout Stream
Trout Valley Creek	9.55	Trout Stream
Tributary 10 to Whitewater River	4.67	Trout Stream Tributary
Trout Run	0.11	none
Logan Creek	0.06	Trout Stream
Trib 6 to Middle Branch	0.03	Trout Stream Tributary
Unnamed Creeks (280)	131.56	Mixed

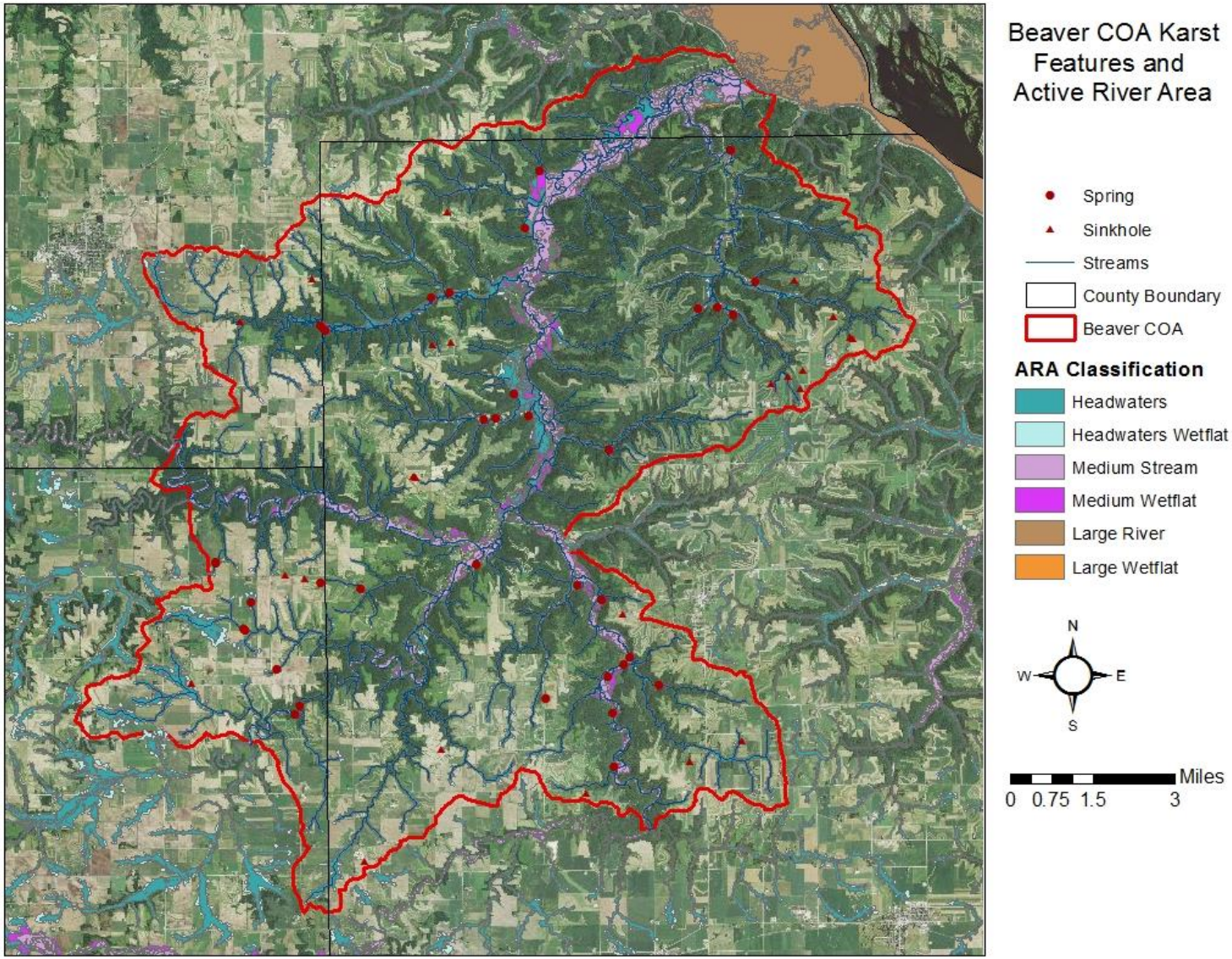

Figure 16. Karst features and Active River Area in the Beaver COA.

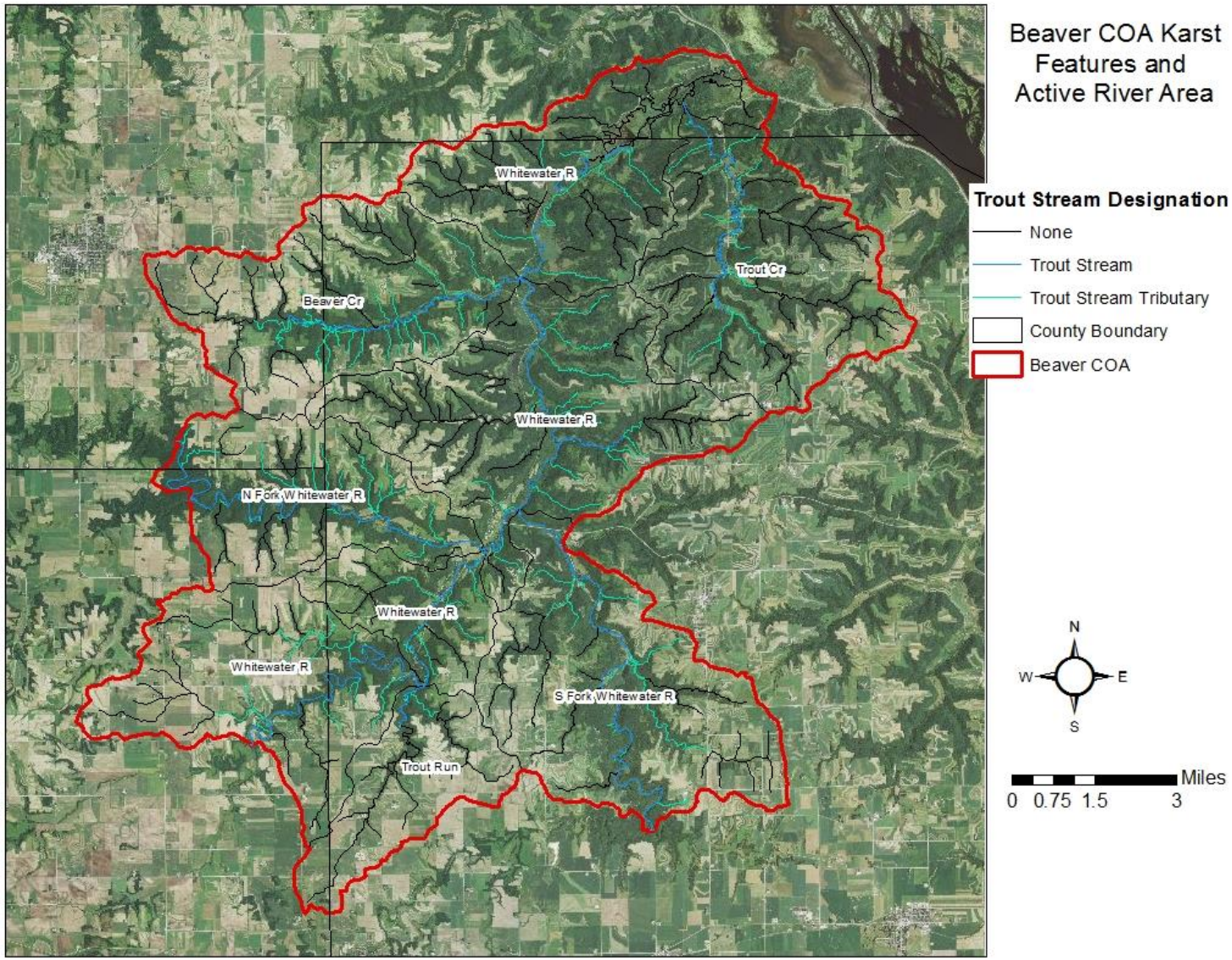

Figure 17. Designated Trout Streams in Beaver COA. Labels refer to the defining stream feature of the minor catchment.

Plant Communities

Beaver COA contains 32 different Native Plant Community (NPC) types and subtypes, including 8 different systems (Table 2, Figure 6). Mesic hardwoods make up a majority of the acreage. Fire dependent and upland prairie systems make up 15% and 13%, respectively. While the cliff/talus system communities only cover 100 acres, maderate cliffs and algific talus slopes are rare and sensitive community types unique to Southeastern Minnesota. They occur on areas where cold currents of air and water emerging from subterranean ice maintain a cold micro-climate, allowing plants and animals more commonly found farther north to survive. Full descriptions of native plant community types and their associated ecological systems can be found in *Field Guide to the Native Plant Communities of Minnesota: the Eastern Broadleaf Forest Province*, produced and distributed by the MN DNR.

While most of the NPCs in Beaver COA are on publicly owned land, several NPCs can be found on private parcels, often ranging across the boundaries between public and private lands (Figure 7). Private parcels containing NPCs, especially those bordering publicly managed areas, represent an important priority for increased protection and private conservation efforts.

Table 5. Native Plant Communities of Beaver COA

Native Plant Community	NPC Code	System	Acreage	Percent of Total Beaver COA NPC Acreage
Southern Dry Cliff	CTs12	Cliff/Talus	57.08	
Dry Limestone - Dolomite Cliff (Southern)	CTs12b	Cliff/Talus	5.98	
Maderate Cliff: Limestone Subtype	CTs43a1	Cliff/Talus	8.29	
Maderate Cliff: Dolomite Subtype	CTs43a2	Cliff/Talus	0.65	
Algific Talus: Dolomite Subtype	CTs46a2	Cliff/Talus	28.70	
Total Cliff/Talus system			100.70	0.79%
White Pine - Oak Woodland (Sand)	FDs27b	Fire Dependent	22.08	
Black Oak - White Oak Woodland (Sand)	FDs27c	Fire Dependent	278.55	
Oak - Shagbark Hickory Woodland	FDs38a	Fire Dependent	1628.50	

Total Fire Dependent System			1929.13	15.19%
Silver Maple - Green Ash - Cottonwood Terrace Forest	FFs59a	Floodplain Forest	23.12	
Elm - Ash - Basswood Terrace Forest	FFs59c	Floodplain Forest	636.29	
Total Floodplain Forest System			659.41	5.19%
White Pine - Sugar Maple - Basswood Forest (Cold Slope)	MHc38a	Mesic Hardwood	1.76	
Southern Dry-Mesic Oak Forest	MHs37	Mesic Hardwood	2247.06	
Red Oak - White Oak Forest	MHs37a	Mesic Hardwood	1762.65	
Red Oak - White Oak - (Sugar Maple) Forest	MHs37b	Mesic Hardwood	1329.16	
White Pine - Oak - Sugar Maple Forest	MHs38a	Mesic Hardwood	531.33	
Red Oak - Sugar Maple - Basswood - (Bitternut Hickory) Forest	MHs38c	Mesic Hardwood	852.57	
Southern Mesic Maple-Basswood Forest	MHs39	Mesic Hardwood	196.08	
Sugar Maple - Basswood - (Bitternut Hickory) Forest	MHs39a	Mesic Hardwood	51.17	
Sugar Maple - Basswood - Red Oak - (Blue Beech) Forest	MHs39b	Mesic Hardwood	653.32	
Southern Wet-Mesic Hardwood Forest	MHs49	Mesic Hardwood	155.71	
Elm - Basswood - Black Ash - (Hackberry) Forest	MHs49a	Mesic Hardwood	200.23	
Elm - Basswood - Black Ash - (Blue Beech) Forest	MHs49b	Mesic Hardwood	258.62	
Total Mesic Hardwood System			8239.68	64.90%
Northern Bulrush-Spikerush Marsh	MRn93	Marsh	2.83	
Total Marsh System			2.83	0.02%

Dry Barrens Prairie (Southern)	UPs13a	Upland Prairie	34.54	
Dry Bedrock Bluff Prairie (Southern)	UPs13c	Upland Prairie	619.26	
Dry Barrens Oak Savanna (Southern): Jack Pine Subtype	UPs14a1	Upland Prairie	89.67	
Dry Barrens Oak Savanna (Southern): Oak Subtype	UPs14a2	Upland Prairie	839.59	
Mesic Prairie (Southern)	UPs23a	Upland Prairie	110.48	
Total Upland Prairie System			1693.54	13.34%
Black Ash - Sugar Maple - Basswood - (Blue Beech) Seepage Swamp	WFs57b	Wet Forest	31.77	
Total Wet Forest System			31.77	0.25%
Sedge Meadow	WMn82b	Wet Meadow	30.12	
Seepage Meadow/Carr	WMs83a	Wet Meadow	3.41	
Seepage Meadow/Carr Tussock: Sedge Subtype	WMs83a1	Wet Meadow	5.68	
Total Wet Meadow System			39.21	0.31%
Total acreage of NPCs in Beaver COA			12696.28	100.00%

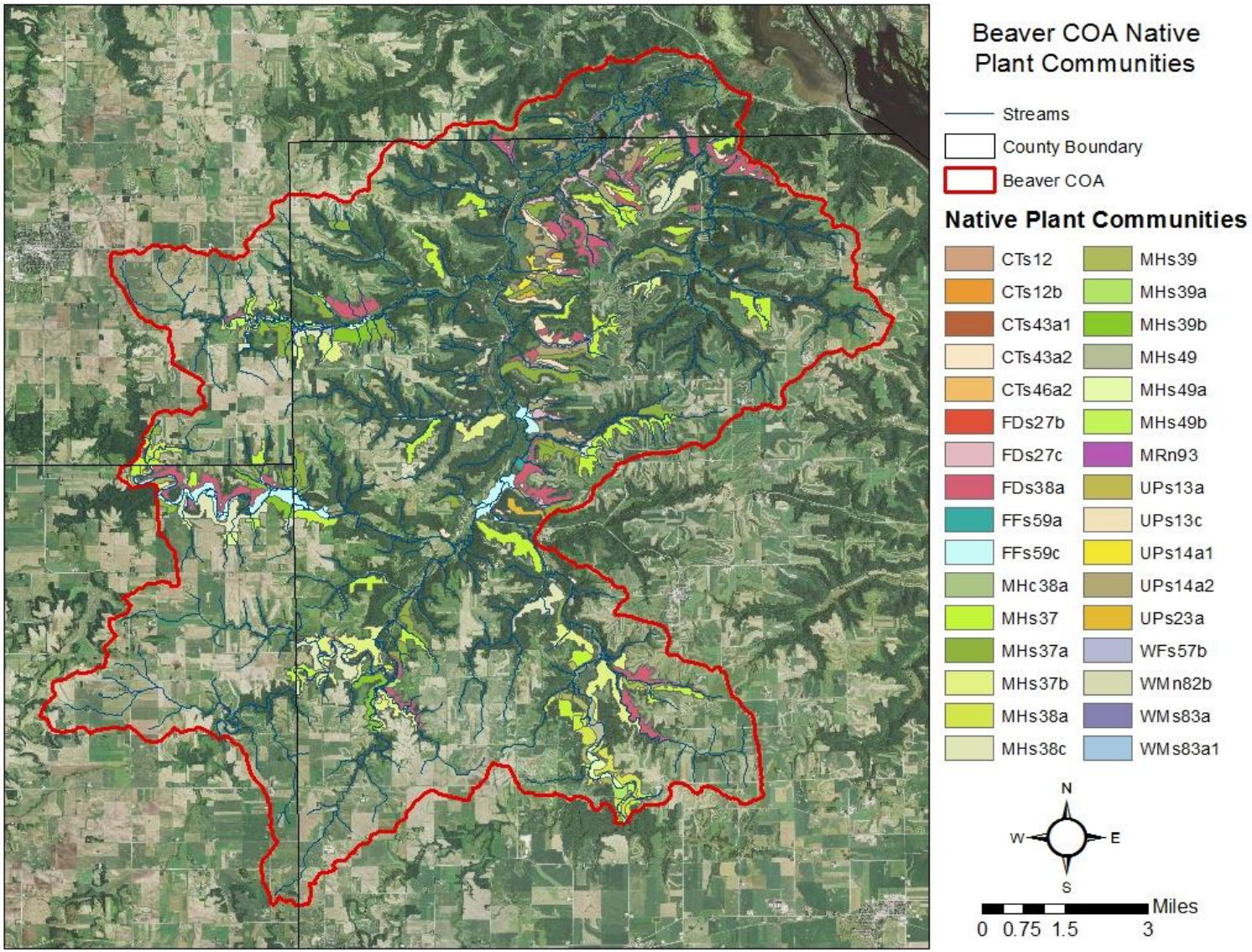

Figure 18. NPCs within Beaver COA

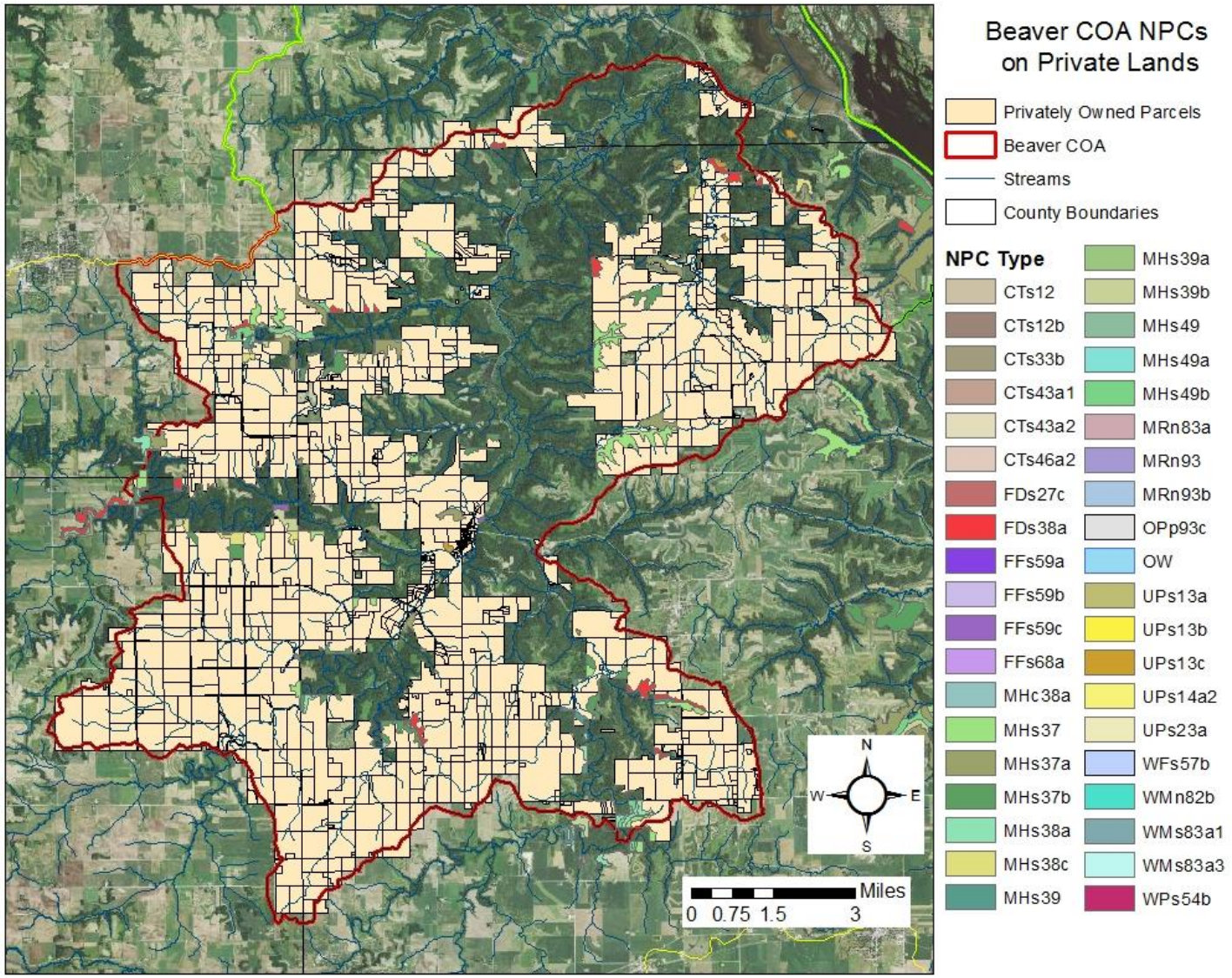

Figure 19. NPCs occurring on privately owned parcels within Beaver COA.

Biodiversity and Rare Species

The Beaver COA, especially the areas in and around Whitewater State Park and Whitewater WMA, is an important area statewide for biodiversity. The complex of habitat types including deep forests, oak savannas, prairies, wetlands, and cliffs/talus support some of the most diverse communities in the state, including a number of rare species (Figure 7, Table 3). Rare species are those listed as either endangered, threatened, or of special concern in the Natural Heritage Information System (NHIS). **Endangered** species are those facing extinction throughout all or a significant portion of its range within Minnesota. **Threatened** species are likely to become endangered in the foreseeable future. **Species of Special Concern**, though not endangered or threatened, are extremely uncommon in Minnesota. Other species (listed in table below as N/A) not officially listed in those categories may be monitored due to potential concern. Additionally, 25 rare terrestrial communities are listed in Beaver COA. Rare terrestrial communities are collections of plant species growing together, whose presence on the landscape is rare or severely diminished. These communities are monitored, but not given designations as endangered, threatened, or of special concern. The rare plant and animal species observed within Beaver COA are listed by organism type in Table 4.

Table 6. Number of rare species and communities observed.

Organism Type	Occurrences
Animal Assemblage	1
Fungus	1
Invertebrate Animal	11
Terrestrial Community - Other Classification	25
Vascular Plant	49
Vertebrate Animal	24

Table 7. Rare plant and animal species observed in Beaver COA.

Common Name	Scientific Name	Organism Type	Conservation Status
Bat Concentration	Bat Colony	Animal Assemblage	N/A
A Species of Lichen	Buellia nigra	Fungus	Special Concern
Iowa Skipper	Atrytone arogos iowa	Invertebrate Animal	Special Concern
Northern Barrens Tiger Beetle	Cicindela patruela patruela	Invertebrate Animal	Special Concern
Splendid Tiger Beetle	Cicindela splendida cyanocephalata	Invertebrate Animal	Special Concern
Persius Dusky Wing	Erynnis persius persius	Invertebrate Animal	Endangered
Leonard's Skipper	Hesperia leonardus leonardus	Invertebrate Animal	Special Concern
Ottoe Skipper	Hesperia ottoe	Invertebrate Animal	Endangered
Karner Blue	Lycaeides melissa samuelis	Invertebrate Animal	Endangered
A Jumping Spider	Pelegrina arizonensis	Invertebrate Animal	Special Concern
A Jumping Spider	Sassacus papenhoei	Invertebrate Animal	Special Concern
Regal Fritillary	Speyeria idalia	Invertebrate Animal	Special Concern
Hubricht's Vertigo	Vertigo hubrichti	Invertebrate Animal	N/A
White Baneberry	Actaea pachypoda	Vascular Plant	N/A
Moschatel	Adoxa moschatellina	Vascular Plant	N/A
Round-stemmed False Foxglove	Agalinis gattingeri	Vascular Plant	Endangered
Nodding Wild Onion	Allium cernuum	Vascular Plant	Special Concern

Smooth Rock-cress	Arabis laevigata	Vascular Plant	Special Concern
Smooth Rock Cress	Arabis laevigata var. laevigata	Vascular Plant	Special Concern
Green Dragon	Arisaema dracontium	Vascular Plant	Special Concern
Sea-beach Needlegrass	Aristida tuberculosa	Vascular Plant	Threatened
Clasping Milkweed	Asclepias amplexicaulis	Vascular Plant	Threatened
Ebony Spleenwort	Asplenium platyneuron	Vascular Plant	Special Concern
Fernleaf False Foxglove	Aureolaria pedicularia	Vascular Plant	Threatened
Plains Wild Indigo	Baptisia bracteata var. glabrescens	Vascular Plant	Special Concern
Prairie Moonwort	Botrychium campestre	Vascular Plant	Special Concern
Carey's Sedge	Carex careyana	Vascular Plant	Endangered
James' Sedge	Carex jamesii	Vascular Plant	Threatened
Smooth-sheathed Sedge	Carex laevivaginata	Vascular Plant	Threatened
Spreading Sedge	Carex laxiculmis	Vascular Plant	Threatened
Wood's Sedge	Carex woodii	Vascular Plant	N/A
Hill's Thistle	Cirsium pumilum var. hillii	Vascular Plant	Special Concern
Silvery Spleenwort	Deparia acrostichoides	Vascular Plant	Special Concern
Squirrel-corn	Dicentra canadensis	Vascular Plant	Special Concern
Narrow-leaved Spleenwort	Diplazium pycnocarpon	Vascular Plant	Threatened
Goldie's Fern	Dryopteris goldiana	Vascular Plant	Special Concern

Rattlesnake-master	Eryngium yuccifolium	Vascular Plant	Special Concern
Upland Boneset	Eupatorium sessilifolium	Vascular Plant	Threatened
False Mermaid	Floerkea proserpinacoides	Vascular Plant	Threatened
Canada Frostweed	Helianthemum canadense	Vascular Plant	Special Concern
Long-bearded Hawkweed	Hieracium longipilum	Vascular Plant	N/A
Beach-heather	Hudsonia tomentosa	Vascular Plant	Threatened
Golden-seal	Hydrastis canadensis	Vascular Plant	Endangered
Twinleaf	Jeffersonia diphylla	Vascular Plant	Special Concern
Creeping Juniper	Juniperus horizontalis	Vascular Plant	Special Concern
Lilia-leaved Twayblade	Liparis liliifolia	Vascular Plant	N/A
Glade Mallow	Napaea dioica	Vascular Plant	Threatened
Old Field Toadflax	Nuttallanthus canadensis	Vascular Plant	Special Concern
One-flowered Broomrape	Orobanche uniflora	Vascular Plant	Threatened
Cowbane	Oxypolis rigidior	Vascular Plant	N/A
American Ginseng	Panax quinquefolius	Vascular Plant	Special Concern
Rough-seeded Fameflower	Phemeranthus rugospermus	Vascular Plant	Threatened
Woodland Bluegrass	Poa sylvestris	Vascular Plant	N/A
Wolf's Bluegrass	Poa wolfii	Vascular Plant	Special Concern
Christmas Fern	Polystichum acrostichoides	Vascular Plant	Endangered

Leedy's Roseroot	Rhodiola integrifolia ssp. leedyi	Vascular Plant	Endangered
Beaked Snakeroot	Sanicula trifoliata	Vascular Plant	Special Concern
Cliff Goldenrod	Solidago sciaphila	Vascular Plant	N/A
Short's Aster	Symphyotrichum shortii	Vascular Plant	Special Concern
Yellow Pimpernel	Taenidia integerrima	Vascular Plant	Special Concern
Goat's-rue	Tephrosia virginiana	Vascular Plant	Special Concern
Valerian	Valeriana edulis var. ciliata	Vascular Plant	Threatened
Henslow's Sparrow	Ammodramus henslowii	Vertebrate Animal	Endangered
Red-shouldered Hawk	Buteo lineatus	Vertebrate Animal	Special Concern
North American Racer	Coluber constrictor	Vertebrate Animal	Special Concern
Timber Rattlesnake	Crotalus horridus	Vertebrate Animal	Threatened
Trumpeter Swan	Cygnus buccinator	Vertebrate Animal	Special Concern
Acadian Flycatcher	Empidonax virescens	Vertebrate Animal	Special Concern
Blanding's Turtle	Emydoidea blandingii	Vertebrate Animal	Threatened
Peregrine Falcon	Falco peregrinus	Vertebrate Animal	Special Concern
Common Gallinule	Gallinula galeata	Vertebrate Animal	Special Concern
Sandhill Crane	Grus canadensis	Vertebrate Animal	N/A
Bald Eagle	Haliaeetus leucocephalus	Vertebrate Animal	N/A
Eastern Hognose Snake	Heterodon platirhinos	Vertebrate Animal	N/A

Milksnake	Lampropeltis triangulum	Vertebrate Animal	N/A
American Brook Lamprey	Lethenteron appendix	Vertebrate Animal	N/A
Pickerel Frog	Lithobates palustris	Vertebrate Animal	N/A
Prairie Vole	Microtus ochrogaster	Vertebrate Animal	Special Concern
Woodland Vole	Microtus pinetorum	Vertebrate Animal	Special Concern
Western Foxsnake	Pantherophis ramspotti	Vertebrate Animal	N/A
Louisiana Waterthrush	Parkesia motacilla	Vertebrate Animal	Special Concern
Tricolored Bat	Perimyotis subflavus	Vertebrate Animal	Special Concern
Gophersnake	Pituophis catenifer	Vertebrate Animal	Special Concern
King Rail	Rallus elegans	Vertebrate Animal	Endangered
Cerulean Warbler	Setophaga cerulea	Vertebrate Animal	Special Concern
Bell's Vireo	Vireo bellii	Vertebrate Animal	Special Concern

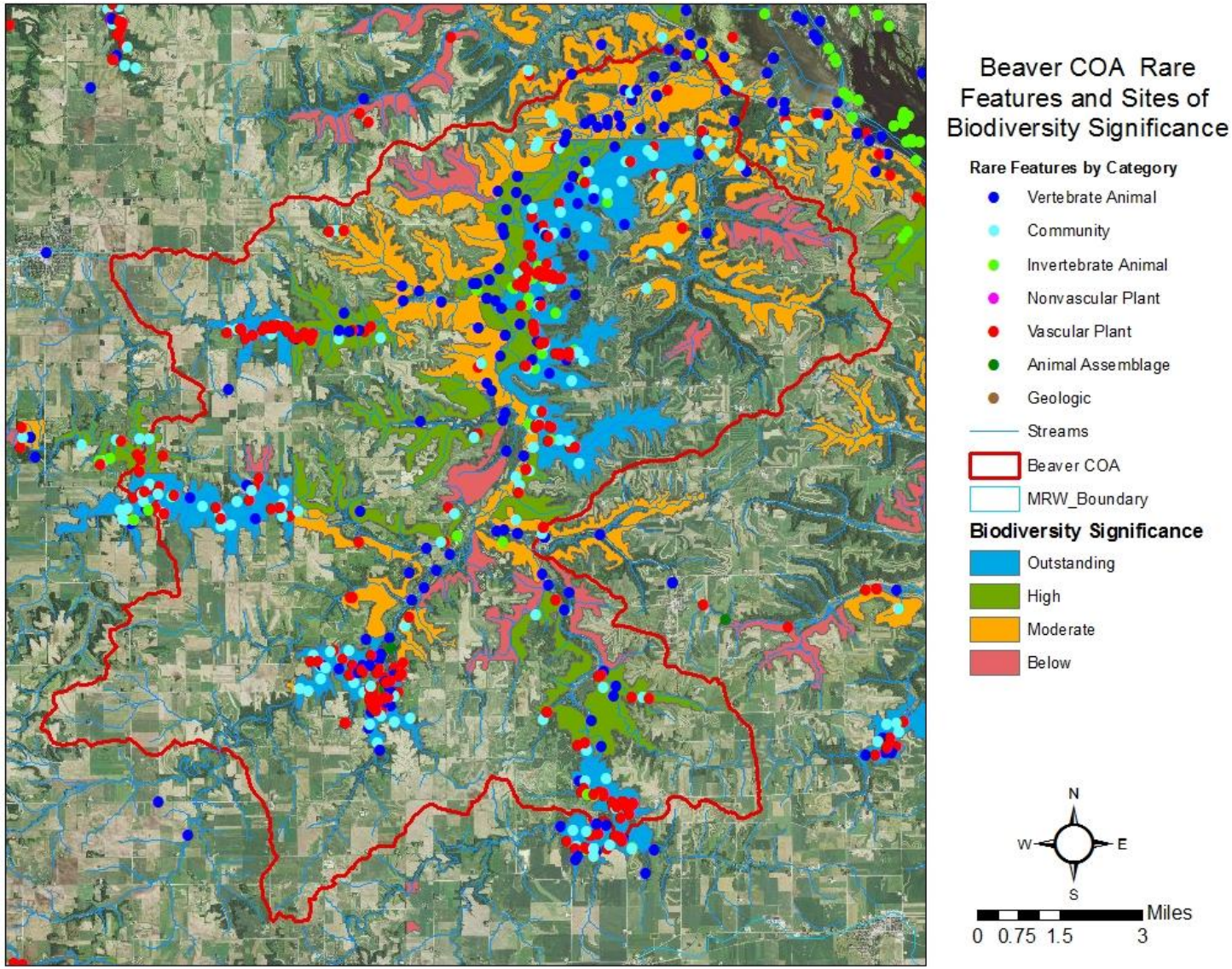

Figure 20. Rare features and sites of biodiversity significance in Beaver COA.

Recreation

There are a number of important areas for outdoor recreation in Beaver COA (Figure 8). Numerous snowmobile trails wind through the area. Hunting is allowed in most of the Whitewater WMA, accessible by several parking lots and trails. Many of the streams in the COA are designated trout streams, and fishing is an important tourism activity in the area. The Whitewater River is also a state water trail, with water access at several spots in the COA. Beaver COA also includes Whitewater State Park, a popular destination for campers, hikers, and anglers. The park offers roughly 10 miles of hiking trails, a sandy beach with swimming area, excellent trout fishing, and 6 miles of groomed cross-country ski trails in the winter. Outdoor recreation and tourism is an important component of the area economy.

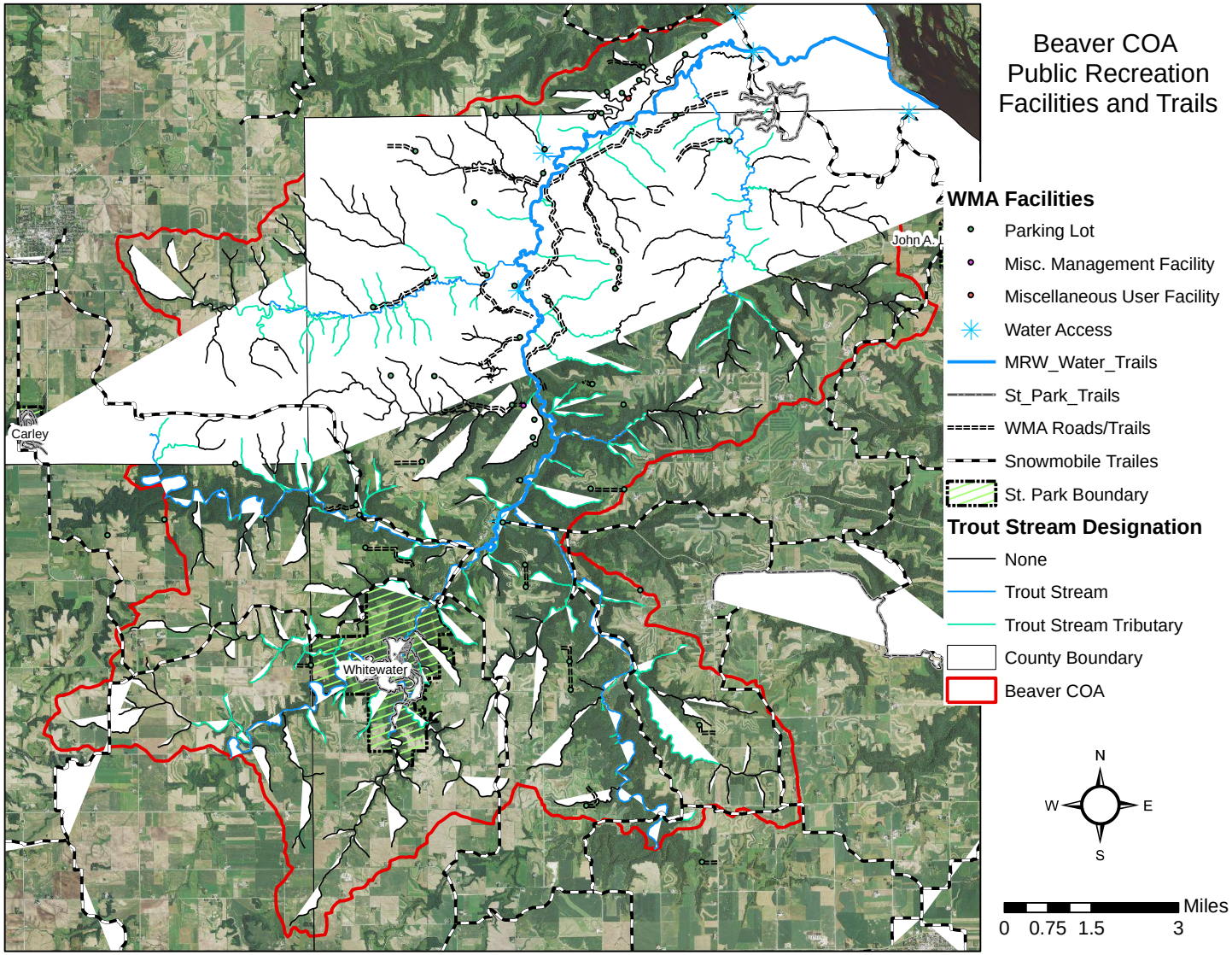

Figure 21. **Recreation trails and facilities in Beaver COA.**

Environmental Threats

Development pressures:
Winona County, in which the majority of Beaver COA lies, is expected to grow in population by a projected 1,300 people by 2020, requiring approximately 650 new dwellings and 1,500 acres of land. A half hour drive (22.6 miles) from Whitewater State Park, Rochester, MN, is in the early stages of a multi-billion dollar economic development project called the "Destination Medical Center" (DMC). The DMC is projected to create between 26,800 to 32,200 new jobs directly. This economic and population growth can lead to increased parcellization, fragmentation, and conversion of rural lands. This disrupts wildlife movement and migration, reduces available habitat, and increased water quality concerns from the added impervious surface area.

Industrial silica sand mining:
Southeast Minnesota has significant deposits of industrial silica sand bedrock at or near the surface. The increased demand for this material in the hydrological fracturing (fracking) process for oil and gas development has created an ongoing policy debate about appropriate use and regulations of this resource. There is currently one aggregate mine operating near beaver COA, between Elba and Altura. Potential impacts of mining include removal of vegetation and underlying substrates, habitat destruction, warming of trout stream waters, chemical contamination of karst hydrology, and water contamination from high volume dispersals from water processing facilities and dewatering pits.
Mismanagement of forest resources:

The forests of Southeast Minnesota support a number of high value timber species, and many sites exist containing high quality timber stock. This represents an important resource for the region, but is also a tempting target for exploitative harvesting practices. Timber harvests that remove all of the most valuable trees in a stand, and leave behind a patchy, irregular forest of poor quality trees do serious harm to the health and productive potential of that site, and severely limit management options in the future. The high value of the timber resource enables sustainable timber management to produce valuable economic products while also providing the habitat and ecosystem services of a healthy forest. Unsustainable harvesting practices can seriously impair a stand's ability to do so in the future.

Nutrient, sediment, and contaminants from upstream agricultural areas:
Much of the area upstream of Beaver COA is heavily farmed, often with practices that do not protect water quality. This has large impacts on downstream reaches. Best management practices are available to farmers to protect their soil from erosion, and help prevent excess nutrients and sediment from washing into the streams. Riparian buffer strips help slow run-off and increase infiltration, allowing nutrients to be filtered and removed by soil processes. Increased adoption of agricultural BMPs to protect water quality in upstream areas will help protect the water quality of downstream reaches in the COA.

C. Land Ownership and Use

Of the three COAs identified for the Mississippi River – Winona Watershed, the Beaver COA has the highest amount and proportion of public land. The Division of Fish and Wildlife owns over 25,000 acres, or 30% of the COA area, all part of the Whitewater WMA. Two thousand acres of the Richard J. Dorer Memorial Hardwood Forest, owned by the Division of Forestry, are also within the COA. However, the majority of the land area is owned privately. Private owners hold 54,000 acres, of which roughly 2,000 are enrolled in the CRP program.

Table 8. Estimated Land ownership in Beaver COA.

Ownership	Parcels	Percent of Parcel Count	Size (Acres)	Percent of COA Acreage
Private	1061	67%	54,216	65%
Division of Fish and Wildlife	470	30%	25,358	30%
Division of Forestry	29	2%	2,231	3%
Division of Parks and Recreation	21	1%	1,382	2%
Total	1581	100%	83,187	100%

Along with the publicly owned and managed areas of the COA, Private lands will play an important role in the ecological and water quality dynamics of the area (Figure 8). Private conservation programs have a presence in the area. The Reinvest in Minnesota (RIM) program has easements in the COA covering 273 acres. The DNR Division of Fisheries also has easements on streams in and near the COA. Many private parcels have a registered Forest Stewardship Plan, a possible sign of landowner involvement and concern for the ecological health of the landscape.

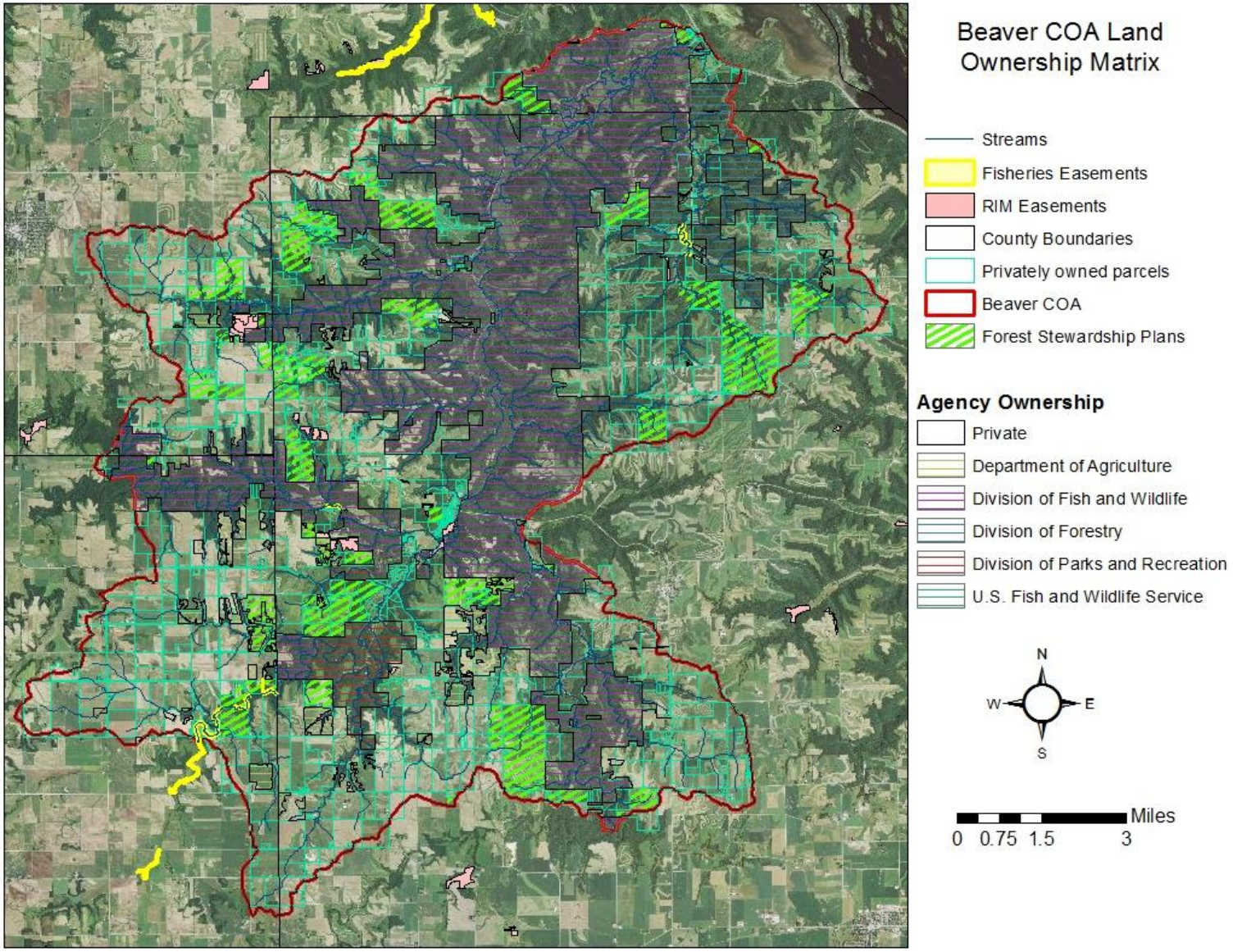

Figure 22. Land ownership in the Beaver COA.

Land Use

Land use patterns in the Beaver COA follow the general pattern for the broader watershed. The predominantly flat, upland areas are mostly cropland or pasture. The steep hillsides are dominated by forests, and the valley floors and floodplain areas contain a mix of cropland, pasture, forests, and wetlands (Figure 5). Major cover types are deciduous forest (38%) and cultivated crops (27%). Pasture/hay (15%) and grassland/herbaceous (12%) cover is also significant (Table 4).

Table 9. Area of land cover types in Beaver COA.

Land Cover Type	Area (Acres)	Percent of COA
Barren Land (Rock/Sand/Clay)	8	0.01%
Cultivated Crops	22,652	27.23%
Deciduous Forest	31,772	38.20%
Developed, High Intensity	21	0.02%
Developed, Low Intensity	484	0.58%
Developed, Medium Intensity	111	0.13%
Developed, Open Space	2,187	2.63%
Emergent Herbaceous Wetlands	1,175	1.41%
Evergreen Forest	307	0.37%
Grassland/Herbaceous	10,013	12.04%
Mixed Forest	45	0.05%
Open Water	252	0.30%
Pasture/Hay	12,638	15.20%
Shrub/Scrub	69	0.08%
Woody Wetlands	1,440	1.73%
Total	83,172	100.00%

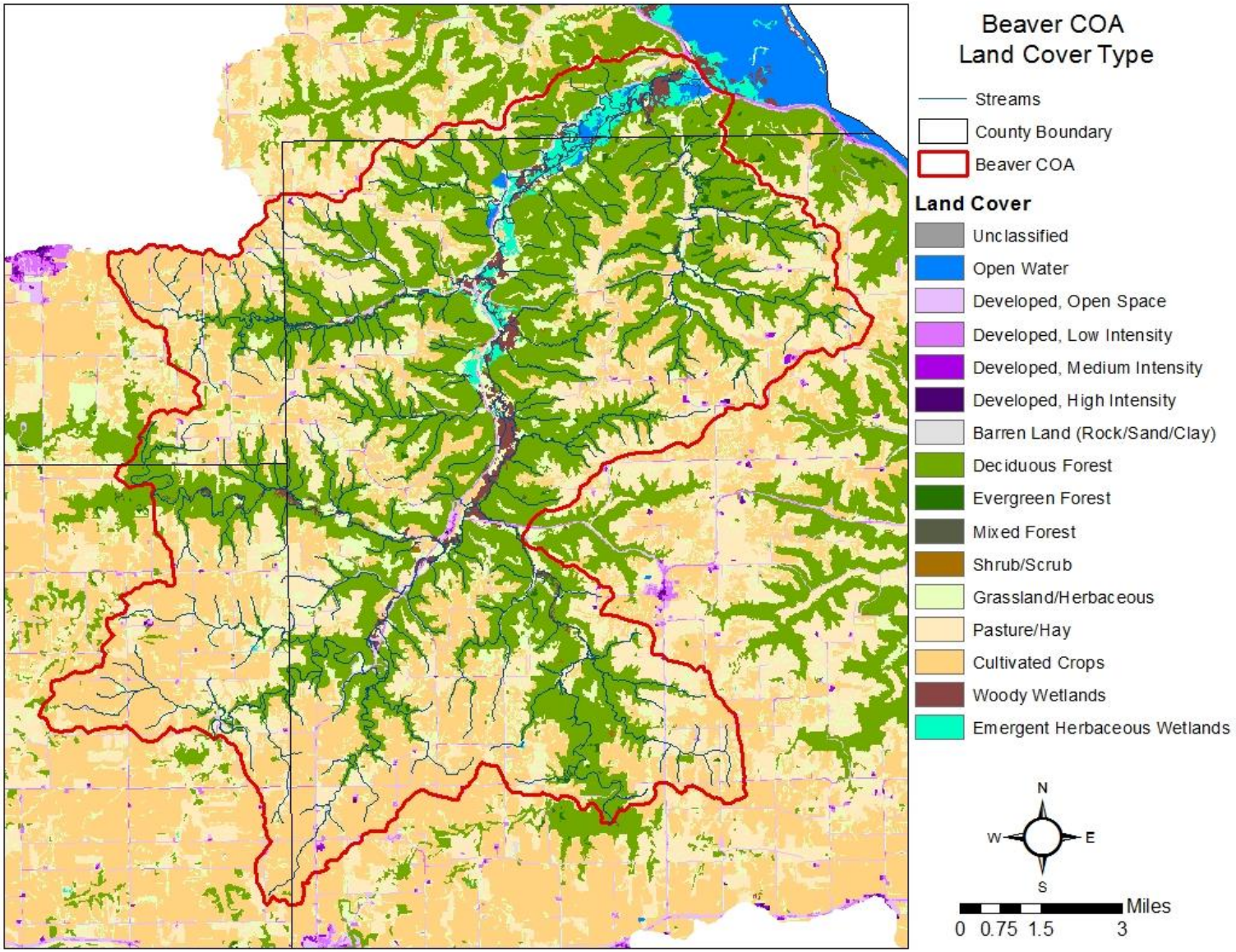

Figure 23. Land cover type with the Beaver COA.

D. Desired Future Conditions

- Biotic integrity of all streams within the COA is restored, resulting in healthy aquatic species and de-listing of impaired waters.
- 100% of riparian areas are covered by native vegetation, returning a host of ecological services for water quality, habitat quality, and connectivity.
- Human activity in riparian areas follows best management practices to protect water quality and sensitive shorelines.
- Diversified agricultural practices include smaller fields, more rotations, fewer pesticides and fertilizers being applied, and marginal acres taken out of row crop production in favor of livestock pasture or pollinator habitat.
- Agricultural practices within the COA follow best management practices to protect soil from erosion, and streams from sedimentation and nutrient loading.
- A natural fire regime is restored through prescribed burning regimens on all appropriate native plant communities.
- Large blocks of all native habitat types exist across ownership lines.
- Habitat corridors link patches of biodiversity habitat, supporting migration and travel, especially in riparian areas.
- Native plant community remnants have expanded
- Rare plants and animal habitat are protected from degradation
- Invasive species are monitored and controlled

E. Key Stewardship Parcels

Conservation efforts on private lands in Beaver COA will be most effective in places where they protect existing native plant communities, and enhance habitat on public lands by increasing their size and/or connectivity. Working with larger parcels is preferable, because more stewardship options are available on larger tracts, and stewardship planning will impact a greater area. A GIS analysis identified key stewardship parcels in the Beaver COA that met the following conditions:

- Parcels larger than 80 acres in size
- That contain at least one native plant community mapped by the MBS
- And are with a quarter mile of publicly owned conservation lands.

There were 93 such parcels within Beaver COA, covering over 14,000 acres, with 68 unique owners listed (Figure 11). Average size among priority parcels was 155 acres.

The priority parcels contain 1,500 acres of Native Plan Communities mapped by MBS. Mesic hardwoods are the most common ecological system within priority parcels by acreage, but they contain the highest percentage of Wet Forest system communities overall (18.6%).

Table 10. Acreage of Native Plant Community ecological systems on priority parcels in Beaver COA.

Ecological system	Area (ac)	Percent of total in COA
Cliff/Talus	9.35	4.58%
Fire Dependent Forest	219.52	7.71%
Floodplain Forest	2.29	0.04%
Mesic Hardwood	1,262.53	8.01%
Upland Prairie	46.29	1.22%
Wet Forest	9.97	18.63%
Total	**1,549.94**	**12.21%**

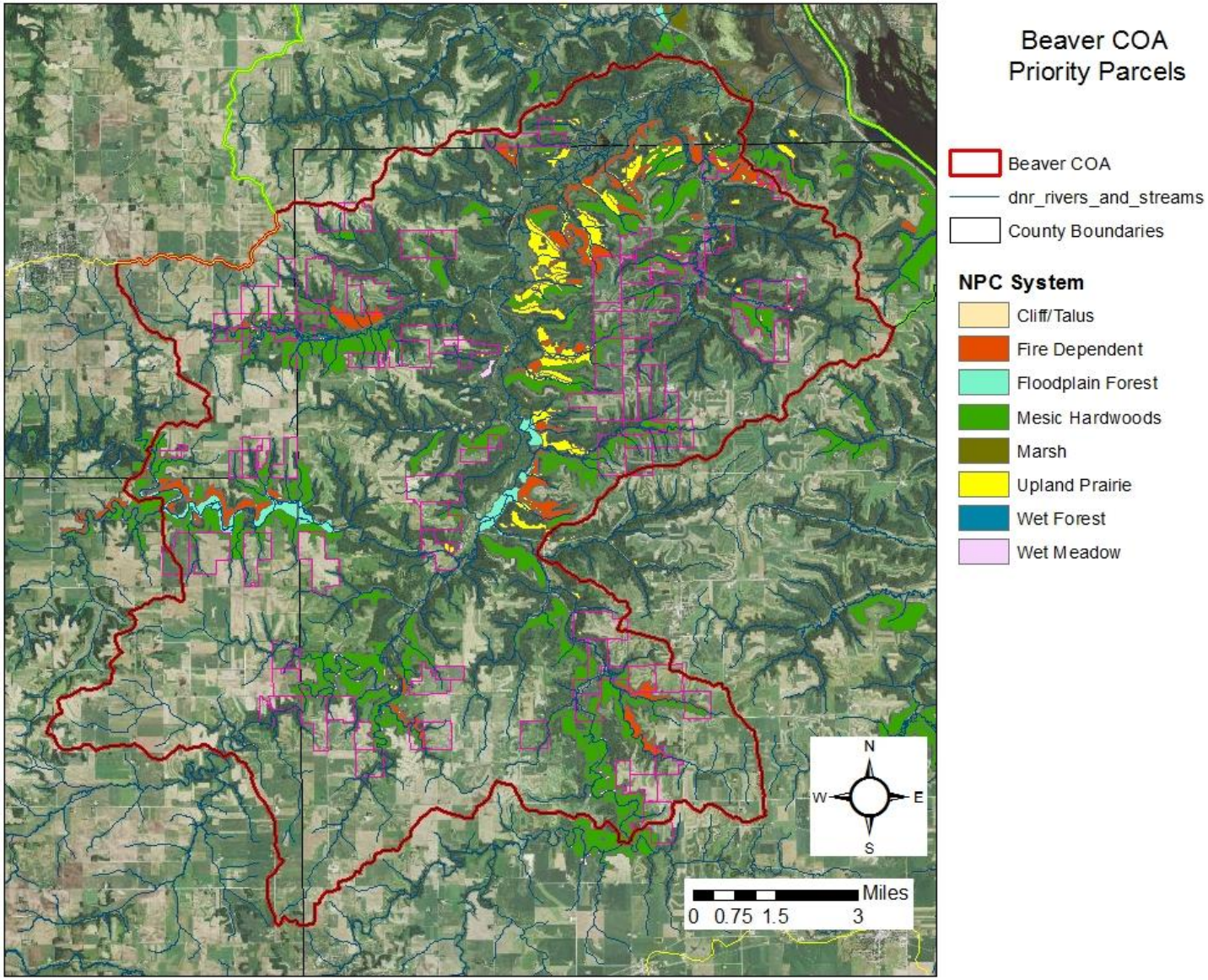

Figure 24. Priority parcels for targeted conservation efforts.

F. Stewardship Activities

There are a variety of tools and strategies available as tools for enacting stewardship activities on the landscape (see Landscape Stewardship Plan, Section 6). Different strategies and actions will be appropriate for different types of parcels, natural resources, and landowners. This section provides a summary of strategies appropriate to different natural resources present in the COA.

Core Forest Areas

Large, continuous stretches of forest communities represent core forest habitat. In addition to providing quality habitat to a number of species, these areas are often favorite places for recreation and scenery, making them important for the tourism industry in the region. They also provide a great benefit to water quality, as forests help prevent erosion, slow and filter water run-off, and shade streams in riparian areas.

Stewardship Activities:

On all lands:

- Control invasive species
- Burn where appropriate
- Manage according to sustainable silvicultural and ecological principles
- Where possible, increase size and connectivity of forest habitat through reforestation/afforestation of connecting patches

On Private lands:

- Prepare comprehensive forest stewardship plans
- Assess landowner interest in Forest Bank style conservation program
- Assist landowner in researching and applying for relevant cost-share programs available (e.g. EQIP, CSP)

Prairies, Savannas, and Fire-Associated Native Plant Communities

The suppression of fire and mass conversion to agriculture that came with Euro-American settlement drastically reduced the amount of native prairie and savannas in both Minnesota, and the US as a whole (Figure 12). These communities offer important habitat for a number of animals, and many flowering plants and grasses.

Stewardship Activities:

On all lands:

- Restore a natural fire regime through prescribed burns
- Remove brush as needed
- Control invasive species
- Expand grassland habitat as buffer areas around other NPCs.

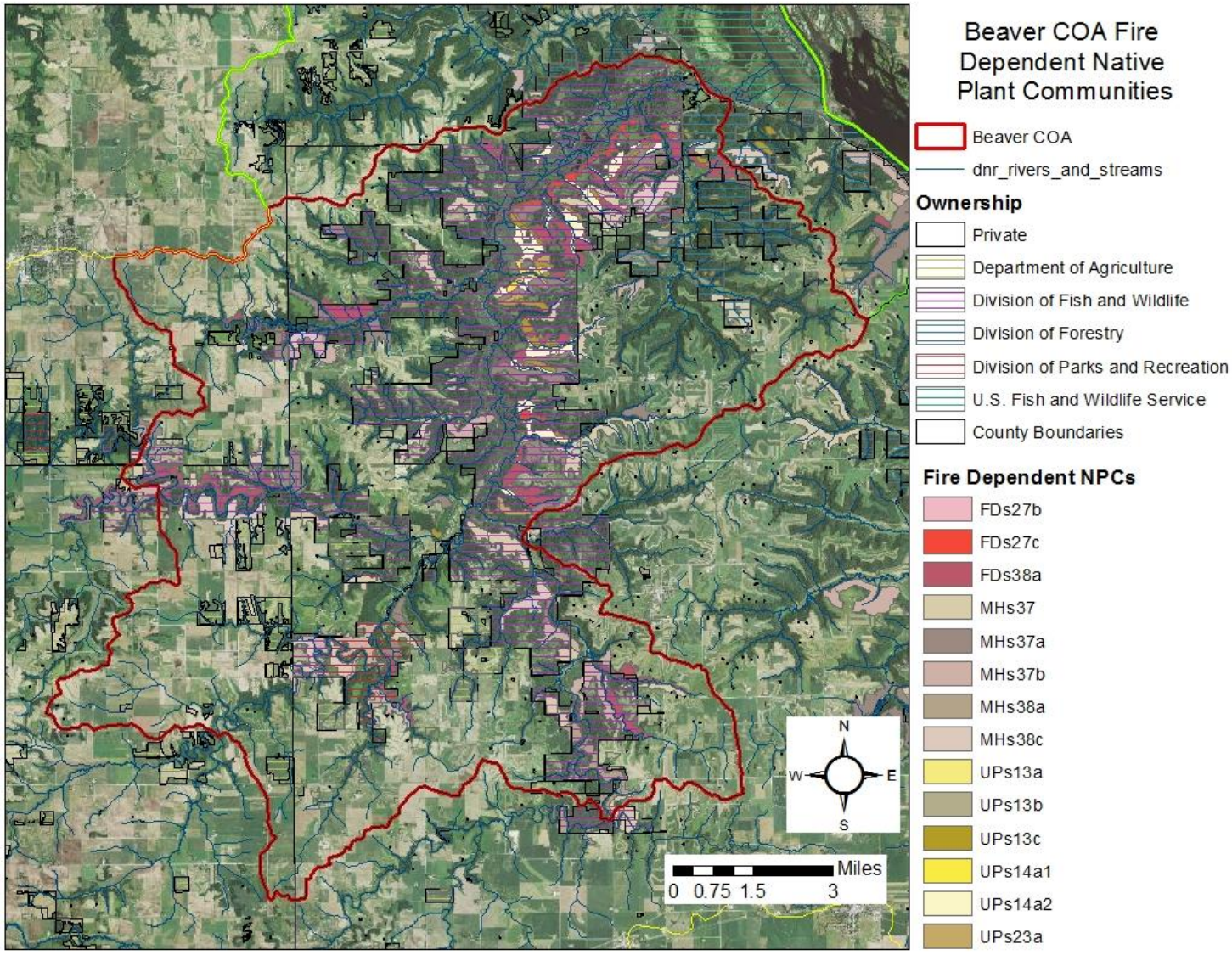

Figure 25. Fire dependent native plant communities in Beaver COA.

Croplands in Riparian Areas

Riparian areas are those nearest, and most connected to streams and rivers. They have an important impact on water quality, either positively, by slowing and filtering run-off, or negatively, by contributing to sediment and nutrient loads brought to streams through erosion and run-off. Croplands that involve tilling soil and applying nutrients in riparian areas can pose a risk to water quality in the stream (Figure 14).

Stewardship Activities:

On public lands:

- Convert to perennial cover, preferably forest cover

On private lands:

- Enforce state shore land ordinance
- Help interested landowners apply for the various cost-share or easement programs available for water quality protection (e.g. CRP, RIM)

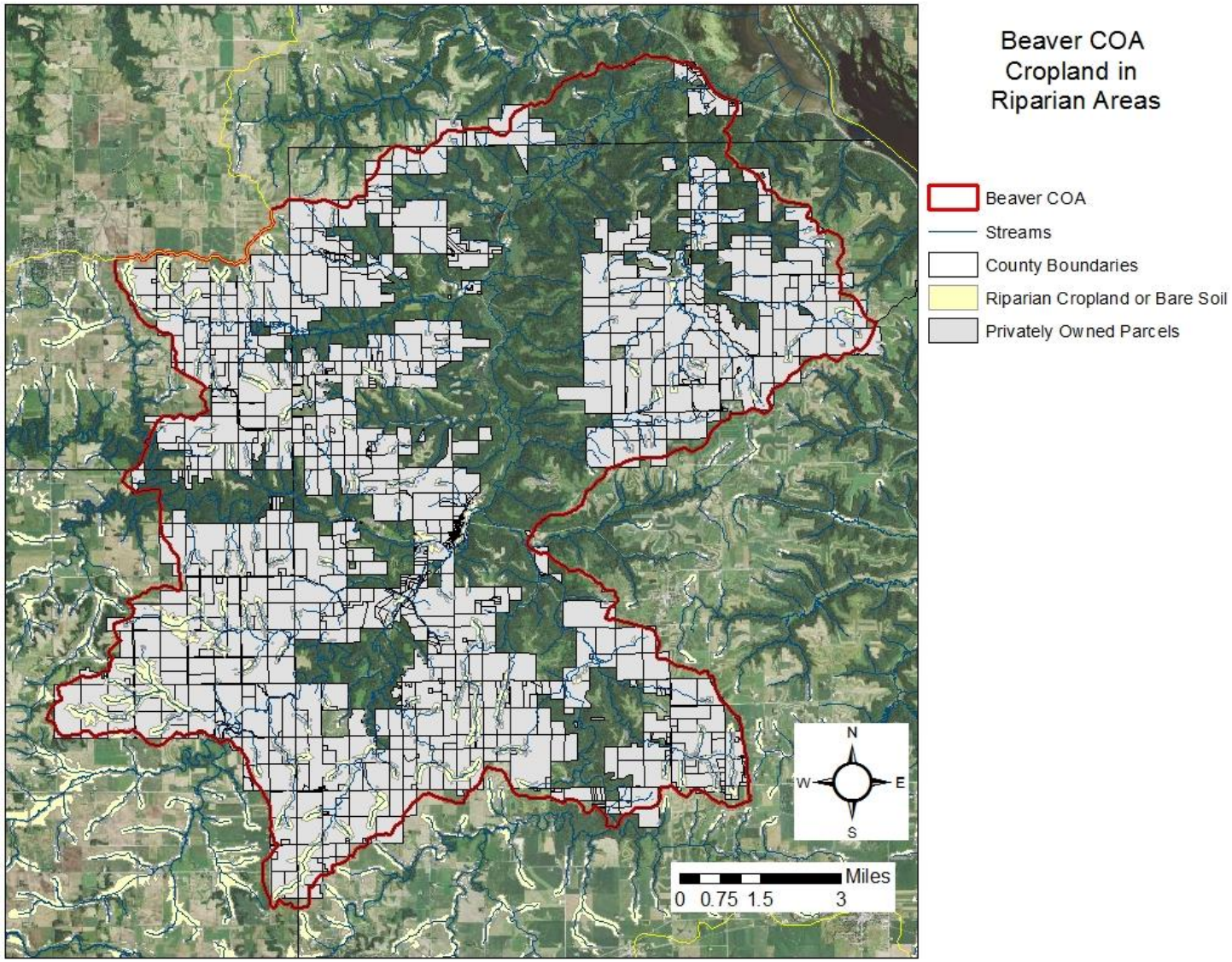

Figure 26. Cropland in riparian areas within the Beaver COA. Most of these areas occur on private land.

Karst Features

Karst features are locations where cracks or fissures in the bedrock allow bring direct connections between groundwater and surface water. Sinkholes provide surface water a direct route to groundwater aquifers. Springs and seeps are places where groundwater reemerges onto the land or streams. Pollution in these areas can quickly enter groundwater reservoirs, which can also affect surface water quality. They are crucial areas to protect in order to preserve the water quality of the COA.

Stewardship Activities:

- Protect sinkholes and springs with buffers of native vegetation
- Limit pesticide applications in the vicinity of sinkholes

Key Stewardship Parcels

These parcels were identified based on their geographical size, inclusion of a native plant community, and proximity to public land (Figure 11, above). They are areas where conservation effort can be most beneficial to the overall health of the landscape.

Stewardship Activities:

- Work to engage the owners of these parcels in a targeted manner.
- Tailor outreach and assistance to each landowner individually based on characteristics of their parcel and its geographical and ecological characteristics
- Prioritize stewardship efforts affecting these parcels

G. Project Lead and Coordination

No single agency will be expected to perform or support all activities listed above. The Landscape Specialist for the Mississippi River – Winona LSP will be responsible for coordinating efforts. A project lead person specific to Beaver COA will also be appointed to take responsibility for guiding access to expertise, labor, and funding. This should be someone with a strong vested interest in some aspect of Beaver COA.

The project lead and Landscape Specialist will then work to recruit partner agencies, contact key landowners, and implement the called for stewardship activities.

Section 11.
City of Winona (CoW) COA

A. Overview

The City of Winona (CoW) COA occupies the southeast corner of the Mississippi River – Winona Watershed. It includes several indivual direct tributaries to the Mississippi River, as well as nearly 14 miles of the Mississippi River itself. The City of Winona itself occupies the northern corner of the COA, and, along with Goodview, is the population center of the area. Many of The rest of the COA area, running generally Southeast from the City, lies between it and the Lacrosse, WI, and a number of the valleys hold scattered residences for people who commute to either city. CoW COA has much less agriculture than the rest of the Mississippi River – Winona Watershed; most of the streams in the COA originate from bluffside springs and cut quickly down into their valleys, leaving little room in the intervening ridgetops for large farms. As such, while very little public land is present in the COA, much of the area still supports forested communities. The MBS has designated substantial portions of the COA as having moderate or high significance to biodiversity, and an opportunity exists for successful private land conservation efforts.

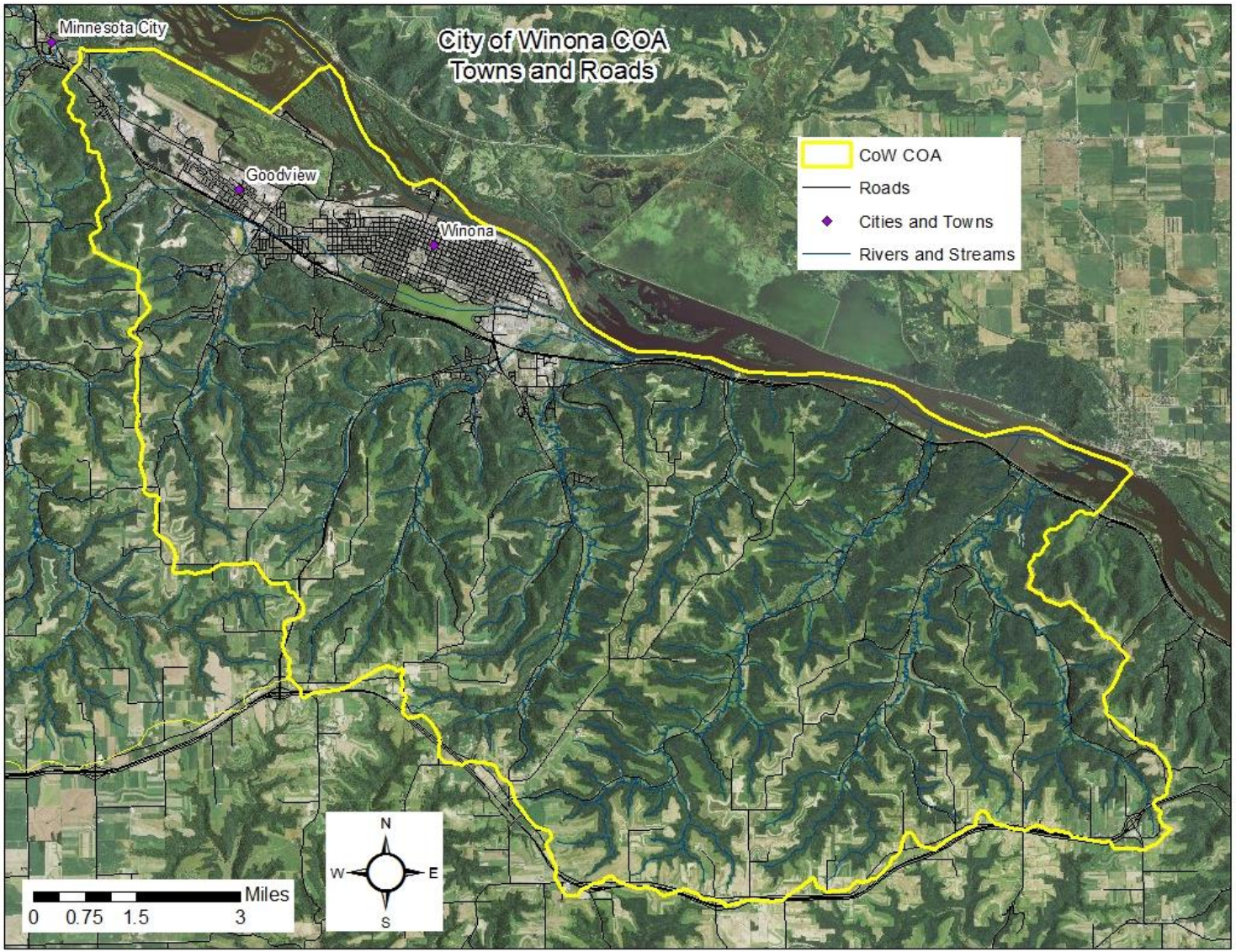

Figure 27. Location of roads and towns in CoW COA.

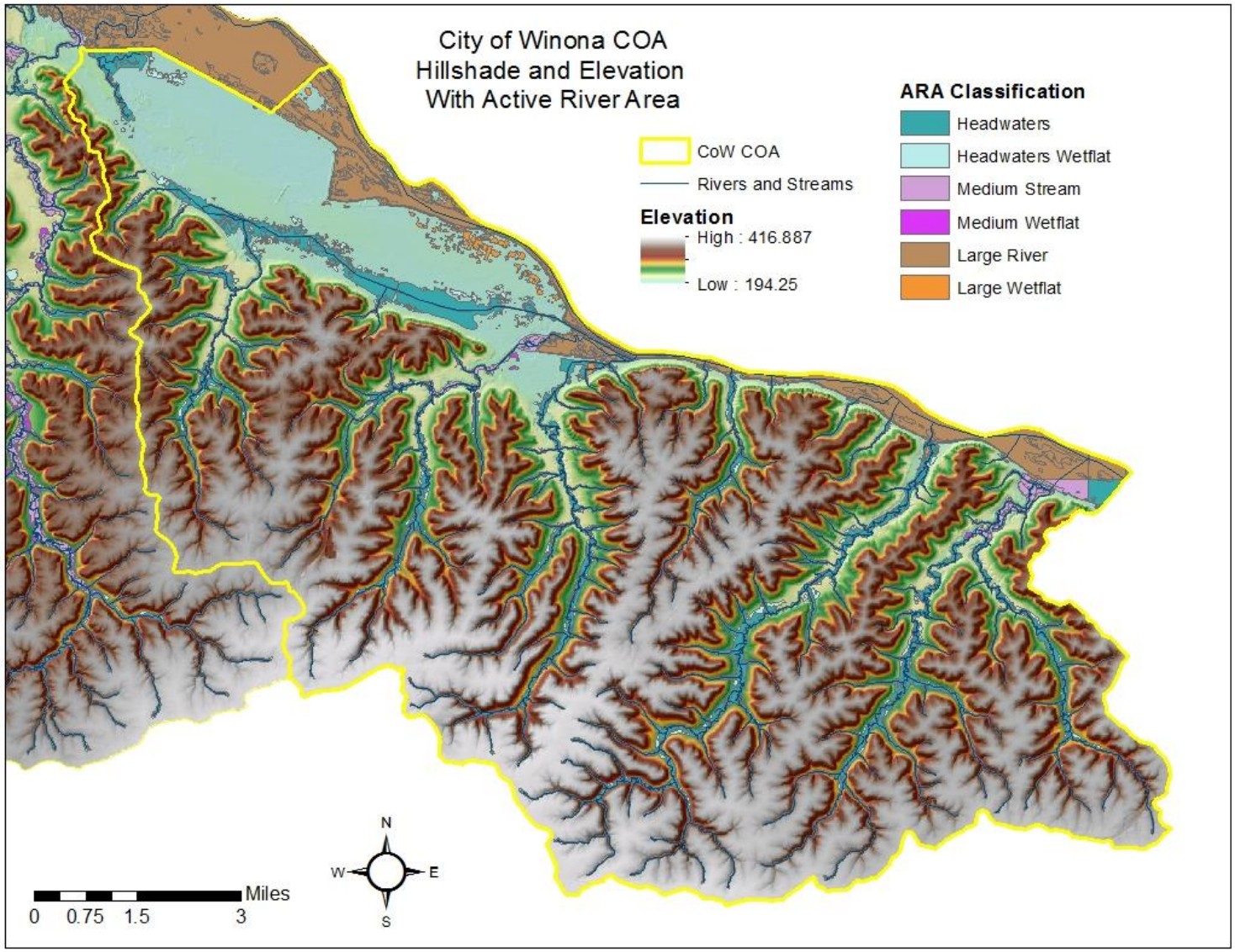

Figure 28. Topography of CoW COA with Active River Area.

B. Natural Resource Assessment

Hydrology

The CoW COA includes eight primary named streams which drain directly into the Mississippi River, as well as substantial mileage of other unnamed perennial or intermittent streams that feed them (Figure 2). Nearly all include stretches with official trout stream designation (Table 1, Figure 4). Karst features are common in the area, and springs feed several of the streams (Figure 3). Scattered lakes are found in the Mississippi River valley, often in depressions that old abandoned river channels. In the Winona, Gilmore creek widens to form the largest of these, Lake Winona. The East boundary of the COA is formed by the Mississippi River. The COA includes almost 14 miles of the Mississippi River's main channel, as well as backwaters areas and wetlands found in its floodplain.

Table 11. Perennial stream lengths within City of Winona COA.

Perennial and Intermittent Streams	Mileage within COA	Trout Stream Designation
Gilmore Creek	13.80	Trout Stream
Cedar Valley Creek	11.83	Trout Stream
Pickwick Creek	10.88	Mixed
Pleasant Valley Creek	10.44	Trout Stream
Burns Valley Creek, East	9.72	Mixed
Little Pickwick Creek	6.90	Mixed
Homer Creek	5.02	None
Burns Valley Creek, West	4.17	Mixed
Other/Unnamed Creeks	103.12	Mixed
Mississippi River	13.92	None

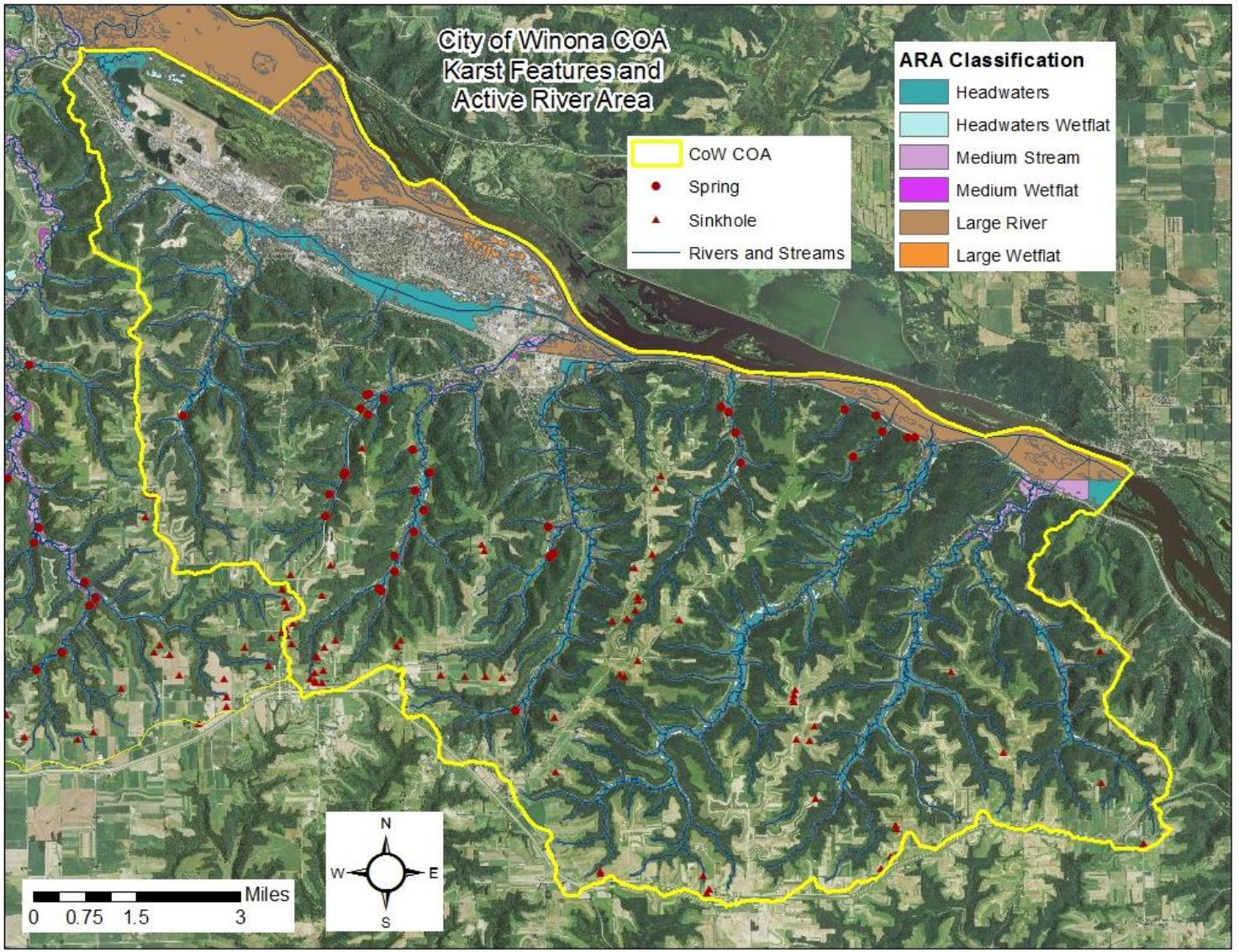

Figure 29. Karst features and active river area in CoW COA.

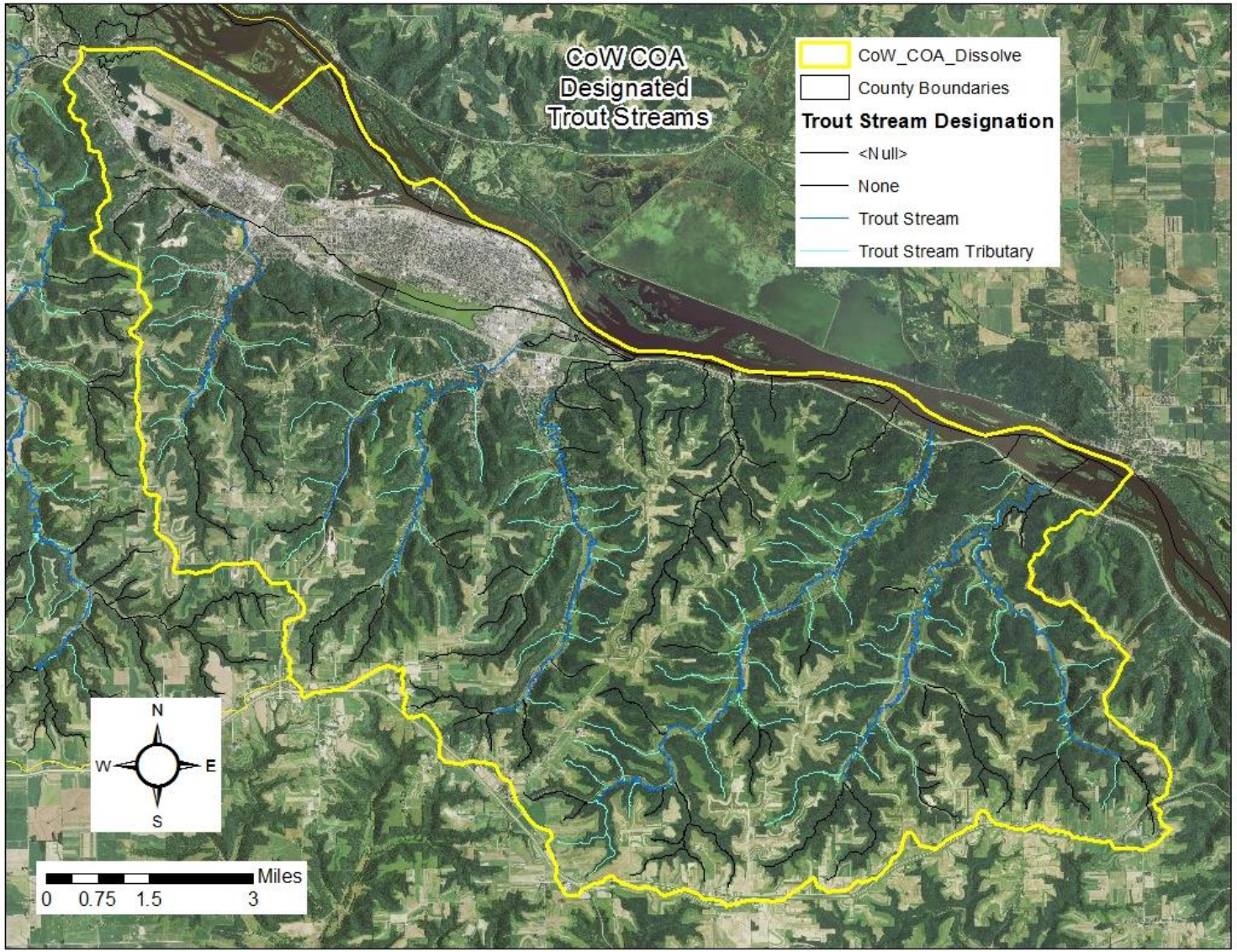

Figure 30. Designated Trout Streams in CoW COA.

Plant Communities

CoW COA contains over 6,000 acres of Native Plan Communities identified by the Minnesota Biological Survey (MBS) (Table 2). Nearly half of that acreage is made up of Mesic Hardwoods. Floodplain Forests make up the next largest section, accounting for a quarter of the total acreage. A significant portion of the COA would benefit from the reintroduction of fire to the landscape- Upland Prairie and Fire Dependent Forest systems combined make up an additional 20% of the NPC acreage.

As private lands make up the vast majority of the COA, it is unsurprising that most NPCs in CoW COA occur on privately-owned parcels (Figure 6). Engaging with landowners to manage and protect these communities will be important to protect them for the future.

Table 12. Native Plant Communities in CoW COA.

Native Plant Community	**NPC Code**	**System**	**Acreage**	**Percent of total CoW COA NPC Acreage**
Southern Dry Cliff	CTs12	Cliff/Talus	28.43	0.46%
Total Cliff/Talus System			**28.43**	**0.46%**
Oak - Shagbark Hickory Woodland	FDs38a	Fire Dependent Forest	711.66	11.60%
Total Fire Dependent Forest System			**711.66**	**11.60%**
Silver Maple - Green Ash - Cottonwood Terrace Forest	FFs59a	Floodplain Forest	601.16	9.80%
Silver Maple - (Virginia Creeper) Floodplain Forest	FFs68a	Floodplain Forest	973.48	15.87%
Total Floodplain Forest System			**1,574.64**	**25.67%**
Red Oak - Sugar Maple - Basswood - (Bitternut Hickory) Forest	MHs38c	Mesic Hardwoods	223.23	3.64%
Red Oak - White Oak Forest	MHs37a	Mesic Hardwoods	679.97	11.09%
Sugar Maple - Basswood - (Bitternut Hickory) Forest	MHs39a	Mesic Hardwoods	133.25	2.17%
Red Oak - White Oak - (Sugar Maple) Forest	MHs37b	Mesic Hardwoods	1101.34	17.96%
Southern Dry-Mesic Oak Forest	MHs37	Mesic Hardwoods	737.57	12.03%
Sugar Maple - Basswood - Red Oak - (Blue Beech) Forest	MHs39b	Mesic Hardwoods	68.53	1.12%
Southern Mesic Maple-Basswood Forest	MHs39	Mesic Hardwoods	5.41	0.09%
Total Mesic Hardwood System			**2,949.30**	**48.09%**
Northern Bulrush-Spikerush Marsh	MRn93	Marsh	247.37	4.03%

Total Marsh System			**247.37**	**4.03%**
Dry Sand - Gravel Prairie (Southern)	UPs13b	Upland Prairie	43.06	0.70%
Dry Bedrock Bluff Prairie (Southern)	UPs13c	Upland Prairie	493.58	8.05%
Mesic Prairie (Southern)	UPs23a	Upland Prairie	74.30	1.21%
Total Upland Prairie System			**610.93**	**9.96%**
Seepage Meadow/Carr: Impatiens Subtype	WMs83a3	Wet meadow	10.80	0.18%
Total Wet Meadow System			**10.80**	**0.18%**
Total			**6,133.13**	**100.00%**

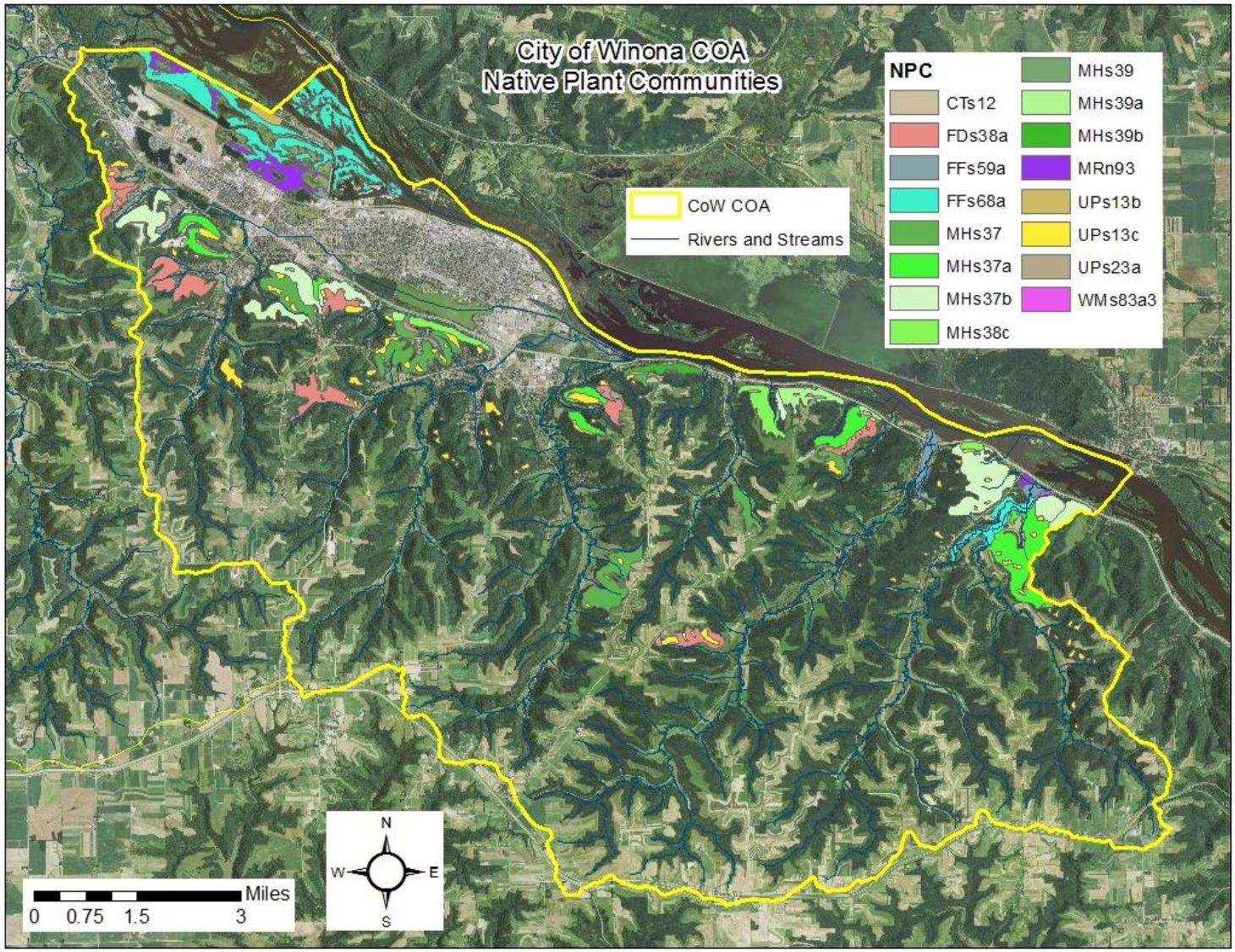

Figure 31. NPCs within CoW COA

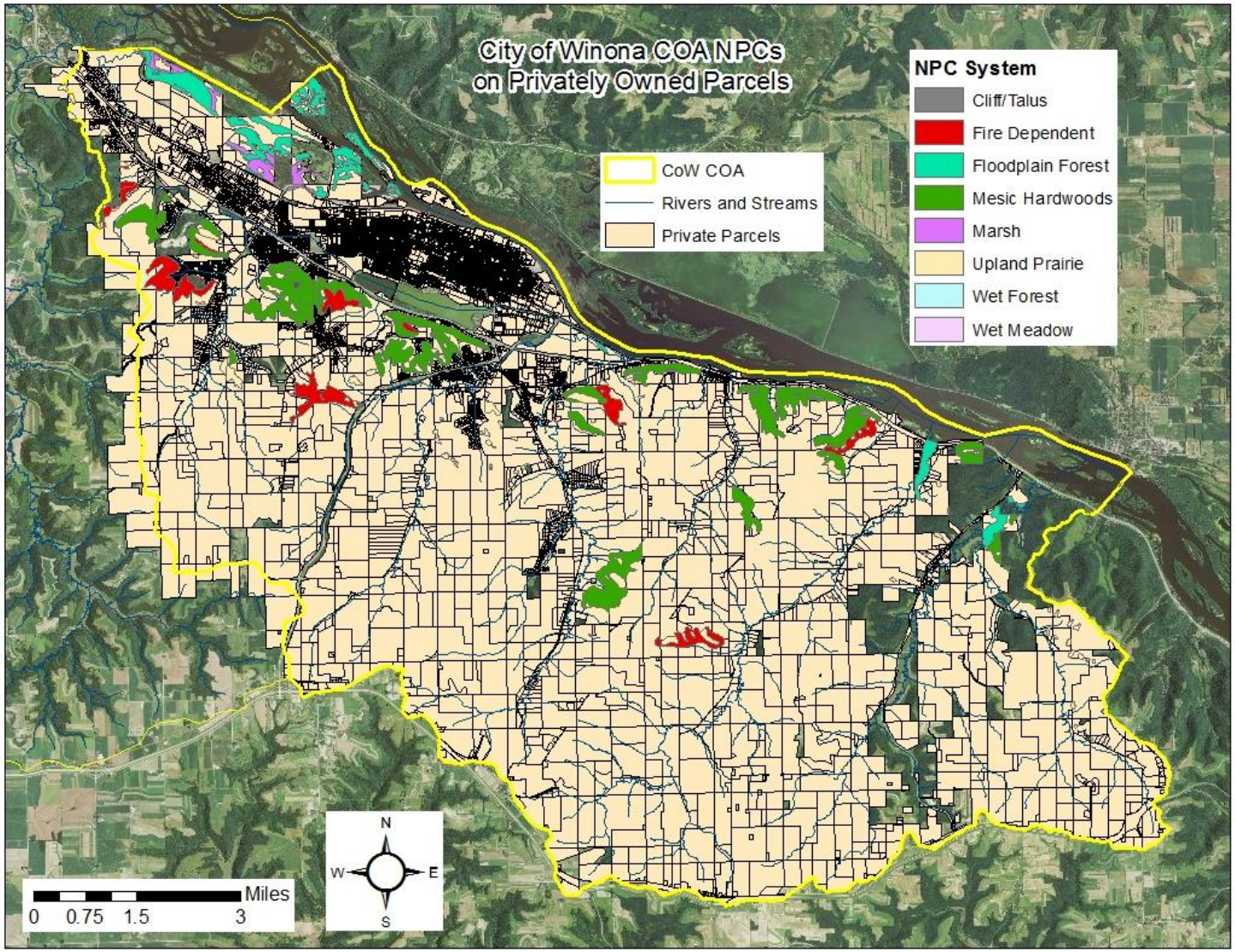

Figure 32. NPCs occurring on privately owned parcels within CoW COA. (Note, some gaps in the private parcel shapefiles are simple features missing from the dataset, not necessarily public land)

Biodiversity and Rare Species

The National Heritage Information System (NHIS) has recorded 75 different occurrences of plants, animals, or communities in CoW COA that are considered rare (table 3). Rare species are those listed as either endangered, threatened, or of special concern. **Endangered** species are those facing extinction throughout all or a significant portion of its range within Minnesota. **Threatened** species are likely to become endangered in the foreseeable future. **Species of Special Concern**, though not endangered or threatened, are extremely uncommon in Minnesota. Other species (listed in table below as N/A) not officially listed in those categories may be monitored due to potential concern. Additionally, 12 rare terrestrial communities are listed in CoW COA. Rare terrestrial communities are collections of plant species growing together, whose presence on the landscape is rare or severely diminished. These communities are monitored, but not given designations as endangered, threatened, or of special concern. The rare plant and animal species observed within CoW COA are listed by organism type in Table 4.

A large portion of CoW COA has been assessed by the Minnesota Biological Survey for its significance to biodiversity in the state (Figure7). Much of the forested bluffsides have warranted assessment, along with backwaters areas north of Winona and Goodview. While none of the areas have been rated as "Outstanding," several large areas near the Mississippi River are designated as having "high" importance.

Table 13. Number of rare species or communities by type in CoW COA.

Organism Type	
Invertebrate Animal	15
Nonvascular Plant	1
Terrestrial Community - Other Classification	12
Vascular Plant	22
Vertebrate Animal	25
Total	**75**

Table 14. Rare plant and animal species or communities recorded in CoW COA.

Common name	Scientific Name	Organism Type	Conservation Status
Mucket	Actinonaias ligamentina	Invertebrate Animal	THR
Elktoe	Alasmidonta marginata	Invertebrate Animal	THR
Rock Pocketbook	Arcidens confragosus	Invertebrate Animal	END
Splendid Tiger Beetle	Cicindela splendida cyanocephalata	Invertebrate Animal	SPC
Butterfly	Ellipsaria lineolata	Invertebrate Animal	THR
Elephant-ear	Elliptio crassidens	Invertebrate Animal	END
Spike	Elliptio dilatata	Invertebrate Animal	THR
Ebonyshell	Fusconaia ebena	Invertebrate Animal	END
Black Sandshell	Ligumia recta	Invertebrate Animal	SPC
Washboard	Megalonaias nervosa	Invertebrate Animal	END
Hickorynut	Obovaria olivaria	Invertebrate Animal	Watchlist
Round Pigtoe	Pleurobema sintoxia	Invertebrate Animal	SPC
Monkeyface	Quadrula metanevra	Invertebrate Animal	THR
Wartyback	Quadrula nodulata	Invertebrate Animal	THR
Fawnsfoot	Truncilla donaciformis	Invertebrate Animal	THR
Sword Moss	Bryoxiphium norvegicum	Nonvascular Plant	END
Black Ash - Sugar Maple - Basswood - (Blue Beech) Seepage Swamp	Black Ash - Sugar Maple - Basswood - (Blue Beech) Seepage Swamp Type	Terrestrial Community - Other Classification	
Dry Bedrock Bluff Prairie (Southern)	Dry Bedrock Bluff Prairie (Southern) Type	Terrestrial Community - Other Classification	
Dry Sand - Gravel Prairie (Southern)	Dry Sand - Gravel Prairie (Southern) Type	Terrestrial Community - Other Classification	
Oak - Shagbark Hickory Woodland	Oak - Shagbark Hickory Woodland Type	Terrestrial Community - Other Classification	
Red Oak - Sugar Maple - Basswood - (Bitternut Hickory) Forest	Red Oak - Sugar Maple - Basswood - (Bitternut Hickory) Forest Type	Terrestrial Community - Other Classification	
Red Oak - White Oak - (Sugar Maple) Forest	Red Oak - White Oak - (Sugar Maple) Forest Type	Terrestrial Community - Other Classification	
Red Oak - White Oak Forest	Red Oak - White Oak Forest Type	Terrestrial Community - Other Classification	

Common name	Scientific Name	Organism Type	Conservation Status
Seepage Meadow/Carr, Impatiens Subtype	Seepage Meadow/Carr; Impatiens Subtype	Terrestrial Community - Other Classification	
Silver Maple - (Virginia Creeper) Floodplain Forest	Silver Maple - (Virginia Creeper) Floodplain Forest Type	Terrestrial Community - Other Classification	
Southern Dry-Mesic Oak Forest	Southern Dry-Mesic Oak Forest Class	Terrestrial Community - Other Classification	
Sugar Maple - Basswood - (Bitternut Hickory) Forest	Sugar Maple - Basswood - (Bitternut Hickory) Forest Type	Terrestrial Community - Other Classification	
Sugar Maple - Basswood - Red Oak - (Blue Beech) Forest	Sugar Maple - Basswood - Red Oak - (Blue Beech) Forest Type	Terrestrial Community - Other Classification	
White Baneberry	Actaea pachypoda	Vascular Plant	
Green Dragon	Arisaema dracontium	Vascular Plant	SPC
Ebony Spleenwort	Asplenium platyneuron	Vascular Plant	SPC
Plains Wild Indigo	Baptisia bracteata var. glabrescens	Vascular Plant	SPC
Blunt-lobed Grapefern	Botrychium oneidense	Vascular Plant	THR
Gray's Sedge	Carex grayi	Vascular Plant	SPC
Muskingum Sedge	Carex muskingumensis	Vascular Plant	SPC
Cattail Sedge	Carex typhina	Vascular Plant	SPC
Buttonbush	Cephalanthus occidentalis	Vascular Plant	
Squirrel-corn	Dicentra canadensis	Vascular Plant	SPC
Narrow-leaved Spleenwort	Diplazium pycnocarpon	Vascular Plant	THR
Jewelled Shooting Star	Dodecatheon amethystinum	Vascular Plant	Watchlist
Rock Clubmoss	Huperzia porophila	Vascular Plant	THR
Lilia-leaved Twayblade	Liparis liliifolia	Vascular Plant	
Broad Beech-fern	Phegopteris hexagonoptera	Vascular Plant	END
Cross-leaved Milkwort	Polygala cruciata	Vascular Plant	END
Cliff Goldenrod	Solidago sciaphila	Vascular Plant	
White Heath Aster	Symphyotrichum pilosum	Vascular Plant	SLL-Watch
Goat's-rue	Tephrosia virginiana	Vascular Plant	SPC
Valerian	Valeriana edulis var. ciliata	Vascular Plant	THR
Lance-leaved Violet	Viola lanceolata var. lanceolata	Vascular Plant	THR
Silverleaf Grape	Vitis aestivalis var. bicolor	Vascular Plant	THR

Common name	Scientific Name	Organism Type	Conservation Status
Lake Sturgeon	Acipenser fulvescens	Vertebrate Animal	SPC
Blanchard's Cricket Frog	Acris blanchardi	Vertebrate Animal	END
Skipjack Herring	Alosa chrysochloris	Vertebrate Animal	END
Henslow's Sparrow	Ammodramus henslowii	Vertebrate Animal	END
Smooth Softshell	Apalone mutica	Vertebrate Animal	SPC
Pirate Perch	Aphredoderus sayanus	Vertebrate Animal	SPC
North American Racer	Coluber constrictor	Vertebrate Animal	SPC
Timber Rattlesnake	Crotalus horridus	Vertebrate Animal	THR
Crystal Darter	Crystallaria asprella	Vertebrate Animal	END
Blue Sucker	Cycleptus elongatus	Vertebrate Animal	SPC
Blanding's Turtle	Emydoidea blandingii	Vertebrate Animal	THR
Peregrine Falcon	Falco peregrinus	Vertebrate Animal	SPC
Common Gallinule	Gallinula galeata	Vertebrate Animal	SPC
Bald Eagle	Haliaeetus leucocephalus	Vertebrate Animal	Watchlist
Black Buffalo	Ictiobus niger	Vertebrate Animal	THR
Milksnake	Lampropeltis triangulum	Vertebrate Animal	Watchlist
American Brook Lamprey	Lethenteron appendix	Vertebrate Animal	Watchlist
Bullfrog	Lithobates catesbeianus	Vertebrate Animal	Watchlist
Prairie Vole	Microtus ochrogaster	Vertebrate Animal	SPC
Yellow Bass	Morone mississippiensis	Vertebrate Animal	SPC
Pugnose Minnow	Opsopoeodus emiliae	Vertebrate Animal	Watchlist
Western Foxsnake	Pantherophis ramspotti	Vertebrate Animal	Watchlist
Shovelnose Sturgeon	Scaphirhynchus platorynchus	Vertebrate Animal	Watchlist
Hooded Warbler	Setophaga citrina	Vertebrate Animal	SPC
Bell's Vireo	Vireo bellii	Vertebrate Animal	SPC

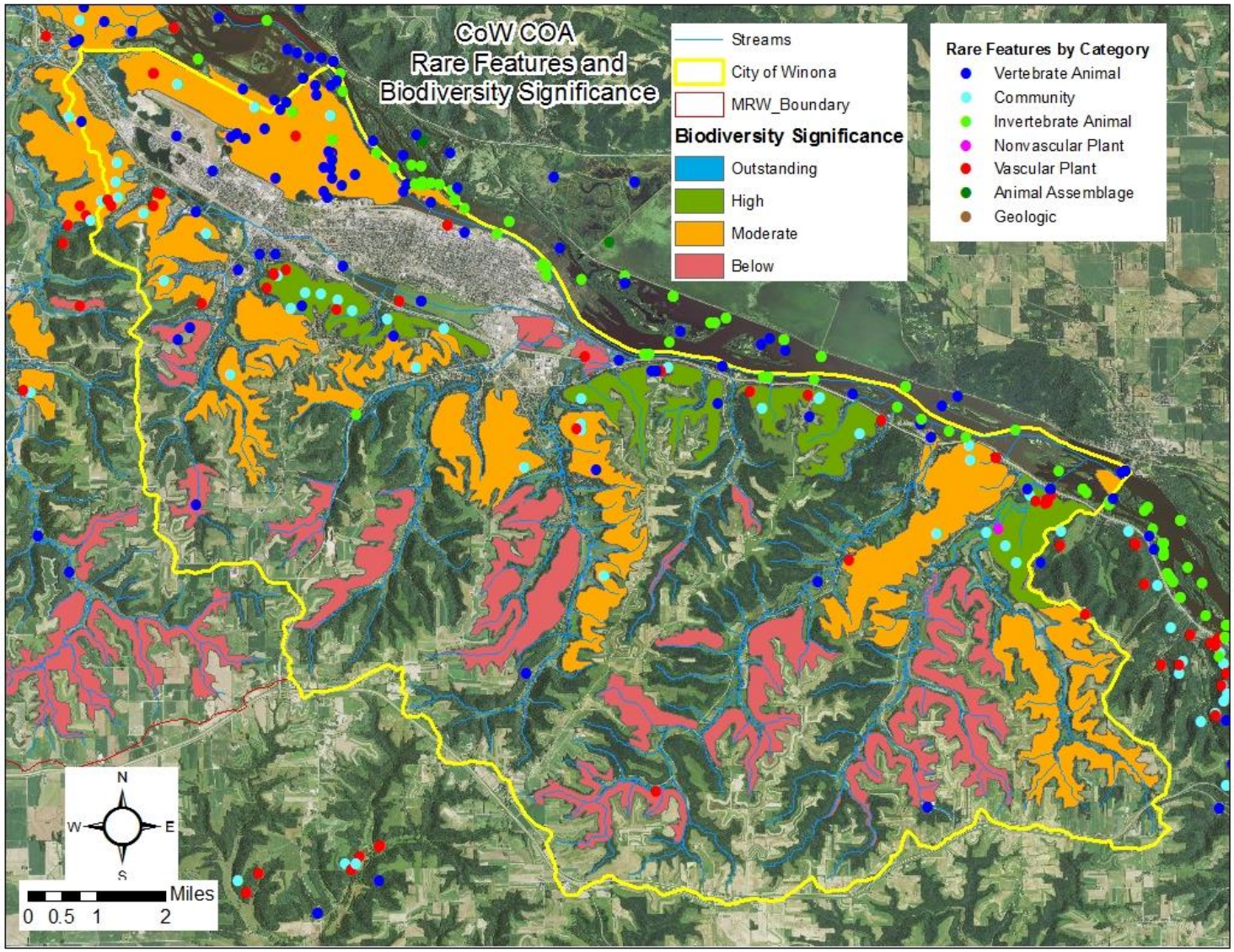

Figure 33. Rare features and sites of biodiversity significance in CoW COA.

Recreation

Nearly all of the land in CoW COA is privately owned, and so public access for outdoor activities is much more limited than in other COAs (Figure 8). The Mississippi River is popular with boaters. Where access is allowed, most of the main streams of the watershed are designated trout streams, and the region is a popular angling spot. Several of the State and County Highways winding through the COA are also popular biking routes. The City of Winona, as well as both Winona State University and St. Mary's University, maintain some trails through the bluffs near the city (not shown on map). Canoes and other small watercraft are also often seen on Lake Winona in the summer. In winter, snowshoeing and cross-country skiing are possible on the trails maintained by the City and St. Mary's. A network of snowmobile trails also winds through the COA.

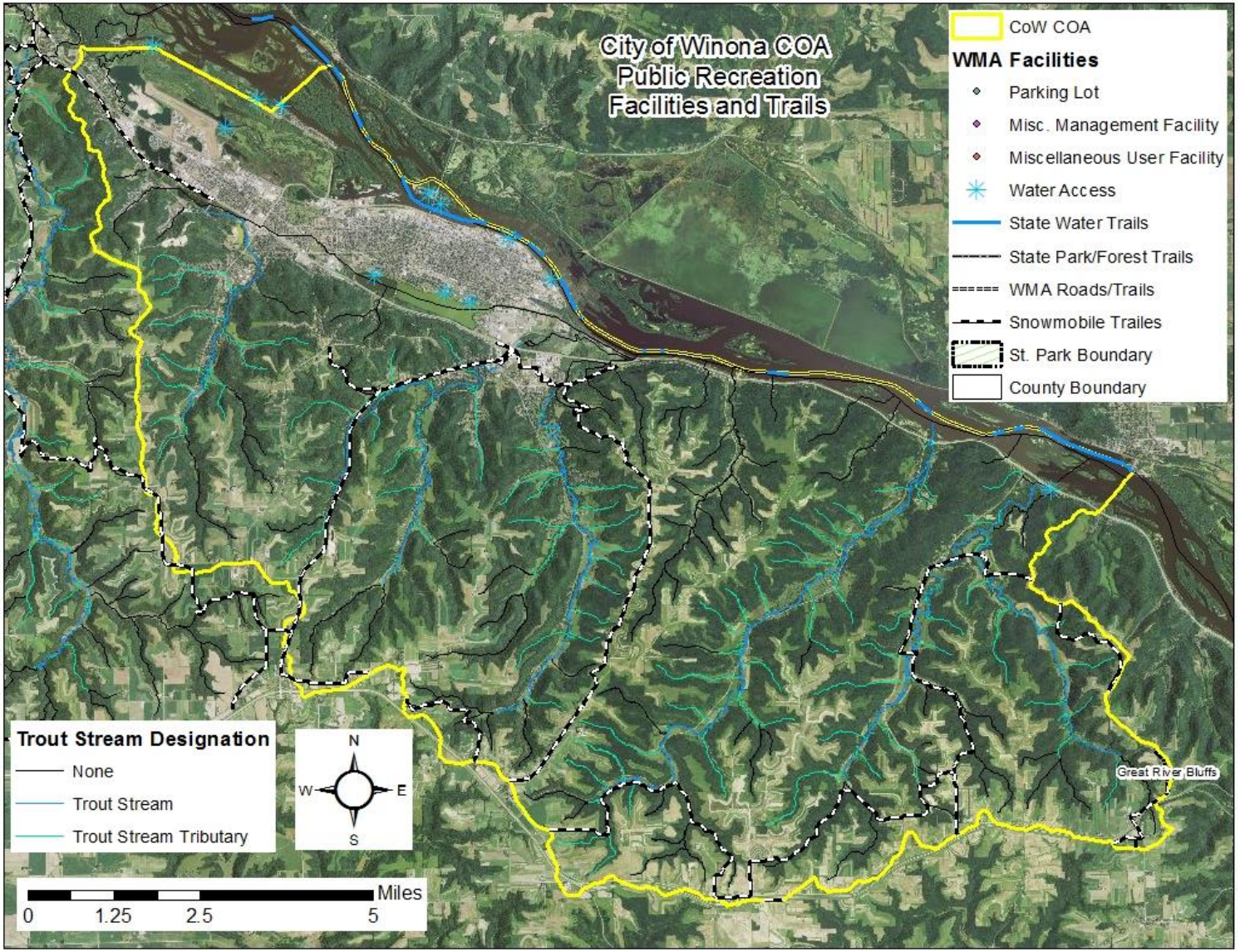

Figure 34. Recreation trails and facilities in CoW COA.

Environmental Threats

Development pressures:

Regionally, the demand for dispersed rural residences places less-disturbed parts Southeast Minnesota's landscape under pressure for development. This is compounded by the likelihood of population growth in the region. Rochester, MN, is in the early stages of a multi-billion dollar economic development project called the "Destination Medical Center" (DMC). The DMC is projected to create between 26,800 to 32,200 new jobs directly. Winona County is expected to grow in population by a projected 1,300 people by 2020, requiring approximately 650 new dwellings and 1,500 acres of land. This economic and population growth can lead to increased parcellization, fragmentation, and conversion of rural lands. This disrupts wildlife movement and migration, reduces available habitat, and increased water quality concerns from the added impervious surface area. While the CoW COA's geographic distance from Rochester will likely buffer it from development pressure related to the DMC, its position between both Winona and lacrosse, WI, has already resulted in significant development of the stream valleys. This development pressure is likely to continue, and protection measures will be needed to prevent continuing parcellization and land conversion.

Industrial silica sand mining:

Southeast Minnesota has significant deposits of industrial silica sand bedrock at or near the surface. The increased demand for this material in the hydrological fracturing (fracking) process for oil and gas development has created an ongoing policy debate about appropriate use and regulations of this resource. Potential impacts of mining include removal of vegetation and underlying substrates, habitat destruction, warming of trout stream waters, chemical contamination of karst hydrology, and water contamination from high volume dispersals from water processing facilities and dewatering pits.

Mismanagement of forest resources:

The forests of Southeast Minnesota support a number of high value timber species, and many sites exist containing high quality timber stock. This represents an important resource for the region, but is also a tempting target for exploitative harvesting practices. Timber harvests that remove all of the most valuable trees in a stand, and leave behind a patchy, irregular forest of poor quality trees do serious harm to the health and productive potential of that site, and severely limit management options in the future. The high value of the timber resource enables sustainable timber management to produce valuable economic products while also providing the habitat and ecosystem services of a healthy forest. Unsustainable harvesting practices can seriously impair a stand's ability to do so in the future.

Land Ownership and Use

Almost all of CoW COA is privately owned (Table 5, Figure 9). The DNR Division of Forestry and the U.S. Fish and Wildlife Service are the only public agencies that own over 1,000 acres. Each accounts for only 2% of the total COA acreage. Private lands make up 96% of the COA by area. As such, it is clear that private landowners will play a crucial role in conservation in this COA. Much of the forested area occurs in areas with dispersed residential development, and finding programs that will appeal to these landowners will be necessary to encouraging the necessary private conservation.

Table 15. Estimated land ownership in CoW COA.

Ownership	Parcels	Percent of Parcel Count	Size (Acres)	Percent of COA Acreage
Division of Forestry	33	0%	1,194	2%
Department of Agriculture	14	0%	533	1%
Private	13241	100%	64,337	96%
County Admin/State Forest	-	-	39	0%
U.S. Fish and Wildlife Service	12	0%	1,115	2%
Total	**13300**	**100%**	**67,217**	**100%**

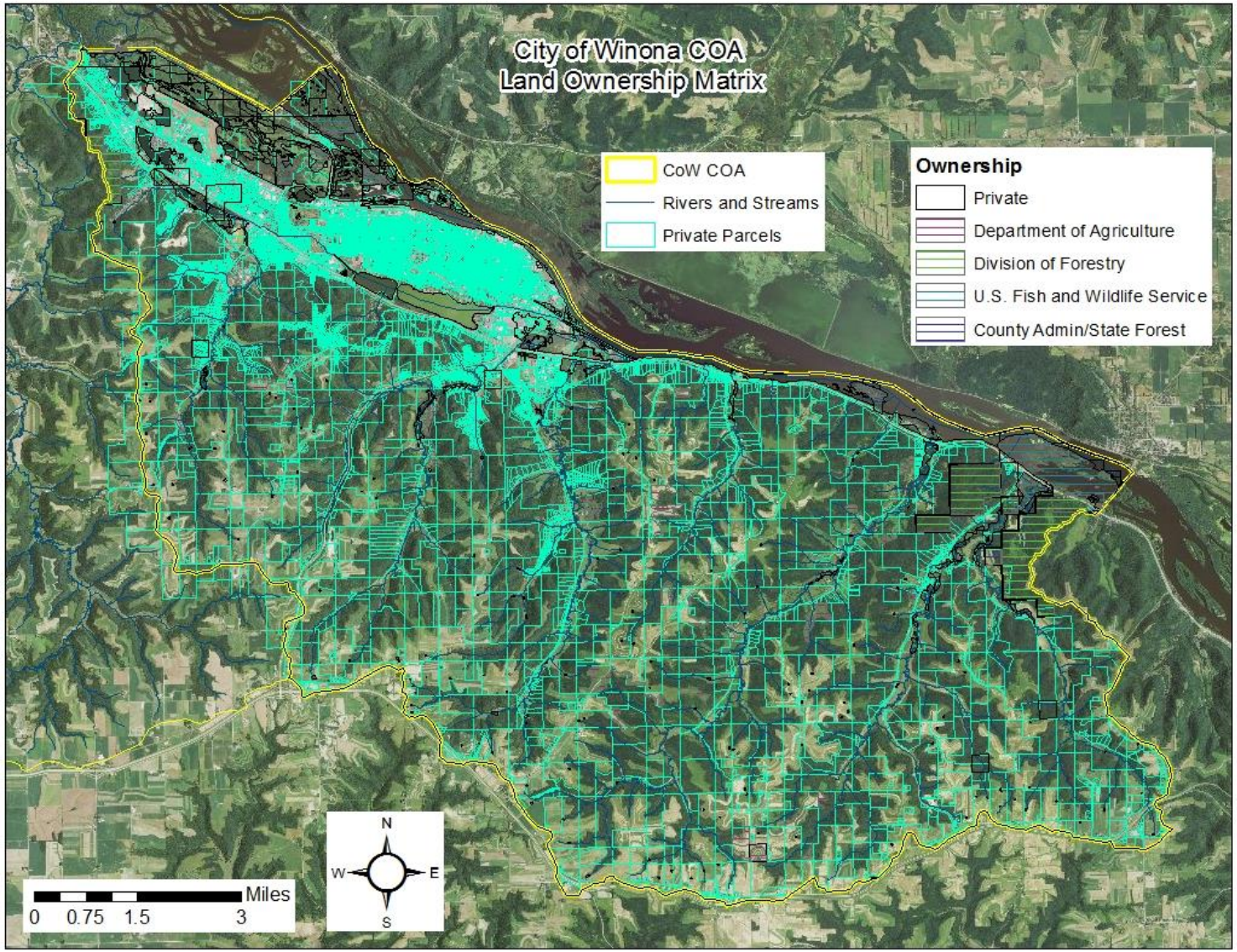

Figure 35. Land ownership and private conservation programs in CoW COA.

Land Use

Deciduous forest is the dominant land cover type in the COA, occupying 47% of the area (Table 6). Pasture/Hay is the next most common, covering nearly 20% of the area. Cultivated crops make up significantly less than the other COAs of the watershed, covering only 4% of CoW COA. Grassland/Herbaceous cover is more common, covering roughly 6% of the area. Nearly 15% of the watershed is designated as developed. Much of that development is from dispersed residences in river valleys near Winona (Figure 10).

Table 16. Acres of land cover type in CoW COA.

Land Cover Type	Area (Acres)	Percent of COA
Barren Land (Rock/Sand/Clay)	116	0.17%
Cultivated Crops	2,879	4.28%
Deciduous Forest	31,519	46.89%
Developed, High Intensity	797	1.19%
Developed, Low Intensity	3,093	4.60%
Developed, Medium Intensity	1,913	2.85%
Developed, Open Space	4,074	6.06%
Emergent Herbaceous Wetlands	839	1.25%
Evergreen Forest	73	0.11%
Grassland/Herbaceous	3,932	5.85%
Mixed Forest	4	0.01%
Open Water	3,576	5.32%
Pasture/Hay	13,040	19.40%
Shrub/Scrub	164	0.24%
Woody Wetlands	1,197	1.78%
Total	**67,217**	**100%**

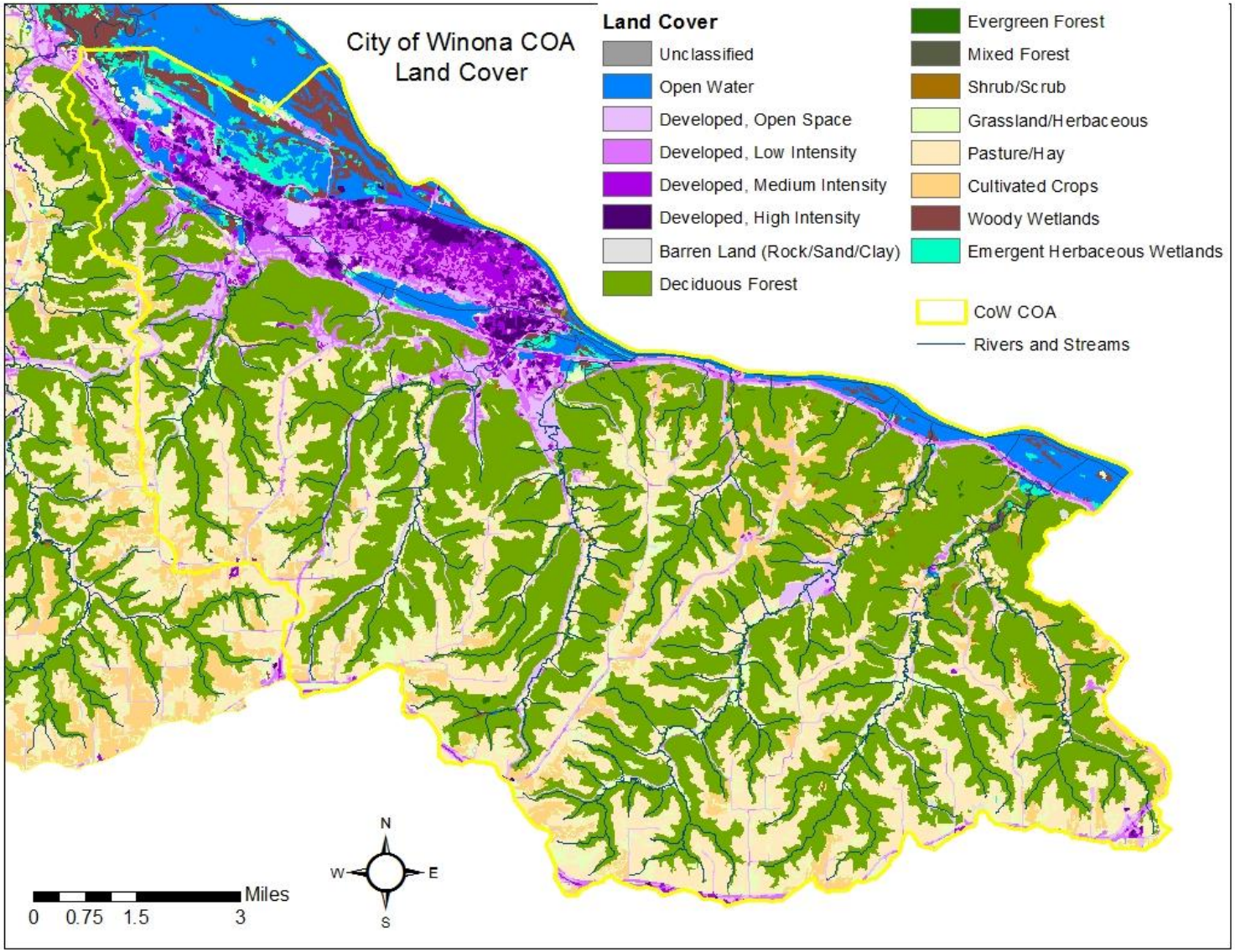

Figure 36. Land cover type classification in CoW COA.

C. Desired Future Conditions

- Biotic integrity of all streams within the COA is restored, resulting in healthy aquatic species and de-listing of impaired waters.
- 100% of riparian areas are covered by native vegetation, returning a host of ecological services for water quality, habitat quality, and connectivity.
- Human activity in riparian areas follows best management practices to protect water quality and sensitive shorelines.
- Diversified agricultural practices include smaller fields, more rotations, fewer pesticides and fertilizers being applied, and marginal acres taken out of row crop production in favor of livestock pasture or pollinator habitat.
- Agricultural practices within the COA follow best management practices to protect soil from erosion, and streams from sedimentation and nutrient loading.
- Reduced nutrient and sediment loads in tributary streams leads to healthier wetland and marsh systems in the Mississippi backwaters areas
- A natural fire regime is restored through prescribed burning regimens on all appropriate native plant communities.
- Large blocks of native habitat types exist across ownership lines.
- Habitat corridors link patches of biodiversity habitat, supporting migration and travel, especially in riparian areas.
- Native plant community remnants have expanded
- Rare plants and animal habitat are protected from degradation
- Invasive species are monitored and controlled

D. Key Stewardship Parcels

With the relative lack of public land in CoW COA, stewardship efforts on private parcels will be crucial to protecting the natural resources of the area. The residential development in many of the stream valleys is also leading to smaller average parcel sizes in forested areas. To make the most efficient use of conservation resources, it is useful to target parcels where those resources will have the most impact. Larger parcels have a bigger footprint on the landscape, and allow more options for stewardship activities. Figure 11 shows private parcels 80 acres and larger, which contain at least part of an area rated as moderate or higher for its biodiversity significance by the Minnesota Biological Survey (MBS). These larger parcels, containing important habitat for biodiversity, will be important to establish more permanent protection in the COA.

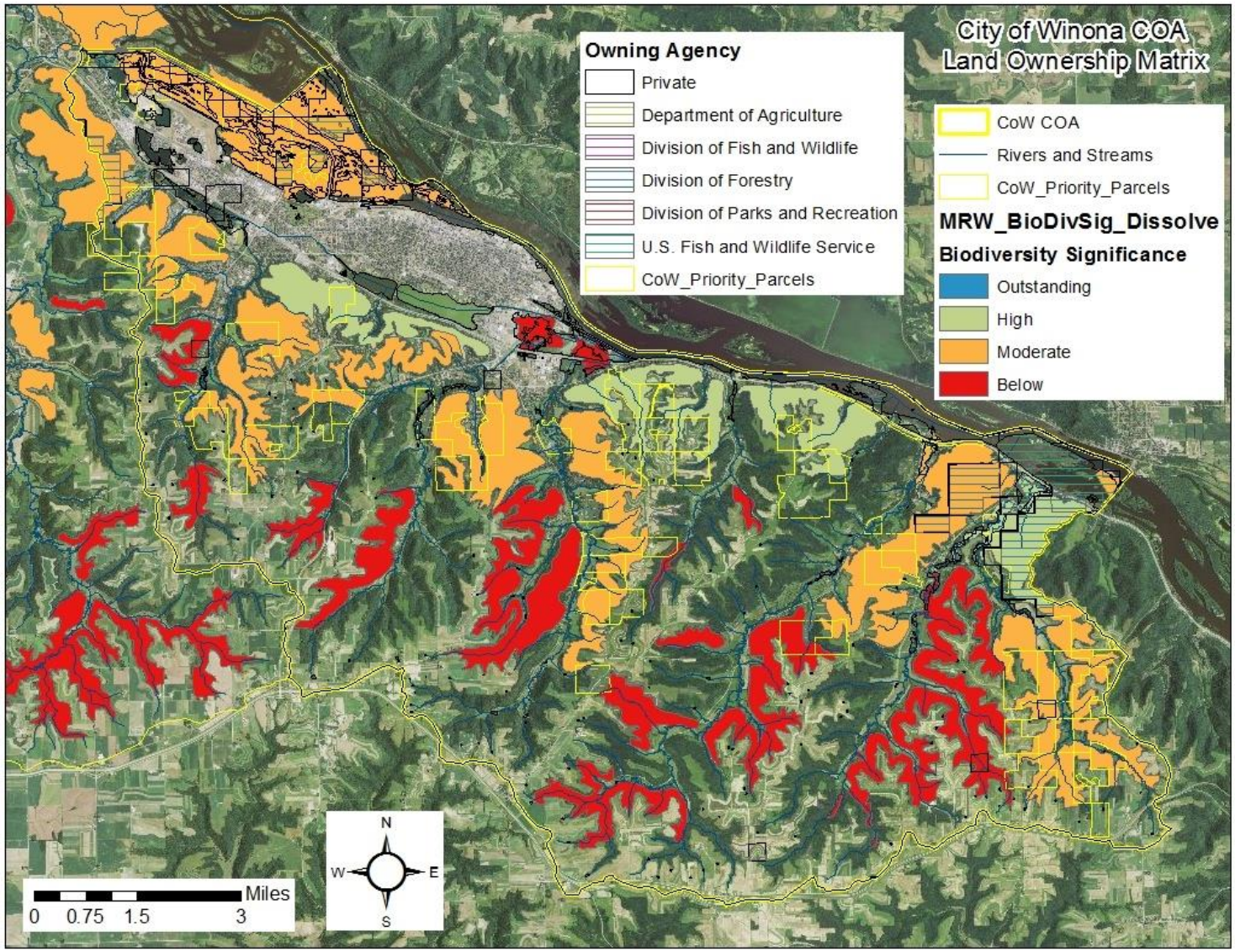

Figure 37. Priority Parcels in CoW COA.

E. Stewardship Activities

There are a variety of tools and strategies available as tools for enacting stewardship activities on the landscape (see Landscape Stewardship Plan, Section 6). Different strategies and actions will be appropriate for different types of parcels, natural resources, and landowners. This section provides a summary of strategies appropriate to different natural resources present in the COA.

Core Forest Areas

Large, continuous stretches of forest communities represent core forest habitat. In addition to providing quality habitat to a number of species, these areas are often favorite places for recreation and scenery, making them important for the tourism industry in the region. They also provide a great benefit to water quality, as forests help prevent erosion, slow and filter water run-off, and shade streams in riparian areas.

Stewardship Activities:

On all lands:

- Control invasive species
- Burn where appropriate
- Manage according to sustainable silvicultural and ecological principles
- Where possible, increase size and connectivity of forest habitat through reforestation/afforestation of connecting patches

On Private lands:

- Prepare comprehensive forest stewardship plans
- Assess landowner interest in Forest Bank style conservation program
- Assist landowner in researching and applying for relevant cost-share programs available (e.g. EQIP, CSP)

Prairies, Savannas, and Fire-Associated Native Plant Communities

The suppression of fire and mass conversion to agriculture that came with Euro-American settlement drastically reduced the amount of native prairie and savannas in both Minnesota, and the US as a whole. While habitats associated with fire regimes are not widespread in CoW COA, there are areas of bluff and ridge-top prairies, as well as oak savannas which will benefit from prescribed fire. In this COA, most of these communities are on private lands. This will bring extra challenges to the reintroduction of fire.

Stewardship Activities:

On all lands:

- Restore a natural fire regime through prescribed burns
- Remove brush as needed
- Control invasive species
- Expand grassland habitat as buffer areas around other NPCs.

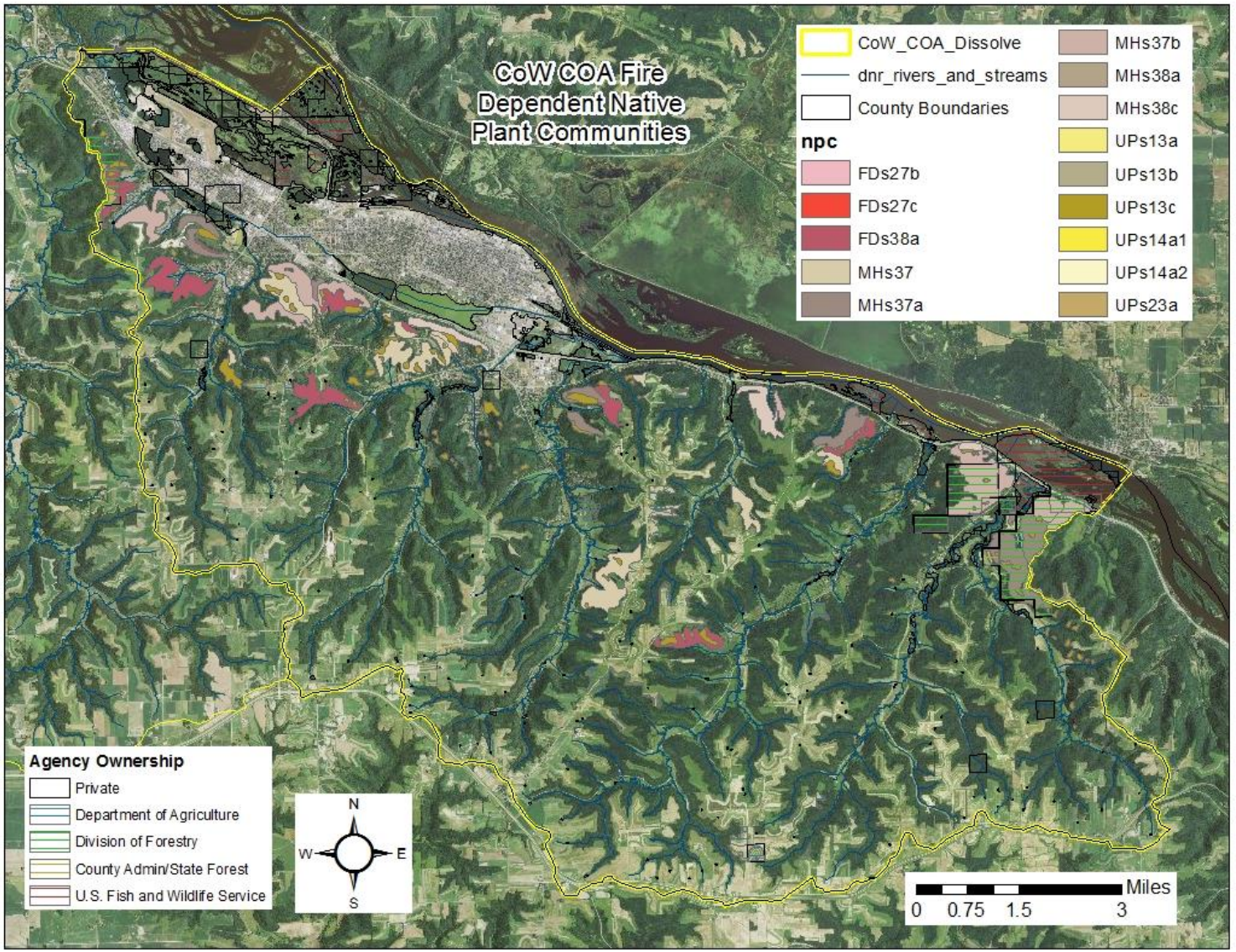

Figure 38. Native Plant Communities in CoW COA with relatively short return intervals for fire disturbance.

Croplands in Riparian Areas

Riparian areas are those nearest, and most connected to streams and rivers. They have an important impact on water quality, either positively, by slowing and filtering run-off, or negatively, by contributing to sediment and nutrient loads brought to streams through erosion and run-off. Croplands that involve tilling soil and applying nutrients in riparian areas can pose a risk to water quality in the stream (Figure 14).

Stewardship Activities:

On public lands:

- Convert to perennial cover, preferably forest cover

On private lands:

- Enforce state shore land ordinance
- Help interested landowners apply for the various cost-share or easement programs available for water quality protection (e.g. CRP, RIM)

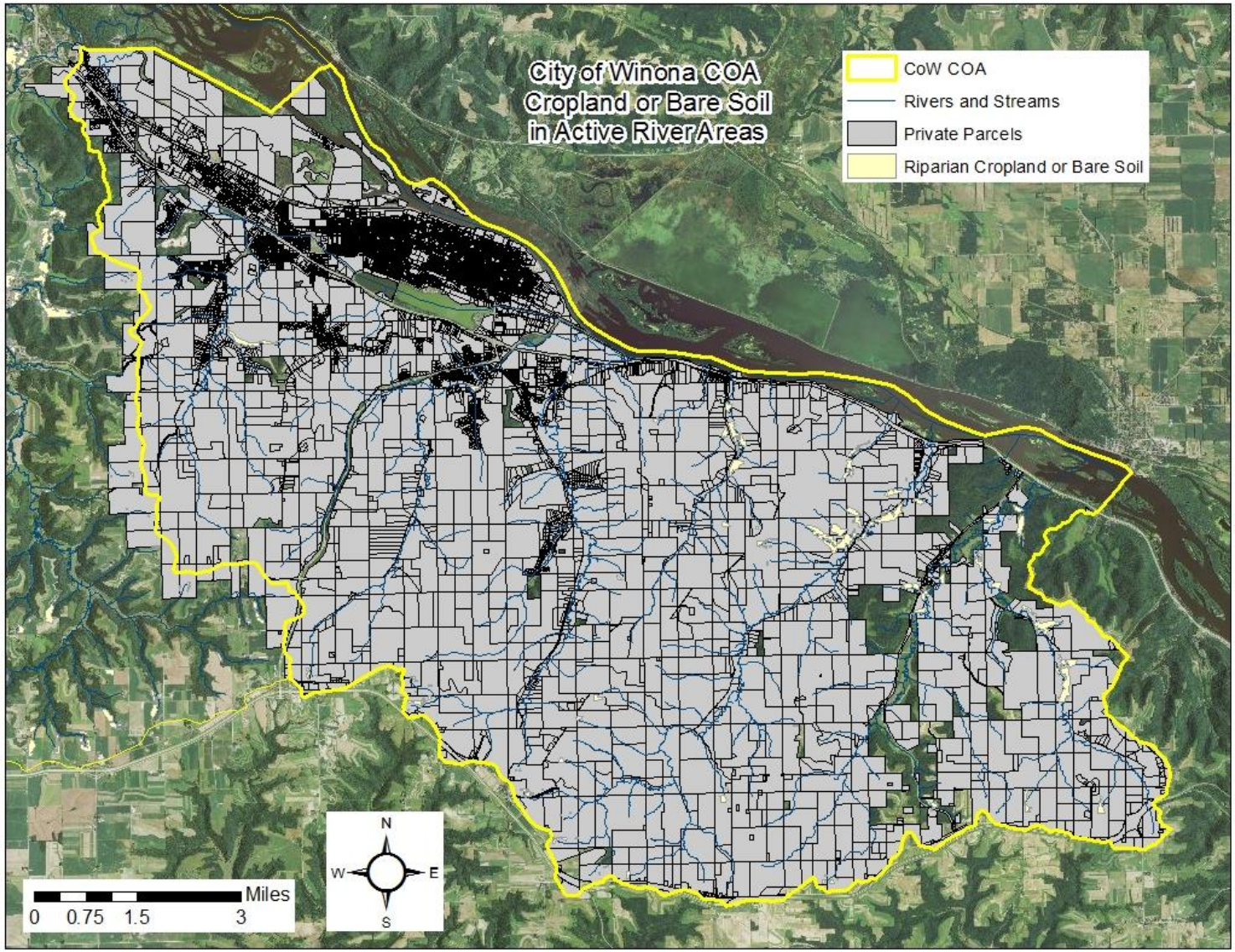

Figure 39. Areas of cultivated cropland or bare soil in riparian areas identified through Active River Area analysis according to the NLDC 2011.

Karst Features

Karst features are locations where cracks or fissures in the bedrock allow bring direct connections between groundwater and surface water. Sinkholes provide surface water a direct route to groundwater aquifers. Springs and seeps are places where groundwater reemerges onto the land or streams. Pollution in these areas can quickly enter groundwater reservoirs, which can also affect surface water quality. They are crucial areas to protect in order to preserve the water quality of the COA.

Stewardship Activities:

- Protect sinkholes and springs with buffers of native vegetation
- Limit pesticide applications in the vicinity of sinkholes

Key Stewardship Parcels

These parcels were identified based on their geographical size, inclusion of a native plant community, and proximity to public land (Figure 11, above). They are areas where conservation effort can be most beneficial to the overall health of the landscape.

Stewardship Activities:

- Work to engage the owners of these parcels in a targeted manner.
- Tailor outreach and assistance to each landowner individually based on characteristics of their parcel and its geographical and ecological characteristics
- Prioritize stewardship efforts affecting these parcels

F. Project Lead and Coordination

No single agency will be expected to perform or support all activities listed above. The Landscape Specialist for the Mississippi River – Winona LSP will be responsible for coordinating efforts. A project lead person specific to CoW COA will also be appointed to take responsibility for guiding access to expertise, labor, and funding. This should be someone with a strong vested interest in some aspect of CoW COA. The project lead and Landscape Specialist will then work to recruit partner agencies, contact key landowners, and implement the called for stewardship activities.

Section 12.
Weaver COA

A. Overview

The Weaver COA is composed of the watersheds for East Indian Creek, Snake Creek, and Gorman Creek, as well as the portion of the Mississippi River into which they drain. It covers just over 54,000 acres in the northern part of the Mississippi River – Winona Watershed. The hillsides tend to be forested, with farming dominating flat upland areas. The town of Kellogg is on the northern boundary of the COA, and Minnieska is located in the southern portion (Figure 1).

The Weaver Dunes area, located to the southeast of the town of Kellogg, between Highway 61 and the Mississippi River, is on a sand terrace of the Mississippi, and hosts prairie communities in close proximity to floodplain forests and water that provides important habitat for the endangered Blanding's Turtle. A Large portion of that area is part of the Kellogg Weaver Dunes Scientific and Natural Area (SNA). The Nature Conservancy also owns and manages a preserve there. The Mississippi itself, and the associated backwaters and wetlands, support many floodplain forest and marsh areas, and are part of a major migratory flyway for a number of bird species.

While both the state and The Nature Conservancy own land in this COA, Private owners hold the majority of land, and conservation on private lands will be crucial to maintaining the environmental health and quality of this area.

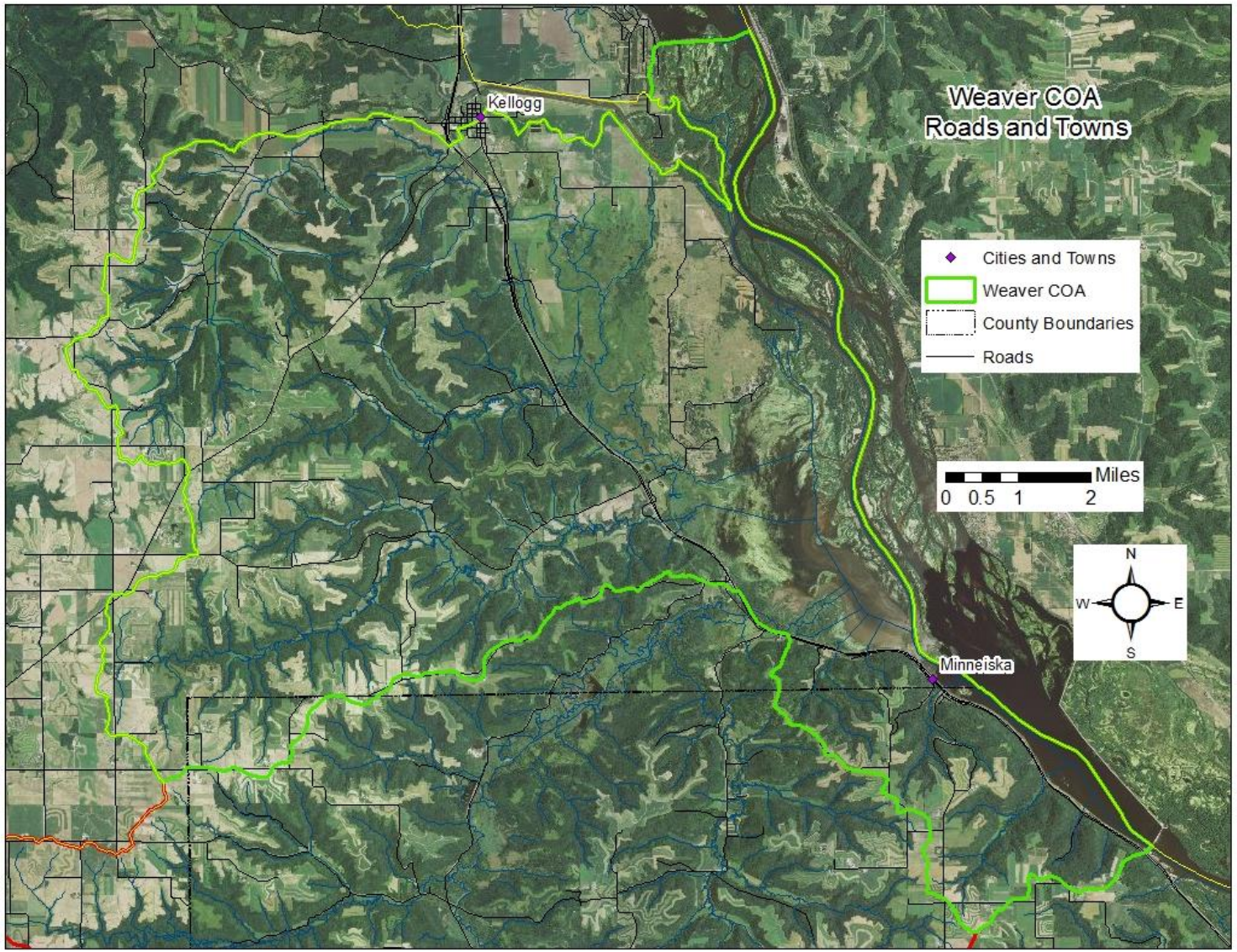

Figure 40. Location of roads and towns in Weaver COA.

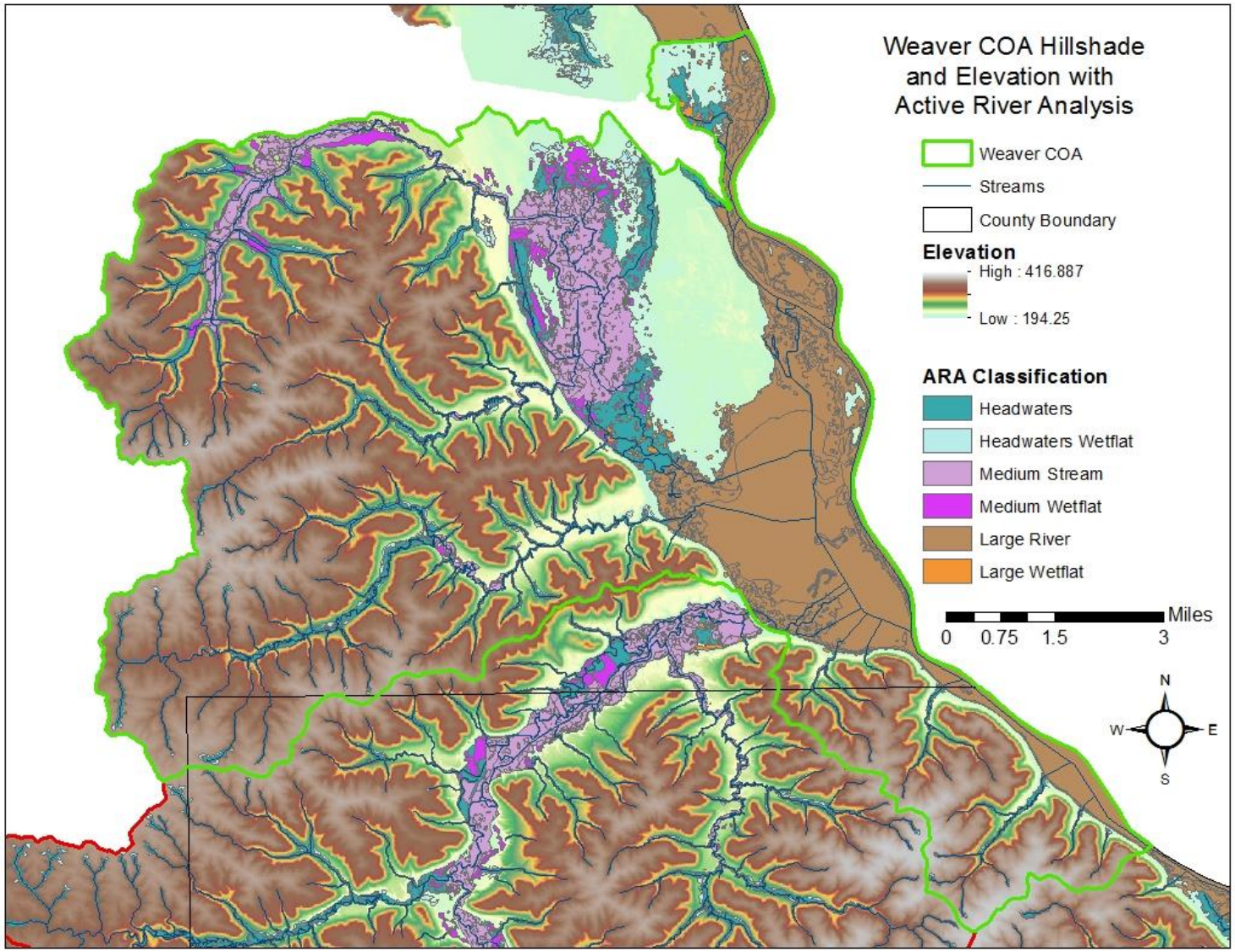

Figure 41. Topography of Weaver COA with Active River Area.

B. Natural Resource Assessment

Hydrology

Weaver COA contains three larger streams which flow into the Mississippi River: Gorman Creek, Snake Creek, and East Indian Creek (from North to South). All three are designated trout streams (Figure 4), and are partly fed by springs emerging from the region's karst aquifers (Figure 5). Other smaller intermittent or unnamed streams flow directly into the Mississippi. Weaver COA also includes significant floodplains and backwaters areas associated with the Mississippi River.

Table 17. Perennial stream lengths within Weaver COA.

Perennial Streams	Mileage within COA	Trout Stream Designation
Mississippi River	13.11	None
East Indian Creek	11.58	Trout Stream
Gorman Creek	9.28	Trout Stream
Snake Creek	5.67	Trout Stream
Unnamed or Other	13.53	Mixed

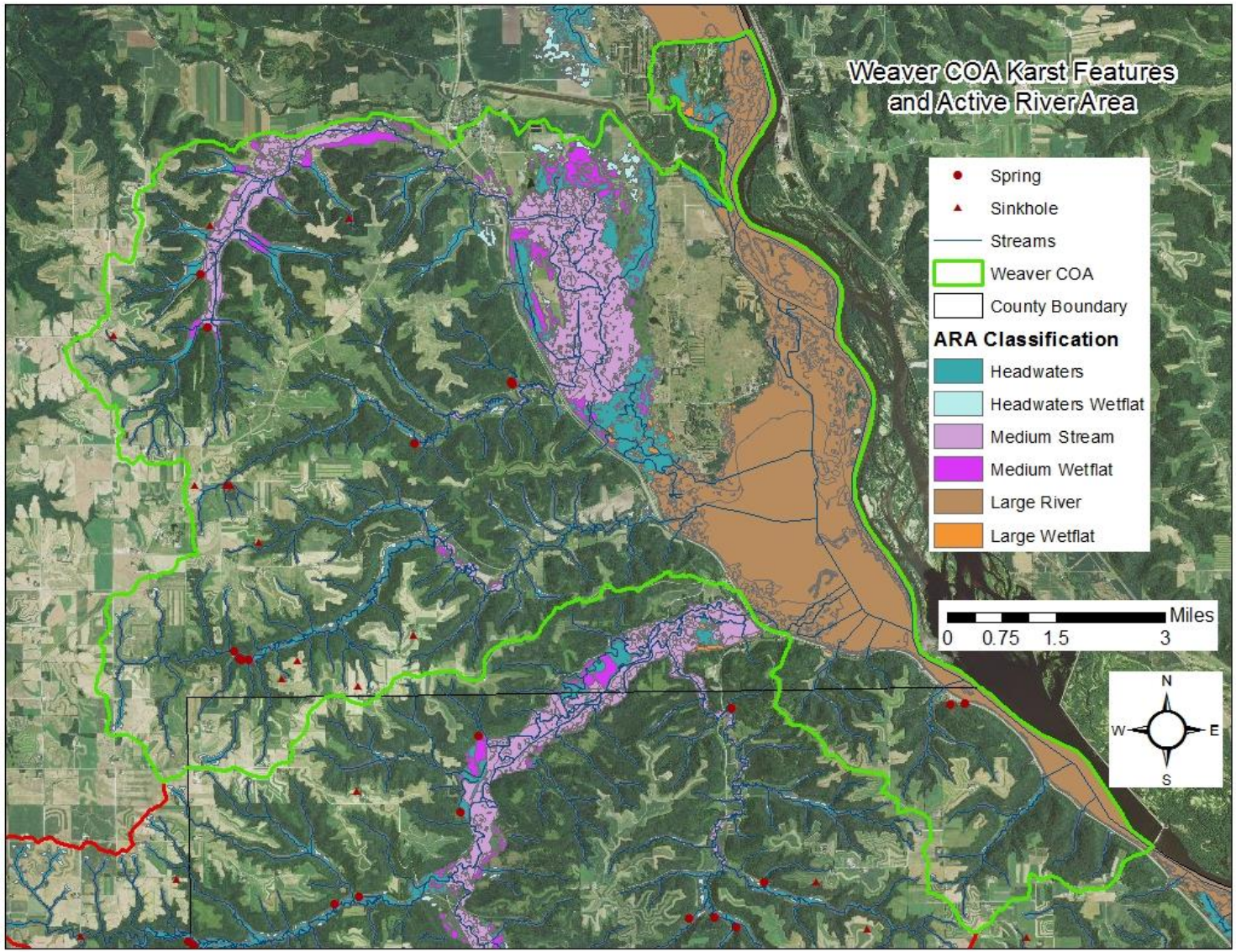

Figure 42. Karst features and active river area in Weaver COA.

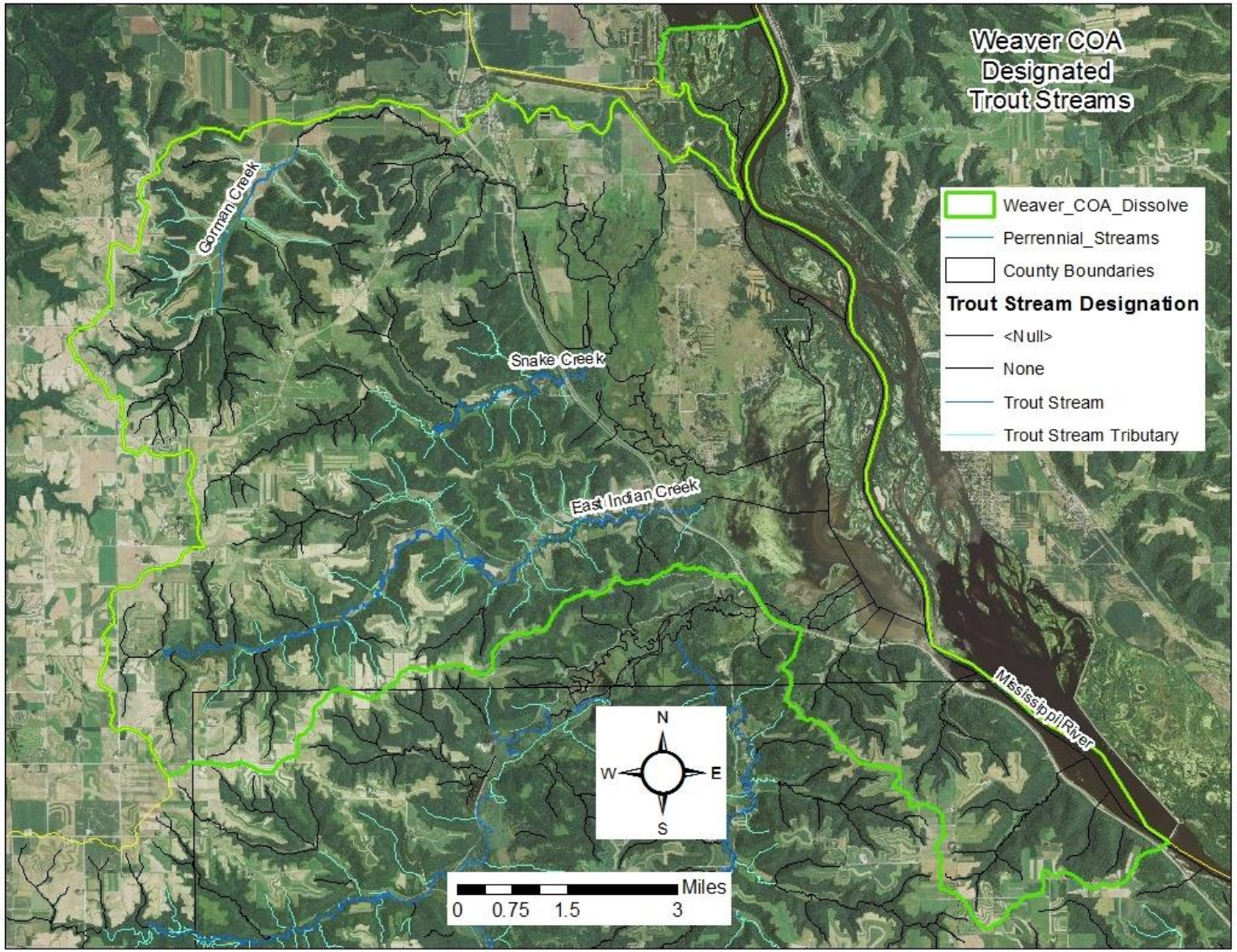

Figure 43. Designated Trout Streams in Weaver COA.

Plant Communities

There are over 7,000 acres of Native Plant Communities (NPCs) mapped by the Minnesota Biological Survey in Weaver COA (Table 2). The ecological systems with the most acreage present are Mesic Hardwoods (2,017 acres) and Floodplain Forest (1,916 acres). While the hillsides surrounding the streams and tributaries contain primarily mesic hardwood forests, The Mississippi Valley, with its floodplain areas and sand terraces, supports many of the NPCs in the COA. Most of the floodplain forests are found here, as well as marsh areas and wet meadows. The upland prairies of the Kellogg-Weaver Dunes area lie on a sand terrace of the Mississippi River Valley, between the River and its floodplain to the East, and marsh and wet meadows occupying low-lying areas to the West.

As private lands make up the majority of the COA, it is unsurprising that man NPCs occur on privately-owned parcels (Figure 6). Engaging with landowners to manage and protect these communities will be important to protect them for the future.

Table 18. Native Plant Communities in Weaver COA.

Native Plant Community	**NPC Code**	**System**	**Acreage**	**Percent of Total Weaver COA NPC Acreage**
Southern Dry Cliff	CTs12	Cliff/Talus	7.16	
Total Cliff/Talus system			7.16	0.10%
Oak - Shagbark Hickory Woodland	FDs38a	Fire Dependent Forest	155.58	
Total Fire dependent Forest System			155.58	2.16%
Silver Maple - (Virginia Creeper) Floodplain Forest	FFs68a	Floodplain Forest	1004.12	
Silver Maple - Green Ash - Cottonwood Terrace Forest	FFs59a	Floodplain Forest	813.59	
Swamp White Oak Terrace Forest	FFs59b	Floodplain Forest	98.52	
Total Floodplain Forest System			1916.23	26.65%
Cattail - Sedge Marsh (Northern)	MRn83a	Marsh	166.13	
Northern Bulrush-Spikerush Marsh	MRn93	Marsh	260.58	
Spikerush - Bur Reed Marsh (Northern)	MRn93b	Marsh	38.02	

Total Marsh System			464.74	6.46%
Red Oak - White Oak - (Sugar Maple) Forest	MHs37b	Mesic Hardwood	579.99	
Red Oak - White Oak Forest	MHs37a	Mesic Hardwood	1135.85	
Southern Dry-Mesic Oak Forest	MHs37	Mesic Hardwood	103.94	
Red Oak - Sugar Maple - Basswood - (Bitternut Hickory) Forest	MHs38c	Mesic Hardwood	172.72	
Sugar Maple - Basswood - (Bitternut Hickory) Forest	MHs39a	Mesic Hardwood	16.38	
Southern Wet-Mesic Hardwood Forest	MHs49	Mesic Hardwood	8.25	
Total Mesic Hardwood System			2017.13	28.05%
Other Water Body	OW	Open Water	37.33	
Total Open Water System			37.33	0.52%
Dry Barrens Oak Savanna (Southern): Oak Subtype	UPs14a2	Upland Prairie	95.16	
Dry Barrens Prairie (Southern)	UPs13a	Upland Prairie	924.47	
Dry Bedrock Bluff Prairie (Southern)	UPs13c	Upland Prairie	153.28	
Total Upland Prairie System			1172.92	16.31%
Black Ash - Sugar Maple - Basswood - (Blue Beech) Seepage Swamp	WFs57b	Wet Forest	3.33	
Total Wet Forest System			3.33	0.05%
Sedge Meadow	WMn82b	Wet Meadow	1414.10	
Seepage Meadow/Carr Tussock: Sedge Subtype	WMs83a1	Wet Meadow	3.05	
Total Wet Meadow System			1417.15	19.71%
Total acreage of NPCs in Weaver COA			7191.56	100.00%

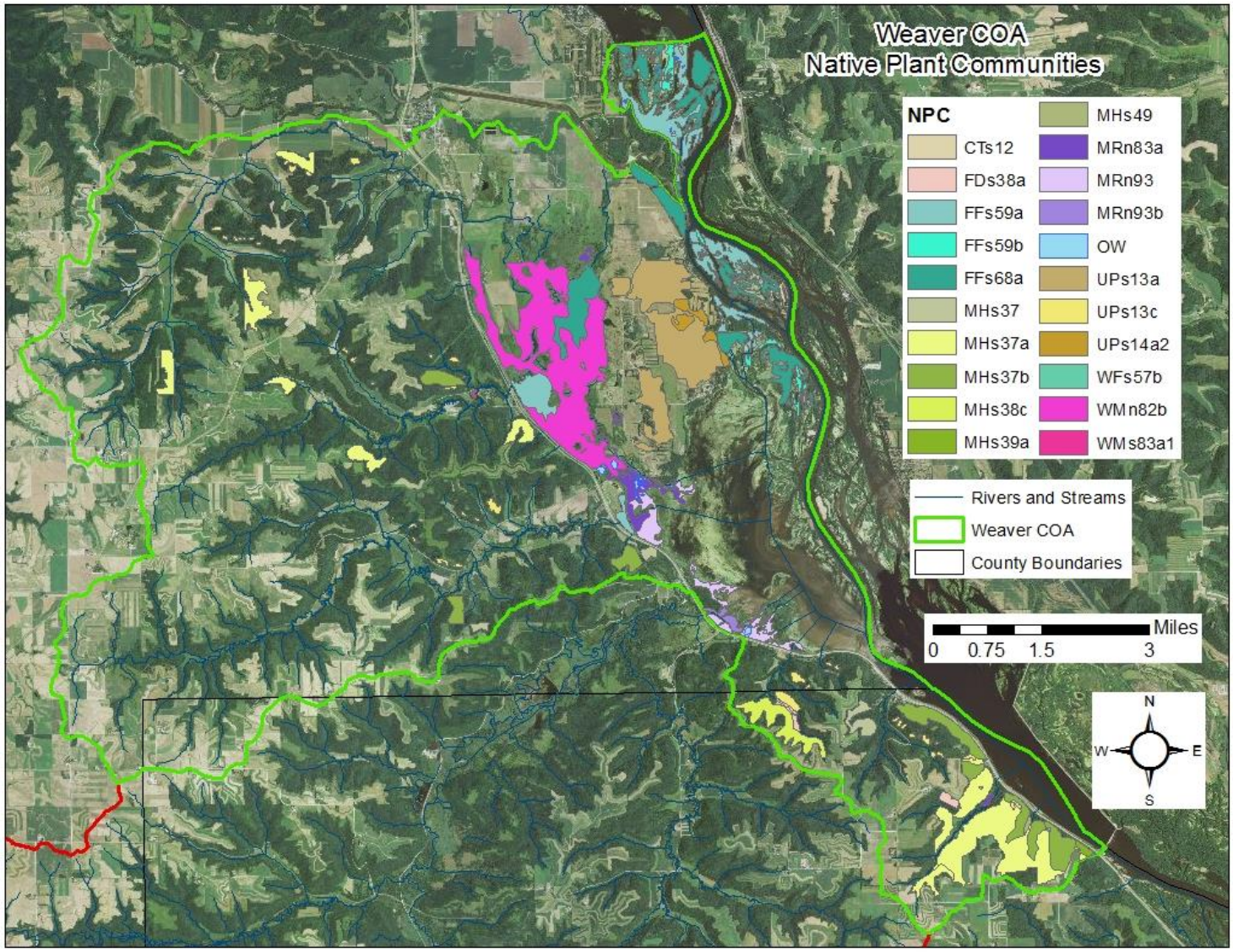

Figure 44. NPCs within Weaver COA

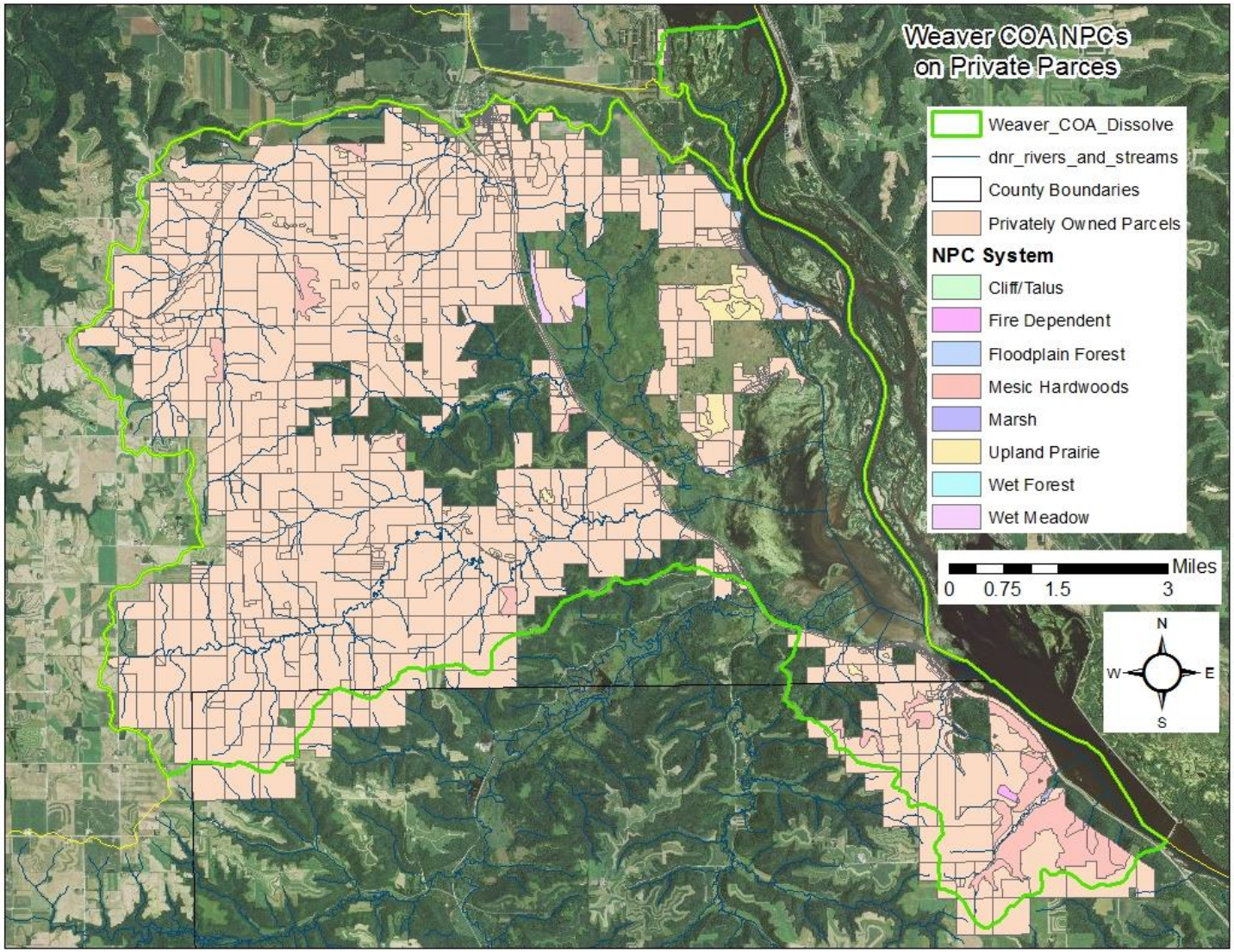

Figure 45. NPCs occurring on privately owned parcels within Weaver COA.

Biodiversity and Rare Species

The National Heritage Information System (NHIS) has recorded 104 different occurrences of plants, animals, or communities in Weaver COA that are considered rare (table 3). Rare species are those listed as either endangered, threatened, or of special concern. **Endangered** species are those facing extinction throughout all or a significant portion of its range within Minnesota. **Threatened** species are likely to become endangered in the foreseeable future. **Species of Special Concern**, though not endangered or threatened, are extremely uncommon in Minnesota. Other species (listed in table below as N/A) not officially listed in those categories may be monitored due to potential concern. Additionally, 15 rare terrestrial communities are listed in Weaver COA. Rare terrestrial communities are collections of plant species growing together, whose presence on the landscape is rare or severely diminished. These communities are monitored, but not given designations as endangered, threatened, or of special concern. The rare plant and animal species observed within Weaver COA are listed by organism type in Table 4.

A large portion of Weaver COA has been assessed by the Minnesota Biological Survey as being significant to biodiversity in the state (Figure7). The floodplain and terrace communities East of Highway 61 host large areas listed as having outstanding or high biodiversity significance. West of the highway, along the hillsides surrounding streams, much of the remaining forestland has also been assessed, though the quality is generally lower.

Table 19. Number of rare species or communities by type in Weaver COA.

Organism Type	
Animal Assemblage	1
Invertebrate Animal	17
Other (Ecological)	3
Terrestrial Community - Other Classification	15
Vascular Plant	37
Vertebrate Animal	31
Total	**104**

Table 20. Rare plant and animal species or communities recorded in Weaver COA.

Common Name	Scientific Name	Organism Type	Conservation Status
Bat Concentration	Bat Colony	Animal Assemblage	N/A
Mucket	Actinonaias ligamentina	Invertebrate Animal	Threatened
Elktoe	Alasmidonta marginata	Invertebrate Animal	Threatened
Splendid Tiger Beetle	Cicindela splendida cyanocephalata	Invertebrate Animal	Special Concern
Butterfly	Ellipsaria lineolata	Invertebrate Animal	Threatened
Spike	Elliptio dilatata	Invertebrate Animal	Threatened
Persius Dusky Wing	Erynnis persius persius	Invertebrate Animal	Endangered
Leonard's Skipper	Hesperia leonardus leonardus	Invertebrate Animal	Special Concern
Ottoe Skipper	Hesperia ottoe	Invertebrate Animal	Endangered
Black Sandshell	Ligumia recta	Invertebrate Animal	Special Concern
Hickorynut	Obovaria olivaria	Invertebrate Animal	Watchlist
A Jumping Spider	Pelegrina arizonensis	Invertebrate Animal	Special Concern
A Jumping Spider	Phidippus apacheanus	Invertebrate Animal	Special Concern
Round Pigtoe	Pleurobema sintoxia	Invertebrate Animal	Special Concern
Monkeyface	Quadrula metanevra	Invertebrate Animal	Threatened
A Jumping Spider	Sassacus papenhoei	Invertebrate Animal	Special Concern
Regal Fritillary	Speyeria idalia	Invertebrate Animal	Special Concern
Pistolgrip	Tritogonia verrucosa	Invertebrate Animal	Endangered
Stream Deposition (Holocene)	Stream deposition (holocene)	Other (Ecological)	N/A
Wind Deposition (Holocene)	Wind deposition (holocene)	Other (Ecological)	N/A

Common Name	Scientific Name	Organism Type	Conservation Status
Wind Process (Holocene)	Wind process (holocene)	Other (Ecological)	N/A
Black Ash - Sugar Maple - Basswood - (Blue Beech) Seepage Swamp	Black Ash - Sugar Maple - Basswood - (Blue Beech) Seepage Swamp Type	Terrestrial Community - Other Classification	N/A
Calcareous Fen (Southeastern)	Calcareous Fen (Southeastern) Type	Terrestrial Community - Other Classification	N/A
Cattail - Sedge Marsh (Northern)	Cattail - Sedge Marsh (Northern) Type	Terrestrial Community - Other Classification	N/A
Dry Barrens Oak Savanna (Southern), Oak Subtype	Dry Barrens Oak Savanna (Southern); Oak Subtype	Terrestrial Community - Other Classification	N/A
Dry Barrens Prairie (Southern)	Dry Barrens Prairie (Southern) Type	Terrestrial Community - Other Classification	N/A
Dry Bedrock Bluff Prairie (Southern)	Dry Bedrock Bluff Prairie (Southern) Type	Terrestrial Community - Other Classification	N/A
Red Oak - Sugar Maple - Basswood - (Bitternut Hickory) Forest	Red Oak - Sugar Maple - Basswood - (Bitternut Hickory) Forest Type	Terrestrial Community - Other Classification	N/A
Red Oak - White Oak - (Sugar Maple) Forest	Red Oak - White Oak - (Sugar Maple) Forest Type	Terrestrial Community - Other Classification	N/A
Red Oak - White Oak Forest	Red Oak - White Oak Forest Type	Terrestrial Community - Other Classification	N/A
Sedge Meadow	Sedge Meadow Type	Terrestrial Community - Other Classification	N/A
Seepage Meadow/Carr, Tussock Sedge Subtype	Seepage Meadow/Carr; Tussock Sedge Subtype	Terrestrial Community - Other Classification	N/A
Silver Maple - (Virginia Creeper) Floodplain Forest	Silver Maple - (Virginia Creeper) Floodplain Forest Type	Terrestrial Community - Other Classification	N/A
Spikerush - Bur Reed Marsh (Northern)	Spikerush - Bur Reed Marsh (Northern) Type	Terrestrial Community - Other Classification	N/A
Swamp White Oak Terrace Forest	Swamp White Oak Terrace Forest Type	Terrestrial Community - Other Classification	N/A
Willow - Dogwood Shrub Swamp	Willow - Dogwood Shrub Swamp Type	Terrestrial Community - Other Classification	N/A

Common Name	Scientific Name	Organism Type	Conservation Status
White Baneberry	Actaea pachypoda	Vascular Plant	N/A
Smooth Rock Cress	Arabis laevigata var. laevigata	Vascular Plant	Special Concern
Green Dragon	Arisaema dracontium	Vascular Plant	Special Concern
Sea-beach Needlegrass	Aristida tuberculosa	Vascular Plant	Threatened
Clasping Milkweed	Asclepias amplexicaulis	Vascular Plant	Threatened
Plains Wild Indigo	Baptisia bracteata var. glabrescens	Vascular Plant	Special Concern
White Wild Indigo	Baptisia lactea var. lactea	Vascular Plant	Special Concern
Bur-marigold	Bidens discoidea	Vascular Plant	Special Concern
Yellow-fruited Sedge	Carex annectens	Vascular Plant	Special Concern
Raven's Foot Sedge	Carex crus-corvi	Vascular Plant	Watchlist
Davis' Sedge	Carex davisii	Vascular Plant	Threatened
Gray's Sedge	Carex grayi	Vascular Plant	Special Concern
Muskingum Sedge	Carex muskingumensis	Vascular Plant	Special Concern
Cattail Sedge	Carex typhina	Vascular Plant	Special Concern
Buttonbush	Cephalanthus occidentalis	Vascular Plant	N/A
Jewelled Shooting Star	Dodecatheon amethystinum	Vascular Plant	Watchlist
Kentucky Coffee-tree	Gymnocladus dioica	Vascular Plant	Special Concern
Sweet-smelling Indian-plantain	Hasteola suaveolens	Vascular Plant	Endangered
Canada Frostweed	Helianthemum canadense	Vascular Plant	Special Concern
Long-bearded Hawkweed	Hieracium longipilum	Vascular Plant	Watchlist
Beach-heather	Hudsonia tomentosa	Vascular Plant	Threatened
Creeping Juniper	Juniperus horizontalis	Vascular Plant	Special Concern
Catchfly Grass	Leersia lenticularis	Vascular Plant	Threatened

Common Name	Scientific Name	Organism Type	Conservation Status
Lilia-leaved Twayblade	Liparis liliifolia	Vascular Plant	N/A
Old Field Toadflax	Nuttallanthus canadensis	Vascular Plant	Special Concern
Rhombic-petaled Evening Primrose	Oenothera rhombipetala	Vascular Plant	Special Concern
One-flowered Broomrape	Orobanche uniflora	Vascular Plant	Threatened
American Ginseng	Panax quinquefolius	Vascular Plant	Special Concern
Rough-seeded Fameflower	Phemeranthus rugospermus	Vascular Plant	Threatened
Swamp White Oak	Quercus bicolor	Vascular Plant	Special Concern
Widgeon-grass	Ruppia cirrhosa	Vascular Plant	Special Concern
Long-lobed Arrowhead	Sagittaria calycina	Vascular Plant	Threatened
Ovate-leaved Skullcap	Scutellaria ovata var. versicolor	Vascular Plant	Threatened
Cliff Goldenrod	Solidago sciaphila	Vascular Plant	N/A
Yellow Pimpernel	Taenidia integerrima	Vascular Plant	Special Concern
Goat's-rue	Tephrosia virginiana	Vascular Plant	Special Concern
Purple Sand-grass	Triplasis purpurea var. purpurea	Vascular Plant	Special Concern
Skipjack Herring	Alosa chrysochloris	Vertebrate Animal	Endangered
Smooth Softshell	Apalone mutica	Vertebrate Animal	Special Concern
Pirate Perch	Aphredoderus sayanus	Vertebrate Animal	Special Concern
Upland Sandpiper	Bartramia longicauda	Vertebrate Animal	Watchlist
American Bittern	Botaurus lentiginosus	Vertebrate Animal	Watchlist
Red-shouldered Hawk	Buteo lineatus	Vertebrate Animal	Special Concern
North American Racer	Coluber constrictor	Vertebrate Animal	Special Concern
Timber Rattlesnake	Crotalus horridus	Vertebrate Animal	Threatened

Common Name	Scientific Name	Organism Type	Conservation Status
Crystal Darter	Crystallaria asprella	Vertebrate Animal	Endangered
Blue Sucker	Cycleptus elongatus	Vertebrate Animal	Special Concern
Acadian Flycatcher	Empidonax virescens	Vertebrate Animal	Special Concern
Blanding's Turtle	Emydoidea blandingii	Vertebrate Animal	Threatened
Peregrine Falcon	Falco peregrinus	Vertebrate Animal	Special Concern
Common Gallinule	Gallinula galeata	Vertebrate Animal	Special Concern
Wood Turtle	Glyptemys insculpta	Vertebrate Animal	Threatened
Sandhill Crane	Grus canadensis	Vertebrate Animal	Watchlist
Bald Eagle	Haliaeetus leucocephalus	Vertebrate Animal	Watchlist
Plains Hog-nosed Snake	Heterodon nasicus	Vertebrate Animal	Special Concern
Eastern Hognose Snake	Heterodon platirhinos	Vertebrate Animal	Watchlist
Black Buffalo	Ictiobus niger	Vertebrate Animal	Threatened
Milksnake	Lampropeltis triangulum	Vertebrate Animal	Watchlist
Yellow Bass	Morone mississippiensis	Vertebrate Animal	Special Concern
Mudpuppy	Necturus maculosus	Vertebrate Animal	Special Concern
Pugnose Minnow	Opsopoeodus emiliae	Vertebrate Animal	Watchlist
Western Foxsnake	Pantherophis ramspotti	Vertebrate Animal	Watchlist
Plains Pocket Mouse	Perognathus flavescens	Vertebrate Animal	Special Concern
Gophersnake	Pituophis catenifer	Vertebrate Animal	Special Concern
Paddlefish	Polyodon spathula	Vertebrate Animal	Threatened
Cerulean Warbler	Setophaga cerulea	Vertebrate Animal	Special Concern
Forster's Tern	Sterna forsteri	Vertebrate Animal	Special Concern
Bell's Vireo	Vireo bellii	Vertebrate Animal	Special Concern

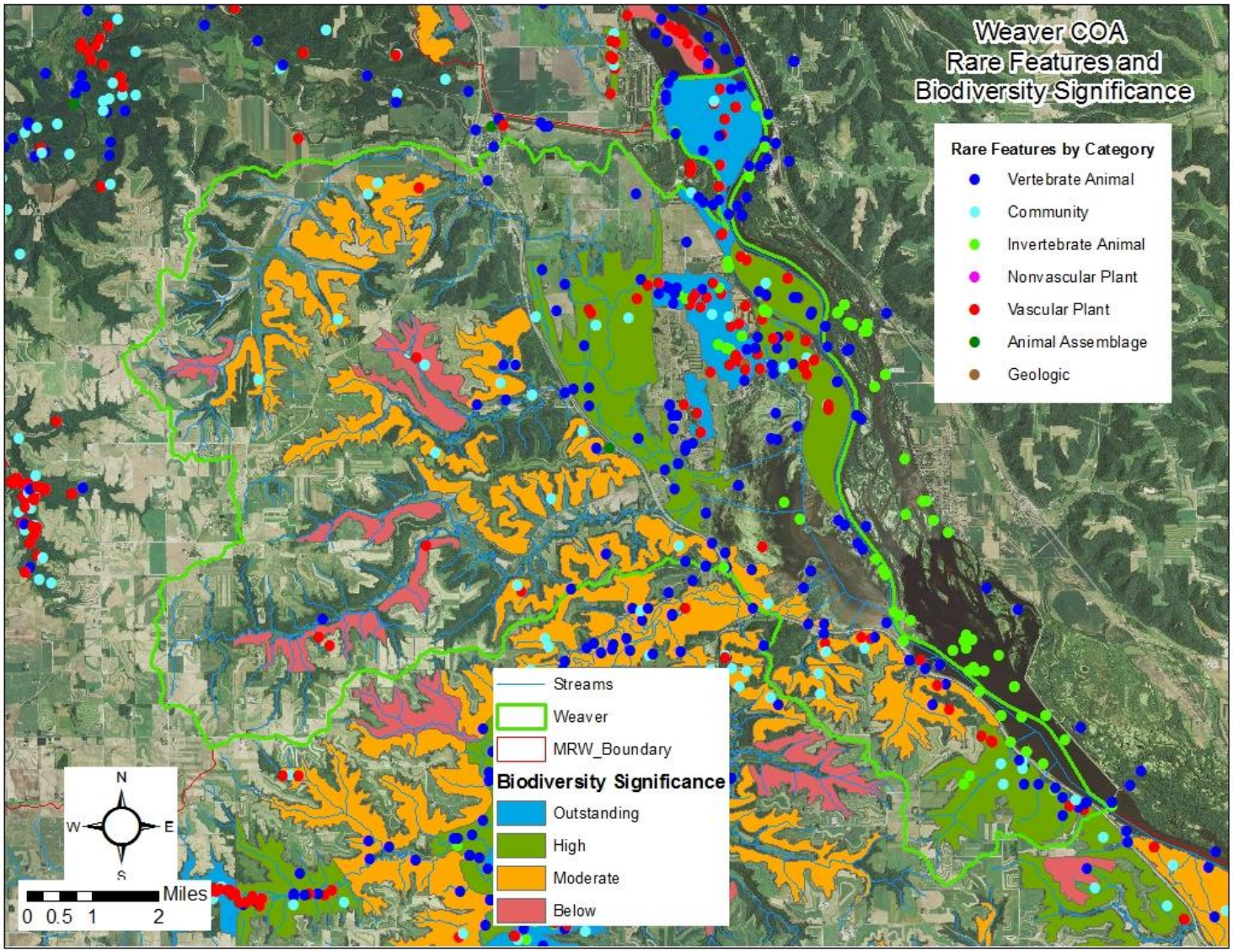

Figure 46. Rare features and sites of biodiversity significance in Weaver COA.

Recreation

Much of the public land in Weaver COA is managed more for wildlife than for recreation, however there are plenty of opportunities for hiking, fishing, and paddling in the area (Figure 8). The Mississippi River is used frequently by boaters during the summer months, and the backwaters offer paddling areas for kayaks and canoes. John A. Latsch State Park is found at the very southern point of the COA. Its Riverview trail is a steep but rewarding path leading to broad views of the Mississippi River and the surrounding bluffs. Portions of the three main streams in the COA are state-designated trout streams, and are popular spots for anglers. A network of snowmobile trails winds through the area.

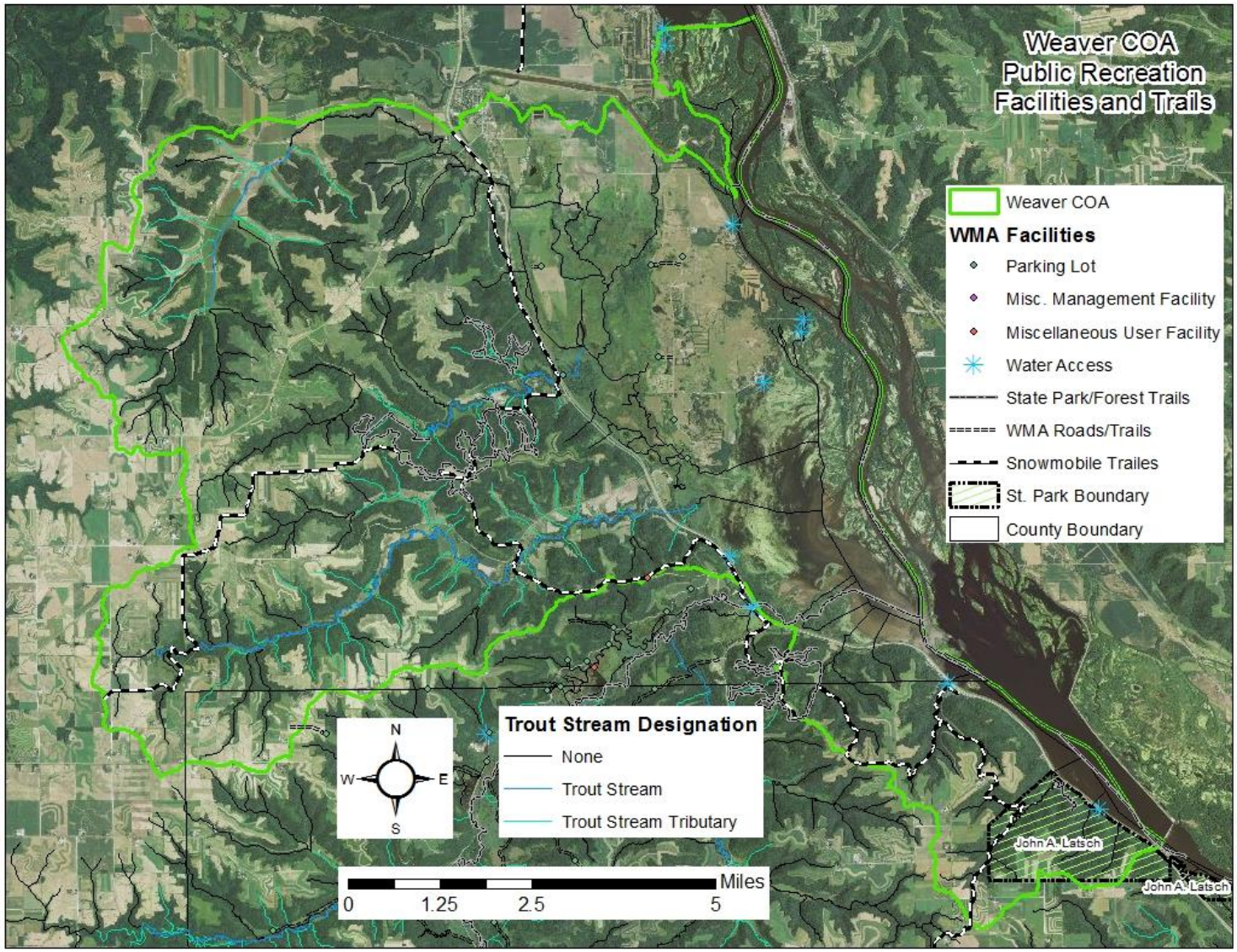

Figure 47. Recreation trails and facilities in Weaver COA.

Environmental Threats

Development pressures:
Regionally, the demand for dispersed rural residences places less-disturbed parts Southeast Minnesota's landscape under pressure for development. This is compounded by the likelihood of population growth in the region. Rochester, MN, is in the early stages of a multi-billion dollar economic development project called the "Destination Medical Center" (DMC). The DMC is projected to create between 26,800 to 32,200 new jobs directly. Winona County is expected to grow in population by a projected 1,300 people by 2020, requiring approximately 650 new dwellings and 1,500 acres of land. This economic and population growth can lead to increased parcellization, fragmentation, and conversion of rural lands. This disrupts wildlife movement and migration, reduces available habitat, and increased water quality concerns from the added impervious surface area. While Weaver COA is the further from Rochester and Winona than the other COAs in the Mississippi River - Winona Watershed, it will not be immune to these trends.

Industrial silica sand mining:
Southeast Minnesota has significant deposits of industrial silica sand bedrock at or near the surface. The increased demand for this material in the hydrological fracturing (fracking) process for oil and gas development has created an ongoing policy debate about appropriate use and regulations of this resource. Potential impacts of mining include removal of vegetation and underlying substrates, habitat destruction, warming of trout stream waters, chemical contamination of karst hydrology, and water contamination from high volume dispersals from water processing facilities and dewatering pits.

Mismanagement of forest resources:
The forests of Southeast Minnesota support a number of high value timber species, and many sites exist containing high quality timber stock. This represents an important resource for the region, but is also a tempting target for exploitative harvesting practices. Timber harvests that remove all of the most valuable trees in a stand, and leave behind a patchy, irregular forest of poor quality trees do serious harm to the health and productive potential of that site, and severely limit management options in the future. The high value of the timber resource enables sustainable timber management to produce valuable economic products while also providing the habitat and ecosystem services of a healthy forest. Unsustainable harvesting practices can seriously impair a stand's ability to do so in the future.

Nutrient, sediment, and contaminants from upstream agricultural areas:
Many of the streams and tributaries in Weaver COA originate in flat upland areas. These areas are heavily farmed, often in ways that contribute to sedimentation and contamination of those streams. This has significant impacts on downstream reaches, and the marsh and wetland communities associate with the Mississippi River. Best management practices are available to farmers to protect their soil from erosion, and help prevent excess nutrients and sediment from washing into the streams. Riparian buffer strips help slow run-off and increase infiltration, allowing nutrients to be filtered and removed by soil processes. Increased adoption of agricultural BMPs to protect water quality in upstream areas will help protect the water quality of downstream reaches in the COA.

Land Ownership and Use

Two-thirds of the land area in Weaver COA is privately owned (Table 5). The next largest landowner is the U.S. Fish and Wildlife Service, which holds 8,279 acres, or 15% of the COA area. The remainder is owned by various division of the DNR, along with slightly over 600 acres held by The Nature Conservancy as their Kellogg-Weaver Dunes Preserve.

The large proportion of private land demonstrates the importance individual landowners will play in the health of the COA. Many of the larger, forested parcels have had forest stewardship plans prepared for them and registered with the DNR (Figure 9). The DNR Division of Fisheries holds some easements on private land, and another 164 acres are under protection through the RIM program.

Table 21. Estimated land ownership in Weaver COA.

Ownership	Parcels	Percent of Parcel Count	Size (Acres)	Percent of COA Acreage
Private	1,126	77%	36,002	67%
U.S. Fish and Wildlife Service	147	10%	8,279	15%
Division of Forestry	87	6%	3,822	7%
Division of Fish and Wildlife	55	4%	3,013	6%
Department of Agriculture	30	2%	1,792	3%
The Nature Conservancy	13	1%	619	1%
Division of Parks and Recreation	6	0%	290	1%
Division of Ecological Services	3	0%	200	0%
Total	**1,467**	**100%**	**54,016**	**100%**

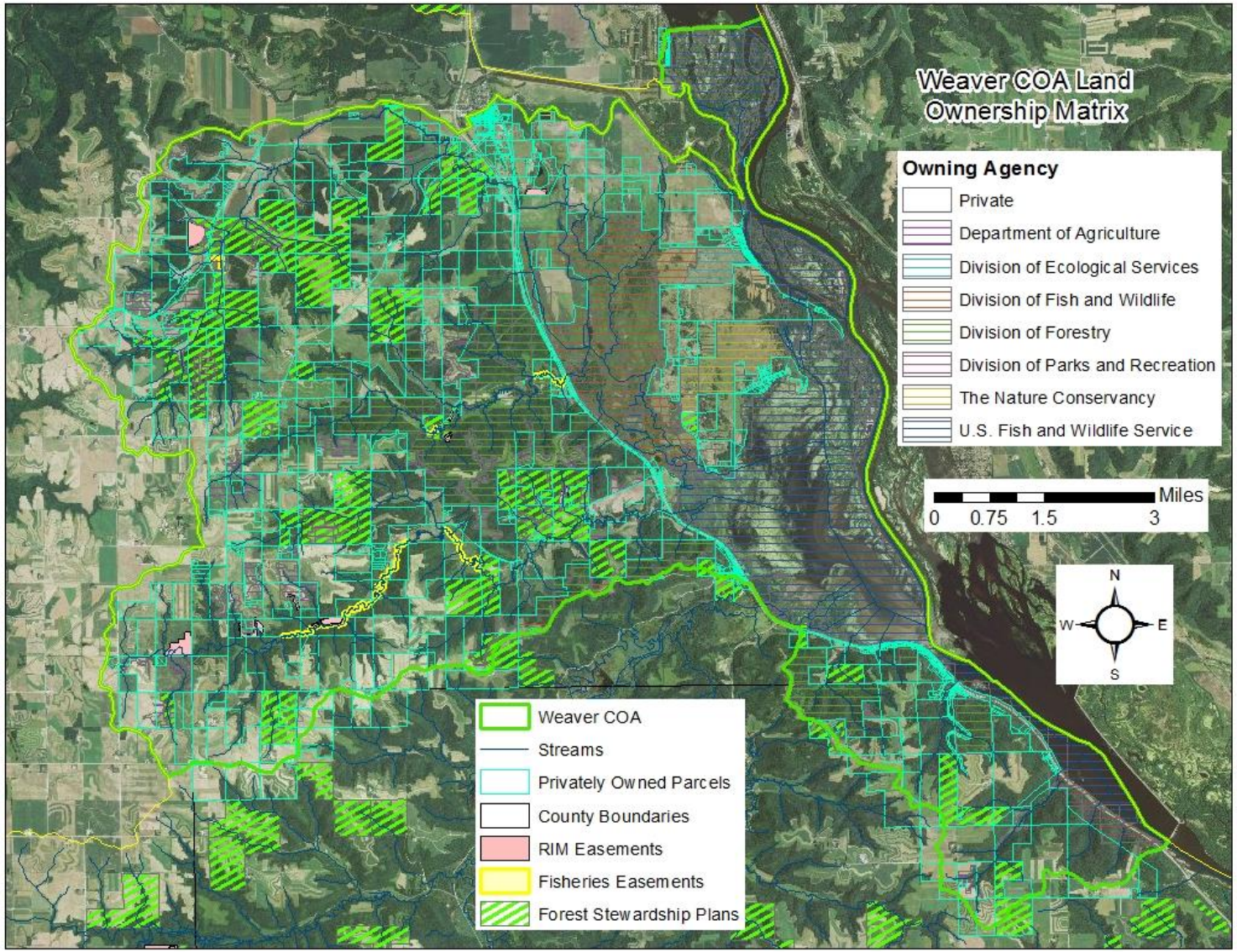

Figure 48. Land ownership and private conservation programs in Weaver COA.

Land Use

Deciduous forest and cultivated crops occupy nearly half of the land in Weaver COA, making up 31% and 19% of the land area, respectively (Table 6). Pasture/Hay and Grassland/Herbaceous cover types occupy another 13% and 10%. Nearly 12% of the COA is open water, much of that being the Mississippi River. The more than 3,000 acres of emergent herbaceous wetlands found in or near the backwaters of the Mississippi constitute a significant wetland complex.

Less than 5% of the watershed is classified as developed, through dispersed rural housing is common. Vegetation follows the general pattern of cropland and pasture on the upland plateau area and deciduous forest occurring on the hillsides. Most of the wetlands are in the Mississippi River Valley, and connected to the river and backwater system.

Table 22. Acres of land cover type in Weaver COA.

Land Cover Type	Area (Acres)	Percent of COA
Barren Land (Rock/Sand/Clay)	93	0.17%
Cultivated Crops	10,306	19.08%
Deciduous Forest	16,626	30.78%
Developed, High Intensity	4	0.01%
Developed, Low Intensity	507	0.94%
Developed, Medium Intensity	62	0.12%
Developed, Open Space	1,629	3.02%
Emergent Herbaceous Wetlands	3,110	5.76%
Evergreen Forest	234	0.43%
Grassland/Herbaceous	5,548	10.27%
Mixed Forest	58	0.11%
Open Water	6,349	11.75%
Pasture/Hay	7,049	13.05%
Shrub/Scrub	72	0.13%
Woody Wetlands	2,370	4.39%
Total	**54,016**	**100%**

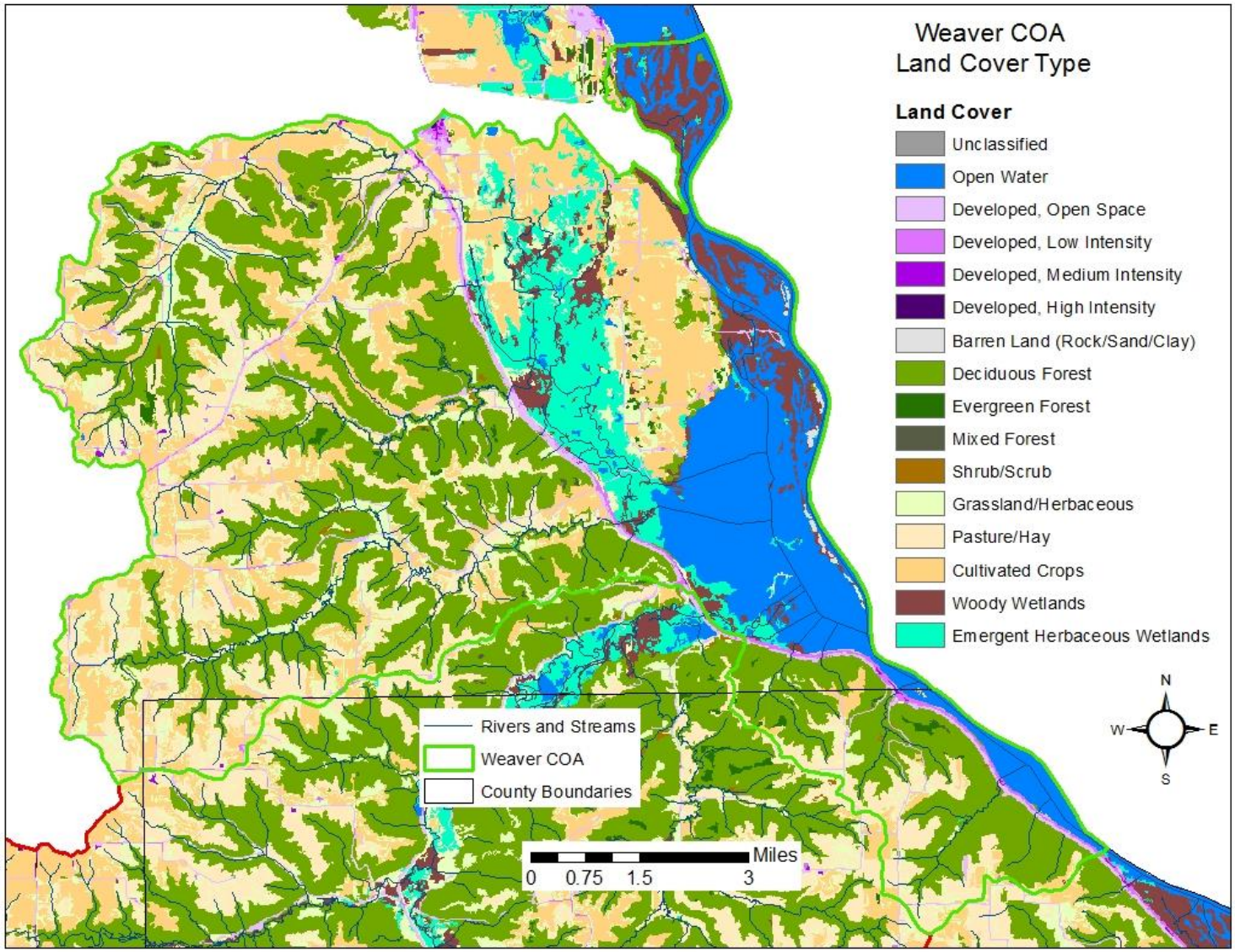

Figure 49. Land cover type classification in Weaver COA**.**

C. Desired Future Conditions

- Biotic integrity of all streams within the COA is restored, resulting in healthy aquatic species and de-listing of impaired waters.
- 100% of riparian areas are covered by native vegetation, returning a host of ecological services for water quality, habitat quality, and connectivity.
- Human activity in riparian areas follows best management practices to protect water quality and sensitive shorelines.
- Diversified agricultural practices include smaller fields, more rotations, fewer pesticides and fertilizers being applied, and marginal acres taken out of row crop production in favor of livestock pasture or pollinator habitat.
- Agricultural practices within the COA follow best management practices to protect soil from erosion, and streams from sedimentation and nutrient loading.
- Reduced nutrient and sediment loads in tributary streams leads to healthier wetland and marsh systems in the Mississippi backwaters areas
- A natural fire regime is restored through prescribed burning regimens on all appropriate native plant communities.
- Large blocks of native habitat types exist across ownership lines.
- Habitat corridors link patches of biodiversity habitat, supporting migration and travel, especially in riparian areas.
- Native plant community remnants have expanded
- Rare plants and animal habitat are protected from degradation
- Invasive species are monitored and controlled

D. Key Stewardship Parcels

With only a third of the land area of Weaver COA owned by a public agency or conservation group, stewardship efforts on private parcels will be crucial to protecting the natural resources of the area. To make the most efficient use of conservation resources, it is useful to target parcels where those resources will have the most impact. Larger parcels have a bigger footprint on the landscape, and allow more options for stewardship activities. Parcels currently occupied by desirable plant communities should be targeted to protect those resources. Figure 11 shows private parcels 80 acres and larger, which contain at least part of a Native Plant Community mapped the MBS.

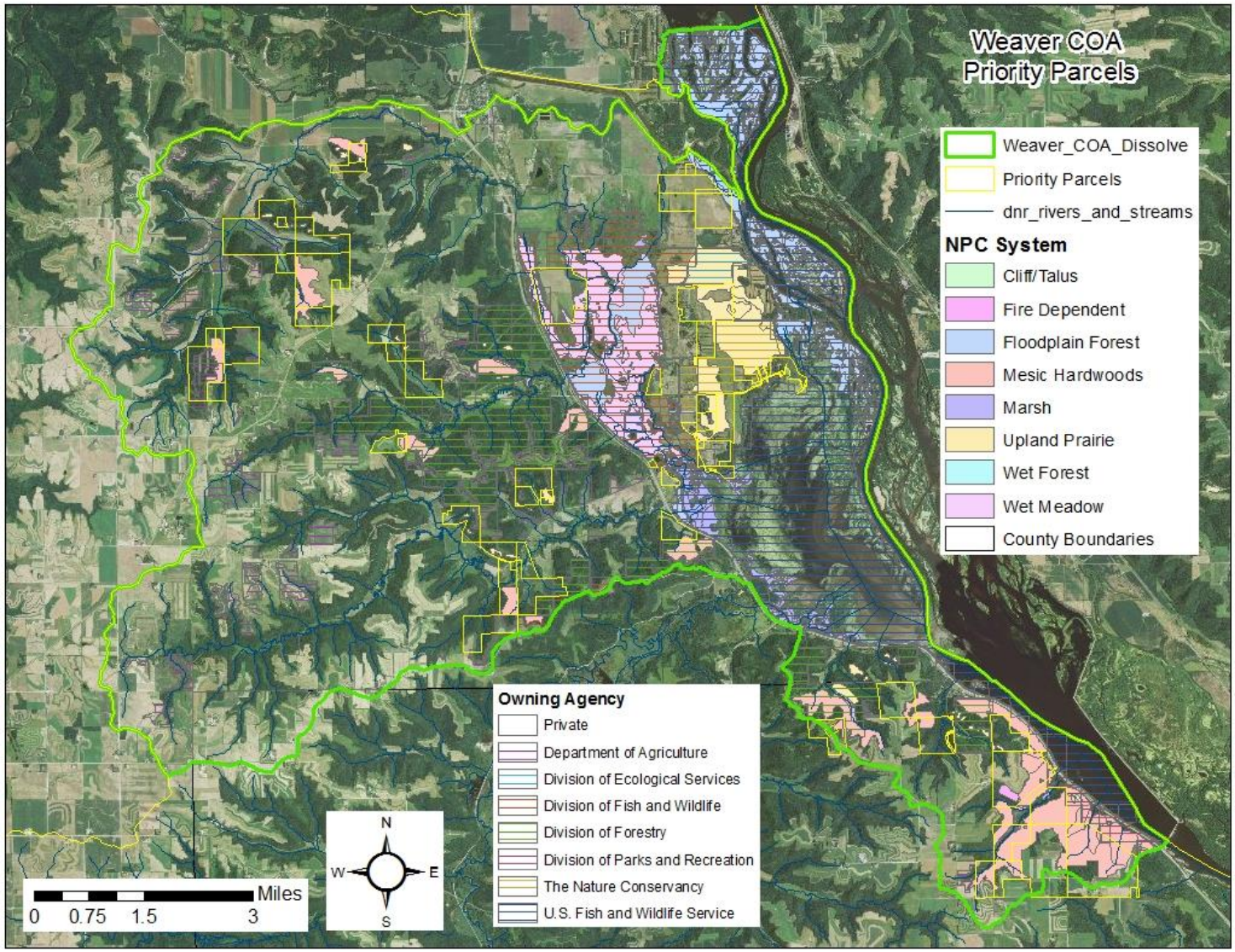

Figure 50. Priority Parcels in Weaver COA.

E. Stewardship Activities

There are a variety of tools and strategies available as tools for enacting stewardship activities on the landscape (see Landscape Stewardship Plan, Section 6). Different strategies and actions will be appropriate for different types of parcels, natural resources, and landowners. This section provides a summary of strategies appropriate to different natural resources present in the COA.

Core Forest Areas

Large, continuous stretches of forest communities represent core forest habitat. In addition to providing quality habitat to a number of species, these areas are often favorite places for recreation and scenery, making them important for the tourism industry in the region. They also provide a great benefit to water quality, as forests help prevent erosion, slow and filter water run-off, and shade streams in riparian areas.

Stewardship Activities:

On all lands:

- Control invasive species
- Burn where appropriate
- Manage according to sustainable silvicultural and ecological principles
- Where possible, increase size and connectivity of forest habitat through reforestation/afforestation of connecting patches

On Private lands:

- Prepare comprehensive forest stewardship plans
- Assess landowner interest in Forest Bank style conservation program
- Assist landowner in researching and applying for relevant cost-share programs available (e.g. EQIP, CSP)

Prairies, Savannas, and Fire-Associated Native Plant Communities

The suppression of fire and mass conversion to agriculture that came with Euro-American settlement drastically reduced the amount of native prairie and savannas in both Minnesota, and the US as a whole. Weaver COA has several areas of NPCs with disturbance histories associate with regular to infrequent fire disturbance (Figure 12), including a large patch of sand prairie in and around the Kellogg-Weaver Dunes preserve. These communities offer important habitat for a number of animals, and many flowering plants and grasses.

Stewardship Activities:

On all lands:

- Restore a natural fire regime through prescribed burns
- Remove brush as needed
- Control invasive species
- Expand grassland habitat as buffer areas around other NPCs.

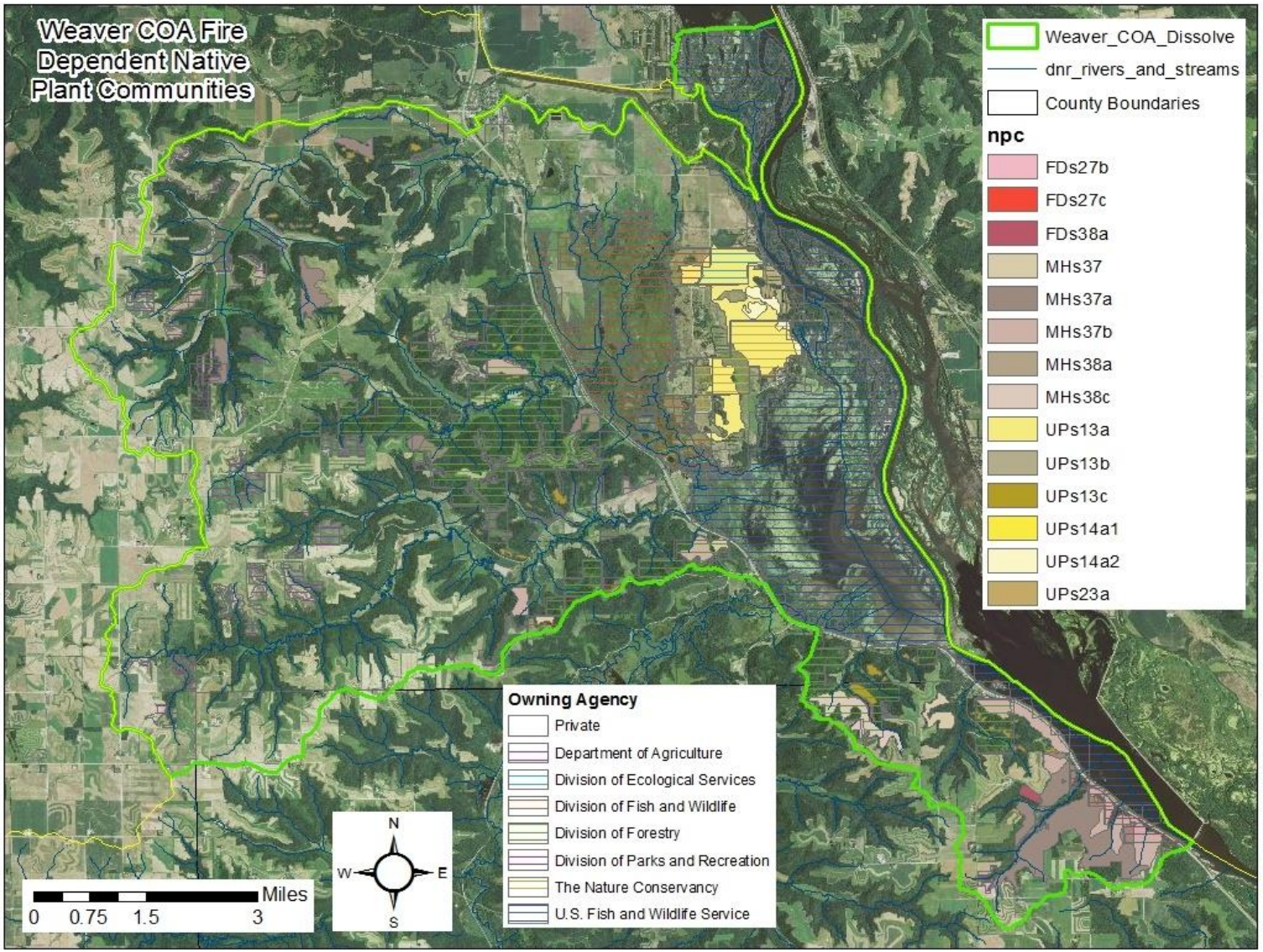

Figure 51. Native Plant Communities in Weaver COA with relatively short return intervals for fire disturbance.

Croplands in Riparian Areas

Riparian areas are those nearest, and most connected to streams and rivers. They have an important impact on water quality, either positively, by slowing and filtering run-off, or negatively, by contributing to sediment and nutrient loads brought to streams through erosion and run-off. Croplands that involve tilling soil and applying nutrients in riparian areas can pose a risk to water quality in the stream (Figure 14).

Stewardship Activities:

On public lands:
- Convert to perennial cover, preferably forest cover

On private lands:
- Enforce state shore land ordinance.
- Help interested landowners apply for the various cost-share or easement programs available for water quality protection (e.g. CRP, RIM)

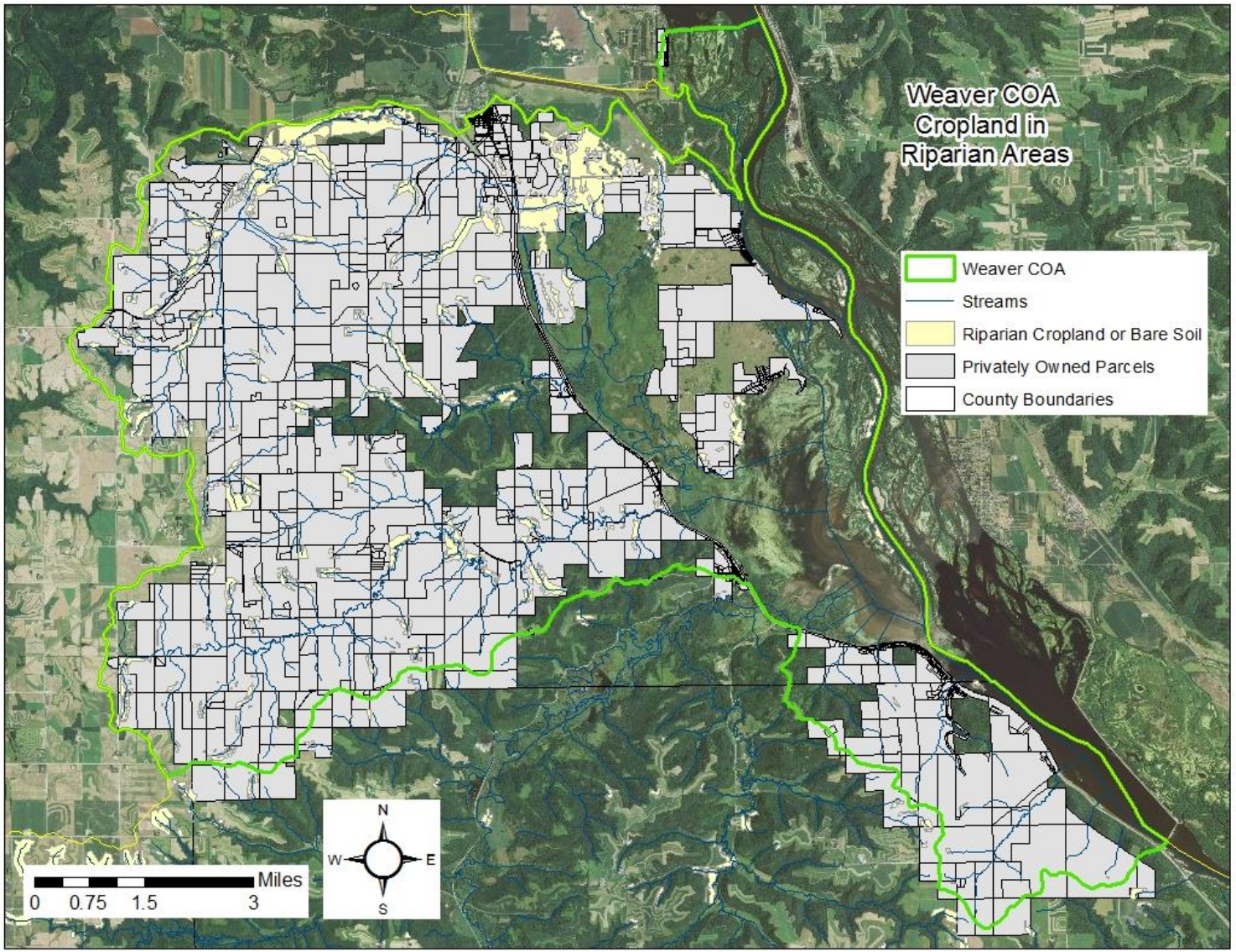

Figure 52. Areas of cultivated cropland or bare soil in riparian areas identified through Active River Area analysis according to the NLDC 2011.

Karst Features

Karst features are locations where cracks or fissures in the bedrock allow bring direct connections between groundwater and surface water. Sinkholes provide surface water a direct route to groundwater aquifers. Springs and seeps are places where groundwater reemerges onto the land or streams. Pollution in these areas can quickly enter groundwater reservoirs, which can also affect surface water quality. They are crucial areas to protect in order to preserve the water quality of the COA.

Stewardship Activities:

- Protect sinkholes and springs with buffers of native vegetation
- Limit pesticide applications in the vicinity of sinkholes

Key Stewardship Parcels

These parcels were identified based on their geographical size, inclusion of a native plant community, and proximity to public land (Figure 11, above). They are areas where conservation effort can be most beneficial to the overall health of the landscape.
Stewardship Activities:

- Work to engage the owners of these parcels in a targeted manner.
- Tailor outreach and assistance to each landowner individually based on characteristics of their parcel and its geographical and ecological characteristics
- Prioritize stewardship efforts affecting these parcels

F. Project Lead and Coordination

No single agency will be expected to perform or support all activities listed above. The Landscape Specialist for the Mississippi River – Winona LSP will be responsible for coordinating efforts. A project lead person specific to Weaver COA will also be appointed to take responsibility for guiding access to expertise, labor, and funding. This should be someone with a strong vested interest in some aspect of Weaver COA.

The project lead and Landscape Specialist will then work to recruit partner agencies, contact key landowners, and implement the called for stewardship activities.

Appendix A: List of Agencies and Organizations (with abbreviations) Important to Conservation in the Mississippi River – Winona Watershed

Agencies and Conservation Organizations

BALMM	Basin Alliance for the Lower Mississippi in Minnesota
BWSR	Board of Water and Soil Resources
DNR	Department of Natural Resources
MDA	Minnesota Department of Agriculture
MNDHA	Minnesota Deer Hunters Association
MFRC	Minnesota Forest Resources Council
MLT	Minnesota Land Trust
MPCA	Minnesota Pollution Control Agency
NTC	National Trout Center
NRCS	National Resource Conservation Service
SEMWRB	Southeast Minnesota Water Resources Board
SWCD	Soil and Water Conservation District
TNC	The Nature Conservancy
T U	Trout Unlimited
U of M	University of Minnesota

Mississippi River – Winona Landscape Stewardship Plan Steering Committee members:

- Rich Biske, TNC
- Daryl Buck, Winona SWCD
- Larry Gates, Landowner and DNR (Retired)
- Sheila Harmes, Winona County
- Shaina Keseley, MPCA
- Amanda Kueper, MFRC
- Terri Peters, SWCD
- Vaughn Snook, DNR Fisheries
- Hannah Texler, DNR Wildlife

Appendix B: Terms, Definitions and Acronyms

(Entries taken from Root River Landscape Stewardship Plan)

Land Management Terms

Comprehensive Plan: The official public document adopted by a community as the policy guide for decisions about its future development and redevelopment. It consists of a vision for the community, background data, goals, policy statements, standards and programs for guiding the physical, social and economic development of a community. A comprehensive plan usually includes, but is not limited to, a land use plan, transportation plan, public facilities plan, housing plan, parks and open space plan, environmental protection plan and implementation strategies. The time frame for a plan typically ranges from 15 to 25 years. (MN Planning. "Under Construction: Tools and Techniques for Local Planning".)

Ecological Classification System (ECS): The Ecological Classification System is part of a nationwide mapping initiative developed to improve the ability to manage all natural resources on a sustainable basis. It is a method to identify, describe, and map progressively smaller areas of land of increasingly uniform ecological characteristics. Associations of biotic and environmental factors that directly affect or indirectly express differences in energy, moisture, and nutrient supplies are used. These factors include climate, geology, soils, hydrology and vegetation. Four levels of mapping have been completed for Minnesota. From the largest to the smallest scale, these include province, section, subsection, and land type association.

Forest Management: The regeneration, management, utilization, and/or conservation of forests to meet specific goals and objectives (excerpt from the Dictionary of Forestry, Helms 1998).

Forest Spatial Patterns: The size, shape and arrangement of forested landscape patches. Patches may be any feature that can be mapped such as (MN DNR):

- Forest types, habitats, and vegetation communities.
- Landforms, soils, and aquatic systems.
- Disturbances – both natural and human caused.

Forestland: Land which is at least ten percent stocked by trees of any size and capable of producing timber, or of exerting an influence on the climate or on the water regime; land from which the trees described above have been removed to less than ten percent stocking and which has not been developed for other use; and afforested areas. (Minnesota Statutes 2003, Chapter 89.)

Fragmentation: Changes across a landscape that break large continuous areas of a particular land cover (e.g. forest) into smaller isolated patches. (Kilgore)

Landscape Stewardship: is an "all lands" approach to forest conservation that works across multiple ownerships to address issues and opportunities identified in each State's Forest Resource Assessment and Strategy.

Landscape Stewardship Plan: is one element of a landscape stewardship project. It is a multi-landowner Forest Stewardship Plan written to address landscape-level issues across all ownerships.

Landscape Stewardship Project: is a collaborative effort to achieve desired social, economic, and environmental objectives shared by the stakeholders through community and landowner engagement.

Native Plant Community: A group of native plants that interact with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms. These groups of native plants form recognizable units that tend to repeat over space and time. Native plant communities are classified and described by considering vegetation, hydrology, landforms, soils, and natural disturbance regimes. In 2005, the DNR completed the southeast version for classification of native plant communities, Minnesota's Native Plant Community Classification (Version 2.0), published in the book, Field Guide to the Native Plant Communities of Minnesota: The Eastern Broadleaf Forest Province.

Parcelization: An increase in the number of land parcels in a given area (e.g. fragmentation of land ownership). Fragmentation does not necessarily result in parcelization and vice versa. (Kilgore)

Sense of Place: The common feeling or attitude people share about a community or place they identify with and relate to. A place with a "sense of community" is a place that naturally brings people together as a community. (MN Planning. "Under Construction: Tools and Techniques for Local Planning".)

Spatial Analysis: The mapping and measuring of spatial patterns in a landscape or given area. (DNR)

Sustainable Forest Management: Development, protection, and use of forest resources for achievement of economic and social well-being without damaging the forest resource base or compromising the ability of future generations to meet their own needs. (MFRC "Sustaining Minnesota Forest Resources: Voluntary Site Level Guidelines".)

The Watershed: This plan is focused on the Mississippi River - Winon Watershed and two focus areas within the watershed. From this point forth, the plan focus area will be referred to as "the Watershed".

Planning Terms

Desired Future Conditions: Desired Future Conditions (DFC) are broad overarching statements that describe preferred or desired conditions that a given geographic area or region will be like at the end of a given timeframe. DFC statements are very general and long range in nature. They are intended to provide an initial starting point for agreement on what forests in the landscape should be like in the future. DFCs are comparable in content to vision statements found in local government plans such as comprehensive plans. The DFC statements for the previously approved MFRC landscape plans have typically used a fifty to one hundred (50 – 100) year horizon when describing the desired future conditions of forests.

Goals: Goal statements outline the general directions that an organization intended to be attained at some point in the future. Goals are intended to provide general direction for a given resource initiative (ecological, economic, social, and administration/coordination). Words such as encourage, increase, preserve, and protect are commonly found in goal statements. The goals in the Mississippi River - Winona Watershed Plan represent what the Committee wants to pursue over the next ten to twenty (10 – 20) years to promote sustainable forest resources in the landscape.

Objectives: Statements that provide more specific direction on the efforts or strategies that are needed to implement each goal. Goals usually have more than one objective. Words like construct, plant, remove, and monitor are used to describe more specific direction in implementing the goals. Often, objectives will include quantifiable targets, as means to provide more specific and measurable parameters for monitoring progress towards the goals. The initial description of programs and projects are usually found in objective statements.

Action Items: Statements that outline what an organization anticipates will be the major tasks in completing the objectives. Objectives should contain several action item statements to help further clarify efforts needed to complete the objectives.

Appendix C: Regional Plans Relevant to Landscape Stewardship in the Mississippi River – Winona Watershed

(Entries taken from Root River Landscape Stewardship Plan and MFRC Forest Policy Inventory Report)

MFRC Southeast Landscape Plan

Goals

1. Increase forest land
2. Decrease fragmentation from development

Strategies

1. Use prescribed fire to support regeneration of oak
2. Prepare and implement Stewardship Plans
3. Encourage reforestation next to existing forested areas
4. Remove exotic/invasive species (e.g. buckthorn, garlic mustard, gypsy moth)
5. Identify areas of exotic/invasive species
6. Research long-term economic benefits of contiguous forest land
7. Research developing a program where landowners enroll their forest land into and receive yearly payments based on the revenue from the management of all the forest land in the program
8. Provide unique outreach activities (field days, workshops) to various groups including: private woodlot owners, farmland owners near forested areas, marginal cropland owners, seasonal residents, elected officials and stakeholder groups
9. Promote long-term benefits of forest management
10. Provide silvicultural examples for management of mesic, oak savanna and hardwood sites
11. Provide workshops and field days (for example woodland advisor classes) for loggers and private landowners on stewardship planning and landscape goals
12. Show successful forest management (use passive demonstration areas and active field days)
13. Activate Forest Legacy areas in the region
14. Establish continuity between plans.
15. Develop methods to support long-term commitments from: political structures, funding sources, planning groups
16. Utilize private/public partnerships to assist in implementation of these strategies. One on one relationship building is important.

Minnesota Department of Natural Resources (MN DNR) Blufflands/Rochester Plateau Subsection Forest Resource Management Plan (SFRMP) and extension

Challenges

1. Biodiversity
2. Management of minor cover types
3. Old growth forest management
4. Private forest land management
5. Enhance quality and health of minor forest types through silvicultural treatments
6. Promote white pine cover types along riparian corridors and where it exists as a component of other cover types
7. Increase area identified for Extended Rotation Forestry (ERF)

Goals

1. Enhance quality and health of minor forest types through silvicultural treatments
2. Promote white pine cover types along riparian corridors and where it exists as a component of other cover types
3. Increase area identified for Extended Rotation Forestry (ERF)

Strategies

1. Introduce large scale and repetitive prescribed burns to regenerate oak
2. Identify locations of exotics to reduce potential spread
3. Use prescribed fire and/or logging to provide mineral soil exposure to promote regeneration of white pine
4. Develop and maintain transfer of knowledge between local managers and natural resource professionals
5. Identify stands adjacent to public lands during stand selection process to determine opportunities for cooperative management
6. Consider silvicultural practices that enhance endangered and threatened species and/or native plant communities
7. Incorporate protection of rare species into forest management objectives
8. Use voluntary site-level forest management guidelines

MN DNR High Biodiversity Area Management Plan- "Whitewater North Fork Area"

Issues

1. Escalating development pressure in the surrounding landscape (p. 1)
2. Increasing fragmentation (p. 1)
3. Global change (p. 1)
4. Biodiversity enhancement (p. 2)
5. Game management for such species as wild turkeys, white-tailed deer, ruffed grouse, (p.2)
6. Recreation (p. 2)
7. Steep slopes in this area result in sensitivity to altered drainage patterns that may result from certain management operations. (p. 2)
8. Erosion [from a nearby road] (p. 2)
9. Rare species and community types (p. 3)
10. Invasion of nonnative species such as buckthorn and honeysuckle. (p. 3)
11. Effects of past grazing […] armed shrubs are frequent/dense understories of prickly ash and other native shrubs that follow grazing [in the oak woodland-brushland community] (p. 4)
12. Exotic species prevalent in [the floodplain forest/lowland hardwood] community include creeping charley (*Glechoma hederacea*) and reed canary grass (Phalaris arundinacea).
13. Blowdowns are a common fate for larger trees in stands on steep, talus-laden soils. [maple-basswood] (p. 5)

Visions

1. …management of these sites should focus on the site as a whole, employ practices that perpetuate endangered, threatened, or special concern species, and native plant communities while following the mandates of forestry or wildlife administered lands. (p.1)
2. …to maintain and regenerate native plant communities and the biodiversity of the area using processes that mimic the natural disturbances that helped to maintain and establish these communities. (p. 2)
3. This plan will meld the goals of biodiversity enhancement, game management for such species as wild turkeys, white-tailed deer, ruffed grouse, and recreation into an adaptive management process. (p. 2)

Goals

1. …maintain the mix of community types providing a variety of habitat for numerous rare species. (p. 3)
2. Any logging used in the management of these areas will be designed to mimic natural disturbance process and will be performed in a way that minimizes soil compaction and damage to the understory species. (p. 3)
3. Management will be performed using existing road and trail systems and the construction of new roads will be kept to a minimum. (p. 3)
4. Those areas with a preponderance of maple/basswood and northern hardwood regeneration will be allowed to succeed to maple/basswood forests. (p. 3) [oak forest]

5. Management techniques will be designed to mimic natural disturbances such as blow downs, disease, and fire. (p. 3) [oak forest]
6. Management in the mesic oak forest areas will be designed to minimize canopy loss and techniques such as group selection will be examined for their effectiveness. (p. 3) [oak forest]
7. Those stands that have a high component of oak and other shade intolerant regeneration […] will be managed to augment the oak component for the benefit of numerous game and non-game species. (p. 3) [oak forest]
8. Management options [to combat invasive species] might include prescribed fire, timber harvest, supplemental planting of oak both pre- and post- harvest, and post-sale silvicultural treatment efforts. (p. 4) [oak forest]
9. Oak woodland-brushlands will be managed to encourage the maintenance of the oak woodland-brushland community or encourage regeneration of the savanna communities through controlled burning and, where feasible to open up canopies, carefully planned logging.
10. Reduce [native] invasive shrubs [oak woodland-brushland] (p. 4)
11. Areas that are threatened by invasion of non-natives will be managed to reduce the threat of these species. [oak woodland-brushland] (p. 4)
12. …maintain a diverse floodplain forest community type and to encourage the continued existence of the forest interior bird species that currently occupy these areas. [floodplain forest/lowland hardwood forest] (p. 5)
13. Areas that are not threatened by reed canary grass and are regenerating the overstory species such as cottonwood and silver maple will be maintained with minimal management. [floodplain forest/lowland hardwood forest] (p. 5)
14. Areas of floodplain forest that are dominated by reed canary grass will be managed to minimize this risk. [floodplain forest/lowland hardwood forest] (p. 5)
15. Areas that are regenerating box elder as the major understory species will be managed to encourage the regeneration of overstory species such as cottonwood and silver maple and decrease the dominance of box elder. [floodplain Forest/lowland hardwood forest] (p. 5)
16. These areas will be managed to maintain the maple basswood forest community and the full canopy cover that is typical of this native plant community [maple-basswood] (p. 5)
17. Harvest activity should limit canopy gap creation wherever possible and account for fill in by remaining crowns. [maple-basswood] (p. 5)
18. Seasonal and equipment restrictions should be used to limit soil disturbance. [maplebasswood] (p. 5)
19. Where nonnative species invasion is prevalent management action should be taken. [maple-basswood] (p. 5)
20. …maintain the White Pine-Hardwood Forest plant community. [white-pine hardwood] (p. 6)
21. White-Pine-Hardwood Forest areas should be monitored for white pine regeneration. Those areas that exhibit white pine regeneration should be allowed to continue natural regeneration. Those areas outside the Old Growth stand that exhibit a lack of white pine regeneration should be managed to encourage white pine regeneration. [white-pine hardwood] (p. 6)
22. Any management in this area should be conducted in a [manner] that is sensitive to the needs for the community as a whole. [white-pine hardwood] (p. 6)
23. ..a collaborative effort by the Section of Wildlife, Division of Ecological Services, and the Division of Forestry to develop a management plan for the old growth stand should be considered. [white-pine hardwood] (p. 6)
24. Maintain and protect the sensitive habitat of these areas. [Maderate cliffs/Algific Talus slopes] (p. 6)
25. Avoid management activities that would threaten these areas. [Maderate cliffs/Algific Talus slopes] (p. 6)
26. Include buffers between adjacent sites when management is implemented. [Maderate cliffs/Algific Talus slopes] (p. 6)

27. Maintain and protect these habitats. [Dry cliffs] (p. 7)
28. Avoid management activities that would threaten these areas. [Dry cliffs] (p. 7)
29. …some of the stands identified by the CSA database will be placed in a reserved and ERF status during the current and upcoming stand review process of the Blufflands/Rochester Plateau SFRMP. [summary] (p.7)

Strategies

Oak forest (mesic and dry-mesic subtype) (p. 4) [G4-8]

1. [Two stands] were identified in the SFRMP process for harvesting over the next 7 years.
2. Because of the advancing age of the oak resource, further investigation and on-site fields visits may be necessary to better identify those additional stands of oak with the greatest probability of future regeneration
3. Management activities will be designed in cooperation with the Whitewater WMA Manager, Area Forester, Regional Ecologist, Non-game Specialist, and USFS investigators to fit research and management needs.

Oak woodland-brushland [G9-10]

4. An aspen stand was identified in the SFRMP process in this community for harvesting over the next 7 years. (p. 4)

Floodplain forest and lowland hardwood forest [G. 11-14] (p. 5)

5. [One stand, primarily box elder, elm, and bur oak] was identified in the SFRMP process for harvesting over the next 7 years.
6. On-site field evaluation may allow this area to be managed as a more diverse lowland hardwood forest in the future.

Maple-Basswood Forest

7. No activities are planned during the next 7 years. (p. 5) White Pine-Hardwood Forest . (p. 6) [G19-22]
8. …management may include some form of scarification or logging to encourage white pine regeneration
9. Evaluate and monitor these stands over the next seven (7) years to determine whether white pine regeneration is evident.
10. Develop management strategy should no natural regeneration be present.
11. [One stand] was identified during the SFRMP process for selective harvest during the next seven years.

Dry cliffs [G23-24] (p. 7)

12. No activities planned during the next 7 years.

<u>MN DNR High Biodiversity Area Management Plan- "Whitewater Upper Beaver Creek"</u>

Issues

1. Escalating development pressure in the surrounding landscape (p.1)
2. Increasing fragmentation (p.1)

3. Global change (p.1)
4. Biodiversity enhancement (p.2)
5. Game management for species such as wild turkeys, white-tailed deer, and ruffed grouse (p.2)
6. Recreation (p.2)
7. Rare species and community types (p. 3)
8. Nonnative species such as buckthorn and honeysuckle (p3)
9. Areas have been disturbed by past grazing (p. 5)
10. Prickly ash and other native shrubs that follow grazing (p.5)
11. Reed canary grass

Visions

1. …management of these sites should focus on the site as a whole, employ practices that perpetuate endangered, threatened, or special concern species, and native plant communities while following the mandates of forestry or wildlife administered lands. (p.1)
2. …to maintain and regenerate native plant communities and the biodiversity of the area using processes that mimic the natural disturbances that helped to maintain and establish these communities. (p. 2)
3. …meld the goals of biodiversity enhancement, game management for species such as wildturkeys, white-tailed deer, and ruffed grouse, and recreation into an adaptive management process.
4. …maintain the mix of community types providing a variety of habitat for numerous rare species. (p. 3)

Goals

1. Any logging used in the management of these areas will be designed to mimic natural disturbance process and will be performed in a way that minimizes soil compaction and damage to the understory species. (p.3)
2. Management will be performed using existing road and trail systems and the construction of new roads will be kept to a minimum. (p.3)
3. Those areas with a preponderance of maple/basswood and northern hardwood regeneration will be allowed to succeed to maple/basswood forests. [oak forest mesic] (p. 3)
4. Management techniques will be designed to mimic natural disturbances such as blow downs, disease, and fire. [oak forest mesic] (p. 3)
5. Management in the mesic oak forest areas will be designed to minimize canopy loss and techniques such as group selection will be examined for their effectiveness. [oak forest mesic] (p. 3)
6. Those stands that have a high component of oak and other shade intolerant regeneration […] will be managed to augment the oak component for the benefit of numerous game and non-game species. [oak forest mesic] (p. 3)
7. Management options [for nonnative invasive plants] might include prescribed fire, small, medium, and large-scale timber harvest (including clear-cut, shelterwood, or group selection), supplemental planting of oak both pre- and post- harvest, and post-sale silvicultural treatment efforts. [oak forest mesic] (p. 3)
8. Areas that are succeeding to a more mixed hardwood forest will be allowed to succeed. [oak forest southeast] (p. 5)

9. Areas that have oak regeneration will be managed to promote the continuation of the oak forest including fire, and/or timber harvest. [oak forest southeast] (p. 5)
10. Areas that are threatened by invasion of non-natives will be managed to reduce the threat of these species. [oak forest southeast] (p. 5)
11. Management techniques will be designed to mimic natural disturbances such as blow downs, disease, and fire. [oak forest southeast] (p. 5)
12. Management in the mesic oak forest areas will be designed to minimize canopy loss and techniques such as group selection will be examined for their effectiveness. [oak forest southeast] (p. 5)
13. Oak woodland-brushlands will be managed to encourage the maintenance of the oak woodland-brushland community or encourage regeneration of the savanna communities through controlled burning and, where feasible to open up canopies, carefully planned logging. [oak woodland-brushland] (p. 5)
14. A management goal is to reduce [native] invasive shrubs.[oak woodland-brushland] (p. 5)
15. Areas that are threatened by invasion of non-natives will be managed to reduce the threat of these species. oak woodland-brushland] (p. 5)
16. These areas will be maintained as open cliff communities. [dry cliffs] (p. 5)
17. Management in these areas will be designed to maintain the community type. [mixed hardwood swamp] (p. 6)
18. Brush cutting to control woody competition may be necessary in the wet meadow. [mixed hardwood swamp] (p. 6)
19. These areas should be monitored for nonnative species invasion and seedling regeneration. [mixed hardwood swamp] (p. 6)
    These areas will be managed to maintain the lowland hardwood forest community type and to encourage the continued existence of the forest interior bird species that currently occupy these areas. [lowland hardwood] (p. 6)
20. Areas that are not threatened by reed canary grass and are regenerating the overstory hardwood species will be maintained with minimal management. [lowland hardwood] (p. 6)
21. Areas of lowland hardwood forest that are dominated by reed canary grass will be managed to minimize this risk. [lowland hardwood] (p. 6)
22. Areas that are exhibiting canopy regeneration will be managed to encourage the regeneration of overstory hardwood species and restore the lowland hardwood forest community. [lowland hardwood] (p. 6)
23. …maintain a riparian corridor connecting these two sections of high biological diversity while allowing timber harvest entry to restore and manage for a diverse lowland hardwood forest. [lowland hardwood] (p. 6)
24. These areas will be managed to maintain the maple basswood forest community and the full canopy cover that is typical of this native plant community. [maple basswood] (p. 7)
25. Where nonnative species invasion is prevalent management action should be taken. [maple basswood] (p. 7)
26. The management goal for this area is to maintain the White Pine-Hardwood Forest plant community. [white pine-hardwood] (p. 7)
27. Those areas that exhibit white pine regeneration should be allowed to continue natural regeneration. [white pine-hardwood] (p. 7)
28. Those areas that exhibit a lack of white pine regeneration should be managed to encourage white pine regeneration. This management may include some form of scarification or logging to encourage white pine regeneration. [white pine-hardwood] (p.7)
29. Maintain and protect the sensitive habitat of these areas. [Algific talus slope] (p. 8)
30. Avoid management activities that would threaten these areas. [Algific talus slope] (p. 8)
31. Include buffers between adjacent sites when management is implemented. [Algific talus slope] (p. 8)

32. Management concerns such as undue edge effects on interior birds will be considered when examining management technique that allow for oak regeneration. [summary] (p. 8)
33. …some of the stands identified by the CSA database will be placed in a reserved and ERF status during the current and upcoming stand review process of the DNR SFRMP. [summary] (p. 8)

Strategies

Oak forest Mesic Subtype (p. 5) [G3-7]
1. Two (2) stands […] were identified as meeting the criteria for harvest over the next 7 year period…
2. [one aspen] stand could be included during the harvest of stand 10 to regenerate this type and improve habitat for ruffed grouse and woodcock.

Oak forest southeast (p. 5) [G8-12]
3. There is no management activities planned for the next seven years for this native plant community.

Oak Woodland-Brushland (p. 6) [G13-15]
4. No activities are planned during the next 7 years.

Dry Cliffs [G16] (p. 6)
5. No activities are planned during the next 7 years.

Mixed Hardwood Swamp [G17-19] (p. 6)
6. No activities are planned during the next 7 years.

Lowland Hardwood Forest (p. 6) [G20-24]
7. No activities are planned during the next 7 years.

Maple Basswood Forest (p. 7) [G25-26]
8. No activities are planned for the next 7 years.

White Pine-Hardwood Forest
9. No activities are planned for the next 7 years.

Algific Talus slope
10. No activities are planned.

MN DNR High Biodiversity Area Management Plan- "Whitewater Sand Savanna"

Issues

1. Escalating development pressure in the surrounding landscape (p. 2)
2. Increasing fragmentation (p. 2)
3. Global change (p. 2)
4. Rare species and community types (p. 2)
5. Biodiversity protection (p. 2)
6. Game species management (p. 2)
7. Recreation (p. 2)
8. Karner blue butterfly (p. 3)
9. Exotic species including Tartarian honeysuckle and buckthorn (p. 3)
10. White-tailed deer have greatly reduced jack pine seedling survival due to browsing. (p. 3)
11. Reed canary grass (p. 8)
12. [Low diversity] following agricultural use (p. 8)

Visions

1. … management of these sites should focus on the site as a whole, employ practices that perpetuate endangered, threatened, or special concern species, and native plant communities while following the mandates of forestry or wildlife administered lands. (p.1)
2. …to manage and enhance native plant communities and the plant and animal species that reside in this area using processes that mimic the disturbances processes that helped to establish and maintain these communities. (p.2)
3. …meld the goals of biodiversity protection, game species management, and recreation into an adaptive management process. (p.2)

Goals

1. …to maintain the mix of community types providing a variety of habitat for numerous rare species. (p.3)
2. Any logging used in the management of these areas will be designed to mimic natural disturbance process and will be performed in a way that minimizes soil compaction and damage to the understory species. (p.3)
3. Management will be performed using existing road and trail systems and the construction of new roads will be kept to a minimum. (p.3)
4. Areas will continue to be burned with an emphasis on enlarging the burn area to encourage expansion of the oak savanna in the dryer oak brushland and oak forest communities, particularly those areas of Plainfield Sand soils. (p.3)
5. Management will include, selective cutting and girdling of trees, herbicide application to create patchy openings, firewood sales, as well as prescribed fire. (p.3)
6. Management techniques will be designed to mimic natural disturbances such as blow downs, diseases native to the area, and fire. (p.3)
7. …enhance the jack pine barrens communities in the area while being sensitive to the Karner blue butterfly population. (p. 4) [Jack pine barrens]

8. Current work to expand Karner blue butterfly habitat will continue with creating a patchwork of open savanna adjacent to the occupied areas. (p. 4) [Jack pine barrens]
9. Management treatments may include, commercial firewood sales or other timber sales, girdling and herbicide application, scarification, and prescribed burning (p. 4) [Jack pine
10. Barrens oak savannas will be managed to encourage regeneration of the savanna community and current work to expand Karner Blue butterfly habitat will continue with creating a patchwork of open savanna adjacent to the occupied areas. [Barrens oak savanna] (p. 4)
11. Management treatments might include, commercial firewood and other timber sales, girdling and herbicide application, scarification, and prescribed burning. [Barrens oak savanna] (p. 4)
12. Areas that are threatened by invasion of non-natives will be managed to reduce the threat of these species. [Barrens oak savanna] (p. 4)
13. Maintain the White Pine-Hardwood Forest plant community. [White Pine-Hardwood] (p. 5)
14. These areas do not naturally experience frequent or intense disturbance patterns and should be maintained naturally without disturbance. [White Pine-Hardwood] (p. 5)
15. Any management in this area should be conducted in a manner that is sensitive to the needs for the community as a whole, including the forest interior birds that breed in this area. [White Pine-Hardwood] (p. 5)
16. …dry oak forests will be managed to encourage regeneration of the oak forest communities through controlled burning and, where necessary to open up canopies, carefully planned logging. (p.5)
17. Areas that are threatened by invasion of non-natives will be managed to reduce the threat of these species. (p.6)
18. Oak woodland-brushlands will be managed to encourage regeneration of the savanna communities through controlled burning and, where necessary to open up canopies, carefully planned logging. [Oak woodland-brushlands] (p. 6)
19. Reduce […] invasive [native] shrubs. [Oak woodland-brushlands] (p. 6)
20. Areas that are threatened by invasion of non-natives will be managed to reduce the threat of these species. [Oak woodland-brushlands] (p. 6)
21. Those areas with a preponderance of maple/basswood and northern hardwood regeneration will be allowed to succeed to maple/basswood forests. [Oak forest] (p. 6)
22. Those stands that have a high component of oak and other shade intolerant regeneration […] will be managed to augment the oak component. [Oak forest] (p. 6)
23. Management options might include prescribed fire, timber harvest, supplemental planting of oak both pre- and post- harvest, and post-sale treatment efforts. [Oak forest] (p. 6)
24. Prescribed fire in adjacent communities of barrens oak savannas, oak forest-dry subtype, oak woodland-brushlands, or dry prairies may be allowed to carry into the mesic oak type as part of larger landscape burns to take advantage of natural firebreaks. [Oak forest] (p. 6)
25. Areas that are in valleys managed for the karner blue recovery project will be managed according to the goals of this project. [Oak forest] (p. 6)
26. The high quality mesic oak forest communities located at the upper ends of valleys are important forest interior habitat to rare species such as Acadian flycatcher (Empidonax virescens), cerulean warbler (Dendroica cerulea), and red-shouldered hawk (Buteo lineatus); these areas will be allowed to succeed without intensive management. [Oak forest] (p. 6)
27. …areas will be managed to restore a diverse floodplain forest community type and to encourage the continued existence of the forest interior bird species that currently occupy these areas. [Floodplain forest] (p. 8)

28. Areas that are not threatened by reed canary grass and are regenerating the overstory species such as cottonwood and silver maple will be maintained with minimal management. [Floodplain forest] (p. 8)
29. Areas of floodplain forest that are dominated by reed canary grass will be managed to minimize this risk. [Floodplain forest] (p. 8)
30. Areas that are regenerating box elder as the major understory species will be managed to encourage the regeneration of overstory species such as cottonwood and silver maple and decrease the dominance of box elder. [Floodplain forest] (p. 8)

Strategies
Terrace Unit

Jack Pine Barrens (p. 3-4) [G7-9]
1. Management activities that open the habitat and encourage the reproduction of Jack Pineiare ongoing in this area.
2. Continue the current management through the use of prescribed fire on habitat adjacent to wetlands, mesic prairies, bluff prairies, and barren oak savanna with reference to both the Natural Heritage Registry agreement and the recommendations of the Karner Blue Recovery Plan.
3. Continue management to maintain and enhance the oak savanna habitat and Jack Pine Barrens based on current management practices and Karner Blue butterfly recovery plan in the areas identified in this plan.
4. Use selective cutting, girdling and chemical application to create a patchy habitat. Expand Karner blue habitat work into the jack pine barrens community to eliminate competing oak and release jack pine.
5. Conduct a large scale prescribed burn throughout the entire Natural Heritage Registry site excluding the occupied Karner blue butterfly site within four years.

Barrens oak savanna (p. 5) [G10-12]
6. Continue the current management through the use of prescribed fire and brush removal with reference to both the Natural Heritage Registry agreement and the recommendations of the Karner Blue Recovery Plan.
7. Continue management to maintain and enhance the oak savanna habitat based on current management practices and Karner Blue butterfly recovery plan in the areas identified in this plan.

White Pine-Hardwood Forest (mesic subtype) (p. 5) [G13-15]
8. Manage these areas in a fashion compatible with the long-term objectives stated above.
9. Conduct field inventories in these communities to determine amount of advanced regeneration.
10. Consider and initiate management techniques including prescribed burning to encourage white pine regeneration on these sites.

Bluff Unit

Oak forest (dry subtype) [G16-17] (p. 5-6)
11. [One stand] will be managed according to the Long-term management objective above considering management techniques such as group selection harvest and prescribed burning.

Oak woodland-brushland [G18-20] (p. 6)

12. Continue to manage these areas with the use of fire and brush removal to encourage the regeneration of the savanna communities.

Oak forest (mesic subtype) [G21-26] (p. 6-7)

13. Vegetation management could include: prescribed burning, partial cutting, shelterwood or group selection and/or clearcutting to regenerate oak.

Floodplain Unit

Floodplain Forest (p. 8) [G27-30]

14. Vegetation management could include: prescribed burning, partial cutting, shelterwood or group selection and/or clearcutting to regenerate oak.
15. [Six stands] will be managed to remove the dominant box elder canopy and regenerate the area to a diverse floodplain forest community
16. Practices might include commercial timber harvest, direct seeding, scarification with bulldozer to remove undesirable competition (i.e., reed canary grass) or tree planting.
17. A portion of [one stand] that is currently in agriculture will be direct seeded to diverse lowland hardwoods.

MN DNR High Biodiversity Area Management Plan- "Whitewater South Fork"

Issues

1. Escalating development pressure in the surrounding landscape (p.1)
2. Increasing fragmentation (p.1)
3. Global change (p.1)
4. Biodiversity enhancement (p.2)
5. Game management (p.2)
6. Recreation (p.2)
7. Rare species and community types (p. 3)
8. Invasion of nonnative species such as buckthorn and honeysuckle (p. 3)
9. Reed canary grass (p. 4)

Visions

1. …management of these sites should focus on the site as a whole, employ practices that perpetuate endangered, threatened, or special concern species, and native plant communities while following the mandates of forestry or wildlife administered lands. (p.1)
2. …to maintain and regenerate native plant communities and the biodiversity of the area using processes that mimic the natural disturbances that helped to maintain and establish these communities. (p. 2)
3. …meld the goals of biodiversity enhancement, game management, and recreation into an adaptive management process. (p. 2)

Goals

1. Management in these [rare species and community types] will be performed in a manner that mimics natural disturbance processes and is sensitive to the maintenance of the native plant communities and the species found within these communities. (p. 3)
2. …maintain the mix of community types providing a variety of habitat for numerous rare species. (p. 3)
3. Any logging used in the management of these areas will be designed to mimic natural disturbance process and will be performed in a way that minimizes soil compaction and damage to the understory species. (p. 3)
4. In general, much of the harvest related management activities will take place in the northern portion of this site. […] The southern portion of the site provides habitat for most of the rare species found in this area and many of the more sensitive native plant communities and will be managed accordingly. (p. 3)
5. Management will be performed using existing road and trail systems and the construction of new roads will be kept to a minimum. (p. 3)
6. Some of these areas [of oak forest] will lend themselves well to oak regeneration through various sized timber harvests while others will convert to northern hardwood species like maple, basswood, elm, and hackberry. [oak forest] (p. 3)
7. Opportunities to incorporate shelterwood or group selection harvests should be explored when possible. [oak forest] (p. 3)
8. Non-game Wildlife and MCBS data will be utilized to identify critical habitat for management in small, medium, and large patches, i.e., red-shouldered hawks. [oak forest] (p. 3)
9. Management decisions on these areas will be designed to encourage the oak community type and may include fire and timber harvest. [oak forest] (p. 3)
10. The management of these areas will be designed to encourage the maintenance of the oak woodland-brushland community and will include fire and timber harvest. [Oak woodlandbrushland] (p. 4)
11. Areas that are threatened by invasion of nonnative species will be managed to reduce the threat of these species. [Oak woodland-brushland] (p. 4)
12. Management techniques will be designed to mimic natural disturbances such as blow downs, disease, and fire. [Oak woodland-brushland] (p. 4)
13. These areas will be managed to maintain the lowland hardwood forest community type and to encourage the continued existence of the forest interior bird species that currently occupy these areas. [Lowland hardwood forest] (p. 4)
14. Areas that are not threatened by reed canary grass and are regenerating the overstory hardwood species will be maintained with minimal management. [Lowland hardwood forest] (p. 4)
15. Areas of lowland hardwood forest that are dominated by reed canary grass will be managed to minimize this risk. [Lowland hardwood forest] (p. 4)
16. Areas that are exhibiting canopy regeneration will be managed to encourage the regeneration of overstory hardwood species and restore the lowland hardwood forest community. [Lowland hardwood forest] (p. 4)
17. …maintain the maple basswood forest community and the full canopy cover that is typical of this native plant community. [maple-basswood] (p. 5)
18. Harvest activity should limit canopy gap creation wherever possible and account for fill in by remaining crowns. [maple-basswood] (p. 5)
19. Where nonnative species invasion is prevalent management action should be taken. [maple-basswood] (p. 5)

20. …maintain the white pine-hardwood forest plant community. [white pine-hardwood] (p. 6)
21. Those areas that exhibit white pine regeneration should be allowed to continue natural regeneration. [white pine-hardwood] (p. 6)
22. Those areas that exhibit a lack of white pine regeneration should be managed to encourage white pine regeneration. This management may include some form of scarification or logging to encourage white pine regeneration. [white pine-hardwood] (p. 6)
23. …maintain the northern hardwood-conifer forest plant community. [Northern hardwoodconifer] (p. 6)
24. Where nonnative species invasion is prevalent management action should be taken. [Northern hardwood-conifer] (p. 6)
25. Maintain and protect the sensitive habitat of these areas. [Talus slope/moist cliff] (p. 7)
26. Avoid management activities that would threaten these areas. [Talus slope/moist cliff] (p.7)
27. Include buffers between adjacent sites when management is implemented. [Talus slope/moist cliff] (p. 7)
28. Maintain and protect these habitats. [Dry cliffs] (p. 7)
29. Avoid management activities that would threaten these areas. [Dry cliffs] (p. 7)
30. Maintain and protect the sensitive habitat of these areas. [moist cliff] (p. 8)
31. Avoid management activities that would threaten these areas. [moist cliff] (p. 8)
32. Include buffers between adjacent sites when management is implemented. [moist cliff] (p. 8)
33. These areas will be managed to maintain the black ash swamp community and the canopy cover and emergent vegetation that is typical of this native plant community. [Black ash swamps] (p. 8)
34. Where nonnative species invasion is prevalent management action should be taken. [Black ash swamps] (p. 8)

STRATEGIES

Oak forest (southeast section) mesic subtype (p. 3-4) [G6-9]

1. Five CSA forest stands met stand selection criteria for harvest and fall in the Mesic Oak Forest plant community designated by the MCBS.
2. Timber management should consider small, medium, and large-scale harvests in these types to provide habitat for game and non-game species, including forest interior birds.
3. Clear cuts for oak regeneration is the normal practice, efforts to apply group selection and shelterwood cuts should be applied where appropriate.
4. Management in the mesic oak forest areas will be designed to minimize canopy loss and techniques such as group selection will be examined for their effectiveness.

Oak woodland-brushland (p. 4) [G10-12]

5. There are no stands meeting selection criteria over the next seven years.

Lowland hardwood forest (p. 5) [G13-16]

6. Two stands were identified through the SFRMP process in this community for limited harvesting over the next seven years
7. Stands that are not threatened by box elder conversion or invasion of exotics species will not be managed with harvest.

Maple-basswood forest (p. 5) [G17-19]

8. Harvest planned in this community type will follow the additional management guidance provided by the division directors of DNR Forestry, Wildlife, and Ecological Services. (p. 5)
9. No management actions will be implemented [on old growth stands]. (p. 5)

White pine-hardwood forest (p. 6) [G20-22]

10. The white pine-hardwood forest community contains one CSA stand that met harvest criteria during the next seven years
11. …it is recommended that a thorough ground survey be conducted by staff from the Divisions of Ecological Services, Forestry and Wildlife prior to any timber harvest to detail plans for ensuring retention of this unique community.
12. Opportunities to encourage white pine regeneration will be explored while maintaining a healthy oak component in this type.
13. …should a timber harvest be proposed, only a portion of the community will be harvested to better monitor impacts on ground cover and any subsequent white pine regeneration within this type.
14. No harvesting activity will take place in the old growth areas.

Northern hardwood-conifer forest (p. 6) [G23-24]

15. No activities are planned during the next seven years.

Talus slope (algific subtype) and moist cliff (southeast section) maderate subtype (p. 7) [G25-27]

16. No activities planned during the next seven years.

Dry cliffs (southeast section) [28-29]

17. No activities planned during the next seven years.

Moist cliff (southeast section) (p. 7) [G30-32]

18. No activities planned during the next seven years.

Black ash swamp (p. 8) [G33-34]

19. No activities planned during the next seven years.

<u>MN DNR Land Asset Management Plan for Rochester Forestry Area</u>

Goals

1. Achieve the optimum pattern of forest land ownership for the management of forest resources designed to best serve the needs of Minnesota's citizens
2. Obtain conservation easements from willing participants on non-state lands adjacent to state forestland, where development pressure exists that would create land use conflicts, hindering the ability to effectively manage the forest resource

Strategies

1. Acquire Private lands in the following priorities that provide for state forest land:
   1) Consolidation
      a. Land that is landlocked inside a large contiguous block of Division of Forestry administered land
      b. Land that reduces state /private boundaries
   2) Resource protection.
      a. Productive forest land
      b. Land that could be developed causing land-use conflicts with adjacent Division of Forestry administered land
2. Control noxious weeds on state lands

Lower Mississippi River Basin Fecal Coliform Implementation Plan

Challenges

1. Widespread risk of ground water contamination due to karst geology
2. Aquatic and terrestrial habitat degradation

Strategies

1. Riparian buffers: funding, installation and maintenance.
2. Streamlining the process to producers to install buffers through NRCS (EQIP and other programs).

MNDNR Division of Fisheries Strategic Plan for Coldwater Resources Management in Southeast Minnesota 2004-2015

Challenges

1. To maintain, enhance, or restore the health of Minnesota ecosystems so that they can continue to serve environmental, social, and economic purposes.

Goals

1. Improve our ability to protect, improve, and restore riparian and in-stream habitat so that fish populations are healthy.
2. Support and use a watershed approach for trout management so that all coldwater resources are protected and improved, and basin-wide impacts to coldwater streams can be addressed.

Strategies

1. Work to increase the amount of critical habitat that is protected through fee title acquisition or other land protection options (e.g., conservation easements, land trusts).
2. Improve the ability of southeast Fisheries staff to assist landowners in decisions and activities concerning riparian management and fish populations.

3. Integrate coldwater resource management by establishing partnerships and sharing information with other natural resource and land management agencies having administrative responsibility in southeast Minnesota including Natural Resource Conservation Service (NRCS), Board of Water and Soil Resources (BWSR), County Water Planning, Department of Agriculture, local units of government, and non-governmental organizations.
4. Coordinate and develop partnerships with other interested parties listed in Strategy 1 to develop a central stream and watershed database/Geographical Information System (GIS) that incorporates water quality, land use, and biological information.
5. Continue to provide staff time to maintain a Fisheries presence in watershed issues, track State and Federal Farm Bill Legislation, provide private lands management assistance, and advocate for management at the watershed scale to improve trout populations and aquatic habitat.

Basin Alliance for the Lower Mississippi in Minnesota 2001 Basin Plan Scoping Document

Goals

1. Promote appropriate timber harvesting techniques
2. Develop Forest Stewardship Plans
    1. Expand forested areas
    2. Improve current timber stands
    3. Protect existing natural vegetation
    4. Increase stream miles of riparian buffers at least 50 feet wide bordering protected waters

Strategies

5. Determine watershed prioritization criteria for protection or restoration
6. Permanently protect and preserve highly vulnerable areas
7. Keep stream and spring flows and groundwater levels within historic ranges

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Appendix E: Native Plant Communities Mapped by the Minnesota Biological Survey in the Mississippi River – Winona Watershed

NPC Type Code	NPC Class and Type Names	Conservation Status Rank	Mapped Acres
CTs12	Southern Dry Cliff		101
CTs12b	Dry Limestone - Dolomite Cliff (Southern)	S4	13
CTs33b	Mesic Limestone - Dolomite Cliff (Southern)	S3	31
CTs43a1	Maderate Cliff: Limestone Subtype	S1	8
CTs43a2	Maderate Cliff: Dolomite Subtype	S1	17
CTs46a2	Algific Talus: Dolomite Subtype	S1	34
FDs27b	White Pine - Oak Woodland (Sand)	S1	22
FDs27c	Black Oak - White Oak Woodland (Sand)	S2	279
FDs38a	Oak - Shagbark Hickory Woodland	S3	2,548
FFs59a	Silver Maple - Green Ash - Cottonwood Terrace Forest	S3	1,510
FFs59b	Swamp White Oak Terrace Forest	S1	99
FFs59c	Elm - Ash - Basswood Terrace Forest	S2	636
FFs68a	Silver Maple - (Virginia Creeper) Floodplain Forest	S3	4,057
MHc38a	White Pine - Sugar Maple - Basswood Forest (Cold Slope)	S1	5

MHs37	Southern Dry-Mesic Oak Forest		3,700
MHs37a	Red Oak - White Oak Forest	S3	4,450
MHs37b	Red Oak - White Oak - (Sugar Maple) Forest	S4	3,692
MHs38a	White Pine - Oak - Sugar Maple Forest	S3	660
MHs38c	Red Oak - Sugar Maple - Basswood - (Bitternut Hickory) Forest	S3	1,249
MHs39	Southern Mesic Maple-Basswood Forest		229
MHs39a	Sugar Maple - Basswood - (Bitternut Hickory) Forest	S2	227
MHs39b	Sugar Maple - Basswood - Red Oak - (Blue Beech) Forest	S3	1,013
MHs49	Southern Wet-Mesic Hardwood Forest		241
MHs49a	Elm - Basswood - Black Ash - (Hackberry) Forest	S3	211
MHs49b	Elm - Basswood - Black Ash - (Blue Beech) Forest	S2	385
MRn83a	Cattail - Sedge Marsh (Northern)	S2	166
MRn93	Northern Bulrush-Spikerush Marsh		939
MRn93b	Spikerush - Bur Reed Marsh (Northern)	S2	100
OPp93c	Calcareous Fen (Southeastern)	S1	3
OW	Other Water Body		41
UPs13a	Dry Barrens Prairie (Southern)	S1S2	1,017
UPs13b	Dry Sand - Gravel Prairie (Southern)	S2	43
UPs13c	Dry Bedrock Bluff Prairie (Southern)	S3	1,423

UPs14a1	Dry Barrens Oak Savanna (Southern): Jack Pine Subtype	S1	90
UPs14a2	Dry Barrens Oak Savanna (Southern): Oak Subtype	S1S2	995
UPs23a	Mesic Prairie (Southern)	S2	212
WFs57b	Black Ash - Sugar Maple - Basswood - (Blue Beech) Seepage Swamp	S1	54
WMn82a	Willow - Dogwood Shrub Swamp	S5	7
WMn82b	Sedge Meadow	S4 or S5	1,444
WMs83a	Seepage Meadow/Carr	S3	3
WMs83a1	Seepage Meadow/Carr Tussock: Sedge Subtype	S3	19
WMs83a3	Seepage Meadow/Carr: Impatiens Subtype	S2	15
WPs54b	Wet Prairie (Southern)	S2	27

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Appendix F: List of Rare Natural Features in the Mississippi River – Winona Watershed (as of December 2014)

Protection Status: END = Endangered; THR = Threatened; SPC = Special Concern;

Common Name	Scientific Name	Category	State Protection Status
Bat Concentration	Bat Colony	Animal Assemblage	
A Species of Lichen	Buellia nigra	Fungus	SPC
Mucket	Actinonaias ligamentina	Invertebrate Animal	THR
Elktoe	Alasmidonta marginata	Invertebrate Animal	THR
Rock Pocketbook	Arcidens confragosus	Invertebrate Animal	END
Iowa Skipper	Atrytone arogos iowa	Invertebrate Animal	SPC
Northern Barrens Tiger Beetle	Cicindela patruela patruela	Invertebrate Animal	SPC
Splendid Tiger Beetle	Cicindela splendida cyanocephalata	Invertebrate Animal	SPC
Purple Wartyback	Cyclonaias tuberculata	Invertebrate Animal	END
Butterfly	Ellipsaria lineolata	Invertebrate Animal	THR

Elephant-ear	Elliptio crassidens	Invertebrate Animal	END
Spike	Elliptio dilatata	Invertebrate Animal	THR
Persius Dusky Wing	Erynnis persius persius	Invertebrate Animal	END
Ebonyshell	Fusconaia ebena	Invertebrate Animal	END
Leonard's Skipper	Hesperia leonardus leonardus	Invertebrate Animal	SHL-SPC
Ottoe Skipper	Hesperia ottoe	Invertebrate Animal	END
Black Sandshell	Ligumia recta	Invertebrate Animal	SPC
Karner Blue	Lycaeides melissa samuelis	Invertebrate Animal	END
Washboard	Megalonaias nervosa	Invertebrate Animal	END
Hickorynut	Obovaria olivaria	Invertebrate Animal	Watchlist
A Jumping Spider	Pelegrina arizonensis	Invertebrate Animal	SPC
A Jumping Spider	Phidippus apacheanus	Invertebrate Animal	SPC
Round Pigtoe	Pleurobema sintoxia	Invertebrate Animal	SPC
Monkeyface	Quadrula metanevra	Invertebrate Animal	THR
Wartyback	Quadrula nodulata	Invertebrate Animal	THR

A Jumping Spider	Sassacus papenhoei	Invertebrate Animal	SPC
Regal Fritillary	Speyeria idalia	Invertebrate Animal	SPC
Pistolgrip	Tritogonia verrucosa	Invertebrate Animal	END
Fawnsfoot	Truncilla donaciformis	Invertebrate Animal	THR
Hubricht's Vertigo	Vertigo hubrichti	Invertebrate Animal	Watchlist
Bluff Vertigo	Vertigo meramecensis	Invertebrate Animal	THR
Sword Moss	Bryoxiphium norvegicum	Nonvascular Plant	END
Stream Deposition (Holocene)	Stream deposition (holocene)	Other (Ecological)	
Wind Deposition (Holocene)	Wind deposition (holocene)	Other (Ecological)	
Wind Process (Holocene)	Wind process (holocene)	Other (Ecological)	
Algific Talus, Dolomite Subtype	Algific Talus; Dolomite Subtype	Terrestrial Community - Other Classification	
Black Ash - Sugar Maple - Basswood - (Blue Beech) Seepage Swamp	Black Ash - Sugar Maple - Basswood - (Blue Beech) Seepage Swamp Type	Terrestrial Community - Other Classification	
Black Oak - White Oak Woodland (Sand)	Black Oak - White Oak Woodland (Sand) Type	Terrestrial Community - Other Classification	
Calcareous Fen (Southeastern)	Calcareous Fen (Southeastern) Type	Terrestrial Community - Other Classification	

Cattail - Sedge Marsh (Northern)	Cattail - Sedge Marsh (Northern) Type	Terrestrial Community - Other Classification	
Dry Barrens Oak Savanna (Southern), Jack Pine Subtype	Dry Barrens Oak Savanna (Southern); Jack Pine Subtype	Terrestrial Community - Other Classification	
Dry Barrens Oak Savanna (Southern), Oak Subtype	Dry Barrens Oak Savanna (Southern); Oak Subtype	Terrestrial Community - Other Classification	
Dry Barrens Prairie (Southern)	Dry Barrens Prairie (Southern) Type	Terrestrial Community - Other Classification	
Dry Bedrock Bluff Prairie (Southern)	Dry Bedrock Bluff Prairie (Southern) Type	Terrestrial Community - Other Classification	
Dry Limestone - Dolomite Cliff (Southern)	Dry Limestone - Dolomite Cliff (Southern) Type	Terrestrial Community - Other Classification	
Dry Sand - Gravel Prairie (Southern)	Dry Sand - Gravel Prairie (Southern) Type	Terrestrial Community - Other Classification	
Elm - Ash - Basswood Terrace Forest	Elm - Ash - Basswood Terrace Forest Type	Terrestrial Community - Other Classification	
Elm - Basswood - Black Ash - (Blue Beech) Forest	Elm - Basswood - Black Ash - (Blue Beech) Forest Type	Terrestrial Community - Other Classification	
Elm - Basswood - Black Ash - (Hackberry) Forest	Elm - Basswood - Black Ash - (Hackberry) Forest Type	Terrestrial Community - Other Classification	
Maderate Cliff, Dolomite Subtype	Maderate Cliff; Dolomite Subtype	Terrestrial Community - Other Classification	
Maderate Cliff, Limestone Subtype	Maderate Cliff; Limestone Subtype	Terrestrial Community - Other Classification	

Mesic Limestone - Dolomite Cliff (Southern)	Mesic Limestone - Dolomite Cliff (Southern) Type	Terrestrial Community - Other Classification	
Mesic Limestone - Dolomite Talus (Southern)	Mesic Limestone - Dolomite Talus (Southern) Type	Terrestrial Community - Other Classification	
Mesic Prairie (Southern)	Mesic Prairie (Southern) Type	Terrestrial Community - Other Classification	
Oak - Shagbark Hickory Woodland	Oak - Shagbark Hickory Woodland Type	Terrestrial Community - Other Classification	
Red Oak - Sugar Maple - Basswood - (Bitternut Hickory) Forest	Red Oak - Sugar Maple - Basswood - (Bitternut Hickory) Forest Type	Terrestrial Community - Other Classification	
Red Oak - White Oak - (Sugar Maple) Forest	Red Oak - White Oak - (Sugar Maple) Forest Type	Terrestrial Community - Other Classification	
Red Oak - White Oak Forest	Red Oak - White Oak Forest Type	Terrestrial Community - Other Classification	
Sedge Meadow	Sedge Meadow Type	Terrestrial Community - Other Classification	
Seepage Meadow/Carr, Impatiens Subtype	Seepage Meadow/Carr; Impatiens Subtype	Terrestrial Community - Other Classification	
Seepage Meadow/Carr, Tussock Sedge Subtype	Seepage Meadow/Carr; Tussock Sedge Subtype	Terrestrial Community - Other Classification	
Silver Maple - (Virginia Creeper) Floodplain Forest	Silver Maple - (Virginia Creeper) Floodplain Forest Type	Terrestrial Community - Other Classification	
Silver Maple - Green Ash - Cottonwood Terrace Forest	Silver Maple - Green Ash - Cottonwood Terrace Forest Type	Terrestrial Community - Other Classification	

Southern Dry-Mesic Oak Forest	Southern Dry-Mesic Oak Forest Class	Terrestrial Community - Other Classification	
Spikerush - Bur Reed Marsh (Northern)	Spikerush - Bur Reed Marsh (Northern) Type	Terrestrial Community - Other Classification	
Sugar Maple - Basswood - (Bitternut Hickory) Forest	Sugar Maple - Basswood - (Bitternut Hickory) Forest Type	Terrestrial Community - Other Classification	
Sugar Maple - Basswood - Red Oak - (Blue Beech) Forest	Sugar Maple - Basswood - Red Oak - (Blue Beech) Forest Type	Terrestrial Community - Other Classification	
Swamp White Oak Terrace Forest	Swamp White Oak Terrace Forest Type	Terrestrial Community - Other Classification	
Wet Prairie (Southern)	Wet Prairie (Southern) Type	Terrestrial Community - Other Classification	
White Pine - Oak - Sugar Maple Forest	White Pine - Oak - Sugar Maple Forest Type	Terrestrial Community - Other Classification	
White Pine - Oak Woodland (Sand)	White Pine - Oak Woodland (Sand) Type	Terrestrial Community - Other Classification	
White Pine - Sugar Maple - Basswood Forest (Cold Slope)	White Pine - Sugar Maple - Basswood Forest (Cold Slope) Type	Terrestrial Community - Other Classification	
Willow - Dogwood Shrub Swamp	Willow - Dogwood Shrub Swamp Type	Terrestrial Community - Other Classification	
White Baneberry	Actaea pachypoda	Vascular Plant	
Moschatel	Adoxa moschatellina	Vascular Plant	

Round-stemmed False Foxglove	Agalinis gattingeri	Vascular Plant	END
Nodding Wild Onion	Allium cernuum	Vascular Plant	SPC
Smooth Rock-cress	Arabis laevigata	Vascular Plant	SLL-SPC
Smooth Rock Cress	Arabis laevigata var. laevigata	Vascular Plant	SPC
Green Dragon	Arisaema dracontium	Vascular Plant	SPC
Sea-beach Needlegrass	Aristida tuberculosa	Vascular Plant	THR
Clasping Milkweed	Asclepias amplexicaulis	Vascular Plant	THR
Ebony Spleenwort	Asplenium platyneuron	Vascular Plant	SPC
Fernleaf False Foxglove	Aureolaria pedicularia	Vascular Plant	THR
Plains Wild Indigo	Baptisia bracteata var. glabrescens	Vascular Plant	SPC
White Wild Indigo	Baptisia lactea var. lactea	Vascular Plant	SPC
Bur-marigold	Bidens discoidea	Vascular Plant	SPC
Prairie Moonwort	Botrychium campestre	Vascular Plant	SPC
Blunt-lobed Grapefern	Botrychium oneidense	Vascular Plant	THR
Yellow-fruited Sedge	Carex annectens	Vascular Plant	SPC

Carey's Sedge	Carex careyana	Vascular Plant	END
Raven's Foot Sedge	Carex crus-corvi	Vascular Plant	Watchlist
Davis' Sedge	Carex davisii	Vascular Plant	THR
Gray's Sedge	Carex grayi	Vascular Plant	SPC
James' Sedge	Carex jamesii	Vascular Plant	THR
Smooth-sheathed Sedge	Carex laevivaginata	Vascular Plant	THR
Spreading Sedge	Carex laxiculmis	Vascular Plant	THR
Muskingum Sedge	Carex muskingumensis	Vascular Plant	SPC
Plantain-leaved Sedge	Carex plantaginea	Vascular Plant	END
Sterile Sedge	Carex sterilis	Vascular Plant	THR
Cattail Sedge	Carex typhina	Vascular Plant	SPC
Wood's Sedge	Carex woodii	Vascular Plant	
Buttonbush	Cephalanthus occidentalis	Vascular Plant	
Hill's Thistle	Cirsium pumilum var. hillii	Vascular Plant	SPC
Silvery Spleenwort	Deparia acrostichoides	Vascular Plant	SPC

Squirrel-corn	Dicentra canadensis	Vascular Plant	SPC
Narrow-leaved Spleenwort	Diplazium pycnocarpon	Vascular Plant	THR
Jewelled Shooting Star	Dodecatheon amethystinum	Vascular Plant	Watchlist
Goldie's Fern	Dryopteris goldiana	Vascular Plant	SPC
Walter's Barnyard Grass	Echinochloa walteri	Vascular Plant	
Rattlesnake-master	Eryngium yuccifolium	Vascular Plant	SPC
Upland Boneset	Eupatorium sessilifolium	Vascular Plant	THR
False Mermaid	Floerkea proserpinacoides	Vascular Plant	THR
Kentucky Coffee-tree	Gymnocladus dioica	Vascular Plant	SPC
Witch-hazel	Hamamelis virginiana	Vascular Plant	THR
Sweet-smelling Indian-plantain	Hasteola suaveolens	Vascular Plant	END
Canada Frostweed	Helianthemum canadense	Vascular Plant	SPC
Long-bearded Hawkweed	Hieracium longipilum	Vascular Plant	Watchlist
Beach-heather	Hudsonia tomentosa	Vascular Plant	THR
Rock Clubmoss	Huperzia porophila	Vascular Plant	THR

Golden-seal	Hydrastis canadensis	Vascular Plant	END
Twinleaf	Jeffersonia diphylla	Vascular Plant	SPC
Creeping Juniper	Juniperus horizontalis	Vascular Plant	SPC
Catchfly Grass	Leersia lenticularis	Vascular Plant	THR
Lilia-leaved Twayblade	Liparis liliifolia	Vascular Plant	
Glade Mallow	Napaea dioica	Vascular Plant	THR
Old Field Toadflax	Nuttallanthus canadensis	Vascular Plant	SPC
Rhombic-petaled Evening Primrose	Oenothera rhombipetala	Vascular Plant	SPC
One-flowered Broomrape	Orobanche uniflora	Vascular Plant	THR
Cowbane	Oxypolis rigidior	Vascular Plant	Watchlist
American Ginseng	Panax quinquefolius	Vascular Plant	SPC
Purple Cliff-brake	Pellaea atropurpurea	Vascular Plant	SPC
Broad Beech-fern	Phegopteris hexagonoptera	Vascular Plant	END
Rough-seeded Fameflower	Phemeranthus rugospermus	Vascular Plant	THR
Woodland Bluegrass	Poa sylvestris	Vascular Plant	Watchlist

Wolf's Bluegrass	Poa wolfii	Vascular Plant	SPC
Cross-leaved Milkwort	Polygala cruciata	Vascular Plant	END
Christmas Fern	Polystichum acrostichoides	Vascular Plant	END
Swamp White Oak	Quercus bicolor	Vascular Plant	SPC
Leedy's Roseroot	Rhodiola integrifolia ssp. leedyi	Vascular Plant	END
Widgeon-grass	Ruppia cirrhosa	Vascular Plant	SPC
Long-lobed Arrowhead	Sagittaria calycina	Vascular Plant	THR
Beaked Snakeroot	Sanicula trifoliata	Vascular Plant	SPC
Ovate-leaved Skullcap	Scutellaria ovata var. versicolor	Vascular Plant	THR
Snowy Campion	Silene nivea	Vascular Plant	THR
Cliff Goldenrod	Solidago sciaphila	Vascular Plant	
White Heath Aster	Symphyotrichum pilosum	Vascular Plant	SLL-Watch
Short's Aster	Symphyotrichum shortii	Vascular Plant	SPC
Yellow Pimpernel	Taenidia integerrima	Vascular Plant	SPC
Goat's-rue	Tephrosia virginiana	Vascular Plant	SPC

Snow Trillium	Trillium nivale	Vascular Plant	SPC
Purple Sand-grass	Triplasis purpurea var. purpurea	Vascular Plant	SPC
Valerian	Valeriana edulis var. ciliata	Vascular Plant	THR
Lance-leaved Violet	Viola lanceolata var. lanceolata	Vascular Plant	THR
Silverleaf Grape	Vitis aestivalis var. bicolor	Vascular Plant	THR
Lake Sturgeon	Acipenser fulvescens	Vertebrate Animal	SPC
Blanchard's Cricket Frog	Acris blanchardi	Vertebrate Animal	END
Skipjack Herring	Alosa chrysochloris	Vertebrate Animal	END
Henslow's Sparrow	Ammodramus henslowii	Vertebrate Animal	END
Smooth Softshell	Apalone mutica	Vertebrate Animal	SPC
Pirate Perch	Aphredoderus sayanus	Vertebrate Animal	SPC
Upland Sandpiper	Bartramia longicauda	Vertebrate Animal	Watchlist
American Bittern	Botaurus lentiginosus	Vertebrate Animal	Watchlist
Red-shouldered Hawk	Buteo lineatus	Vertebrate Animal	SPC
North American Racer	Coluber constrictor	Vertebrate Animal	SPC

Timber Rattlesnake	Crotalus horridus	Vertebrate Animal	THR
Crystal Darter	Crystallaria asprella	Vertebrate Animal	END
Blue Sucker	Cycleptus elongatus	Vertebrate Animal	SPC
Trumpeter Swan	Cygnus buccinator	Vertebrate Animal	SPC
Acadian Flycatcher	Empidonax virescens	Vertebrate Animal	SPC
Blanding's Turtle	Emydoidea blandingii	Vertebrate Animal	THR
Peregrine Falcon	Falco peregrinus	Vertebrate Animal	SPC
Common Gallinule	Gallinula galeata	Vertebrate Animal	SPC
Wood Turtle	Glyptemys insculpta	Vertebrate Animal	THR
Sandhill Crane	Grus canadensis	Vertebrate Animal	Watchlist
Bald Eagle	Haliaeetus leucocephalus	Vertebrate Animal	Watchlist
Plains Hog-nosed Snake	Heterodon nasicus	Vertebrate Animal	SPC
Eastern Hognose Snake	Heterodon platirhinos	Vertebrate Animal	Watchlist
Black Buffalo	Ictiobus niger	Vertebrate Animal	THR
Milksnake	Lampropeltis triangulum	Vertebrate Animal	Watchlist

American Brook Lamprey	Lethenteron appendix	Vertebrate Animal	Watchlist
Bullfrog	Lithobates catesbeianus	Vertebrate Animal	Watchlist
Pickerel Frog	Lithobates palustris	Vertebrate Animal	Watchlist
Prairie Vole	Microtus ochrogaster	Vertebrate Animal	SPC
Woodland Vole	Microtus pinetorum	Vertebrate Animal	SPC
Yellow Bass	Morone mississippiensis	Vertebrate Animal	SPC
Black Redhorse	Moxostoma duquesnei	Vertebrate Animal	SPC
Northern Myotis	Myotis septentrionalis	Vertebrate Animal	SPC
Mudpuppy	Necturus maculosus	Vertebrate Animal	SPC
Pugnose Minnow	Opsopoeodus emiliae	Vertebrate Animal	Watchlist
Western Foxsnake	Pantherophis ramspotti	Vertebrate Animal	Watchlist
Louisiana Waterthrush	Parkesia motacilla	Vertebrate Animal	SPC
Tricolored Bat	Perimyotis subflavus	Vertebrate Animal	SPC
Plains Pocket Mouse	Perognathus flavescens	Vertebrate Animal	SPC
Gophersnake	Pituophis catenifer	Vertebrate Animal	SPC

Paddlefish	Polyodon spathula	Vertebrate Animal	THR
King Rail	Rallus elegans	Vertebrate Animal	END
Shovelnose Sturgeon	Scaphirhynchus platorynchus	Vertebrate Animal	Watchlist
Cerulean Warbler	Setophaga cerulea	Vertebrate Animal	SPC
Hooded Warbler	Setophaga citrina	Vertebrate Animal	SPC
Forster's Tern	Sterna forsteri	Vertebrate Animal	SPC
Bell's Vireo	Vireo bellii	Vertebrate Animal	SPC

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Appendix G:
Conservation Related Tax Programs for Private Landowners

Class 2c Managed Forest Land

(Original found at: http://www.revenue.state.mn.us/propertytax/factsheets/factsheet_17.pdf)

This fact sheet is intended to help you become more familiar with Minnesota tax laws and your rights and responsibilities under the laws. Nothing in this fact sheet supersedes, alters, or otherwise changes any provisions of the tax law, administrative rules, court decisions, or revenue notices.

This property classification, enacted in 2008, provides a reduced class rate of 0.65 percent to forested property that is subject to a current forest management (stewardship) plan and that meets other requirements. There is no minimum term of enrollment; property will receive the reduced class rate as long as it is enrolled and continues to meet the necessary requirements.

What is it?

Property owners that own forested land and who actively abide by the prescriptions set forth in a qualifying forest management plan may receive a reduced class rate of 0.65 percent on any eligible land.

What are the qualifications?

To qualify for class 2c managed forest land, your property must meet the following conditions:

- Have at least 20 eligible acres of forested land (but can only enroll up to 1,920 acres statewide);
- Have a forest management plan that is registered with the DNR and less than 10 years old;
- Cannot be used agriculturally; and
- Cannot include property that is enrolled in the Sustainable Forest Incentive Act (SFIA) program, CRP, CREP, RIM, or the Green Acres program.

The 20 acre requirement is based on the aggregate of all eligible land on contiguous parcels, not a parcel-by-parcel basis.
Class 2c managed forest land property does not receive homestead benefits.

Do structures qualify for the classification?

The presence of a minor, ancillary structure does not disqualify a property from receiving class 2c. These structures are defined as sheds or other primitive structures that add minimal value and are not designed for residential use, the aggregate size of which is less than 300 square feet. The presence of water, sewer, electrical or gas service/hook ups, kitchen facilities, and separate bedroom areas, would all be signs that a structure is not

a minor, ancillary structure. Structures that do not qualify as a minor, ancillary structure require a minimum of 10 acres to be split off and assigned to the structure and classified according to the use of the structure.

How do I apply?
Applications are available in your county assessor's office. Application must be made by May 1 to qualify for class 2c for the current assessment year, taxes payable the following year. For example, in order to qualify for class 2c for the 2010 assessment, you must apply by May 1, 2010. The classification will then affect your taxes payable in 2011. You must have a valid forest management plan at the time of application. You cannot apply for the classification pending a forest management plan.

Can I sell the property once it is enrolled?
Yes. However, if ownership changes after a property is classified as 2c, the new owners will need to complete a new 2c application in order to continue to receive the classification, as well as provide an updated forest management plan that is registered in the new owner's name.

What information do I need to supply?
You must supply the assessor with a completed application, copies of property tax statements for all parcels being enrolled, and copy of a registered forest management plan that encompasses all the land that is being enrolled.

How do I get a Forest Management Plan?
Contact your local Department of Natural Resources (DNR) office or forester to learn about developing a forest management plan. Plan writers must be approved by the DNR.

What if I have questions?
For more information, or for answers to specific questions, contact your county assessor's office.

Information taken from: http://www.revenue.state.mn.us/propertytax/factsheets/factsheet_17.pdf

Sustainable Forest Incentive Act

(Original found at: http://www.revenue.state.mn.us/propertytax/factsheets/factsheet_09.pdf)

This fact sheet is intended to help you become more familiar with Minnesota tax laws and your rights and responsibilities under the laws. Nothing in this fact sheet supersedes, alters or otherwise changes any provisions of the tax law, administrative rules, court decisions or revenue notices. Alternative formats available upon request.

What is the Program?

Legislation passed in 2001—the Sustainable Forest Incentive Act (SFIA)—allows annual payments to be made to enrolled owners of forested land as an incentive to practice long-term sustainable forest management.

Who is Eligible?

To enroll in the sustainable forest incentive program, you must meet all of the following requirements:

- You own 20 or more contiguous acres of land in Minnesota, of which at least 50 percent is forested. An owner may include private individuals, corporations and partnerships—both residents and nonresidents of Minnesota. However, there can only be one claimant per parcel of land. If the land is owned by multiple people, the owners must decide who will receive the incentive payment.
- There are no delinquent property taxes owed on the land prior to enrolling, and the taxes remain current while enrolled in the program.
- The land must have an active forest management plan in place that was prepared by an approved plan writer within the past 10 years. The plan writer must be approved by the Department of Natural Resources (DNR).
- All management activities prescribed in the plan must meet the recommended timber harvesting and forest management guidelines created by the Minnesota Forest Resources Council. A complete copy of the plan must be made available to the Department of Revenue upon request.
- You must certify that the land is not enrolled in Reinvest in Minnesota (RIM), Conservation Reserve Enhancement Program (CREP), Conservation Reserve Program (CRP), Green Acres, Ag Preserves, 2c Managed Timberland or the Rural Preserve Program.
- The enrolled acres of land cannot be used for residential or agricultural purposes.
- You agree to be enrolled in the program for a minimum of eight years. Please note: your land does not drop out at the end of eight years. To withdraw, a request must be made to the Commissioner of Revenue. The withdrawal process takes four years.

If you meet all of the qualifications for enrollment, you must then record a covenant with the county recorder's office (or registrar for registered land) in which your land is located pledging not to develop the land. Covenant forms are available at the county recorder's office. Allow the county recorder two to three months to process your request.

When to File

Once a covenant has been recorded with the county, complete Form TH1, Sustainable Forest Incentive Act Enrollment Application, to enroll in the program. Applications are available at www.revenue.state.mn.us and at many county and DNR forestry offices. When you file, be sure all the requested information on your application is provided—including each parcel's covenant number and number of eligible acres. If all the information is not provided, your application will be delayed or denied. Your application and all required attachments must be postmarked no later

than September 30 to receive an incentive payment the following year. Applications mailed after September 30 and incomplete applications will be denied for that year. The department will send an approval or a denial letter within 90 days after receiving your application.

Signatures
Both you and your approved plan writer must sign the application form. If the land is owned by a business entity or group, an authorized representative of the entity or group must sign. An unsigned application is considered incomplete. By signing the application, you are attesting to the accuracy of the information provided. Criminal and/or civil penalties may apply for filing a false or fraudulent application.

Required Attachments
You must attach the following to your application (all attachments must be clearly legible and accurate):

- a copy of the recorded covenant(s), including Exhibits A and B, for each parcel of land you wish to enroll,
- a copy of the Statement of Property Taxes for each qualifying parcel.
- a copy of the forest management plan map or eligible acres map that clearly shows which acres are being enrolled and any excluded acres (or an aerial photo and/or map of the vegetation and other natural features of the land clearly indicating the boundaries of the land and of the forest land).

Be sure to keep a copy of your application and all attachments for your records. You will need to refer to the parcel information in future years when you complete and sign your annual certification letter. The department will not be able to provide you with a copy.

Annual Certification Letters
By July 1 of every year, the department will send a certification letter to each enrolled participant. In the letter, you will be asked to:

- sign attesting that the requirements and conditions for continued enrollment in the program are currently being met;
- report any changes to the parcel information; and
- return the signed certification by August 15 of that same year.

If you properly complete and return the certification by August 15 of each year, you will receive your annual incentive payment on or before October 1 of the same year. If you fail to return the certification letter as required, you will not receive an incentive payment for that year.

How Payments are Determined
Legislation passed in 2011 provides that the payment-per-acre for property enrolled in the SFIA program is $7 per acre. The amount each participant will receive is determined by multiplying the payment-per-acre ($7) by the number of enrolled acres.

Please note: The payment you receive is **taxable income**.

If you owe delinquent taxes on property not enrolled in SFIA—

or if you owe criminal fines or a debt to a state or county agency, district court, qualifying hospital or public library, state law may require the department to apply your incentive payment to the amount you owe (including penalty and interest on the taxes). Your Social Security number may be used to identify you as the correct debtor. If your debt is less than your incentive payment, you will receive the difference.

Removal for Property Tax Delinquency on Enrolled Land

If you owe delinquent property taxes on any enrolled land, your land will be removed immediately from the program. The department will notify you of the removal and you will have 60 days from the notice date in which to pay the delinquent taxes. If you pay the delinquent taxes within the 60-day period, your land will be reinstated without penalty. Lands terminated from the SFIA program due to delinquent property taxes are not entitled to any payments and are subject to removal penalties. The convenant will remain on the land for the remainder of the eight years.

Use of Information

To enroll in the SFIA program, you must file Form TH1. All information on Form TH1, including your Social Security number, is required by M.S. 290C.04 to properly identify you and determine if you qualify to receive an incentive payment. If the information is not provided, your application may be delayed or denied. If you provide a phone number where you can be reached during the day, the department can save time if questions arise. Your Social Security number is private information and cannot be disclosed to others without your consent. Your federal or state ID number and date of birth are also private nonpublic information, but can be disclosed to county assessors for tax administration purposes and to county treasurers for purposes of Revenue Recapture. All other information is public.

Frequently Asked Questions

If I have more than one parcel of land, do I record a separate covenant for each?

No, but you must record a covenant with each county in which your land is located. The covenant includes all your parcels in the county that will be enrolled in the SFIA program, even if the parcels are not contiguous. Once recorded, the county will assign a covenant recording number.

Where do I find the covenant recording number?

You can find the covenant recording number on the front page of your covenant after it is recorded by the county.

What items must be included in the forest management plan?

The plan must include the landowner's goals for the property, the parcel identification number (PID), a legal description, an inventory of the forest cover types, a map of the vegetation and boundaries, the proposed future conditions, a calendar of management activities, and other information pertinent to the management of the forest. The DNR will work with the claimant and the plan writer to determine what is acceptable.

Do I have to follow the plan to remain eligible for a payment?

Yes. Each plan will include a calendar of management activities. To remain eligible for payment, you must follow the timetable to a reasonable degree.

Can I enroll only a portion of the eligible acres included in the parcel?

Yes, but if you want to enroll the remaining acres in the future, your county must first assign a new PID to the remaining acres. For example, if your parcel of land includes 100 eligible acres but you only want to enroll 75 acres at this time, you can. However, before you can enroll the remaining 25 eligible acres, your county must assign a new PID to the 25 acres. You cannot enroll additional acres using the same covenant and PID numbers of a parcel that is already enrolled.

Do I have to own the land for the entire eight years?

No. You may sell all or a portion of the parcel of land at any time during your enrollment, but the covenant remains in effect. This means the new owner must abide by the covenant.

What types of land are not eligible?

Land that is not eligible in SFIA includes:

- residential land or agricultural land used for agricultural purposes, including pasture, hayfields and cropland.
- land enrolled in RIM, CREP, CRP, Green Acres, Ag Preserves or the Rural Preserve Program.
- land improved with such things as pavement, sewer, roads and campsites. Camping is allowed on SFIA enrolled land, as long as it does not alter the management of the surrounding area.
- land with other improvements that are not required for forest management activities.
- land enrolled in class 2c managed timberland.

What improvements may be included?
A building or structure used exclusively for management activities may be included. An example would be a shed or building that only houses equipment used during management activities. If the building also is used as a temporary or permanent dwelling or is used for storage of items not regularly used for management purposes, the land must be excluded.

If the parcel includes nonqualifying improvements, is the land still eligible?
It depends. Any portion of a parcel of land that has improvements that are not necessary for sustainable forest management must be deducted from the plan's total acres. The minimum deduction is three acres for each area excluded. After deductions for exclusions there must still be a minimum of 20 contiguous acres to be eligible. Note that after the minimum contiguous acres are met, additional tracts may be included in the same plan, even if they are not contiguous.

What if I have nonforested land that is not used for agriculture?
Open water, including rivers, that are less than three acres in size can be included as part of the forested land. Larger areas must be excluded. Marshes and other wetlands not capable of growing trees, but due to their existence have a significant impact on forested land, are eligible for SFIA. This also includes land that may have been an agricultural field in the past, but has recently been planted for reforestation.

What happens if I decide to develop part or all of my enrolled land?
Before you complete the covenant, exclude any area you might develop in the future. If you violate the covenant by developing or constructing improvements on any of your enrolled land, all of your land will be removed from the program and you will be assessed a penalty. The penalty is the total amount of payments you received on all of your land —not just the part in violation—for the previous four years, plus interest.
Please note: The SFIA Covenant remains on the land. You cannot pay a penalty to remove the covenant.

Are there any limitations on the number of acres?
There is no maximum, but any owner enrolling greater than 1,920 acres must allow year-round, nonmotorized public access to fish and wildlife resources, except in areas within one-quarter mile of a permanent dwelling or during periods of high fire danger. (High fire danger is determined by the DNR.)

Can I decide after I'm enrolled to leave the program?
All enrolled land must remain in the program for a minimum of eight years. You may choose to cancel enrollment from the program after four years by filing a written request with the Department of Revenue. Once filed, the cancellation will take effect January 1 of the fifth calendar year that begins after receipt by the commissioner of the termination notice. You will continue to receive incentive payments during the four-year waiting period. Once you withdraw, the land cannot be reenrolled in the program for at least three years.

I have been notified that the land I am buying is enrolled in the SFIA program. Do I have to reenroll?
Yes. If you want to receive annual incentive payments, you must complete and submit an application, Form TH1. Keep in mind that even if you do not apply for payments, your land will remain in the program. Therefore, you must abide by the covenant and you cannot develop the land until it is withdrawn from the program.

I purchased enrolled lands. Can I request to withdraw and still receive the incentive payment while waiting to be removed from the program?
Yes. You need to complete an application Form TH1, and send in an intent to withdraw. You will receive payments until the land is released.

I am the personal representative of an estate in which the decedent was enrolled in the SFIA program. Will the estate continue to receive payments?
It depends if you chose to terminate or continue enrollment. You have up to one year to notify the department to either:

- terminate without penalty—if you choose to terminate, we will issue a document releasing the land from the covenant—
  OR
- continue enrollment in the SFIA program. If you choose to continue, you must submit a letter of explanation with a new application, Form TH1. If the new application is approved, the land is enrolled in the program without a break.

If you do not notify the department within one year, the enrollment will terminate automatically without penalty.

Can my land's classification change?
Yes. This is at the discretion of the county in which the land is located. In a timber program, your land's classification would most likely change to timber.

I recently purchased land already in SFIA. Who will receive the incentive payment for the upcoming year?
This is a determination made between buyer and seller. It may be written in the purchase agreement. In the case of property sold or transferred, the former owner and the purchaser or grantee must determine between them which person is eligible to claim the payments provided under sections 290C.01 to 290C.11. The owners, transferees or grantees must notify the commissioner in writing which person is eligible to claim the payments.

Can I remove just a portion of a parcel?
No. The whole parcel must be removed. Should you decide to reenroll the removed parcel, you will need to wait an additional three years to do so.

Questions? Need Forms?
Call 651-556-6088. TTY: Call 711 for Minnesota Relay. Applications are available at www.revenue.state.mn.us and at many county and DNR forestry offices.

Appendix H: Bibliography for the Mississippi River – Winona Watershed Landscape Stewardship Plan and Associated COA Plans

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