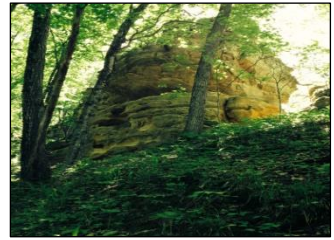


## CHAPTER 5 – AGRICULTURAL, NATURAL AND CULTURAL RESOURCES



As required by Wisconsin Statutes Sec 66.1001(2)(e), this element examines objectives, policies, goals, maps, and programs for the conservation and responsible use of agricultural, natural, and cultural resources. These important considerations include such irreplaceable resources as: groundwater, forests, productive soils, environmentally sensitive areas, threatened and endangered species, rivers, lakes, wetlands, habitat for wildlife, mineral resources, parklands, prairies, historical and cultural resources. These diverse and interrelated subjects covered in this chapter are combined because they so strongly define the region and the state of Wisconsin and influence our health, quality of life and economic growth.

### LAND LEGACY PLACES IN THE WESTERN COULEE RIDGES, CENTRAL SAND PLAINS AND WESTERN PRAIRIE ECOLOGICAL LANDSCAPES

**Land Legacy Places** in Wisconsin the demand for outdoor recreation continues to exceed supply. Wisconsinites like to get outdoors to relax, socialize, and recover from the stresses of daily life. As the population continues to urbanize, more and more people seek out public lands to provide a wide variety of recreation opportunities. This increasing pressure on public lands has led to a growing number of conflicts and overcrowding, as well as impacts to resources. The uneven distribution of lands available for public recreation across the state is a long-standing concern. The Wisconsin Department of Natural Resources recognized this concern and produced a report in 2006 titled "Wisconsin Land Legacy Report". The purpose of the Land Legacy Report is to identify the places most important in meeting Wisconsin's conservation and recreation needs over the next 50 years.

To identify these places the DNR needed to answer the following: which lands and waters will be critical in conserving our native plants and animals and their habitats? Which places will most effectively provide satisfying outdoor recreation? What do we want our landscape to look like in the year 2050, and what role should protected lands play in reaching this goal? Which special places will our children and grandchildren wish we had protected? In answering these questions the DNR identified 229 Legacy Places within the State, these 229 named places cover a broad range of resource types and recreation needs.

The Legacy Places are arranged in the report by Ecological Landscapes –regions of the state that are ecologically distinct based on topography, soils, aquatic features, current and past vegetation, and other factors. The State is divided into 16 Ecological Landscapes. The MRRPC region is covered by three of these landscapes, Map 5.01. The vast majority MRRPC Region falls within the Western Coulee and Ridges Ecological Landscape. This landscape runs north and south along the Mississippi River from the south in Grant and Iowa County to the north in Dunn, Barron and Chippewa County. It includes all or parts of nine counties that make up the MRRPC Region. Its 9,640 square miles cover 17% of Wisconsin's land area. It is characterized by highly eroded non-glaciated topography. Its steep sided valleys are heavily forested with hardwoods and agricultural activities, primarily dairy and beef farming, are confined to the valley floors and ridge tops. Large and small meandering rivers and streams are also a characteristic. Brown and Brook trout are common in the spring fed and cold water streams. Soils are typically silt loams, and sandy loams in the uplands and alluvial or terrace deposits on the valley floors.

The northern half of Pierce County is located in the Western Prairie Ecological Landscape which consists of open, gently to moderately rolling hills with pothole lakes, ponds and wet depressions. Soils mainly are comprised of silty, shallow and stoney alluvial sands and peats with a sub soil consisting of red clay.

Northeastern Monroe County and Eastern Jackson County are located in the Central Sand Plains Ecological Landscape which is a flat, sandy plain that was once the bed of Glacial Lake Wisconsin. The lake once covered over 1,800 square miles at a depth of 70 to 150 feet. The lake was formed by streams and rivers draining glaciers to the north and east. The rivers and streams deposited sand, silt, and clay on the lake bottom which explain the soil composition present today. It is believed that the glacial lake drained in a matter of 7 to 10 days which created some of the deep sided gorges at Wisconsin Dells. The Land Legacy Report named 28 places in the MRRPC region; see Table 5.1 and Map 5.01. Sites have been identified in all

nine of the MRRPC region counties. These identified places range from rivers and forests, which can be found in more than one county to specific sites like the North Prairie du Chien Savanna which is only in Crawford County.

#### **Criteria used to identify Legacy Places**

##### **A) Protect and Maintain the Pearls**

- 1) Lands and their adjacent waters supporting high quality natural areas, important populations of rare species, or regionally significant biological or geological resources.
- 2) Lands containing unique or exceptional natural scenic beauty or lands that provide outstanding scenic views.

##### **B) Maintain Functioning Ecosystems – Keep Common Species Common**

- 3) Lands in each ecologically distinct part of the state that support and sustain the area's representative species, habitats, and ecological systems.

##### **C) Maintain Accessibility and Usability of Public Lands and Waters**

- 4) Lands and adjacent waters near population centers that support, or could reasonably be restored to support, native plants and animals and their habitats.
- 5) Lands that ensure that public lands and waters can support their desired recreational uses and biological components over time.
- 6) Lands that improve access to, or use of, existing public lands and waters where recreational demands warrant.

##### **D) Ensure Abundant Recreation Opportunities**

- 7) Lands that address high priority gaps or unfulfilled needs in outdoor recreation.
- 8) Lands that provide significant opportunities for fishing, hunting and other outdoor activities.

##### **E) Think Big**

- 9) Lands that allow the protection of large, minimally-fragmented, ecologically functional landscapes.

##### **F) Connect the Dots – Create a Network of Corridors**

- 10) Lands that complete a statewide network of land and water-based recreational trails and provide linkages to population centers.
- 11) Lands that establish an interconnected network of corridors (incorporating existing conservation lands and a variety of landscape features) that maximize ecological benefits.

##### **G) Protect Water Resources**

- 12) Lands that most effectively contribute to the protection and improvement of the quality of water used by municipal drinking water systems.
- 13) Lands that most significantly contribute to the quality and quantity of surface waters.

The following is a description of the 28 land legacy places in the region.

##### **1) Bear Bluff - BF**

Bear Bluff is an area that is made up of wetlands interspersed with low, sandy upland ridges supporting stands of pine, aspen, pine barrens, oak barrens, and dry oak forest. Due to its remoteness, size, variety of habitat types, and proximity to large blocks of public land, this area harbors a high concentration of rare species. The Bear Bluff area also contains the largest remaining wetlands in southern Wisconsin.

##### **2) Baraboo River - BO**

Scenic sandstone cliffs occur along the upper reaches of the Baraboo River and support hemlock and pine relicts, forested seeps, and many rare plants and animals. These stands of hemlock and pine are found in deep, moist ravines or on cool, north or east-facing slopes. Until recently, the lower stretch of the river had been impacted by a series of dams that warmed and slowed the flow. The last of the dams was removed in 2001 and the aquatic diversity of the river system is expected to recover in the years to come. At almost 120 miles from its headwaters near Hillsboro in Vernon County to its confluence with the Wisconsin River, the Baraboo River is now considered the longest free-flowing river east of the Mississippi River.

##### **3) Black River - BR**

The Black River originates in the northern forests of central Taylor County and meanders south for more than 100 miles to its confluence with the Mississippi River. Biological diversity along the corridor is high due to its north-south orientation, association with four ecological landscapes, and the presence of pronounced, intact, wet-to-dry environmental gradients along the length of the river. Due to its relatively undeveloped and outstanding scenic qualities, the lower stretch of the Black River was once considered for national Wild and Scenic River status. It presently offers "wilderness-like" canoeing opportunities. The river corridor provides important nesting and migratory habitat for a variety of songbirds and waterfowl, and serves as an important north-south dispersal corridor for bear, wolves and fisher.

#### 4) Battle Bluff Prairie - BT

Battle Bluff Prairie is a south-facing dry prairie on a steep slope. The diverse prairie flora is interspersed with limestone boulders, sandstone outcrops, and a few stunted trees. More than 80 species of native prairie plants have been identified at the state natural area here. The wind-eroded sandstone outcrops and limestone boulders contain a number of unusual plants. The bluff rises some 480 feet, providing clear views to the south across the Mississippi River.



Battle Bluff Prairie near De Soto  
Photo Credit: Wisconsin DNR

#### 5) Buffalo River - BU

This corridor, running from Jackson County to the Mississippi River, contains a diverse mixture of high quality habitats ranging from broad wetlands to large forest blocks to oak savanna. The lower end of the Buffalo River provides valuable nesting and migratory habitat for many species of birds in the Mississippi River Valley and serves as an important staging area for migrating tundra swans. The flat, meandering floodplain lies in stark contrast to the adjacent steep bluffs. Narrow, sharp-crested ridges and broad valleys characterize the upper watershed.

#### 6) Bad Axe River - BX

The upper tributaries of the two main forks harbor good trout populations, with a significant amount of the hillsides wooded with oak and other hardwoods. Downstream from the confluence of the north and south forks, the water temperature gradually rises to the point where the lower reach of the river supports a warm water fishery. The floodplain also widens in the lower reaches and harbors numerous oxbow ponds and associated wetland communities that provide high quality wildlife habitat for waterfowl, cranes, songbirds and a variety of reptiles, amphibians and mammals. Almost 20% of the wetlands found in Vernon County are located within the Bad Axe River system.

#### 7) Coulee Experimental Forest - CE

The DNR's Coulee Experimental Forest contains approximately 3,000 acres of upland oak forests, experimental tree plantings, ridgetop open fields, rock outcroppings and a few small "goat" prairies on steep topography. It provides a unique opportunity to study the combination of wood production and an ecosystem approach to land management on private and public lands. Records on past land use and management practices are available to evaluate the current status of plant and animal communities on the property.

#### 8) Central Wisconsin Forests - CF

The Black River State Forest and the Jackson, Wood, and Clark County Forests together provide a block of more than 330,000 acres of publicly-owned land. Located in the central part of the state, these properties have a "north woods" feel to them and support numerous species more commonly found in northern environs, including timber wolf, black bear, and fisher. Diverse recreation opportunities are provided by these properties, including hunting, fishing, camping, hiking, cross-country skiing, and motorized recreational vehicle use (snowmobile, ATV) on designated trails.



The Jackson County Forest is over  
185 square miles in size

#### 9) Coulee Coldwater Riparian Resources - CO

The Coulee Region of southwestern Wisconsin is renowned for its abundance of springs and the resulting high quality trout streams. These trout waters draw anglers from throughout the Midwest. Some of the most popular streams include Timber Coulee, Rullands Coulee, Coon Creek, upper reaches of the Bad Axe River, and the numerous creeks that feed the Kickapoo River. Substantial protection and restoration efforts in Monroe, La Crosse, Vernon and Crawford Counties have resulted in many miles of high quality coldwater streams and their associated trout fisheries.

#### 10) Cochrane City Bluffs - CY

The Cochrane City Bluffs harbor good quality prairie and oak savanna complexes. A number of rare prairie species are present and the diversity of plant species here is high.

#### 11) Copper Creek to Lynxville Hollows - CZ

This area encompasses a series of small hollows that extend up from the Mississippi River valley only a short distance, but harbor a wide range of high quality forest to dry prairie habitats. In the bottom of these narrow hollows are blocks of forest comprised of oak, maple, basswood, hickory, and black walnut. Moving upslope, more open oak woodlands dominate and near the tops of the ridges, they grade into oak savanna. Along the ridge tops some dry prairie remnants occur. Several rare, threatened, and endangered species exist in this area. The bluffs provide spectacular views of the Mississippi River valley below.

#### 12) Fort McCoy - FM

This U.S. Army training and support installation encompasses approximately 60,000 acres in north central Monroe County. Numerous coldwater streams, which form the headwaters of the La Crosse River, are found within the Fort. Vegetation within the Fort consists of oak woodland, oak savanna, pine-oak barrens, sand prairie, sedge meadow, shrub carr and scattered pockets of red maple swamp. Grasslands,

maintained primarily for training exercises, support diverse, important populations of grassland birds. The mosaic of habitats also supports rich reptile and insect communities. Recreation activities such as hunting (by permit) and fishing are allowed in designated areas.

### **13) Kinnickinnic River - KN**

The Kinnickinnic flows southwesterly through River Falls to the St. Croix River. The upper and middle reaches of the Kinnickinnic support a quality trout fishery. Below River Falls, the river valley deepens and narrows and is heavily forested. The south-facing slopes harbor scattered dry prairies; the north-facing slopes are blanketed with sugar maple, basswood and white pine. The steep sides of the valley support numerous species of rare, cliff-dwelling plants. Near its confluence with the St. Croix River, the deeply incised channel gives rise to scenic bluffs surrounded by large tracts of deciduous forest. Recognized as one of the best trout fisheries in the Upper Midwest, the “Kinni” draws many anglers every year.

### **14) Kickapoo River - KR**

The Kickapoo River originates in Monroe County, and flows south for about 60 miles to its confluence with the Wisconsin River near Wauzeka. The Kickapoo is the largest water body that originates in the Driftless Area and drains parts of four counties. The main stem of the Kickapoo is a low gradient, meandering, warmwater river with many associated wetlands, primarily old river oxbows and meanders. Wet meadow, marsh, and lowland hardwood forest occur in the Kickapoo River floodplain. The headwater streams are highly productive, cold, spring-fed waters that provide abundant fishing opportunities. The West Fork of the Kickapoo supports some of the state's best trout waters and draws anglers from throughout the Midwest. Stretches of the upper river and its tributaries pass through sandstone cliffs, which provide habitat for numerous rare plants and animals, including globally rare species. In addition to its ecological value, the valley is also extraordinarily scenic, harbors many very significant archaeological, cultural and historical sites, and provides a wide variety of recreation opportunities. Canoeing, bird watching, hiking, biking, cross-country skiing, snowmobiling, camping, horseback riding, fishing, hunting, and sightseeing are popular and draw visitors from throughout Wisconsin and surrounding states.

### **15) Lower Chippewa River and Prairies - LC**

The area along the Chippewa River, downstream from Eau Claire, and along the Red Cedar River, downstream from Menomonie, contains one of the largest floodplain forests in the upper Midwest. It also harbors the largest and highest quality floodplain savanna in the state. Along with the rugged hills to the southeast, this area harbors more rare species (125) and more native prairie (25% of the state total) than any area of comparable size in Wisconsin. Seventy-five percent of Wisconsin's nesting bird species occur in the area, as do 50% of Wisconsin's plant species. Exceptional occurrences of dry sand savanna occur on some of the river terraces.

### **16) Lower St. Croix River - LT**

The Lower St. Croix National Scenic Riverway extends 52 miles along the border of Minnesota and Wisconsin, from the dam at St. Croix Falls to its confluence with the Mississippi River. The last 25 miles of river are wide, gently flowing, and bordered by heavily wooded bluffs. The Riverway is very popular with enthusiasts that enjoy boating, canoeing, fishing, rock climbing and hiking along its scenic shoreline. Many rare species are associated with the St. Croix and the corridor is highly significant to migratory birds.

### **17) Lower Wisconsin River - LW**

The lower Wisconsin River, from Sauk Prairie to the Mississippi River, retains much of its natural, wild character and in many ways probably closely resembles the landscape seen hundreds of years ago. Very few roads, and only occasional houses and villages, can be seen from the river. The valley sides are dominated by mesic to dry forests of oak, maple, and red cedar. Bluff prairies are scattered along the south-facing slopes and harbor many rare species. Although not visible from the river, many large sand prairies occur throughout the floodplain. The Lower Wisconsin State Riverway was established in 1989 to protect and preserve the scenic beauty and natural character of the valley. The Riverway encompasses more than 79,000 acres of bluffs, bottomlands, islands and sandbars along the lower 92 miles of the Wisconsin River. With its scenic bluffs, islands, and sand bars, the river is an extremely popular canoeing destination. Public land within the Riverway supports a variety of recreation activities including, hunting, fishing, trapping, and hiking.

### **18) La Crosse River -LX**

Running from Ft. McCoy west to the Mississippi River, the fertile floodplain of the La Crosse River contains several high quality wetland areas. The adjacent upland woods on the north and south slopes are predominantly wooded. The valley bottoms and ridgetops are often devoted to production agriculture.

### **19) North Prairie Du Chien Savanna - NP**

Running from the bluffs overlooking the Mississippi River back several miles, this area contains many high quality remnants of oak savanna and oak woodland within a working agricultural landscape. Some rare, threatened, and endangered species are present. Given the quality of the existing remnants and the potential to restore some additional lands, this area represents one of the state's better opportunities to establish a large oak savanna and oak woodland complex.

**20) Robinson Creek Barrens -RN**

This area is predominantly sandy, nutrient-poor soil within the Robinson Creek watershed includes extensive pine barrens. Numerous pine plantations are also found throughout the area.

**21) Rush River - RR**

Located in the heavily wooded valleys of Pierce County, the Rush River system supports a regionally significant trout fishery that draws anglers from throughout the area. The river's delta, a combination of lowland hardwood forest and rich emergent wetland, spills out into the floodplain of the Mississippi River. The delta supports a myriad of wetland species and is heavily used by waterfowl and wading birds. Morgan Coulee State Natural Area, a complex of high quality oak woods and dry hillside prairies, is also located within the watershed.

**22) Rush Creek - RU**

Atop the southwestern facing bluffs of the Rush Creek State Natural Area is one of the state's most spectacular views of the Mississippi River valley. From the bluffs, visitors can get a glimpse of what the valley must have looked like centuries ago. The prairie complex at this location is the largest and most extensive series of goat prairies left in the state. In addition, the large blocks of forested land provide habitat for forest interior species as well as common game species such as wild turkey and deer. Many rare species are found throughout the Rush Creek area. The existing State Natural Area is extensively used for hunting (deer, turkey, and squirrel), fishing, and non-intensive recreational activities such as bird watching and hiking.

**23) Sandhill-Meadow Valley-Wood County State Wildlife Areas - SM**

Covering more than 80,000 acres, these state-managed wildlife areas support diverse habitats, including oak forest, emergent marsh, sedge meadow, pine and oak barrens, and extensive flowages. Wildlife is abundant. Notable species include sandhill crane, timber wolf, trumpeter swan, sharp-tailed grouse, woodcock, and the federally-endangered Karner blue butterfly. These properties provide excellent opportunities for hunting, berry picking and wildlife observation.

**24) Trimble River -TB**

The Trimble River originates in the rolling, open landscape of northern Pierce County. As the river flows south, it enters the heavily forested, unglaciated area of western Wisconsin. Rich deciduous woodlands supporting numerous species, including a high diversity of songbirds, are found throughout the lower watershed. The Trimble River supports one of the best trout fisheries in western Wisconsin. Due to its proximity to Minnesota's Twin Cities, the river corridor is heavily used by trout anglers.

**25) Trempealeau River Delta - TD**

This area, situated between the Trempealeau National Wildlife Refuge and Perrot State Park and adjacent to the Trempealeau River, provides an excellent opportunity to establish a conservation corridor linking both properties with the Great River State Recreation Trail. Habitat conservation benefits, including protection of sand dunes, pothole ponds, remnant prairie and wooded uplands on the sandy river terrace, would be substantial. This corridor could also provide opportunities for expanded recreational use, as all three properties are heavily used for a variety of recreational purposes.

**26) Trempealeau River - TR**

The Trempealeau River arises from coldwater trout streams located in deeply incised valleys. As it flows southwest, the river gradually becomes larger and warmer and in its lower reach supports a good quality warm water fishery. Abundant nutrients and frequent flooding in the lower stretch nourish extensive high quality wetlands that provide significant habitat for reptiles, amphibians, waterfowl, wading birds, and mammals.

**27) Thompson Valley Savanna - TV**

Due to its size, the structure and composition of the tree species present, and the presence of savanna species in the understory, this area represents one of the best opportunities in the state to restore a large oak savanna. This largely rural area presently consists of a mosaic of farms and large wooded tracts.

**28) Upper Mississippi River National Fish and Wildlife Refuge - UM**

Extending 284 miles from Wabasha, Minnesota to Rock Island, Illinois, this 194,000-acre refuge encompasses most of the floodplain associated with the Mississippi River. Numerous side channels, backwater sloughs, marshes, and extensive tracts of floodplain forest, contribute to the outstanding fish and wildlife habitat provided by the refuge. The refuge also plays host to significant waterfowl migrations, including some of the continent's largest concentrations of migrating tundra swans and canvasback ducks. Boating, fishing and waterfowl hunting are popular recreation pursuits.

**Table 5.1 Legacy Places, Public Conservation Lands In the MRRPC Region**

Name	Location	Size/ Acres	Description	Recreation Uses	Conservation Significance	Recreation Potential
<b>Buffalo County- Western Coulee and Ridges</b>						
CY-Cochrane City Bluffs	Buffalo County	Small	Quality prairie and oaks savanna		☆☆	☆
TD-Trempealeau River Delta	Buffalo County	Small	Undeveloped uplands between Trempealeau Nat'l Wildlife Refuge and Perrot State Park		☆☆☆☆	☆☆☆
<b>Crawford County- Western Coulee and Ridges</b>						
RU-Rush Creek Natural Area	Crawford County	Medium	State Natural Area	Hunting, bird watching, hiking	☆☆☆☆☆	☆☆☆
LW-Lower WI River	Sauk Prairie to Mississippi River	Large	Entire riverway has 79,000 acres of bluffs, bottomlands, islands and sandbars	Hunting, fishing, trapping, hiking	☆☆☆☆☆	☆☆☆☆☆
CZ-Copper Creek to Lynxville Hollows	Town of Seneca		Encompasses series of small hollows		☆☆☆	☆☆☆
NP-N Prairie du Chien Savana	Town of Prairie du Chien		High quality remnants of Oak savanna		☆☆☆☆	☆☆
<b>Jackson County- Western Coulee and Ridges and Central Sand Plains</b>						
BF-Bear Bluff	Jackson County	Large	Vast complex of wetlands, harbors a high concentration of rare species		☆☆☆☆☆	☆
RN-Robinson Creek Barrens	Jackson County	Medium	Robinson Creek watershed, extensive pine barrens		☆☆☆☆☆	☆☆☆
<b>La Crosse County- Western Coulee and Ridges</b>						
CE-Coulee Experiment Forest	La Crosse County	Small	3,000 acres of upland oak forests		☆☆	☆☆
<b>Monroe County- Western Coulee and Ridges</b>						
FM-Fort McCoy	Monroe County	60,000	U.S. Army training and Support Installation	Hunting (by permit) and fishing in designated areas	☆☆☆☆☆	☆
SM- Sandhill-Meadow Valley-Wood County Wildlife Areas	Monroe County	80,000	Support diverse habitats	Hunting, berry picking, wildlife observation	☆☆☆☆☆	☆☆☆
<b>Pierce County – Western Prairie</b>						
KN- Kinnickinnic River	Flows SW through River Falls to the St. Croix River	Medium		High quality trout fishery	☆☆☆☆	☆☆☆☆
TB-Trimbelle River	Originates in Northern Pierce County	Medium		Trout fishing	☆☆	☆☆☆
RR-Rush River	Pierce County	Medium	Supports regionally significant trout fishery	Fishing	☆☆☆☆	☆☆☆
LT-Lower St. Croix River	Extends 52 miles along MN-WI border to its confluence with Mississippi River	Large		Boating, canoeing, fishing, rock climbing & hiking along scenic shoreline	☆☆☆☆☆	☆☆☆☆
<b>Trempealeau County- Western Coulee and Ridges</b>						
TV-Thompson Valley Savanna	Trempealeau County	Small	Largely rural area – mosaic of farms and large wooded tracts		☆☆☆	☆☆☆
TR-Trempealeau River	Trempealeau County	Medium	High quality wetlands		☆☆☆	☆☆☆
<b>Vernon County- Western Coulee and Ridges</b>						
BX-Bad Axe River	Vernon County-Located in Mississippi River Basin	Medium	20% wetlands in county are located in Bad Axe River Basin	Trout fishing	☆☆☆	☆☆☆
BT-Battle Bluff Prairie	Vernon County	Small	South-facing dry prairie on a steep slope		☆☆	☆
<b>Multi County- Legacy Places</b>						
BU- Buffalo River (Buffalo, Jackson, Trempealeau)	Corridor runs from Jackson County to the Mississippi River	Large	Diverse mix high quality habitats, migratory habitat		☆☆☆	☆☆
UM-Upper Mississippi River Nat'l Wildlife & Fish Refuge (Buffalo, Crawford, La Crosse, Pepin, Pierce, Trempealeau, Vernon)	Extends 284 miles from Wabasha, MN to Rock Island, IL.	194,000	Refuge encompasses most of floodplain associated with Mississippi River. Migratory habitat.	Boating, fishing, and waterfowl hunting	☆☆☆☆☆	☆☆☆☆☆
KR-Kickapoo River (Crawford, Monroe, Vernon)	Originates in Monroe County to confluence with WI River	Large	Largest water body in driftless area, rugged terrain, diverse natural community, habitat for rare plants & animals	Canoeing, bird watching, hiking, biking, x-country skiing, snowmobiling, camping, fishing, hunting etc.	☆☆☆☆☆	☆☆☆☆☆



**Table 5.1 Legacy Places, Public Conservation Lands In the MRRPC Region**

Name	Location	Size/ Acres	Description	Recreation Uses	Conservation Significance	Recreation Potential
CO-Coulee Coldwater Riparian Resources (Crawford, La Crosse, Monroe, Vernon)	Coldwater streams in Crawford, Monroe, La Crosse and Vernon Counties	N/A	Coldwater streams, riparian shore lands, and upland buffers	Trout fishing	☆☆☆☆	☆☆☆☆
BR-Black River (Jackson, La Crosse, Monroe, Trempealeau)	Taylor County to confluence with Mississippi River	Large	High biological diversity, nesting and migratory habitat	High quality sport fishing opportunities	☆☆☆☆	☆☆☆☆
LX-La Crosse River (La Crosse, Monroe)	Corridor runs from Ft. McCoy west to Mississippi River	Medium	Fertile floodplain and high quality wetland areas	Biking, fishing	☆☆	☆☆
BO-Baraboo River (Monroe and Vernon)	Headwaters in Hillsboro to confluence with Wis. River	Large	Scenic sandstone bluffs along upper reaches of River		☆☆☆☆	☆☆☆☆
LC-Lower Chippewa River and Prairies (Buffalo, Pepin)	Along Chippewa River	Large	Large floodplain forest, high quality oak savanna		☆☆☆☆	☆☆☆☆
CF-Central Wisconsin Forests (Jackson, Monroe)	Black River State Forest, & Jackson, Wood & Clark County Forests	Large	330,000 acres of public owned land	Hunting, fishing, camping, hiking, x-country skiing, snowmobile, ATV	☆☆☆☆	☆☆☆☆

## PRODUCTIVE AGRICULTURAL AREAS AND FORESTS

Settlement patterns, native vegetation, and crop production are all impacted by the region's soils. Native vegetation patterns are related to the type of soil present in which the vegetation can grow. Much of the region, in pre-European settlement times, was covered by oak savanna, which is an open growth of prairie grasses interspersed with large topped oak trees, with the crowns, or tops, possibly covering about 20-30 percent of the surface area. Eastern Pierce County, and eastern Vernon and Crawford counties had a more dense forest cover made up of the Maple-Basswood type, which is the southern relative of the vast acreage of Birch-Maple forest which even today covers much of northern Wisconsin. There were also rather extensive areas of Southern Oak Forest, more typically found today in Illinois and Indiana. Eastern Jackson and Monroe counties had a complex vegetation pattern caused by the less developed drainage patterns, sandy soils, and generally colder climate. This was, and remains to this day, White and Red Pine forest, on the better sites, and Jack Pine on the poorer sites. There were a few areas of true Prairie Vegetation, mostly in central Vernon, and southern Trempealeau counties. Lowland forests of elm, soft maple and willow were found along the major river drainages, including the Mississippi River.

The predominate soils in Crawford, Vernon and southern La Crosse and Monroe counties, as well as most of Buffalo County, are called "Soils of The Southwestern Ridges and Valleys", and consist mostly of residual from the limestone of bedrock, wind deposited fine material called "loess", and modified by either forest deposited organic material (light colored soils) or prairie vegetation organic material (dark colored soils). These soils are generally well drained and are quite productive for annual agricultural crops. Most of Trempealeau and Jackson counties, and northern Monroe and La Crosse counties are predominantly sandstone derived soils, appropriately called, "Soils of The Western Sandstone Uplands, Valley Slopes, and Plains". In general these soils are not as naturally productive for annual crops as the heavier soils, but moderate slopes and well placed soil modifiers can make productive farms. Forest cover is more common on the poorer parts of these soils. Much of Eastern Jackson and Monroe counties have a two broad soil types known as, "Soils of The Central Sandy Uplands and Plains" and "Soils of The Stream Bottom and Major Wetlands". Both of these types are much flatter than the rest of the region. The primary vegetative cover on these soils is forest, usually coniferous or "softwoods", although specialty crop agriculture such as cranberries, sod farms, and Christmas trees are successful economic enterprises. Northern Pierce County is predominantly covered by a soil type which reflects the fact this area was glaciated. "Soils of The Northern Silty Upland And Plains" are generally more level than the soils in the rest of the region, and they are moderately productive for annual agricultural crops, with the average temperature and growing season becoming more the restrictive factor than the soil itself.

## Agriculture

One of the Mississippi River Region's greatest resources is the regions productive agricultural lands and resulting agricultural products. Table 5.2 illustrates the assessed agricultural acres in the region by county from 2002 through 2012. Effective January 1, 2004 Wisconsin Act 33 defined "agricultural land" for assessment purposes as land exclusive of buildings and improvements and the land necessary for their location and convenience, which is devoted primarily to agriculture use as defined by rule. The rules define agricultural use as crop production, animal production, and such uses and Christmas tree or ginseng farming. In 2002 the region had 1,814,919 acres assessed as agriculture and the number of acres decreased to 1,742,650 by 2012. In 2012 Vernon County had the most acres assessed as agriculture at 276,929 followed by Trempealeau County at 255,330 acres. Pepin County had the least amount of agricultural acres at 77,675.



There were over 11,000 farms in the Region in 2012

**Table 5.2 Assessed Agricultural Acres**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Buffalo	220,132	221,276	219,681	218,299	215,727	214,102	213,357	213,382	212,435	211,341	210,933
Crawford	204,503	206,200	206,735	201,519	203,850	199,641	199,073	200,317	196,141	195,322	196,727
Jackson	161,190	160,128	159,249	157,306	152,049	152,128	151,583	151,587	151,854	151,922	151,648
La Crosse	115,183	112,812	115,044	115,477	112,837	112,295	111,939	111,414	111,386	111,328	108,854
Monroe	250,254	250,672	252,690	253,156	251,301	247,868	248,138	248,420	248,344	246,515	245,477
Pepin	80,452	80,504	80,312	79,432	79,160	78,140	78,343	78,332	77,514	77,577	77,675
Pierce	225,577	224,155	223,943	222,159	221,437	219,473	218,211	218,295	218,904	218,997	219,077
Trempealeau	270,663	269,098	263,607	269,447	258,566	257,252	256,855	257,462	256,615	255,756	255,330
Vernon	286,965	287,050	285,524	283,605	284,194	283,922	282,297	282,403	280,833	280,215	276,929
<b>MRRPC Region Total</b>	<b>1,814,919</b>	<b>1,811,895</b>	<b>1,806,785</b>	<b>1,800,400</b>	<b>1,779,121</b>	<b>1,764,821</b>	<b>1,759,796</b>	<b>1,761,612</b>	<b>1,754,026</b>	<b>1,748,973</b>	<b>1,742,650</b>

Source: Department of Revenue, Statement of Assessments (Note: 2010 Assessment was used for V. Steuben in 2011)

As Table 5.3 below shows the MRRPC region has a diverse agricultural economy. Within the region as of 2007 there were 12,728 farms and crop production farms led the way with 50.5 percent. Beef cattle ranches/farms followed at 18.7 percent, while dairy cattle and milk production farms accounted for 15.5 percent of the farms. In 2012 there were 11,086 farms in the region, a decrease of over 12 percent from 2007. In 2012 Crop production farms again led the way with 56.5 percent of farms followed by Beef cattle ranches/farms at 17.2 percent, and dairy cattle and milk production farms at 14.2 percent.

**Table 5.3 MRRPC Farms by North American Industry Classification System: 2007 and 2012**

	Buffalo					Crawford					Jackson					La Crosse				
	2007		2012		% Chg 2007-2012	2007		2012		% Chg 2007-2012	2007		2012		% Chg 2007-2012	2007		2012		% Chg 2007-2012
<b>Type of Farm</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>%</b>
Oilseed/grain farming (1111)	250	20.3	370	34.9	48.0	125	9.3	260	23.5	108.0	143	15.1	221	25.6	54.5	158	18.7	252	33.7	59.5
Vegetable/melon farming (1112)	10	0.8	4	0.4	-60.0	17	1.3	9	0.8	-47.1	3	0.3	12	1.4	300.0	17	2	13	1.7	-23.5
Fruit/tree nut farming (1113)	6	0.5	7	0.7	16.7	25	1.9	26	2.4	4.0	46	4.9	48	5.6	4.3	6	0.7	15	2.0	150.0
Greenhouse/nursery/floriculture (1114)	13	1.1	10	0.9	-23.1	21	1.6	15	1.4	-28.6	30	3.2	21	2.4	-30.0	18	2.1	12	1.6	-33.3
Other crop farming* (1119)	333	27.1	226	21.3	-32.1	449	33.3	325	29.4	-27.6	285	30.2	195	22.6	-31.6	261	30.9	177	23.7	-32.2
Beef cattle ranch./farm. (11211)	203	16.5	153	14.4	-24.6	375	27.8	278	25.2	-25.9	107	11.3	120	13.9	12.1	136	16.1	89	11.9	-34.6
Cattle feedlots (11212)	61	5	9	0.8	-85.2	36	2.7	10	0.9	-72.2	20	2.1	7	0.8	-65.0	36	4.3	10	1.3	-72.2
Dairy cattle/milk prod. (11212)	185	15.1	128	12.1	-30.8	155	11.5	113	10.2	-27.1	176	18.6	138	16.0	-21.6	112	13.3	98	13.1	-12.5
Hog & pig farming (1122)	9	0.7	-	0.0	NA	19	1.4	5	0.5	NA	12	1.3	10	1.2	NA	8	0.9	4	0.5	NA
Poultry/egg production (1123)	71	5.8	67	6.3	-5.6	34	2.5	6	0.5	-82.4	13	1.4	16	1.9	23.1	21	2.5	18	2.4	-14.3
Sheep & goat farming (1124)	18	1.5	20	1.9	11.1	11	0.8	9	0.8	-18.2	22	2.3	27	3.1	22.7	16	1.9	13	1.7	-18.8
Animal aquaculture & other animal prod. (1125, 1129)	70	5.7	67	6.3	-4.3	80	5.9	49	4.4	-38.8	88	9.3	49	5.7	-44.3	56	6.6	47	6.3	-16.1
<b>TOTAL FARMS</b>	<b>1,229</b>	<b>100</b>	<b>1,061</b>	<b>100</b>	<b>-13.7</b>	<b>1,347</b>	<b>100</b>	<b>1,105</b>	<b>100</b>	<b>-18.0</b>	<b>945</b>	<b>100</b>	<b>864</b>	<b>100</b>	<b>-8.6</b>	<b>845</b>	<b>100</b>	<b>748</b>	<b>100</b>	<b>-11.5</b>



Table 5.3 MRRPC Farms by North American Industry Classification System: 2007 and 2012 (Continued)

Type of Farm	Monroe					Pepin					Pierce					Trempealeau				
	2007		2012		% Chg 2007-2012	2007		2012		% Chg 2007-2012	2007		2012		% Chg 2007-2012	2007		2012		% Chg 2007-2012
Type of Farm	No.	%	No.	%	%.	No.	%	No.	%	%.	No.	%	No.	%	%.	No.	%	No.	%	%.
Oilseed/grain farming (1111)	305	14.4	515	26.7	68.9	128	25.4	183	39.9	43.0	237	15.5	379	30.1	59.9	271	15.7	450	31.3	66.1
Vegetable/melon farming (1112)	15	0.7	17	0.9	13.3	9	1.8	5	1.1	-44.4	24	1.6	19	1.5	-20.8	13	0.8	6	0.4	-53.8
Fruit/tree nut farming (1113)	92	4.3	77	4.0	-16.3	8	1.6	7	1.5	-12.5	21	1.4	16	1.3	-23.8	15	0.9	20	1.4	33.3
Greenhouse/nursery/ floriculture prod. (1114)	20	0.9	21	1.1	5.0	9	1.8	5	1.1	-44.4	44	2.9	32	2.5	-27.3	18	1	13	0.9	-27.8
Other crop farming* (1119)	562	26.6	434	22.5	-22.8	165	32.8	105	22.9	-36.4	496	32.4	311	24.7	-37.3	668	38.8	370	25.8	-44.6
Beef cattle ranch/farm. (112111)	459	21.7	344	17.9	-25.1	47	9.3	51	11.1	8.5	251	16.4	178	14.1	-29.1	243	14.1	207	14.4	-14.8
Cattle feedlots (112112)	60	2.8	17	0.9	-71.7	26	5.2	7	1.5	-73.1	59	3.9	13	1.0	-78.0	43	2.5	20	1.4	-53.5
Dairy cattle/milk prod. (11212)	389	18.4	304	15.8	-21.9	92	18.3	67	14.6	-27.2	183	12	155	12.3	-15.3	233	13.5	167	11.6	-28.3
Hog & pig farming (1122)	13	0.6	8	0.4	NA	0	0	1	0.2	NA	15	1	9	0.7	NA	15	0.9	7	0.5	NA
Poultry/egg production (1123)	33	1.6	42	2.2	27.3	5	1	15	3.3	200.0	38	2.5	22	1.7	-42.1	89	5.2	77	5.4	-13.5
Sheep & goat farming (1124)	19	0.9	41	2.1	115.8	4	0.8	3	0.7	-25.0	49	3.2	28	2.2	-42.9	20	1.2	21	1.5	5.0
Animal aquaculture & other animal prod. (1125, 1129)	148	7	106	5.5	-28.4	10	2	10	2.2	0.0	114	7.4	97	7.7	-14.9	93	5.4	78	5.4	-16.1
<b>TOTAL FARMS</b>	<b>2,115</b>	<b>100</b>	<b>1,926</b>	<b>100</b>	<b>-8.9</b>	<b>503</b>	<b>100</b>	<b>459</b>	<b>100</b>	<b>-8.7</b>	<b>1,531</b>	<b>100</b>	<b>1,259</b>	<b>100</b>	<b>-17.8</b>	<b>1,721</b>	<b>100</b>	<b>1,436</b>	<b>100</b>	<b>-16.6</b>

Table 5.3 MRRPC Farms by North American Industry Classification System: 2007 and 2012 (Continued)

Type of Farm	Vernon					Region					Wisconsin					United States				
	2007		2012		% Chg 2007-2012	2007		2012		% Chg 2007-2012	2007		2012		% Chg 2007-2012	2007		2012		% Chg 2007-2012
Type of Farm	No.	%	No.	%	%.	No.	%	No.	%	%.	No.	%	No.	%	%.	No.	%	No.	%	%.
Oilseed/grain farming (1111)	347	13.9	523	23.5	50.7	1,964	15.4	3,153	28.4	60.5	13508	17.2	19,730	28.3	46.1	338,237	15.3	369,332	17.5	9.2
Vegetable/melon farming (1112)	59	2.4	71	3.2	20.3	167	1.3	156	1.4	-6.6	1645	2.1	1,318	1.9	-19.9	40,589	1.8	43,021	2.0	6.0
Fruit/tree nut farming (1113)	52	2.1	53	2.4	1.9	271	2.1	269	2.4	-0.7	1320	1.7	1,264	1.8	-4.2	98,281	4.5	93,020	4.4	-5.4
Greenhouse/nursery/ floriculture prod. (1114)	33	1.3	22	1.0	-33.3	206	1.6	151	1.4	-26.7	2147	2.7	1,754	2.5	-18.3	54,889	2.5	52,777	2.5	-3.8
Other crop farming* (1119)	616	24.7	407	18.3	-33.9	3,835	30.1	2,550	23.0	-33.5	22081	28.1	15,719	22.5	-28.8	519,893	23.6	496,837	23.6	-4.4
Beef cattle ranch/farm. (112111)	558	22.4	489	21.9	-12.4	2,379	18.7	1,909	17.2	-19.8	11593	14.8	10,241	14.7	-11.7	656,475	29.8	619,172	29.4	-5.7
Cattle feedlots (112112)	61	2.4	13	0.6	-78.7	402	3.2	106	1.0	-73.6	2485	3.2	892	1.3	-64.1	31,065	1.4	13,734	0.7	-55.8
Dairy cattle/milk prod. (11212)	448	18	400	18.0	-10.7	1,973	15.5	1,570	14.2	-20.4	13081	16.7	10,401	14.9	-20.5	57,318	2.6	46,005	2.2	-19.7
Hog & pig farming (1122)	29	1.2	7	0.3	NA	120	0.9	51	0.5	NA	989	1.3	475	0.7	NA	30,546	1.4	21,687	1.0	NA
Poultry/egg production (1123)	86	3.5	55	2.5	-36.0	390	3.1	318	2.9	-18.5	2297	2.9	1,591	2.3	-30.7	64,570	2.9	52,849	2.5	-18.2
Sheep & goat farming (1124)	49	2	70	3.1	42.9	208	1.6	232	2.1	11.5	1501	1.9	1,555	2.2	3.6	67,254	3.1	73,272	3.5	8.9
Animal aquaculture & other animal prod. (1125, 1129)	154	6.2	118	5.3	-23.4	813	6.4	621	5.6	-23.6	5816	7.4	4,814	6.9	-17.2	245,675	11.1	227,597	10.8	-7.4
<b>TOTAL FARMS</b>	<b>2,492</b>	<b>100</b>	<b>2,228</b>	<b>100</b>	<b>-10.6</b>	<b>12,728</b>	<b>100</b>	<b>11,086</b>	<b>100</b>	<b>-12.9</b>	<b>78,463</b>	<b>100</b>	<b>69,754</b>	<b>100</b>	<b>-11.1</b>	<b>2,204,792</b>	<b>100</b>	<b>2,109,303</b>	<b>100</b>	<b>-4.3</b>

Source: USDA Census of Agriculture, 2007 & 2012, <http://www.agcensus.usda.gov/>

## Forests

The MRRPC Region has valuable forest resources in all nine counties and the MRRPC region has 10.4 percent of the total forestland in the state. Quality forests provide materials for wood processing industries, habitat for wildlife as well as recreational opportunities. The forest products industry in the Mississippi River Region is often overlooked as an economic asset because it doesn't have as high visibility as the forest products industry in the more northern part of the state. In the broadest sense, "forest products" can mean any benefit which humans derive from forested lands; including watershed protection, hunting, outdoor recreation, and natural scenic beauty. In the more commonly used definition however forest products is meant to be those products of the forest which can be gathered or taken from woodlands for economic benefit to the gatherer, and which are converted to some useful product. In addition to posts, poles, lumber, plywood, particle board, and wood for paper pulp, forest products also includes products such as maple syrup, pine cones for decorative purposes, Christmas trees, and naturally gathered medicinal plants such as ginseng.

Forest land is defined in the "Wisconsin's Forests, 2004: Statistics and Quality Assurance" as:

*Land at least 10 percent stocked by forest trees of any size, including land that formerly had such tree cover and that will be naturally or artificially regenerated. Forest land includes transition zones, such as areas between heavily forested and nonforested land that are at least 10 percent stocked with forest trees and forest areas adjacent to urban and built-up lands. The minimum area for classification of forest land is 1 acre. Roadside, streamside and shelterbelt strips of trees must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams and clearings in forest areas are classified as forest if less than 120 feet wide.*

Table 5.4 details the acres of forest land in each of the nine counties as well as the number of acres in each county that are enrolled in either the Forest Crop Program or the Managed Forest Land Program. The region has over 1.6 million acres of forested land. Jackson County contains the most forested land at 373,500 acres followed by Monroe County at 298,900 acres. Landowners in the region owning forest acres may also be eligible to apply for entry into the state's managed Forest Law (MFL) Program if their forest acres are: 10 or more contiguous acres; at least 80% of the parcel is capable of producing at least 20 cubic feet of merchantable timber per acre per year; and the land is not developed in a way incompatible with the practice of forestry. Landowners must also follow a forest management plan. More information on the MFL program can be found on the DNR's website at: <http://dnr.wi.gov/forestry/ftax/>. The MFL program replaced the Forest Crop Program but some land owners still maintain Forest Crop Program contracts. As Table 5.4 illustrates over 396,000 acres are enrolled in the WDNR forestry programs or about 23.7 percent of the forested land in the region.

**Table 5.4 Total Forest Acres**

	(1) All Forest Land	(2) Total Forest Crop/ Managed Forest Lands
Buffalo	185,200	75,304
Crawford	146,900	42,758
Jackson	373,500	45,522
La Crosse	131,500	27,189
Monroe	298,900	48,130
Pepin	49,100	20,101
Pierce	94,500	27,460
Trempealeau	156,600	47,413
Vernon	233,500	62,366
<b>MRRPC Region</b>	<b>1,669,700</b>	<b>396,241</b>
State	16,037,200	NA

Source: (1) USDA Resource Bulletin NRS-24 "Wis. Forests, 2004: Statistics and Quality Assurance"; (2) Wisconsin Department of Revenue, Line Summary for 2012 Final Statement of Assessment

Table 5.5 illustrates the type and acres of forest species in the region. Oak-Hickory species make up approximately 51 percent of the forestland (851,400 acres). The Maple-Beech-Birch species make up 15 percent of the forestland followed by White Pine or Jack Pine species at 10 percent of forested land. The region has a diversified forestland and with over 395,000 acres in forestry management programs forest land will continue to be a valuable and productive natural resource for the region.

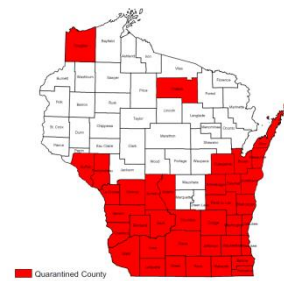
**Table 5.5 Total Forest Acres (By Species)**

	All Forest Land	White-Red Jack Pine	Spruce-Fir	Pinyon-Juniper	Exotic Soft-woods	Oak-Pine	Oak-Hickory	Elm-Ash-Cotton-wood	Maple Beech-Birch	Aspen-Birch	Exotic Hard-woods	Non-Stocked
Buffalo	185,200	2,200	2,800			2,900	117,100	31,300	10,000	17,500		1,400
Crawford	146,900			700		2,200	92,000	10,300	35,900	4,500		1,500
Jackson	373,500	111,500	16,100			28,100	150,500	19,200	8,400	34,800		4,900
La Crosse	131,500	2,900					77,700	8,400	20,900	21,500		
Monroe	298,900	32,000				25,400	156,800	15,500	32,400	28,900		7,800
Pepin	49,100	700					16,700	14,700	12,900	4,100		
Pierce	94,500	500	800				29,600	6,900	49,900	6,100		700
Trempealeau	156,600	8,700					98,300	21,000	13,100	10,700	2,700	2,200
Vernon	233,500	4,500		800	2,200	2,900	112,700	26,900	71,700	11,100		700
<b>MRRPC Region</b>	<b>1,669,700</b>	<b>163,000</b>	<b>19,700</b>	<b>1,500</b>	<b>2,200</b>	<b>61,500</b>	<b>851,400</b>	<b>154,200</b>	<b>255,200</b>	<b>139,200</b>	<b>2,700</b>	<b>19,200</b>
<b>State Total</b>	<b>16,037,200</b>	<b>1,461,600</b>	<b>1,342,100</b>	<b>18,300</b>	<b>22,200</b>	<b>543,800</b>	<b>3,428,600</b>	<b>1,347,500</b>	<b>4,448,600</b>	<b>3,265,600</b>	<b>4,600</b>	<b>153,100</b>

Source: USDA Resource Bulletin NRS-24 "Wis. Forests, 2004: Statistics and Quality Assurance"

### **Emerald Ash Borer( EAB) Infestation**

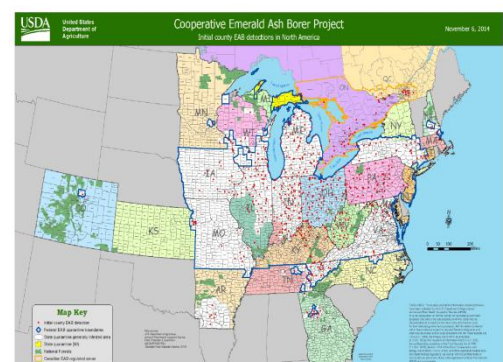
The Emerald Ash Borer or EAB has been detected in Buffalo, Crawford, La Crosse, Monroe, Trempealeau, and Vernon counties, 37 Wisconsin Counties in all have been quarantined for the EAB as of October 2014, Figure 5.01. The EAB was first discovered in the U.S. near Detroit in 2002. While it is not known exactly how it arrived here, it is theorized that it was transported as ship cargo from its native habitat in eastern Russia, northern China, Japan, and Korea. Once in the U.S. it quickly spread to areas of Ontario CA, Ohio, and Indiana. Its presence in Illinois was first confirmed in June, 2006, and just over two years later, it was first detected in Wisconsin in August of 2008 near Newburg, a small town located in Ozaukee and Washington counties. A year later, Emerald Ash Borer was found in the Mississippi River Region near Victory in Vernon County. In the US it has spread as far south as Kansas City and as far west to Boulder, Colorado in 2013, see Figure 5.02



Wisconsin Department of Agriculture, Trade and Consumer Protection  
**Figure 5.01 EAB Quarantined Counties in Wisconsin, DATCP**

EAB is a complete killer of an Ash tree, taking from two to four years to kill a tree. It is often not discovered until the trees show the stress caused by the larvae, Figure 5.03. The Ash population in Wisconsin has been estimated to be somewhere between 732 and 834 million trees, or about 7% of Wisconsin's tree population; however, Ash trees account for roughly 9% of trees in urban areas around the state, down from as high as 20%, less than 10 years ago prior to Ash tree removals by communities to mitigate the EAB impact.

EAB can fly over a mile to a new host, though its spread is assisted by people. So long as the bark is not removed from cut logs, the larvae can survive. Thus far, there has been much effort put towards preventing the spread of EAB via firewood or nursery stock, but this will not stop the spread entirely. In February, 2013, fifteen counties in Wisconsin were quarantined to prevent EAB spread. That number has increased to 37 counties in October, 2014 and includes six of the nine counties in the Mississippi River Region including Buffalo, Crawford, La Crosse, Monroe, Trempealeau, and Vernon. A key concern is that many of the counties not under quarantine have the highest volume density of Ash trees in the state.



**Figure 5.02 Emerald Ash Borer Detections in North America, Source U.S. Dept. of Agriculture**

There are a number of signs of EAB infection in trees but may not be always conclusive of EAB presence. The larvae limit the spread of nutrients

within the tree, and this will result in obvious stress to the tree. The tree's crown will thin out and branches may die. Epicormic sprouts may be another sign. The sick trees try to grow new branches wherever possible, and this will take place lower down on the tree's trunk. Other signs include bark splits, extensive woodpecker flecking, D-shaped emergence holes, and S-shaped larval galleries, Figure 5.03.

A study prepared by the Department of Resource Economics at the University of Nevada – Reno estimated the discounted cost of treatment, removal, and replacement of Ash trees in Wisconsin communities will reach \$1.2 billion by 2020. If communities or property owners select to treat their Ash there are two primary forms of treatment. The first is through direct injection into the tree base. This provides 2-3 years of protection, and the chemicals are contained within the Ash tree. It has a cost of about \$50 for an Ash tree with a 16" diameter at breast height. The second method is via root infiltration. A chemical solution is applied surrounding the base of the tree so that it can be absorbed into the tree through its roots. These treatments are most effective when applied to healthy trees as they may not be successful when applied to stressed or injured trees, and they will cost about \$20-35 per year.



Figure 5.03 EAB Found in Ash Tree near Coon Valley, Vernon County

The Cost of Communities and Private Woodlot Owners Doing Nothing About the EAB is

Risky A panel of experts comprising of the Wisconsin Department Natural Resources, Wisconsin Department of Agriculture Trade and Consumer Protection, UW Madison, UW Extension, US Department of Agriculture-Forest Service, and the US Department of Agriculture- Animal and Plant Health Inspection Service – Plant Pest Quarantine state in a *Wisconsin Emerald Ash Borer Program* guideline report that doing nothing is risky and cost more.

Some of the findings in this report and a Wisconsin DNR report titled *Emerald Ash Borer and Forest Management* are:

- If Wisconsin communities and residents do nothing It will likely cost them \$2-4 billion to remove and replace their ash trees
- It will cost 2 to 3 times more to take down dead ash trees than live or dying ash trees, because dead trees are more hazardous to work in and have a tendency to shatter when they fall and create greater clean up messes. Ash trees over hanging streets, town and county roads are particularly dangerous and pose a safety hazard waiting to happen.
- There are fewer utilization options for wood from dead trees which can eliminate potential income to offset costs. Even chipping is more expensive because dead trees are harder on equipment.
- Communities and wood lot owners that develop and follow a long range EAB management plan over a period of years are less likely to deal with an overwhelming dead ash tree budgetary problem involving costly removal when markets are low and high replacement costs because of demand for new trees and quality contractors.
- Communities that wait and do nothing about their EAB infestation may see more increased storm water runoff because of lost tree canopy.
- Homeowners and businesses may see increased energy use and cost for cooling and heating due to loss of shade
- Ash Trees selected for harvesting prior to or in early stages of EAB infestation provides opportunities for regional economic development approaches for ash wood. Entrepreneurs can come up with cost shared harvesting initiatives and solutions to produce products to help offset the cost of harvesting Ash.
- It is recommended that all communities and woodlot owners in a quarantined county or within a 15 mile radius of an infestation should develop and implement an Emerald Ash Borer Inventory – Based Management Plan.

Some of the communities in the region have implemented plans for managing the EAB. For example, La Crosse's plan went into effect in December of 2012. This plan's goal was to stay ahead of the EAB infestation in order to manage financial and equipment resource impact on the city. The city budgeted \$30,000 for the removal of a large percentage of Ash trees in city parks and other public property, and this has been assisted by their 2014 Capital Improvement Budget. With a goal of Ash tree replacement in a 1:1 ratio, grants have been submitted for funding as well. Citizens have been highly encouraged to make decisions on how to treat their Ash trees and to participate in an annual treatment program. The plan is currently in the phase three of four and will be in place until March of 2019.



The value of Ash Trees on Forest Lands in the Mississippi River Region is estimated around \$98 million.

It is therefore important to properly manage the region's ash tree resource based on the emerald ash borer infestation planning guidelines as specified in the *Emerald Ash Borer Program* report Developed for Wisconsin by a panel of state and federal agencies and a Wisconsin DNR's report titled *Emerald Ash Borer and Forest Management* to minimize the degradation of the region's forest resource and maximize the economic benefit of the growing ash tree harvests over the coming years. Table 5.6 below reports that based on the U.S Forest Inventory and Analysis statistics in 2012 there are between 16 and 35 million ash trees of five inches in diameter or more in the Mississippi River Region with an estimated value roughly estimated at around \$98 million, Table 5.6. This value does not include urban trees such as trees in residential yards, boulevards and public parks.

Ash is a very versatile hardwood with many uses such as: pallets, railroad ties, crane mats, grade lumber, furniture, flooring, truck flooring, canoe paddles, tool handles, baseball bats and biomass for heating. A 2014 report by the Wisconsin DNR, Division of Forestry titled *Ash* states that Ash is one of the denser hardwoods and due to its availability may become a prominent species for biomass and biofuel production especially if increased volumes become available due to emerald ash borer induced mortality. With such a high value and plentiful resource regional strategies need to be developed to reduce harvesting costs and other transaction costs to maximize utilization of the region's ash trees.

**Table 5.6 Mississippi River Region Ash Tree Inventory and \$ Value**

County	Number of Ash Trees in Region <sup>1</sup>	Percent Sampling Error <sup>2</sup>	Numeric Sampling Error Range Plus or Minus	Estimated Low Number of Ash Trees in Region Based on Sampling Error	Estimated High Number of Ash Trees in Region Based on Sampling Error	Estimated Cubic Feet of Saw Log and Cordwood Ash <sup>1,3</sup>	Estimated Value of Ash Trees in Region based on \$1.27 Per Cubic Foot <sup>1,4</sup>
Buffalo	1,990,740	43.47	865,375	1,125,365	2,856,115	6,378,017	\$8,100,082
Crawford	7,667,993	27.66	2,120,967	5,547,026	9,788,960	14,912,145	\$18,938,424
Jackson	320,300	77.06	246,823	73,477	567,123	269,280	\$341,986
La Crosse	1,517,558	46.43	704,602	812,956	2,222,160	1,236,704	\$1,570,614
Monroe	3,646,991	36.98	1,348,657	2,298,334	4,995,648	14,043,693	\$17,835,490
Pepin	789,309	52.94	417,860	371,449	1,207,169	10,691,088	\$13,577,682
Pierce	2,202,283	78.51	1,729,012	473,271	3,931,295	7,041,644	\$8,942,888
Trempealeau	425,830.00	69.06	294,078	131,752	719,908	1,486,945	\$1,888,420
Vernon	7,422,728	26.91	1,997,456	5,425,272	9,420,184	21,207,577	\$26,933,623
Region	25,983,732	36.53	9,491,857	16,258,901	35,708,563	77,267,093	\$98,129,208

Source: US Forest Service's Forest Inventory and Analysis Program 2012 and Wisconsin Department of Natural Resources

(1) Estimated number of growing-stock trees at least 5 inches in diameter at breast height on forest land, estimate does not include urban trees or trees in community parks. (2) Sampling error is based on one standard error, that is, the chances are two in three that the results would have been within the limits indicated had a 100-percent inventory been conducted using these methods. (3) Based on US Forest Service 2012 Forest Inventory Analysis, sampling errors per county: Buffalo 71%, Crawford 30%, Jackson 76%, La Crosse 60%, Monroe 36%, Pepin 43%, Pierce 44%, Trempealeau 43% and Vernon 25% (4) Based on subtracting the state of Wisconsin's total saw logs comprising of 577,320,186 cubic feet (sampling error 4.66%) from 1,534,782,737 of all ash at least 5" in diameter state wide (sampling error 3.38%) and converting this to 3,182,176 thousand board feet (sampling error 4.76%) of saw logs state wide and assigning \$230 per thousand board feet (based on April –November 2014 Timber Mart North Price Report for "other hardwood") for a state wide value of \$731,900,480 for saw logs, then adding this to \$473,465, 231 the value of cordwood ash statewide based on converting 957,462,551 cubic feet to 11,968,281 cords (89 cubic feet per cord) times \$39.56 per cord (based on April –November 2014 Timber Mart North Price Report for "other hardwood"). These two estimated statewide values of Ash saw logs and Ash cordwood (\$731,900,480 + \$473,465, 231) results in an estimated Ash tree value state wide of \$1,205,365,711. Dividing this into 1,534,782,737 – the total cubic feet of all Ash trees in the state 5" or greater in forests results in a dollar value of \$1.27 per cubic foot of ash. This is a rough estimate that uses a state wide average and assigns it to a county inventory where markets vary, it places no value on trees less than 5 inches, assesses only forests lands not urban areas, does not value the benefit of ash to the environment - cleansing air through respirations, soil retention, stored carbon etc. These estimates and calculations based on assistance from a Wisconsin DNR draft report in progress by Andrew Stoltman, Rural and Urban Forest Inventory Analyst, Wisconsin Department of Natural Resources, Division of Forestry.

## ENVIRONMENTALLY SENSITIVE AREAS

### Threatened and Endangered Wildlife Habitats

The Wisconsin Department of Natural Resources manages a state natural areas (SNAs) program that protects examples of Wisconsin's native landscape of natural communities, significant geological formations and archeological sites. Within the MRRPC Region there are 71 SNAs encompassing 36,029 acres, (See Map 5.04). The SNA areas in the region are highlighted in Table 5.7. The state natural areas are valuable for research and educational use, the preservation of genetic and biological diversity and for providing benchmarks for determining the impact of use on lands. The SNAs also provide some of the last refuges for rare plants and animals in the State of Wisconsin.

**Table 5.7 State Natural Areas in MRRPC Region**

	No of SNA's	Total Acreage	Add'l Information
Buffalo County	6	7,592	Of total acreage shown 1,225 acres are located in State Wildlife areas and 3,740 acres are located in Upper Mississippi River National Wildlife Refuge. Lower Chippewa River (2,184 acres) is located in (Pepin/Dunn/Buffalo)
Crawford County	6	5,661	Of total acreage shown 1,728 acres are located in State Wildlife areas and 798 acres are located in Lower Wisconsin State Riverway
Jackson County	21	9,320	Of the total acreage shown, 4,550 acres are located in Black River Forest, 768 acres are located in North Bend Bottoms Wildlife Area, and 2,949 are located in Jackson County Forest
La Crosse County	8	2,437	Of total acreage shown, 103 acres are located along Great River Trail, 1,891 acres are located in Van Loon Wildlife area, and 379 acres are located in Coulee Experimental Forest. Great River Trail Prairies (33 acres) located in (La Crosse/Trempealeau).
Monroe County	6	1,377	Of total acreage shown, 70 acres are located along Great River Trail, 435 acres are located within Fort McCoy, 485 acres are located in Mill Bluff State Park (Monroe/Juneau), 102 acres are located in Coon Crk Fisher Area, 150 acres located in Sand Crk Fishery Area
Pepin County	4	4,113	Of total acreage shown, 194 acres located in Tiffany Wildlife Area. Nine Mile Island SNA (1,487 acres) is located in (Pepin/Dunn) and Lower Chippewa River (2,184 acres) is located in (Pepin/Dunn/Buffalo).
Pierce County	5	685	Of total acreage shown, 100 acres is located within Kinnickinnic State Park
Trempealeau County	8	548	Of total acreage shown, 155 acres is located in Perrot State Park, 360 acres in located within various wildlife areas (Tamarack Crk/Borst Valley/Chimney Rock/ Vosse Coulee). Great River Trail Prairies (33 acres) located in (La Crosse/Trempealeau)
Vernon County	7	4,296	Of total acreage shown, 65 acres is located within Wildcat Mtn. State Park and 3,600 acres is located within Kickapoo Valley Reserve

Source: <http://dnr.wi.gov/topic/lands/naturalareas/>

Wisconsin's State Natural Areas (SNAs) provide some of the last refuges for rare plants and animals. More than 90% of the plants and 75% of the animals on Wisconsin's list of endangered and threatened species are protected on SNAs. Table 5.8 identifies the federal threatened and endangered species in the region and Table 5.9 shows the number of threatened and endangered species in the Region. There are 19 endangered plants, 5 endangered birds and 9 endangered fish species in the region. Plants also top the list of threatened species at 25 followed by 10 threatened bird species and 9 fish species.

**Table 5.8 Federal Threatened/Endangered Species in MRRPC Region**

Species	Status	County/Habitat
Northern long-eared bat	Proposed as endangered	Buffalo, Crawford, Jackson, La Crosse, Monroe, Pepin, Pierce, Trempealeau, Vernon - Hibernates in caves in mines – swarming is surrounding wooded areas in autumn. Roosts and forages in upland forests and woods.
Eastern Massasauga (reptile)	Candidate	Buffalo, Crawford, Jackson, La Crosse, Monroe, Pepin, Trempealeau - Open to forested wetlands and adjacent uplands
Higgins Eye Pearly Eye Mussel	Endangered	Buffalo, Crawford, La Crosse, Pierce, Trempealeau, Vernon - Mississippi River
Sheepnose (mussel)	Endangered	Buffalo, Crawford, La Crosse, Pepin - Mississippi River
Spectaclecase (mussel)	Endangered	Buffalo, Crawford, Pierce, - Mississippi River/large rivers
Whooping Crane	**Non-essential experimental population	Crawford, Jackson, La Crosse, Monroe, Pepin, Trempealeau – Open wetlands and lakeshores
Kirkland's Warbler	Endangered	Jackson - Potential breeding in young Jack Pine stands (5 to 25 years old)
Kamer Blue Butterfly	Endangered	Jackson, Monroe - Prairie, Oak Savanna and Jack Pine areas with Wild Lupine
Northern Monkshood (plant)	Threatened	Monroe, Vernon – North facing slopes
Prairie Bush-Clover	Threatened	Pepin, Pierce – Dry to mesic prairies with gravelly soil
Snuffbox (mussel)	Endangered	Pierce – Small to medium-sized creeks and some larger rivers, in areas with a swift current

Source: <http://www.fws.gov/midwest/endangered/lists/wisc-cty.html>



**Table 5.9 State Designated Rare and Threatened Species**

	Bird		Butterfly		Dragonfly		Fish		Frog		Leafhopper		Lizard		Mammal		Mayfly		Moth		Mussel		Plant		Snake		Snail		Turtle	
	END	TH	END	TH	END	TH	END	TH	END	TH	END	TH	END	TH	END	TH	END	TH	END	TH	END	TH	END	TH	END	TH	END	TH	END	TH
Buffalo	3	4					6	5													5	4	1	6	1					2
Crawford	2						5		1							1	1				7	5	6	7	1			2		2
Jackson		6	1	1	1		2	4				1	1			2			1		1	2	3	5	1					2
La Crosse	2	8					5	6	1				1				1				3	3	3	6	1			1		2
Monroe	1	7	1	1				3			1	1	1			4			1				3	11	1		1			2
Pepin	2	5					4	4			1					1	1				4	3	4	3	1					1
Pierce	1	2					4	4				1				4					9	3	6	8			2			1
Trempealeau	2	3	1				4	5								2	1				3	2	1	5	1			1		2
Vernon	2	5					4	7	1							4					1	3	2	7			2			2
Region	5	10	2	1	1		9	9	1		1	1	1			4	2		1		8	5	19	25	1			2		2

Source: Wisconsin Department of Natural Resources, Natural Heritage Inventory (NHI) database (2012)

Note: Federally endangered species in the MRRPC Region include the Karner Blue Butterfly; AND Snuffbox, Bullhead, Higgin's Eye, and Spectacle Case Mussels.

## RIVERS, STREAMS AND LAKES

The nine county Mississippi River Region has hundreds of streams and rivers that are a defining characteristic of the region's landscape and contribute greatly to the region's quality of life and economy, (See Map 5.05). Rivers and streams provide high quality recreation opportunities involving everything from large overnight excursion paddle wheel boats on the Mississippi River to trout fishing on small tributary streams. The following is a summary of the major rivers and streams within the Mississippi River Region including in some instances federal and state designations that have been assigned to them.

**Mississippi River and the Upper Mississippi River National Wildlife and Fish Refuge** The Mississippi River is 2,302 miles in length and drains 41% of the conterminous United States. It is the most prominent and well known of all U.S. Rivers. The Mississippi River also forms the western boundary of seven member counties of the MRRPC. It serves as a major recreation resource for the region as well a major commercial shipping resource because of its 28 lock and dams allowing for the economical transport of such commodities as coal, wheat, corn, soybeans, and petroleum to the numerous ports along its banks from Minneapolis, MN to New Orleans, LA. The northern part of the Mississippi River is also part of the Upper Mississippi River National Wildlife and Fish Refuge (See Map 5.06). The refuge was established as an Act of Congress in 1924. It is to serve as a refuge for fish, wildlife and plants and a breeding place for migratory birds. The refuge is located in Minnesota, Wisconsin, Iowa and Illinois. It encompasses one of the largest blocks of floodplain habitat in the lower 48 states. The refuge covers just over 240,000 acres and extends 261 river miles from north to south at the confluence of the Chippewa River in Wisconsin to near Rock Island Illinois. The refuge is divided into four districts: Winona MN – pools 4-6, La Crosse WI – pools 7-8, McGregor IA – pools 9-11, and Savanna IL – pools 12-14. This Refuge is home to more than 600 species of plants, 119 species of fish, 42 species of mussels, 31 species of reptiles including 19 snakes, 1 lizard and 11 turtles, and 14 species of amphibians. Numerous side channels, backwater sloughs, marshes, and extensive tracts of floodplain forest contribute to the outstanding fish and wildlife habitat provided by the refuge. The refuge also plays host to significant waterfowl migrations, including some of the continent's largest concentrations of migrating tundra swans and canvasback ducks. The refuge provides public use opportunities for hunting, fishing, wildlife interpretation, boating and camping. More information on the refuge can be found at: <http://midwest.fws.gov/uppermississippiriver>. There are many locations in the region to access the refuge by boat, canoe or walking. The table below lists the boat landings, canoe access areas, and walk in sites.

**Table 5.10 Upper Mississippi River National Wildlife and Fish Refuge Boat Landings/Access Points**

County	Pool Number	Boat Landings	Canoe Access Areas	Walk in Areas
Buffalo County	4, 5, 5A, 6	24		
Trempealeau County	6, 7	9		
La Crosse County	7, 8	28	2	4
Vernon County	8, 9	13		1
Crawford County	9, 10	21		1

## Lower St. Croix River

The Lower St. Croix National Scenic Riverway includes the lower 52 miles of the St. Croix River between Taylors Falls, MN/St. Croix Falls, WI and the confluence with the Mississippi River at Prescott, WI. The lower St. Croix was the first river added to

the National Wild and Scenic Rivers Program by Congress in 1972. The upper 10-mile stretch of the Lower St. Croix is classified as scenic, while the lower 42 miles are classified as "recreational." The riverway is managed jointly by the National Park Service, the Minnesota DNR and the Wisconsin DNR.

#### **Kinnickinnick River**

The Kinnickinnick River is a 22 mile, spring fed river Class I trout stream designated as an outstanding or exceptional water resource by the Wisconsin Department of Natural Resources (DNR). It rises from springs in St. Croix County and flows in a southwest direction before emptying into the St. Croix River in Kinnickinnic State Park. The river flows through the City of River Falls and is a popular recreation area.

#### **Trimbelle River**

The headwaters of Trimbelle River originate near Martell in Pierce County and flows for 25 miles before discharging into the Mississippi at the Trenton Slough. The Trimbelle River is designated an Exceptional Resource Water (ERW) and a Class II Trout stream.

#### **Rush River**

The Rush River is a 49+ mile long tributary of the Mississippi River in Western Wisconsin originating just north of Interstate-94 in St. Croix County flowing south through Pierce County where it ends at Lake Pepin. The Rush River is designated as a Class II Trout Stream and Exceptional Resource Water.

#### **Chippewa River and the Lower Chippewa River - State Natural Area and Tiffany Wildlife Area**

The Lower Chippewa River State Natural Area is located in Buffalo, Dunn and Pepin Counties and was designated a State Natural Area by the DNR in 2002. The State Natural Area is made up of lands scattered throughout a project area of 250,000 acres. State Natural Area signs will identify specific sites, or contact the DNR and request the locations of sites accessible to the public. From the City of Durand sites lie both north and south along the Chippewa River. This natural area features the largest concentration of remaining prairies and savannas in the state. At the time of European settlement Wisconsin had over 7.7 million acres of native prairie but today only about 8,000 acres remain. This extensive project contains over 2,000 acres of prairie, which equals 25% of all known remaining prairie in the entire state. Lying along and interspersed within the river channels are islands of floodplain savanna and forest while the surrounding hillsides contain prairie and savanna. The largest contiguous floodplain forest in the Midwest is located just south of Durand within this natural area.

The Tiffany Wildlife Area stretches from west side of the Chippewa River opposite the City of Durand on the north, to the mouth where it flows into the Mississippi River to the south; this wildlife area includes both sides of the Chippewa River in Pepin and Buffalo Counties. The 3,900 acres of state land in Pepin County includes wooded coulees and steep bluffs as well as floodplain forest and open marsh. The 8,300 acres of state land in Buffalo County is mostly floodplain forest and marsh. Most of the immediate river influenced area is in state ownership although there is more private land interspersed on the Pepin County side of the River. This outdoor natural area offers opportunities for hunting, fishing, trapping, wilderness camping, boating, and hiking. The area is managed by the Department of Natural Resources and is one of the most outstanding natural semi-wilderness areas in the state. Much of this wooded hillside, wooded bottomland, and bluff top area was purchased from the Tiffany Lumber Co. in 1946. The U.S. Department of the Interior National Park Service has designated a portion of the Tiffany property in Buffalo County, and the adjacent federal Fish and Wildlife Service property, as a National Natural Landmark because it is the largest single stand of bottom land hardwood forest remaining of the post-glacial forest in the U.S.

#### **Buffalo River**

The Buffalo River is 42.38 miles in length and is located in Buffalo and Trempealeau Counties. The River is designated as an impaired water with non-point source pollution and a status of 303d listed with a priority of low. Under Section 303(d) of the Clean Water Act (CWA), states are required to develop lists of impaired waters every two years (i.e., Section 303(d) list) identifying all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards. River impairments include degraded biological community and water quality use restrictions and the pollutant is identified as total phosphorus.

### **Waumandee Creek**

The upper seven miles of Waumandee Creek are classified as a Class III brook and brown trout stream. The remaining 27 miles is listed as fair degraded by livestock pasturing the streambanks, animal waste runoff from barnyards, sediment from cropland erosion and stream channelization.

### **Black River**

The Black River originates in central Wisconsin and travels 190 miles through Taylor, Jackson, Trempealeau and La Crosse Counties until it meets the Mississippi River at La Crosse. The Black River can be divided into two sections separated by the dam at Black River Falls. The upstream section of the river flows much faster than the lower section through the Driftless Area. An additional distinction is that the upper section has a substrate predominantly rocky and soil that contributes tannin. The tannin content of the water is the source of the river's name. The river provides recreational opportunities including fishing, canoeing, hunting, camping, etc.

### **La Crosse River**

The La Crosse River flows in a southwesterly direction for approximately 64 miles through Monroe and La Crosse Counties before reaching the Mississippi River at Riverside Park in the City of La Crosse. The river drains approximately 500 square miles of forested and agricultural land. Five dams on the river create Lake Neshonoc in West Salem, Perch Lake in Sparta, Angelo Pond in the Town of Angelo, and Alderwood Lake and Hazel Dell Pond in Fort McCoy. All five impoundments are used for recreational purposes. From Rockland upstream to the confluence of Squaw Creek in Fort McCoy, the River is a Class II trout stream (8 miles) and upstream from Squaw Creek is designated as a Class I trout stream (12 miles).

### **Coon Creek**

Coon Creek in northwestern Vernon County flows in a southwest direction for approximately 22 miles into the Mississippi River near the Village of Stoddard. From state highway 35 to county trunk highway K in the Village of Chaseburg it is designated a Class III trout stream, and from CTH K to the confluence of Bohemian Valley and Timber Valley Creeks at Coon Valley it's designated a Class II trout stream. The Villages of Chaseburg and Coon Valley provide wheelchair accessible fishing opportunities.

### **Bad Axe River**

This river is located in southwestern Vernon County. The Bad Axe flows west for about five miles and empties into the Mississippi River. Its mouth is just south of the Village of Genoa. The River contains warm water sport fish and is in good condition. The North Fork of the Bad Axe River west of Viroqua flows for about 23 miles southwest to the South Fork to form the Bad Axe River and is classified as warm water sport fish from its mouth upstream to CTH "O". Above CTH "O", the North Fork is designated a Class II trout stream for approximately nine miles. The South Fork of the Bad Axe River flows west for approximately 18.5 miles before joining the North Fork to create the Bad Axe River and is designated a Class III trout stream.

### **Kickapoo River**

The Kickapoo River is the longest tributary (125 miles) of the Wisconsin River, meandering from its source near the Village of Wilton in Monroe County to Wauzeka in Crawford County, where it joins the Wisconsin River. Drawing a straight line between these two towns would cover 65 miles. The word Kickapoo is derivation of an Algonquin word meaning "one who goes there, then here," an accurate description of a river that manages to flow north, south, east and west for some portion of its 125 mile length. Because the most recent continental glacier did not cover the Driftless Area the Kickapoo River continued its meandering way. The Kickapoo River Valley is one of the oldest river systems in the world. The river travels through the 3,600 acre Wildcat Mountain State Park and the 8,600 acre Kickapoo Valley Reserve. The river offers recreational opportunities including fishing, canoeing/kayaking, hunting, camping, etc. The Kickapoo Valley Reserve also has an indoor interpretive center and hiking trails just north of the Village of LaFarge on state highway 131.



The Kickapoo River meanders for 125 miles through Monroe, Vernon and Crawford counties

### Lower Wisconsin River

Along the MRRPC Region and Crawford County's southern border is the historic Wisconsin River. The river valley is filled with scenic beauty, and in 1989 a designation, now known as the Lower Wisconsin State Riverway, was enacted to protect and preserve the scenic beauty and natural character of the Wisconsin River Valley through management of the area's resources. The project's intent is to protect and preserve the area. The agency responsible for assuring scenic protection of the valley is the Lower Wisconsin State Riverway Board, a nine person citizen board with headquarters in Muscoda. The Riverway Board administers a system of regulations designed to protect and preserve the aesthetic integrity of the valley. The Riverway Board is made up of local representatives with six of the nine members coming from the affected counties (Dane, Sauk, Iowa, Grant, Richland and Crawford) and three members who represent recreational users and must reside outside of the Riverway counties. The Riverway law was passed by the Legislature and signed by Governor Tommy G. Thompson in August of 1989. There are over 44,000 acres of state owned land within the Lower Wisconsin State Riverway and the vast majority of those lands are available to the public for public uses such as wildlife watching and hunting.

The regulations require permits for construction of new buildings, modification of existing structures, placement of mobile homes, construction of utility facilities as well as walkways or stairways which provide access to the river. Permits also are required for timber harvests conducted on the 80,000 acres within the project boundary. These regulations are designed to control land use and development, while at the same time not prohibiting development. The regulations were set to assure consistency with the objectives of the project. The regulation is to minimize visual impact of an activity when viewed from the river during leaf-on conditions. Performance standards vary depending on the type of activity and visibility of the site from the river. For sites not visible from the river, regulations are minimal. Administration of the riverway, including regulations and protection, is a cooperative effort between the Riverway Board, the Wisconsin DNR, and each county zoning ordinance requiring minimum setbacks for buildings and limitations on removal of woody vegetation. In addition, The Lower Wisconsin State Riverway Board worked with local units of government to designate state highway 60 from Interstate 90-94 near the Village of Lodi to the Great River Road near Prairie du Chien as a Wisconsin Scenic Byway. In 2009 state highway 60 was designated a Wisconsin Scenic Byway.

### Wisconsin DNR River, Stream and Lake Inventory

Rivers and Streams Numerous small streams are located throughout the region and provide water, valuable fish/wildlife habitat and recreational opportunities for residents. The Wisconsin Department of Natural Resources maintains a listing of streams and rivers by county as illustrated in Table 5.11. Within the region there are 1,214 rivers and streams totaling over 5,330 miles. Vernon County has the most streams by number (228) and distance (882.6 miles). Pepin County the smallest county in region has the least amount of streams (46) and stream miles (268.2).

### The Region's Trout Streams

The WDNR categorizes the number and miles of trout streams by classes. Within the region there are 1,027.8 miles of Class 1 trout waters, 955.5 miles of Class 2 trout waters, and 642.9 miles of Class 3 trout waters. Vernon County has the most miles of Class 1, 2, and 3 trout waters at 527 miles, followed closely by Jackson County at 417.4 miles of Class 1, 2, and 3 trout waters. Map 5.08 shows the location of the region's 616 trout streams that collectively flow for over 2,600 miles. The Wisconsin Department of Natural Resources defines trout stream classes as follows:

**Class 1:** High quality trout waters that have sufficient natural reproduction to sustain populations of wild trout, at or near carry capacity. Consequently, streams in this category require no stocking of hatchery trout. These streams or stream sections are often small and may contain small or slow-growing trout, especially in the headwaters.

There are 5,400 miles of Class 1 trout streams in Wisconsin and they comprise 41% of Wisconsin's total trout stream mileage.

**Class 2:** Streams in this classification may have some natural reproduction, but not enough to utilize available food and space. Therefore, stocking is required to maintain a desirable sport fishery. These streams have good survival and carryover of adult trout, often producing some fish larger than average size.

There are 5,911.6 miles of Class 2 trout streams in Wisconsin and they comprise 45% of Wisconsin's total trout stream mileage.

**Class 3:** These waters are marginal trout habitat with no natural reproduction occurring. They require annual stocking of trout to provide trout fishing. Generally, there is no carryover of trout from one year to the next.

**Table 5.11 Mississippi River Region Rivers and Streams (Class I, Class 2, Class 3 Trout Streams)**

County	No of Rivers/ Streams	Total River Miles	No. of Class 1 Streams	Class I Stream Miles	No. of Class 2 Streams	Class II Stream Miles	No. of Class 3 Streams	Class III Stream Miles
Buffalo	112	537	0	0	11	47	15	84
Crawford	92	506.7	30	176.4	22	89.6	7	28.6
Jackson	195	859.6	61	195	29	137.2	20	85.2
La Crosse	105	409.7	20	76.5	16	83.2	13	37.8
Monroe	161	734.5	55	222	37	113.6	19	91.2
Pepin	46	268.2	2	6.4	9	48.9	1	2.5
Pierce	110	408.2	15	63.4	59	173.0	2	3
Trempealeau	165	724.10	29	82.7	22	86.2	30	164.8
Vernon	228	882.6	45	205.4	20	176.8	27	145.8
<b>MRRPC Region</b>	<b>1,214</b>	<b>5,330.6</b>	<b>257</b>	<b>1,027.8</b>	<b>225</b>	<b>955.5</b>	<b>134</b>	<b>642.9</b>

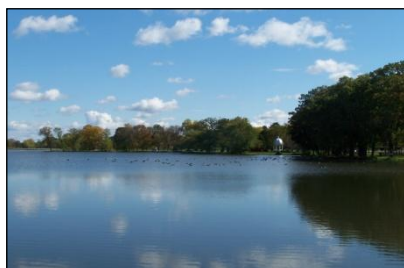
Source: Wisconsin DNR, <http://dnr.wi.gov/water/water> Note: River and Stream miles above may cross county lines.

**Lakes** The majority of the MRRPC Region is located in the part of Wisconsin that was not touched by the most recent continental glacial advance. As a result, the region has few natural lakes compared to areas of the state that were glaciated. The Wisconsin Department of Natural Resources maintains a list of lakes by county in the State of Wisconsin. The state listing includes named and un-named lakes many of which are less than 2 acres in size. The size and depth of lakes are included in the listing. Also listed are many small ponds, flowages, and backwater lakes of the Mississippi River System. Within the region there are 162 named lakes totaling over 62,342 acres. The largest lake in the region is Lake Pepin with 24,550 acres followed by Lake Onalaska with 8,391 acres. Both lakes are part of the Mississippi River. Table 5.12 lists the number of named lakes per county and total named lake acreage.

**Table 5.12 Lakes in Mississippi River Region**

County	No. Named Lakes	Acres
Buffalo	12	3,387.00
Crawford	7	5,437.00
Jackson	57	3,013.33
La Crosse	12	10,183.00
Monroe	31	1,535.05
Pepin	11	674.07
Pierce	11	33,548.00
Trempealeau	12	361.00
Vernon	9	4,204.52
<b>MRRPC</b>	<b>162</b>	<b>62,342.97</b>

\*Lake Pepin's 24,550 acres are included in Pierce County total Acreage of 33,548



The Region has over 62,000 acres of lakes. Most lakes like Lake Henry in the City of Blair and Lake Onalaska, shown left to right were formed by dams. Lake Wazee near Black River Falls, far right is a reclaimed open pit iron mine that is crystal clear and is Wisconsin's deepest inland lake.

## IMPAIRED RIVERS, STREAMS AND LAKES

Every two years the Wisconsin DNR publishes a list of waters considered impaired, as required by the federal Clean Water Act (CWA) Section 303(d). Impaired waters do not meet standards and may not support fishing, swimming, recreating or public health and welfare. The CWA requires states to document the methodology used to assess its waters, including how the state makes decisions to add or delete waters from the Impaired Waters List. Wisconsin's Consolidated Assessment and Listing Methods (WisCALM) provides guidance to DNR staff conducting assessments of water quality. This guidance includes developing monitoring data and other information to develop a list for waters that will not meet water quality standards for a

particular pollutant that is evaluated and updated every two years. States must then develop Total Maximum Daily Loads (TMDLs) to restore these waters. The following describes some of the major pollutants identified as being the reason for the 60 plus lakes, rivers and streams in the region

Phosphorus. Runoff from spreading of manure on farm fields, fertilizer runoff from fields or yards, storm water runoff from streets, failing septic systems, poorly managed municipal or industrial waste water treatment plants, and flooding of waste water treatment plants are the usual causes for high concentrations of phosphorous in rivers lakes and streams. Phosphorus spurs plant and algae growth and is a major threat to rivers and streams. Developing programs and projects that involve properly managing animal and human waste will go a long in cleaning up the region's 60 plus impaired waters.

Polychlorinated Biphenyls, or PCBs are a group of chemicals that were formerly used as hydraulic fluids, plasticizers, adhesives, fire retardants, way extenders, de-dusting agents, pesticide extenders, inks, lubricants, cutting oils, in heat transfer systems, carbonless reproducing paper. The major sources of polychlorinated biphenyls in drinking water are runoff from landfills; and discharge of waste chemicals. People who drink water containing polychlorinated biphenyls well in excess of the maximum contaminant level (MCL) for many years could experience changes in their skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of getting cancer. Use of PCBs has been greatly reduced but it is still exists at a high enough level in some lakes rivers and streams to impair them.

Mercury. Mercury is an element that has many uses. It is also a potent nerve toxin that can impair the way we see, hear, walk, talk, and think. Because it is an element, mercury never breaks down. It evaporates readily and travels long distances in the atmosphere, causing local, regional and global pollution. Worse, the amount of mercury being deposited from the atmosphere today is 3 to 4 times as much as was deposited 150 years ago. Mercury is found in many rocks including coal. When coal is burned, mercury is released into the environment. Coal-burning power plants are the largest human-caused source of mercury emissions to the air in the United States, accounting for over 50 percent of all domestic human-caused mercury emissions. EPA has estimated that about one quarter of U.S. emissions from coal-burning power plants are deposited within the contiguous U.S. and the remainder enters the global cycle. Burning hazardous wastes, producing chlorine, breaking mercury products, and spilling mercury, as well as the improper treatment and disposal of products or wastes containing mercury, can also release it into the environment. Current estimates are that less than half of all mercury deposition within the U.S. comes from U.S. sources. All of us must do our part to keep mercury out of the environment. Some simple things to reduce mercury use are: make sure you buy mercury-free products whenever you can, such as mercury-free thermometers, heating/cooling thermostats, other types of switches and relays, and barometers and manometers. Make sure that you recycle mercury-containing products and bulk mercury. A decrease in the use of coal burning power plants is an obvious step towards preventing higher than acceptable levels of mercury in the region's lakes rivers and streams.

Total Suspended Solids or TSS are solid materials, including organic and inorganic that are suspended in the water. These would include silt, and industrial wastes. High concentrations of suspended solids can lower water quality by absorbing light. Waters then become warmer and lessen the ability of the water to hold oxygen necessary for aquatic life. Because aquatic plants also receive less light, photosynthesis decreases and less oxygen is produced. The combination of warmer water, less light and less oxygen makes it impossible for some forms of life to exist. Suspended solids affect life in other ways. They can clog fish gills, reduce growth rates, decrease resistance to disease, and prevent egg and larval development. Particles that settle out can smother fish eggs and those of aquatic insects, as well as suffocate newly-hatched larvae. The material that settles also fills the spaces between rocks and makes these microhabitats unsuitable for various aquatic insects, such as mayfly nymphs, stonefly nymphs and caddisfly larva. Suspended solids can result from erosion from urban runoff and agricultural land, industrial wastes, bank erosion, bottom feeders (such as carp), algae growth or wastewater discharges. Prevention methods include protection of the land in watersheds from erosion by use of conservation tillage measures and giving urban runoff time to settle out before reaching lakes, rivers and streams.

Table 5.13 below provides a list of over 60 impaired waters in the region and Map 5.09 shows the locations of the rivers streams and lakes that are impaired. At the bottom of Table 5.13 is a key to the numerous acronyms used in the table.



**Table 5.13 Mississippi River Region's Impaired Water List as of January 2014**

Water Body Name (See Map 5.051 for location information)	Water Body ID. Code	County(s)	Pollutant	Impairment	Status	Total Maximum Daily Load Priority	Impairment Start & End Mile
Buffalo River	1813900	Buffalo, Trempealeau	T Phos	Degraded Biological Community, Water Quality Use Restrictions	303d Listed, Low	Low	0- 42.38
Chippewa River	2050000	Buffalo, Pepin	PCBs	Contaminated Fish Tissue	303d Listed, Low	Low	0-20.73
Little Bear Creek	2048000	Buffalo	T Phos	Impairment Unknown	303d Listed	Low	0 - 4.35
Wolf Valley Creek	1811200	Buffalo	Sed/T S Sids	Degraded Habitat	303d Listed	Low	0 - 2.7
Yeager Valley Creek	1810200	Buffalo	Sed/T S Sids	Degraded Habitat	303d Listed	Low	0 - 4.43
Bohris Valley Creek	1774200	Buffalo	Total Phos	Impairment Unknown	303d Listed	Low	0 - 5
Halls Branch	1184300	Crawford	Sed/T S Sids	Degraded Habitat	303d Listed	Low	1.97-5.16
Kickapoo River	1182400	Crawford	T Phos	Impairment Unknown	303d Listed	Low	19.05- 25.45
Kickapoo River	1182400	Crawford	Mercury	Contaminated Fish Tissue	303d Listed	Low	19.05- 25.45
Mississippi (Reach 4) Coon-Yellow - Pool 9 portion - LD 9 to LD 8)	721000	Crawford, Vernon	T Phos	Impairment Unknown	303d Listed	Low	648-679.1
Mississippi (Reach 4) Coon-Yellow - Pool 9 portion - LD 9 to LD 8)	721000	Crawford, Vernon	Mercury	Contaminated Fish Tissue, Water Quality Use Restrictions	303d Listed	Low	648-679.1
Mississippi (Reach 4) Coon-Yellow - Pool 9 portion - LD 9 to LD 8)	721000	Crawford, Vernon	PCBs	Contaminated Fish Tissue, Water Quality Use Restrictions	303d Listed	Low	648 - 679.1
Wisconsin River	1179900	Crawford, Grant	PCBs	Contaminated Fish Tissue	303d Listed	Low	0 -27.67
Wisconsin River	1179900	Crawford, Grant	Mercury	Contaminated Fish Tissue	303d Listed	Low	0 -27.67
Wisconsin River	1179900	Crawford, Grant, Iowa, Richland	PCBs	Contaminated Fish Tissue	303d Listed	Low	27.67 - 57.66
Arbutus Lake	1727700	Clark, Jackson	Mercury	Contaminated Fish Tissue	303d Listed	Low	NA
Black River	1676700	Jackson, La Crosse, Trempealeau	T Phos	Impairment Unknown	303d Listed	Low	0- 24.44
Black River	1676700	Jackson, La Crosse, Trempealeau	PCBs	Contaminated Fish Tissue	303d Listed	Low	0 -24.44
Black River	1676700	Jackson, La Crosse, Trempealeau	Mercury	Contaminated Fish Tissue	303d Listed	Medium	0 -24.44
Black River	1676700	Jackson, Monroe	PCBs	Contaminated Fish Tissue	303d Listed	Low	24.44 60.78
Black River	1676700	Jackson	Mercury	Contaminated Fish Tissue	303d Listed	Medium	60.78 74.33
Clear Creek	1697800	Jackson, Monroe	Elevated Water Temp	Elevated Water Temperature	303d Listed	Low	0 - 5.81
Cranberry Flowage, Upper	1707100	Jackson	Mercury	Contaminated Fish Tissue	303d Listed	Medium	
Harkner Flowage	1704100	Jackson	Mercury	Contaminated Fish Tissue	303d Listed	Medium	
Mill Creek	1688500	Jackson	S T S S	Degraded Habitat	303d Listed	Low	2.5 - 5.46
Pigeon Creek	1700800	Jackson	Other flow regime alterations	Elevated Water Temp.	303d Listed	Low	0 - 4.96
Potter Flowage	1722000	Jackson	Mercury	Contaminated Fish Tissue	303d Listed	Medium	NA
Roaring Creek	1695200	Jackson	S T S S	Degraded Habitat	303d Listed	Low	0- 5.34
Robinson Creek	1696300	Jackson	T Phos	Impairment Unknown	303d Listed	Low	0 - 12
Town Line Flowage	1717300	Jackson	Mercury	Contaminated Fish Tissue	303d Listed	Medium	NA
Trout Run	1695500	Jackson	BOD	Low DO	303d Listed	Low	2.27 – 7.55
Trout Run	1695500	Jackson	S T S S	Elevated Water Temp.	303d Listed	Low	2.27 - 7.55
Lower Merrilann Pond	1711500	Jackson	T Phos	Eutrophication, Elevated pH	303d Listed	Low	NA
Trump Coulee Creek	1800600	Jackson, Trempealeau	T Phos	Low DO	303d Listed	Low	0 -7.71
White Creek	1691700	Jackson	S T S S	Degraded Habitat	303d Listed	Low	0 - 3.1
White Tail Flowage	1717500	Jackson	Mercury	Contaminated Fish Tissue	303d Listed	Medium	NA

Water Body Name (See Map 5.051 for location information)	Water Body ID. Code	County(s)	Pollutant	Impairment	Status	Total Maximum Daily Load Priority	Impairment Start & End Mile
Woodward Creek	1691900	Jackson	S T S S	Degraded Habitat	303d Listed	Low	0 - 4
Fleming Creek	1685600	La Crosse	T Phos	Water Quality Use Restrictions	303d Listed	Low	0 - 10
Fleming Creek	1685600	La Crosse	S T S S	Elevated Water Temp. Degraded Habitat	303d Listed	Low	10 -19.57
Halfway Creek	1676000	La Crosse	S T S S	Degraded Habitat	303d Listed	Low	7.72 -11.59
La Crosse River	1650200	La Crosse, Monroe	T Phos	Impairment Unknown	303d Listed	Low	0 - 33.56
Mississippi (Reach 4) Coon-Yellow - Pool 8 portion - LD 8 to Root R.)	721000	La Crosse, Vernon	Mercury	Water Quality Use Restrictions	303d Listed	Medium	679.1- 693.7
Mississippi (Reach 4) Coon-Yellow - Pool 8 portion - LD 8 to Root R.)	721000	La Crosse, Vernon	T Phos	Impairment Unknown	303d Listed	Low	679.1 - 693.7
Mississippi (Reach 4) Coon-Yellow - Pool 8 portion - LD 8 to Root R.)	721000	La Crosse, Vernon	PCBs	Contaminated Fish Tissue, Water Quality Use Restrictions	303d Listed	Low	679.1- 693.7
Neshonoc Lake	1653500	La Crosse	T Phos	Eutrophication, Impairment Unknown, Elevated pH	303d Listed	Low	NA
Neshonoc Lake	1653500	La Crosse	S T S S	Eutrophication, Elevated pH	303d Listed	Low	NA
Neshonoc Lake	1653500	La Crosse	Mercury	Contaminated Fish Tissue	303d Listed	Low	NA
Johnson Coulee Creek	1676400	La Crosse	S T S S	Degraded Habitat	303d Listed	Low	0 - 2.26
Long Coulee Creek	1676100	La Crosse	S T S S	Degraded Habitat	303d Listed	Low	0 - 5.29
Angelo Pond	1660400	Monroe	Mercury	Contaminated Fish Tissue	303d Listed	Medium	NA
Beaver Creek	1314000	Juneau, Monroe	T Phos	Impairment Unknown	303d Listed	Low	0 - 4
Big Creek	1692900	Monroe	T Phos	Water Quality Use Restrictions	303d Listed	Low	0 - 1.49
Big Creek	1692900	Monroe	T Phos	Water Quality Use Restrictions	303d Listed	Low	1.49 - 6.49
Lemonweir River	1301700	Juneau, Monroe	T Phos	Impairment Unknown	303d Listed	Low	30.64 - 55.88
Little La Crosse River	1655900	Monroe	T Phos	Impairment Unknown	303d Listed	Low	0 - 10.25
Morris Creek	1200000	Monroe	T Phos	Degraded Biological Community	303d Listed	Low	0 - 14
North Flowage	1700300	Monroe	Mercury	Contaminated Fish Tissue	303d Listed	Medium	
Printz Creek	1693100	Monroe	S T S S	Degraded Habitat	303d Listed	Low	0 - 3.06
South Fork Lemonweir River	1338500	Monroe	BOD	Low DO	303d Listed	Low	0 - 5.98
South Fork Lemonweir River	1338500	Monroe	T Phos	Low DO	303d Listed	Low	0 - 5.98
Chippewa River	2050000	Dunn, Pepin	PCBs	Contaminated Fish Tissue	303d Listed	Low	20.73 - 37.58
Mississippi (Reach 1) Rush-Vermillion - St. Croix R to Chippewa R(Pools 3- lower Pool 4, Lake Pepin)	721000	Pepin, Pierce	T Phos	Degraded Biological Community	303d Listed	Low	763.4 - 811.5
Mississippi (Reach 1) Rush-Vermillion - St. Croix R to Chippewa R(Pools 3- lower Pool 4, Lake Pepin)	721000	Pepin, Pierce	Mercury	Water Quality Use Restrictions	303d Listed	Low	763.4 - 811.5
Mississippi (Reach 1) Rush-Vermillion - St. Croix R to Chippewa R(Pools 3- lower Pool 4, Lake Pepin)	721000	Pepin, Pierce	PFOs	Contaminated Fish Tissue	303d Listed	Low	763.4 - 811.5
Mississippi (Reach 1) Rush-Vermillion - St. Croix R to Chippewa R(Pools 3- lower Pool 4, Lake Pepin)	721000	Pepin, Pierce	PCBs	Contaminated Fish Tissue, Water Quality Use Restrictions	303d Listed	Low	763.4 - 811.5
Mississippi (Reach 1) Rush-Vermillion - St. Croix R to Chippewa R(Pools 3- lower Pool 4, Lake Pepin)	721000	Pepin, Pierce	S T S S	Degraded Submerged Aquatic Vegetation (SAV)	303d Listed	Low	763.4 - 811.5
Silver Birch Lake	2054600	Pepin	T Phos	Eutrophication, Elevated pH	303d Listed	Low	NA

Water Body Name (See Map 5.051 for location information)	Water Body ID. Code	County(s)	Pollutant	Impairment	Status	Total Maximum Daily Load Priority	Impairment Start & End Mile
Eau Galle River	2055000	Pierce, Saint Croix	T Phos	Elevated pH	303d Listed	Low	32.55 -33.79
Lake George	2059800	Pierce, Saint Croix	T Phos	Elevated pH	303d Listed	Low	NA
Missouri Creek	2055700	Pierce	S T S S s	Degraded Habitat	303d Listed	Low	13.84 -17.88
Nugget Lake	2053400	Pierce	Mercury	Contaminated Fish Tissue	303d Listed	Medium	NA
St Croix River	2601400	Pierce, Saint Croix	PCBs	Contaminated Fish Tissue	303d Listed	Low	0- 17.43
Elk Creek	1782500	Trempealeau	T Phos	Water Quality Use Restrictions	303d Listed	Low	0 -21.51
Marinuka Lake	1678200	Trempealeau	T Phos	Eutrophication	303d Listed	Low	NA
Marinuka Lake	1678200	Trempealeau	Mercury	Contaminated Fish Tissue	303d Listed	Medium	NA
Tamarack Creek	1770300	Trempealeau	T Phos	Degraded Biological Community	303d Listed	Low	0 - 6.31
Trempealeau River	1769900	Trempealeau	T Phos	Water Quality Use Restrictions	303d Listed	Medium	0 - 31.28
Trempealeau River	1769900	Trempealeau	Mercury	Contaminated Fish Tissue	303d Listed	Low	0 - 31.28
Trout Run Creek	1775000	Trempealeau	T Phos	Water Quality Use Restrictions	303d Listed	Low	0 - 3.8
Turton Creek (American Vly Crk)	1777100	Trempealeau	T Phos	Water Quality Use Restrictions	303d Listed	Low	0 - 3.6
Coon Creek	1643500	Vernon	T Phos	Impairment Unknown	303d Listed	Low	0 - 13.81
Kickapoo River	1182400	Richland, Vernon	T Phos	Impairment Unknown	303d Listed	Low	61.1 - 108
West Br Baraboo River	1288400	Juneau, Vernon	T Phos,	Low DO	303d Listed	Low	0 - 7.24
West Br Baraboo River	1288400	Juneau, Vernon	S T S S	Low DO	303d Listed	Low	0 - 7.24
West Br Baraboo River	1288400	Juneau, Vernon	BOD	Low DO	303d Listed	Low	0 - 7.24

Key to acronyms: BOD: Biological Oxygen Demand, LowDO: Low Dissolved Oxygen, PCPs: Polychlorinated Biphenyl, PFOs: Perfluorinated Surfactants, STSS: Sediment -Total Suspended Solids, TPhos: Total Phosphorous, 303 d Listed: The water body is listed as an impaired water pursuant to EPA's federal Clean Water Act Section 303(d); these waters do not meet water quality standards for an identified pollutant. The state must then develop Total Maximum Daily Loads (TMDLs) or clean-up plans to try to restore these waters.

## GROUNDWATER CONDITION AND CAPACITY

The region's abundant supply of cool and clean ground water is becoming a more important resource with each passing day. Water shortages and increased costs for delivery to communities in the southwest and the plain states of the United States cause them greater economic uncertainty. As population, business development and overall climatic temperatures increase the demand for water will continue to rise. This could result in water becoming a much more valuable commodity and may place greater demands on the region's bountiful supply. The region's groundwater is held in a sandstone and dolomite aquifer that was deposited 425-600 million years ago. A 2006 Groundwater Study Guide prepared by the Wisconsin Department of Natural Resource reports that there are 1.2 quadrillion gallons of water-enough to cover the entire state to depth of over 100 feet that lie hidden underground. A 1997 Wisconsin DNR Publication specifically mentioned that in the Driftless Area of southwest Wisconsin where "...well yields from this productive aquifer are high" Despite this abundance of groundwater there is growing concern about maintaining the water quality that municipal, industrial and domestic users are accustomed too and also having the quantity needed for adequate base flow - the groundwater that sustains our rivers, streams and lakes.

### The Region's Aquifers Vulnerability to Pollutants

A sandstone and dolomite aquifer that covers most of the state of Wisconsin is much more vulnerable in the western and southwestern part of Wisconsin. In the eastern Wisconsin this aquifer lies beneath glacial deposits, a dolomite aquifer and a shale aquitard. In the central part of Wisconsin this aquifer is beneath glacial deposits, but in the western and the southwest part of Wisconsin in particular this aquifer lies closer to the surface with less or no glacial deposits-drift or other natural features to filter contamination from sources above ground. This makes the region's groundwater more vulnerable to pollutants. This aquifer is the major source of the Mississippi River Region's groundwater. Some communities, businesses and residents that are located in river valleys may draw their water from wells that pump from a sand and water aquifer that is even shallower and more vulnerable to pollutants than the sandstone and dolomite aquifer. Private on site sanitary sewer ordinances, well head protection ordinances and animal waste ordinances are some basic tools that can go a long way in protecting the groundwater and surface water resources of the Region.

Region's Water Use Demand

Based on U.S. Geological Survey county estimates in 2005 the Mississippi River Region utilized 865,090,000 gallons of water per day or 315,757,850,000 gallons per year. This included domestic, agricultural, aquaculture, industrial, commercial, industrial, mining, public use and loss, and thermoelectric users. Over 90 percent of this water use was from surface water used for cooling the two Dairyland Power Company power (thermoelectric) stations in Alma, Genoa and Xcel Energy's power station in the Town of Campbell near La Crosse. After thermoelectric uses the remaining 79,410,000 gallons per day of water use or 28,984,650,000 gallons of annual water use was used in the following order (millions of gallon per day): irrigation - 18.85, domestic use - 18.34, industrial - 13.33, livestock - 9.95, commercial - 7.41, public use and loss - 5.31, aqua culture - 3.15, and mining - 3.07. Thermoelectric use accounted for over 99 percent of all surface water use. The surface water used for other non-thermoelectric uses totaled 3.68 million gallons per day. In comparison ground water uses accounted for 75.73 million gallons per day most of it except 400,000 gallons per day in Buffalo County was for non-thermoelectric uses. This analysis' shows the region's electric utility company's dependence on surface water for electricity production and the regions residents' dependence on groundwater for domestic and other economic activity other than electrical production, Table 5.14.

**Table 5.14 Mississippi River Region 2005 Water Uses and Demand in Millions of Gallons a Day**

County	2005 Population	Uses of Water									Source of Water		Total Water Use
		Domestic	Livestock	Aqua-culture	Irrigation	Industrial	Commercial	Thermo-electric	Mining	Public Use and Loss	Ground water	Surface water	
Buffalo	14,076	0.65	1.44	0.00	2.34	0.41	0.09	533.16	0.00	0.16	5.49	532.76	538.25
Crawford	17,493	1.13	0.74	0.00	0.31	0.80	0.37	0.00	0.06	0.30	3.32	0.39	3.71
Jackson	19,828	0.70	0.81	0.00	4.61	0.20	0.35	0.00	0.40	0.42	7.29	0.20	7.49
La Crosse	110,126	9.06	0.69	1.59	0.61	7.13	4.75	42.58	1.83	2.45	27.42	43.27	70.69
Monroe	42,954	2.23	1.48	0.12	3.80	1.22	0.75	0.00	0.36	0.58	10.05	0.49	10.54
Pepin	7,956	0.42	0.51	0.00	0.63	1.27	0.09	0.00	0.00	0.13	1.67	1.38	3.05
Pierce	39,329	1.51	1.08	0.00	0.25	0.78	0.43	0.00	0.25	0.58	4.63	0.25	4.88
Trempealeau	27,975	1.38	1.64	0.00	5.99	1.33	0.34	0.00	0.15	0.47	10.95	0.35	11.30
Vernon	29,189	1.26	1.56	1.44	0.31	0.19	0.24	209.94	0.02	0.22	4.91	210.27	215.18
<b>Region</b>	<b>308,926</b>	<b>18.34</b>	<b>9.95</b>	<b>3.15</b>	<b>18.85</b>	<b>13.33</b>	<b>7.41</b>	<b>785.68</b>	<b>3.07</b>	<b>5.31</b>	<b>75.73</b>	<b>789.36</b>	<b>865.09</b>
<b>State</b>	<b>5,580,000</b>	<b>316.15</b>	<b>72.84</b>	<b>81.72</b>	<b>401.79</b>	<b>585.24</b>	<b>118.96</b>	<b>6,897.93</b>	<b>32.52</b>	<b>100.91</b>	<b>985.91</b>	<b>7,622.15</b>	<b>8,608.06</b>

Source: *Water Use in Wisconsin 2005*, USGS. Note: Domestic water use includes water for household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, watering lawns and gardens. Thermoelectric-power generation include self-supplied water used in the generation of electrical power with fossil-fuel and nuclear energy.

Domestic Water Use Per Capita and Difference in Demand between Public Supply and Self Supplied Water

As shown in Table 5.15 below the region's population was totally dependent on ground water in 2005 for domestic use which includes water for household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, watering lawns and gardens. The amount of groundwater used for domestic purposes in 2005 totaled 18.35 million gallons per day. Over 60% of this groundwater or 11.4 million gallons per day was provided by a public water supply. The remaining 40% of this ground water was provided by self-supplied ground water sources. About 58 % of the region's 2005 population or 176,194 people were dependent on public supplied water and the 42% or 129,617 residents depended upon self-supplied water. The majority of the population in Crawford, La Crosse, Pierce, and Trempealeau counties were dependent on public supplied groundwater in 2005 while the majority of the population in Buffalo, Jackson, Monroe, Pepin, and Vernon counties were more dependent on self-supplied water. Groundwater domestic use per capita varied from a high of 83.2 gallons in La Crosse County to 38.7 gallons in Pierce, with 53.9 gallons per capita being the regional average which was 4.3 gallons more per capita than the state as a whole which averaged 49.6 gallons of water per capita. About 70% of the states total domestic water supply was provided by a public water supply compared to the Mississippi River Region's 60%.

**Table 5.15 Mississippi River Region 2005 Domestic Water Source and Demand Per Capita**

County	Domestic Self-Supplied Population	Domestic Public-Supplied Population	Percent of Population on Ground Water	Percent of Population on Surface Water	Domestic Public Supply Used in Million Gallons Per Day	Domestic Self Supply Used in Million Gallons Per Day	Domestic Water Use Per Capita
Buffalo	8,531	5,437	100	0.00	0.25	0.40	46.6
Crawford	7,897	9,237	100	0.00	0.61	0.52	66.0
Jackson	10,904	8,854	100	0.00	0.17	0.53	49.0
La Crosse	26,969	81,989	100	0.00	6.82	2.24	83.2
Monroe	21,611	21,033	100	0.00	1.10	1.13	52.1
Pepin	4,515	2,865	100	0.00	0.16	0.26	56.7
Pierce	18,477	20,625	100	0.00	0.80	0.71	38.7
Trempealeau	13,477	14,335	100	0.00	0.71	0.67	49.6
Vernon	17,236	11,819	100	0.00	0.52	0.75	43.3
<b>Region</b>	<b>129,617</b>	<b>176,194</b>	<b>100</b>	<b>0.00</b>	<b>11.14</b>	<b>7.21</b>	<b>53.9</b>
<b>State</b>	<b>1,665,739</b>	<b>3,870,462</b>	<b>NA</b>	<b>NA</b>	<b>228.83</b>	<b>87.32</b>	<b>49.6</b>

Source: *Water Use in Wisconsin 2005*, USGS. Note: Domestic water use includes water for household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, watering lawns and gardens.

### Region's High Capacity Wells

The growing demand for high capacity wells for frac sand mining, crop irrigation, and large dairy operations are present day concerns that could reduce the quantity and quality of the region's groundwater supply if their cumulative impact is not considered in the permitting process. Section NR812.07(53), Wisconsin Administrative Code defines a high capacity well system as one or more wells, drillholes or mine shafts on a property that have a combined approved pump capacity of 70 or more gallons per minute or 100,800 gallons a day. A property is defined as contiguous or adjacent land having the same owner. Table 5.16 below shows that the growing well demand described above has generated a 79 percent increase in high capacity wells from 2003 to 2013, an increase of 484 during this time period. Map 5.10 shows a map depicting the growth of these wells in each country.

**Table 5.16 Mississippi River Region High Capacity Well Demand 2003 - 2013**

County	Number of High Capacity Wells in Service in 2003	Number of High Capacity Wells in Service in 2013	2003 -2013 Numeric Change	2003 -2013 Percent Change	2011 Total Groundwater Withdrawals, Gallons Per Year	2012 Total Groundwater Withdrawals, Gallons Per Year	2013 Total Ground Water Withdrawals, Gallons Per Year
Buffalo	48	99	51	106	788,224,730	1,143,828,400	1,138,111,140
Crawford	21	41	20	95	560,214,524	629,087,183	520,759,184
Jackson	70	153	83	119	1,256,124,873	1,730,886,979	1,396,679,353
La Crosse	130	192	62	48	10,024,178,484	8,325,472,695	6,900,558,791
Monroe	151	267	116	77	3,853,992,449	3,265,637,414	7,621,845,713
Pepin	28	86	58	207	911,902,454	1,194,100,331	1,521,231,306
Pierce	37	69	32	87	1,332,813,884	1,466,361,097	1,082,560,035
Trempealeau	77	130	53	69	1,852,580,048	3,293,964,930	2,798,749,198
Vernon	54	63	9	17	938,204,257	1,191,245,423	1,086,488,089
<b>Region</b>	<b>616</b>	<b>1,100</b>	<b>484</b>	<b>79</b>	<b>21,518,235,703</b>	<b>22,240,584,452</b>	<b>24,066,982,809</b>

Source: *Wisconsin Department of Natural Resources*. Totals include the four Dairyland Power Company high capacity groundwater wells in Alma totaling 127,869,200 gallons in 2013, 142,683,300 in 2012 and 121,768,000 in 2011 but does not include the Dairyland Power high capacity surface water pumping of 111,278,346,900 gallons a year in 2013, 122,940,675,200 gallons in 2012, and the 124,106,722,000 in 2011. Additionally, the totals include the three Dairyland Power Company high capacity groundwater wells in Genoa totaling 8,603,888 gallons in 2013, 7,506,298 in 2012, and 5,785,044 in 2011. The totals do not include the 40,059,423,600 gallons in 2013, the 31,282,436,500 in 2012, or the 25,412,527,100 in 2011 pumped for Dairyland Power high capacity surface water.



### Region's Municipal Wells

All the municipal wells in the region draw their water from a sandstone and dolomite aquifer. The region's municipalities are not dependent upon surface waters for potable water like many other areas of the nation. A listing of municipal wells and actions to protect the wells through well head protection ordinances/programs is discussed in Chapter 4. Table 5.17 illustrates the amount of water (surface water and ground water) per day used in the nine counties in the MRRPC Region from 1979 to 2005 in five year increments. Over the 26 year period the regions use of groundwater far exceeded the use of surface water, approximately 369.51 million gallons per day to 10.64 million gallons per day. Throughout this time period La Crosse County used the most groundwater per day, over 26 million gallons per day in 2005. Trempealeau County followed using 10.87 million gallons per day, while Pepin County the smallest county in the region used the least amount of water per day in 2005 at 1.67 million gallons per day. A listing of municipal wells and actions to protect the wells through well head protection ordinances/programs is discussed in the Public Utilities and Community Facilities Chapter 4 section of this plan.

**Table 5.17 County Water use by year (Millions of Gallons per Day)**

	1979		1985		1990		1995		2000		2005		Total	
	Surface Water	Ground Water	Surface Water	Ground Water	Surface Water	Ground Water	Surface Water	Ground Water	Surface Water	Ground Water	Surface Water	Ground Water	Surface Water	Ground Water
Buffalo	0.05	3.01	0.06	3.63	0.15	3.06	0.12	3.99	0.15	7.11	0.26	4.83	0.79	25.63
Crawford	0.03	3.29	0.04	2.84	0.07	3.70	0.07	2.72	0.06	3.42	0.36	3.29	0.63	19.26
Jackson	0.04	3.62	0.07	2.60	0.09	3.45	0.08	2.46	0.10	2.94	0.20	6.89	0.58	21.96
La Crosse	0.03	25.70	0.03	25.34	0.06	27.56	0.06	27.05	0.07	27.73	0.24	26.04	0.49	159.42
Monroe	0.10	5.67	0.08	5.93	0.19	7.17	0.13	6.24	0.11	5.99	0.32	9.86	0.93	40.86
Pepin	0.02	1.19	0.02	1.60	0.04	2.00	0.03	1.20	0.03	2.10	1.38	1.67	1.52	9.76
Pierce	0.05	4.11	0.08	4.46	0.13	4.84	0.12	4.64	0.12	5.08	0.13	4.50	0.63	27.63
Trempealeau	0.13	3.06	0.38	5.16	0.35	5.38	0.22	5.40	0.21	5.94	0.28	10.87	1.57	35.81
Vernon	0.07	4.68	0.08	4.81	0.14	4.15	0.13	5.28	0.26	5.51	0.47	4.75	3.5	29.18
<b>MRRPC Region</b>	<b>0.52</b>	<b>54.33</b>	<b>0.84</b>	<b>56.37</b>	<b>1.22</b>	<b>61.31</b>	<b>0.96</b>	<b>58.98</b>	<b>3.46</b>	<b>65.82</b>	<b>3.64</b>	<b>72.7</b>	<b>10.64</b>	<b>369.51</b>

Source: Protecting Groundwater in Wis. Through Comprehensive Planning, <http://wi.water.usgs.gov/gwcomp/index.html>

### METALLIC AND NON MINERAL RESOURCES

The most common examples of nonmetallic mine sites in the State and Western Wisconsin prior to the demand for silica sand for “fracking” of oil and gas wells were rock quarries and gravel pits. The crushed rock, gravel, and lower grade sands mined throughout the region have historically been used primarily for road fill and concrete mixing. Non-metallic mining of industrial silica sand (commonly referred to as frac sand) in the last decade has become a significant land use issue that towns, villages, cities and counties in the region and the state are attempting to manage. The cause for the demand for frac sand is the oil and gas industry’s extraction process involving high pressure injection of frac sand into underground fissures to help the oil and natural gas flow. The region’s frac sand is extremely hard and round compared to other sands making it a much desired commodity by the oil and gas industry. The silica sands utilized for fracking processes are unique to Western Wisconsin. The extraction of this natural resource provides economic benefits to the region, but communities are also evaluating the negative impacts such as groundwater, health, safety, aesthetics, transportation, etc. of extracting, processing and transporting the sand. Table 5.18 shows the number of active and proposed frac sand mining operations in the region. Map 5.11 shows operational frac sand facilities in the Region.



Frac Sand mine - City of Independence  
in Trempealeau County



**Table 5.18 Frac Sand Mining Operations in MRRPC Region**

County	No. of Mines Operating	No. of Mines and Processing Plants Operating	No. Processing Plants Operating	No. of Rail Load Out Facilities Operating	No. of Proposed/Permitted or In Development Facilities but not Operating
Buffalo	1				1 mine
Crawford				1	1 mine
Jackson	2		3	1	5 mines, 6 processing plants
Monroe	3	6	0	1	
Pepin	1				
Pierce	2		2	2	1 mine, 1 processing plant
Trempealeau	6	4		1	8 mines, 6 mine and proc. Plants, and 1 mine-processing-rail load out facility

Source: County Land Conservation/Land Information/Zoning Departments, January 2014

Chapter NR 135, Wisconsin Administrative Code, made it mandatory for counties to enact ordinances by June 1, 2001 for the purpose of establishing and administering programs to address the reclamation of nonmetallic mining sites and to ensure that uniform reclamation standards are applied consistently throughout the state. Each year non-metallic mine operators report the amount of open acreage (active mining area) from which they are assessed an annual reclamation ordinance fee. Table 5.19 lists the active non-metallic mining acres in the region by county. In 2012 the MRRPC region had about 7,700 acres of land that were actively mined for non-metallic mineral resources. Pierce County had the largest amount of acreage at 3,924 acres however, it must be noted that approximately 3,500 acres included underground mines. Pepin County had the least amount of actively mined acreage at just over 123 acres. This information was obtained from the County Land Conservation or Zoning Departments.

**Table 5.19 Non Metallic Land Acres – Active Mines 2012**

County	Acreage
Buffalo*	303.2
Crawford	264.4
Jackson	747.3
La Crosse	196.8
Monroe	1127.7
Pepin	121.3
Pierce**	3,924.0
Trempealeau	590.5
Vernon	424.7
<b>MRRPC</b>	<b>7,699.90</b>

Source: County Land Conservation and Zoning Depts.

\*Buffalo County, 2013 acres.

\*\*Pierce County has 2 underground mines at an est. 3,500 acres.

## FRAC SAND MINING REGULATIONS AND ANNEXATIONS

Frac sand mining has become a controversial issue throughout the region. There are wide ranging opinions on frac sand mining's costs and benefits to the region and such opinions have divided many communities, boards, neighbors and even families. In many cases local units of government have been overwhelmed in trying to manage frac sand mining, processing facilities and transportation operations.

In counties and towns where frac sand regulations have been enacted these regulations have in some instances been circumvented by annexations of the land by cities and villages who favor mining operations. This strategy to avoid county and/or town regulations have further exposed the problems with the State of Wisconsin annexation laws as towns and counties have minimal authority to contest annexations by cities or villages who agree to annex land. Local governments that support frac sand mines and/or operations often cite tax base, jobs, impact payments or special projects they can receive as benefits for a mine's annexation. The short-term result has been unorthodox annexations that benefit frac sand mining without a comprehensive review of its impact on the surrounding environment and community.

The following list contains various tools available to local units of government to assist them in managing frac sand mining. The MRRPC is available to assist local units of governments in evaluating these tools. Any or all tools may be used by local units of government to address frac sand mining.

- Specifically address and recommend frac sand mining land management actions in the local unit of government's comprehensive plan.
- Adopt or amend a zoning ordinance to address frac sand mining (including noise, blasting, hours of operation, air quality, water quality etc.) that are consistent with recommendations included in the local unit of government's comprehensive plan.

- Adopt a Non-Metallic Mining Licensing Ordinance (addressing noise, blasting, hours of operation, air quality and water quality etc.).
- Adopt a Non-Metallic Mining Reclamation Ordinance to address land reclamation and post mine reclamation development including a performance bond to ensure implementation.
- Develop a local road ordinance/agreement to address frac sand transportation impacts on roads as well as noise, water and air quality.

With regard to annexations the MRRPC encourage state legislation to amend annexation laws to reduce the inequities of the law that often result in the annexing city or village taking all. Instead the MRRPC recommends developing annexation agreements that calls for an annexation to be based on an agreement that addresses the environment, natural resources, health, quality of life, tax base, public infrastructure, and the area's economy over the long term. In the short-term it is recommended that cities, villages, towns and counties work cooperatively on approving annexations based on these criteria.

## **HISTORICAL, NATURAL AND CULTURAL RESOURCES**

Historical Development of the Region The first human settlement in the Mississippi River Region seems to be about 11,000 years ago by the "Paleo-Indians". Evidence supports that the first human settlement followed closely the withdrawal of the Wisconsin glacier. These earliest known "Paleo-Indians" were hunter-gatherers, that traveled in small nomadic family groups. This Ice Age era was known geologically as the Pleistocene period. Mastodons, giant beaver, and saber tooth tigers provided food and clothing, and a source of danger to these early immigrants. About 9,000 years ago, animals such as white tail deer, elk, and smaller mammals became common. This is the beginning of the period archaeologists call the Archaic period. Native peoples known today as Archaic Indians continued to live a nomadic life style as hunter-gathers. Spear point styles changed, and it is these "points" which archaeologists use to distinguish these various early cultural influences. During the Late Archaic period, about 3,000 years ago, there is the first evidence of human burials, and copper artifacts are also found, which indicates the western Wisconsin people had some sort of trade with, or traveled to the copper country a few hundred miles to the north. This is about the time of the beginnings of the Mayan civilization several thousand miles to the south in southern Mexico. About 2,000 years ago a major cultural change occurred. The time is known as Early Woodland. Pottery shards have been found dating to this period. Since clay pots are not easily transported by nomadic people, their presence usually is interpreted as a period of relative residential permanence. About A.D. 200, which coincides with the fall of Rome on the world history time line, archaeologists move the period in of what is now Wisconsin into the Middle Woodland period. At this time a more southerly group of Native people called the Hopewell Culture moved north into Wisconsin and established a more complex economic society. One of the distinctive features of the Hopewells is their elaborate, ritualistic burial mounds and burial practices. These burial mounds contain obsidian rock from Wyoming, shells from the Gulf Coast, and copper from the Lake Superior area, all of which demonstrate a more developed transportation and trading system than had existed previously.

By the Late Woodland period, A.D 600 to about AD 1200 the Natives were building earthen mounds in the shapes of animals or birds. These effigy mound builders didn't always use the mounds for burials, and their purpose seems to have been as a marking of territory, or totems, for extended family groups. This claiming of territory by building permanent structures indicates that the natives were settling into a less nomadic life style and taking up something resembling permanent village life. One technological advancement that did become evident during this period is the discovery, or introduction, of the bow and arrow. Three sided points, typical of arrow points, rather than the flat spear points are found from this period. This would have greatly increased the Natives hunting capacity. The first evidences of a definitely contrived agricultural life style are found in this period also, which helps explain how the people could exist without being tied to a nomadic way of life seeking game and seasonal wild plants.

About A.D 1000 another major cultural change occurred as more developed agricultural peoples from further south, the Mississippian Culture, moved into present day Wisconsin. Again, as with the Hopewells 600 years earlier, the cultural change was partly due to an actual influx of new people and partly due to a few locals, who even in this time of isolation, had ventured out and came back with stories of a different, more abundant, way of life. Out of this interaction came a new culture, known as the Oneota. The Oneota people might be considered the first "modern" Native Americans as it was their culture which was first influenced by the early European explorations far away on the Gulf and Atlantic Coasts. The Oneotas made distinctive pottery, tempered with crushed fresh water mussel shells, and developed an extensive agricultural lifestyle raising corn, beans, and

squash. They also lived in established villages with as many as 3,000 people. The earliest rise of the Oneota culture in the Mississippi River Region appears to be in the Red Wing, Minnesota area typified by a large village site in Pierce County. This site is famous among scholars for the great number of mounds in its vicinity. Since the later Oneota did not build mounds, it seems to be an early development of the Oneota from the Late Woodland period, and a blend of the two cultures. Territorial pressure seems to have resulted in warfare amongst various groups and later the site was abandoned and some groups of the Oneota people moved to the La Crosse area, which at this time was not occupied regularly by any group of Natives.

A major Oneota village at the site now occupied by Valley View Mall in La Crosse was the high-water mark of this culture in Wisconsin as over time, by A.D. 1650 the people seem to have abandoned all their sites and moved into the Root River and Upper Iowa River Valleys in Minnesota and Iowa. They became known to the early French explorers and traders as the Ioway Indians. Early French trader Nicholas Perrot who established a fort at the present site of Trempealeau in 1685 recorded his contact with the Ioway, who came from "many leagues to the southwest". By the time of the coming of the Europeans, the principal Native American settlement pattern in western Wisconsin was in reasonably stationary villages, with farming a mainstay of subsistence, but readily supplemented with hunting, fishing, and gathering of wild plants for food and fiber.

In the 17th and 18th centuries, as the European invasion of eastern and southern North America caused upheavals among the Native American people in those areas, these easterly peoples, such as the Sauk, Fox, Illini, and Hurons, moved into western Wisconsin. These generally were the cultures "discovered" by the French explorers when they came into the Mississippi Valley in the late 1600s. The first European known to have traveled up the Mississippi River through the region is Louis Hennepin, who stopped briefly near the site of present day La Crosse. Nicholas Perrot, a fur trader, established outposts, or "forts" at Prairie du Chien (*Crawford County*), Trempealeau (*Trempealeau County*) and St. Antoine (*Pepin County*). Prairie du Chien, at the confluence of the Wisconsin and Mississippi Rivers later developed as a major French fur trading post.

Prairie du Chien is the oldest European settlement in the region, and the second oldest in the state, dating back to at least the late 17th century, but with real evidence as a community from about 1805. La Crosse and Prescott were also initially fur trading posts, established in the early 1840s. Away from the Mississippi River, the white men, just as the Indians had, found less incentive to form villages, until the logging era began. In the 1860's and 1870's many trading posts such as Black River Falls, Merrilan, Cochrane, and Spring Valley grew as supply points for the upriver pineries, or milling and shipping points for the logs and lumber. Although the region's first railroad reached Prairie du Chien in 1857, the real boom in rail building began in the 1870s. Many former logging towns, facing decline as the pineries played out, were revitalized as rail shipping points for the wheat and other crops being raised on the "cut over", or logged over forest soil. By the 1880s the settlement patterns that exist today were pretty much in place, with most of the region's communities established.

Prominent Historic And Cultural Sites The Wisconsin Register of Historic Places provides an inventory of historic places in the State. The Register's inventory for the region inventoried a total of 161 places in the Region: Buffalo County (14), Crawford 25, Jackson 5, La Crosse 56, Monroe 11, Pepin 2, Pierce 9, Trempealeau 17 and Vernon 22. Table 5.20 and Map 5.12 inventory some of the more prominent historic and cultural resources within the region.



Great River Road Visitor Ctr. at Prescott

**Table 5.20 Prominent Historic and Cultural Resources in MRRPC Region**

County	Historic Site	Community	Type	State & Nat'l Designation
Buffalo	Alma Historic District	Alma	Historic District	Nat'l & State Register Historic Places
	Alma Historical Museum	Alma	Museum	
Crawford	Villa Louis	Prairie du Chien	Historic Site	Nat'l Historic Landmark
	Crawford County Courthouse	Prairie du Chien	Historic Bldg	Nat'l & State Register Historic Places
	Astor Fur House	Prairie du Chien	Historic Bldg	Nat'l Historic Landmark
	Fort Crawford Museum	Prairie du Chien	Museum	Nat'l Historic Landmark
	Brisbois, Michael House	Prairie du Chien	Historic Bldg	Nat'l Historic Landmark
	Dousman Hotel	Prairie du Chien	Historic Bldg	Nat'l Historic Landmark
	City of Prairie du Chien	Prairie du Chien	Main St. Community	Main Street Community
	Kickapoo Indian Caverns	Wauzeka	Historic Site	
Jackson	Blackhawk Pow Wow Grounds	Hwy 54 East	Historic Site	Nat'l & State Register Historic Places
	Silver Mound Archeological District	Hixton	Historic Site	Nat'l Historic Landmark
	Jackson County Historical Society	Black River Falls	Historic Bldg	Nat'l & State Register Historic Places
	Jackson County Veterans Park	Black River Falls	Military Heritage	
La Crosse	Hixon House	La Crosse	Historic Bldg	Nat'l & State Register Historic Places
	Pump House Regional Arts Center	La Crosse	Historic Bldg	Nat'l & State Register Historic Places
	Riverside Museum	La Crosse	Museum	Nat'l & State Register Historic Places
	Swarthout Museum	La Crosse	Museum	
	Childrens Museum of La Crosse	La Crosse	Museum	
	Onalaska Historical Museum	Onalaska	Museum	
	Hamlin Garland House	West Salem	Historic Bldg	Nat'l Historic Landmark
Monroe County	Monroe County Local History Rm & Deke Slayton Memorial Space & Bicycle Museum	Sparta	Museum	Nat'l & State Register Historic Places
	Monroe County Courthouse	Sparta	Historic Bldg	Nat'l & State Register Historic Places
	Little Red Schoolhouse	Tomah	Museum	
	Tomah Area Historical Museum	Tomah	Museum	
	Tomah Area Veterans Memorial	Tomah	Military Heritage	
	Wisconsin Cranberry Discovery Ctr.	Warrens	Museum	
Pepin	Pepin County Courthouse and Jail	Durand	Historic Bldg.	Nat'l & State Register Historic Places
	Laura Ingalls Wilder Wayside & Cabin	Pepin	Historic Site	
Pierce	Pierce County Courthouse	Ellsworth	Historic Bldg.	Nat'l & State Register Historic Places
	Great River Road Visitor Center	Prescott	Cultural/Heritage Center	
	UW-River Falls North & South Hall	River Falls	Historic Bldgs	Nat'l & State Register Historic Places
Trempealeau	Memorial Park	Arcadia	Military Heritage	
	Downtown and Ridge Ave Historic Districts	Galesville	Historic District	Nat'l & State Register Historic Places
	Gale College Historic District	Galesville	Historic District	Nat'l Register of Historic Places
	Main Street Historic District	Trempealeau	Historic District	Nat'l & State Register Historic Places
Vernon	Norskedalen Nature and Heritage Ctr.	Coon Valley	Cultural/Heritage Center	
	Upper Kickapoo Valley Prehistoric Archeological District	LaFarge	Historic District	Nat'l & State Register Historic Places
	Vernon County Courthouse	Viroqua	Historic Bldg.	Nat'l & State Register Historic Places
	Viroqua Downtown Historic District	Viroqua	Historic District	Nat'l & State Register Historic Places
	Vernon County Museum	Viroqua	Museum	Nat'l & State Register Historic Places
	City of Viroqua	Viroqua	Main Street Community	Main Street Community

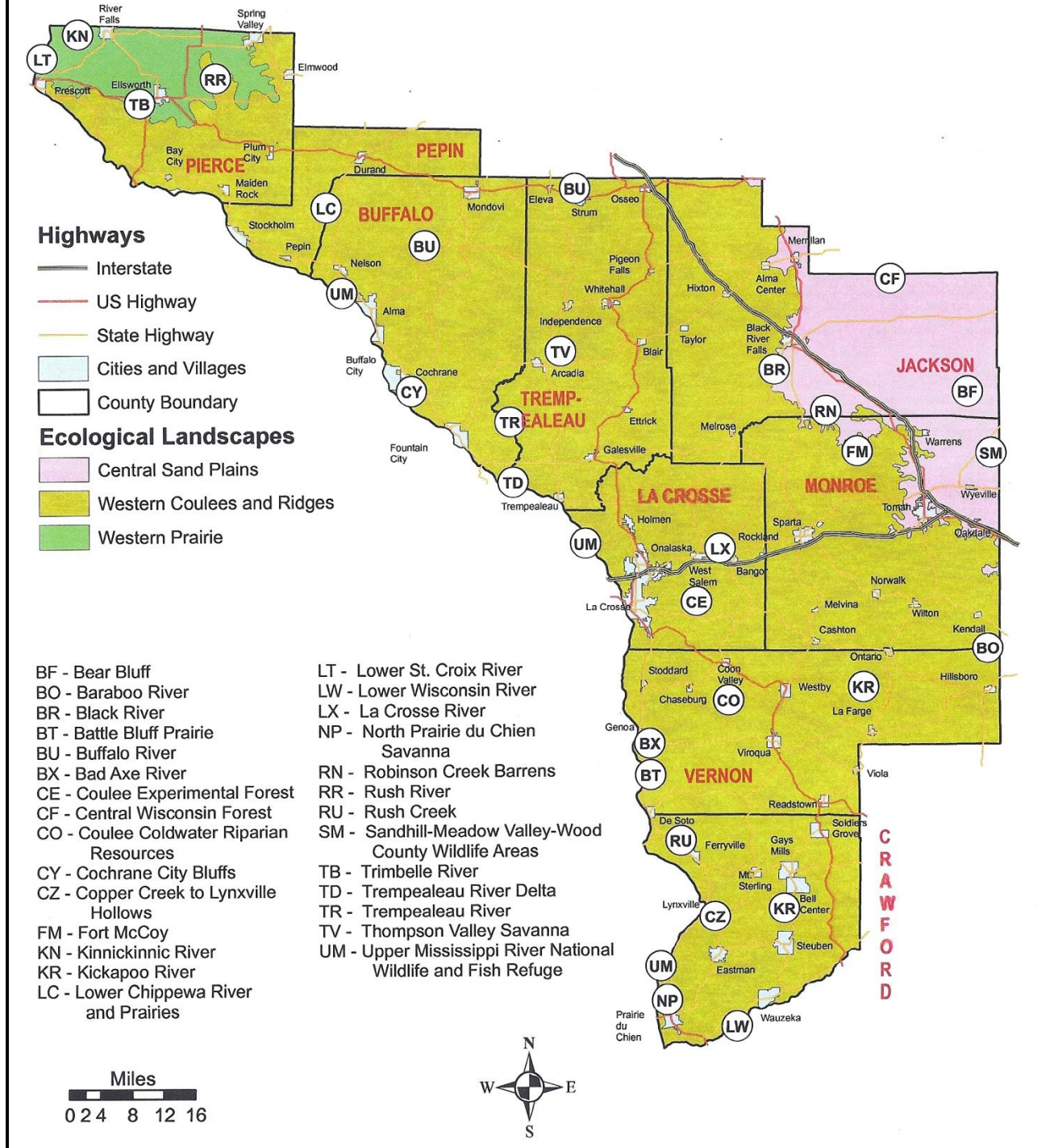
Source: Wisconsin Department of Tourism and <http://www.wisconsinhistory.org/hp/register/summary.asp#nav>

### Regional Agricultural, Natural and Cultural Resources Goals and Recommendations

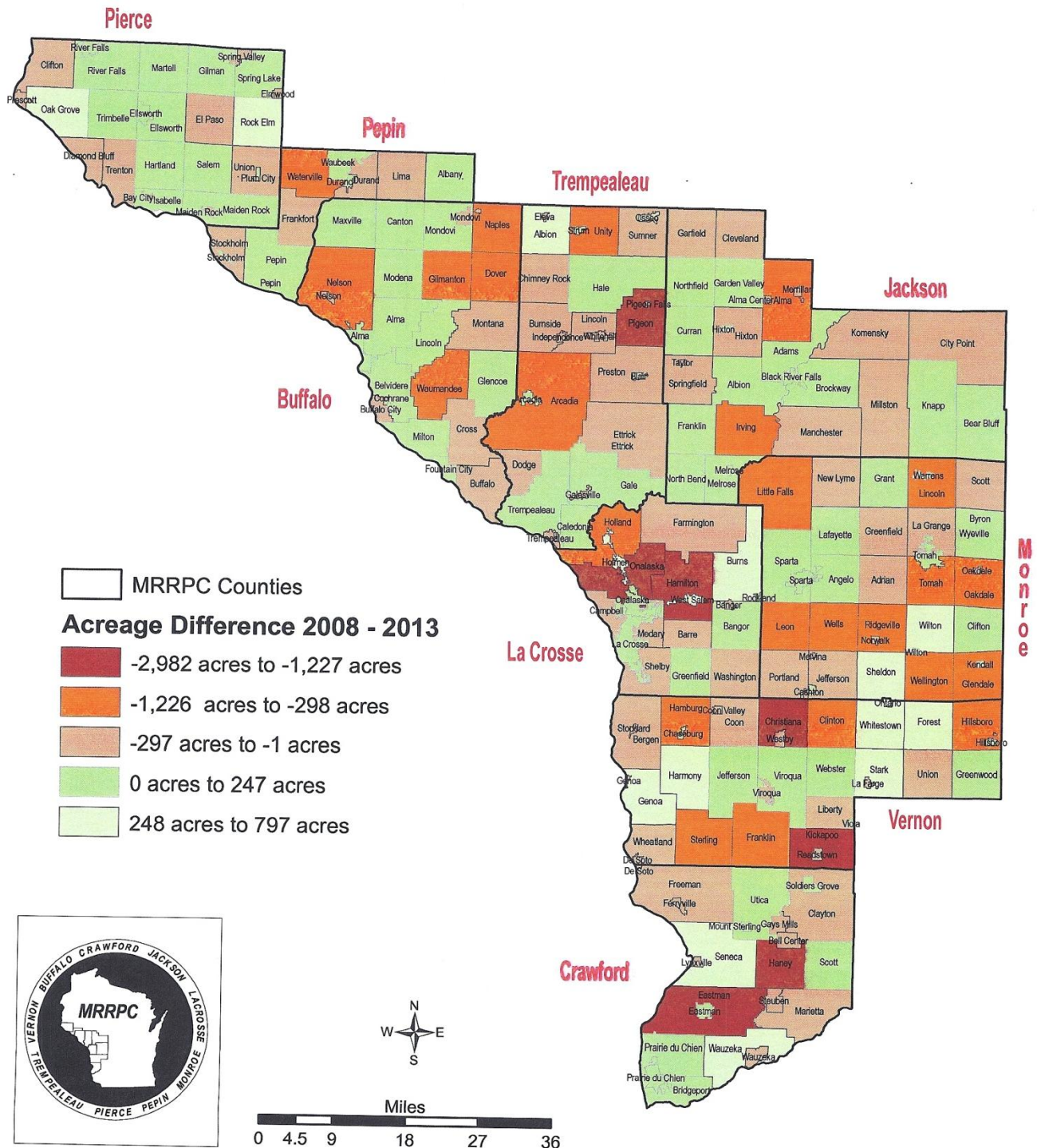
Regional agricultural, natural, and cultural resources goals and recommendations are listed in Chapter 9 – Implementation.



## Map 5.01 Legacy Places and Ecological Landscapes Mississippi River Region

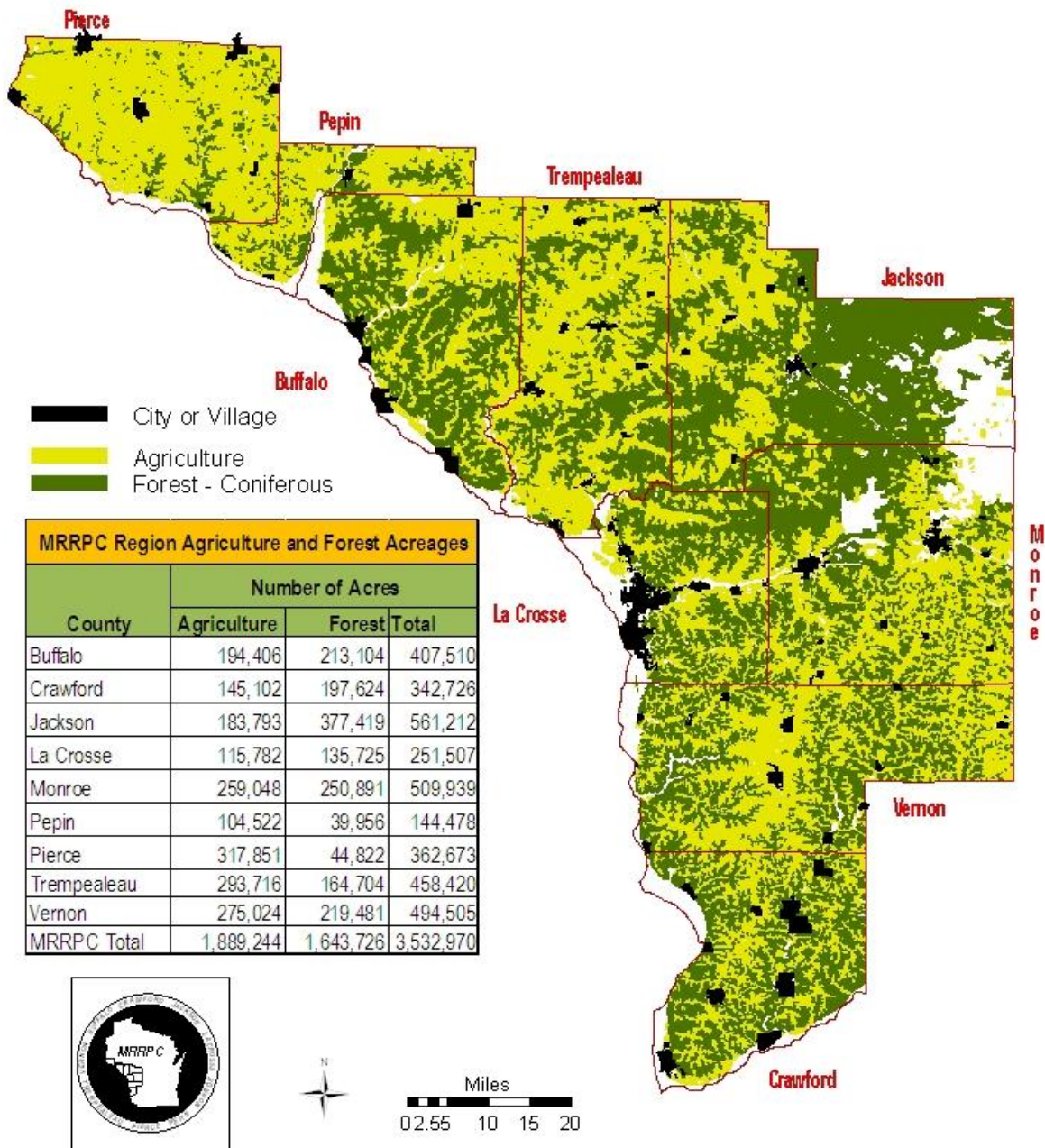


# Map 5.02 Agricultural Lands Loss or Gain Based Upon 2008 & 2013 Assessments

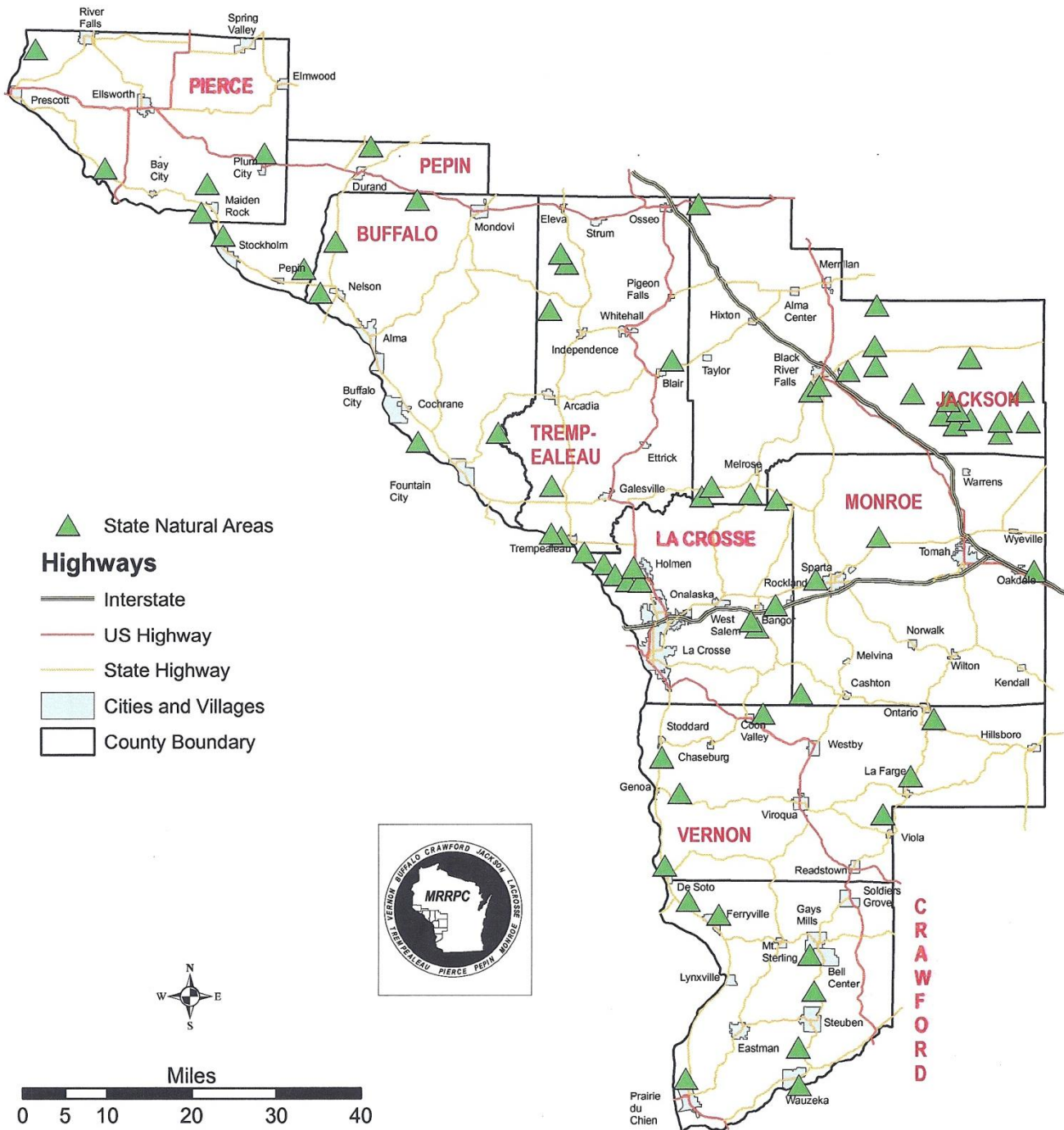




# Map 5.03 Agriculture and Forest Lands

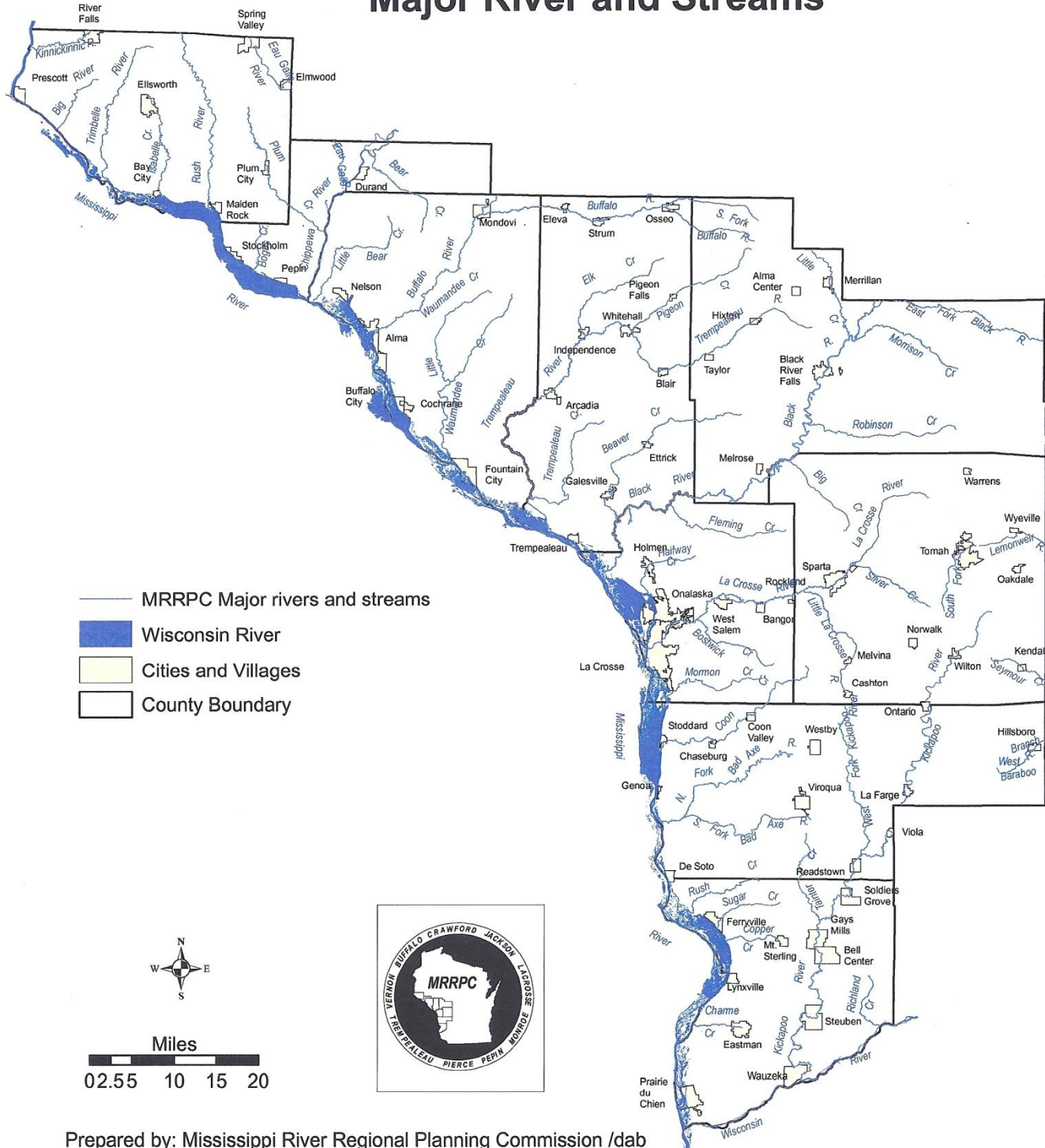


## Map 5.04 Mississippi River Region Designated State Natural Areas



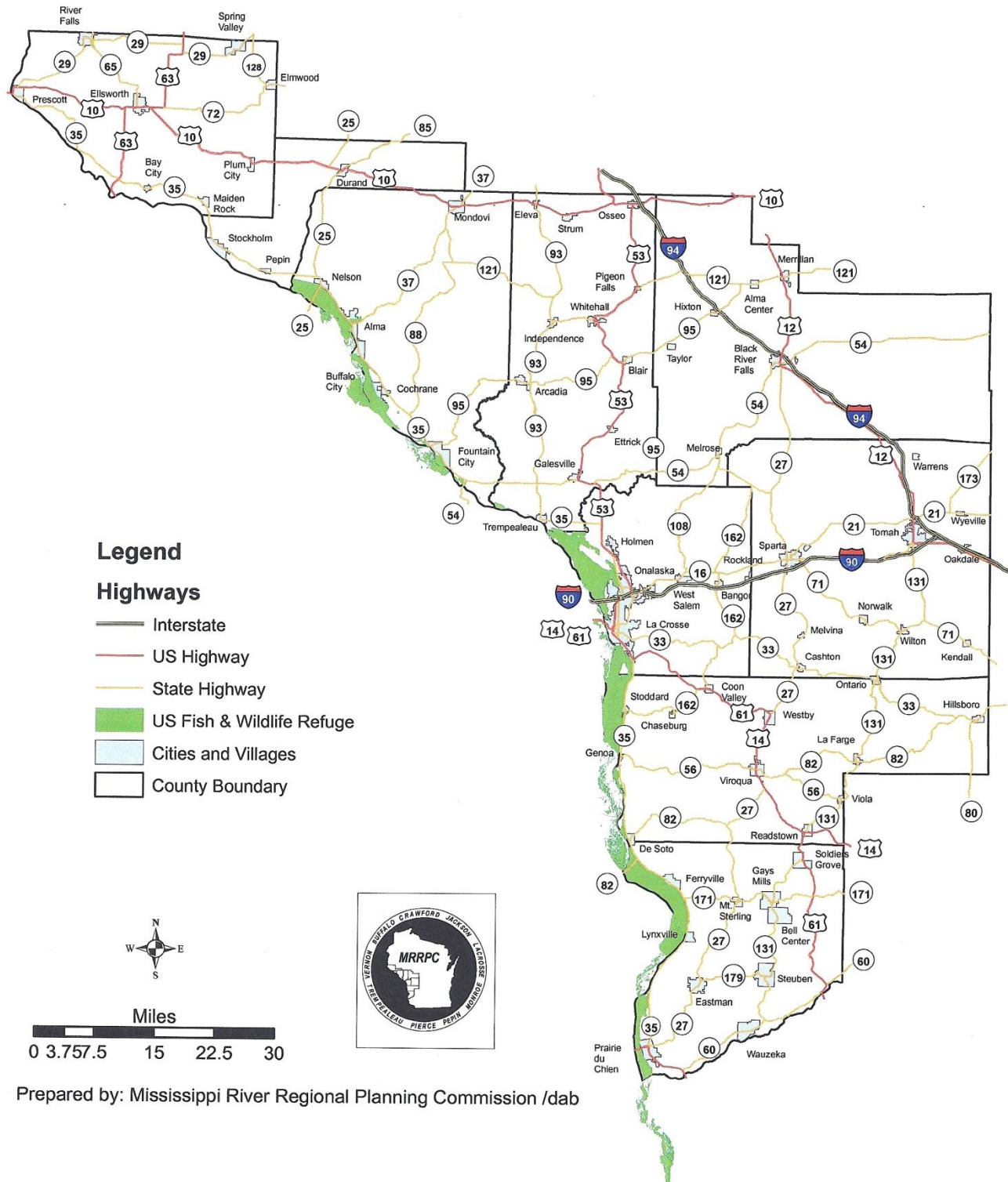
Prepared by: Mississippi River Regional Planning Commission /dab

## Map 5.05 Mississippi River Region Major River and Streams





## Map 5.06 Mississippi River Region U.S. Fish and Wildlife Refuge

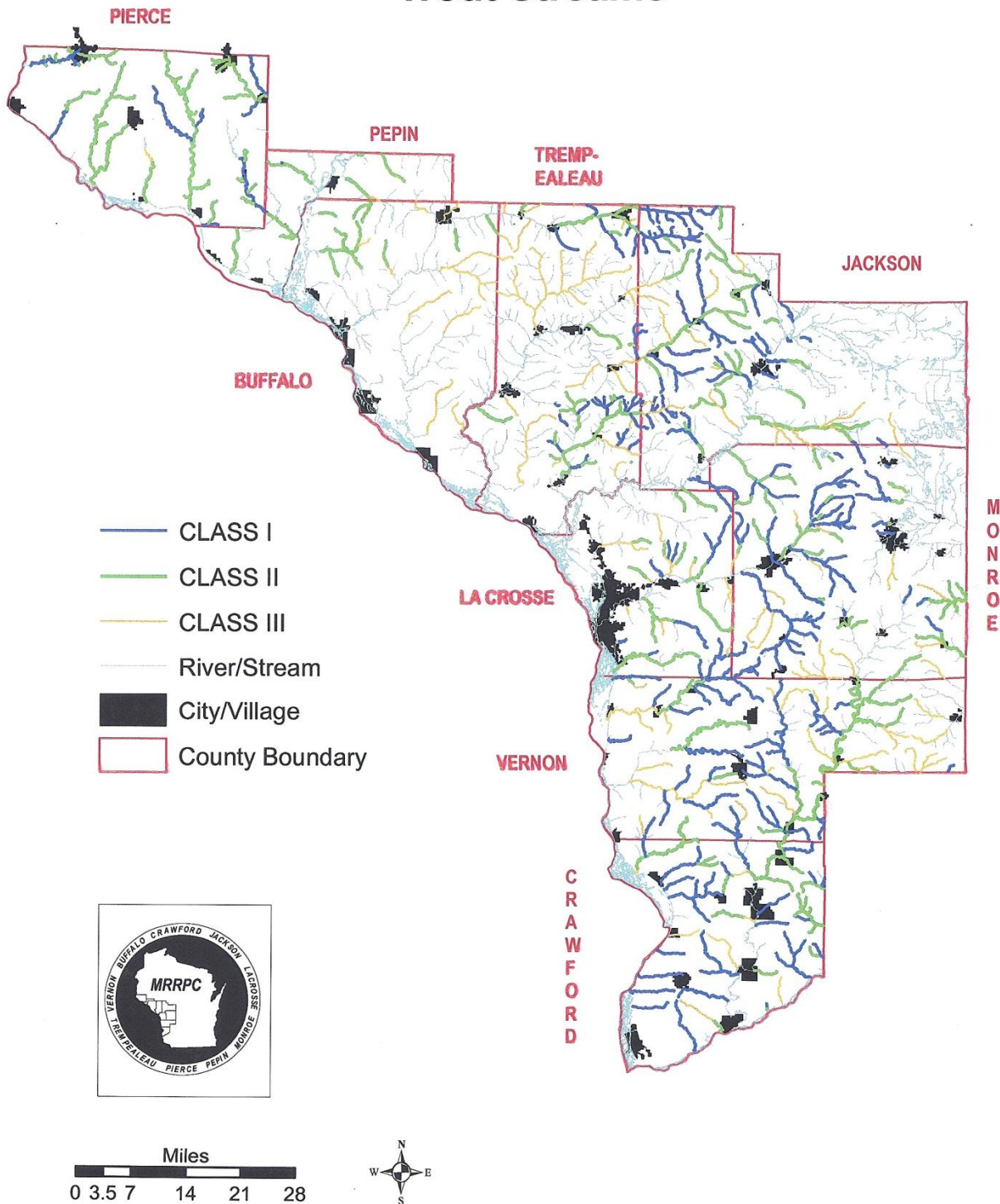




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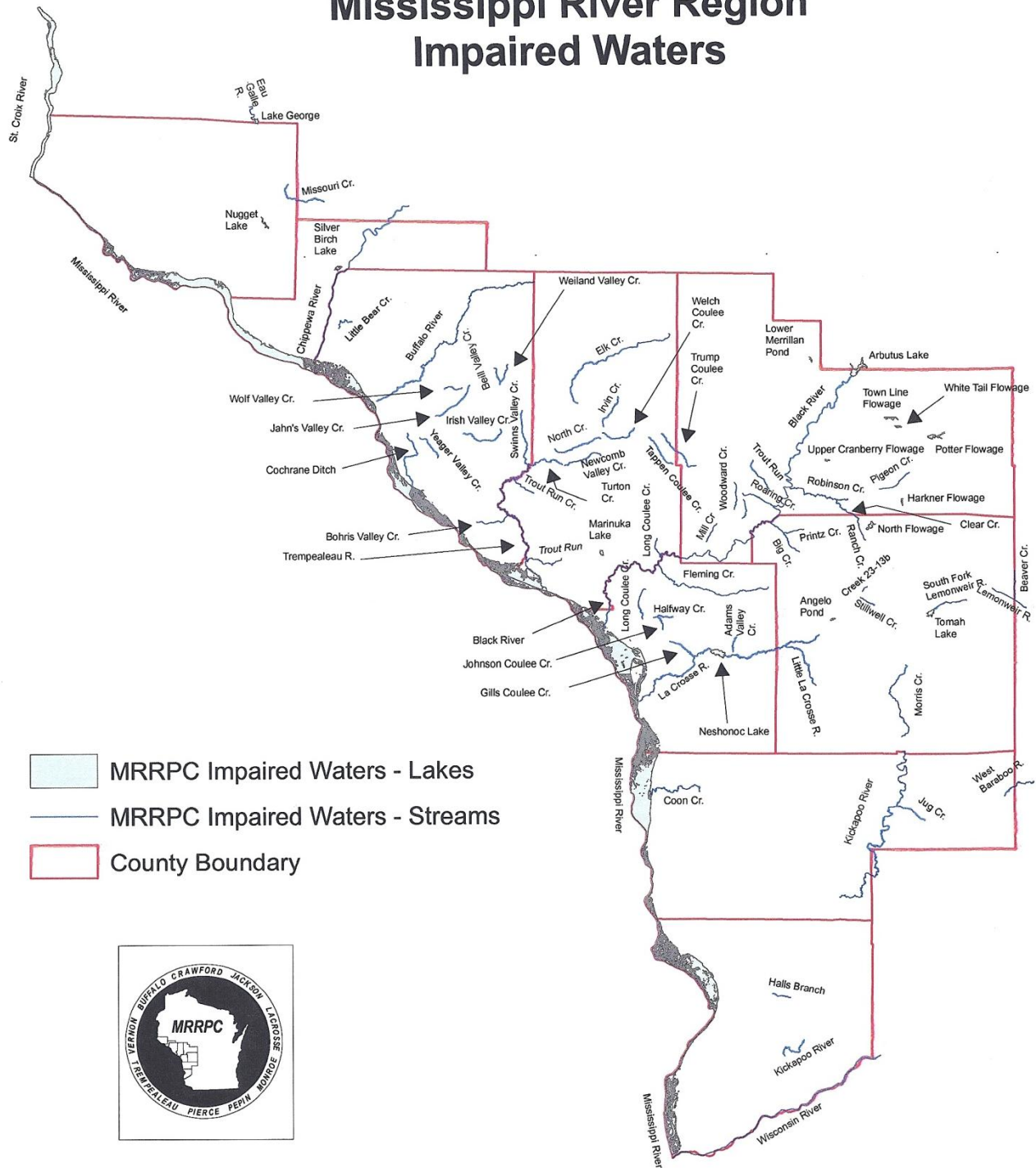


## Map 5.08 Mississippi River Region Trout Streams



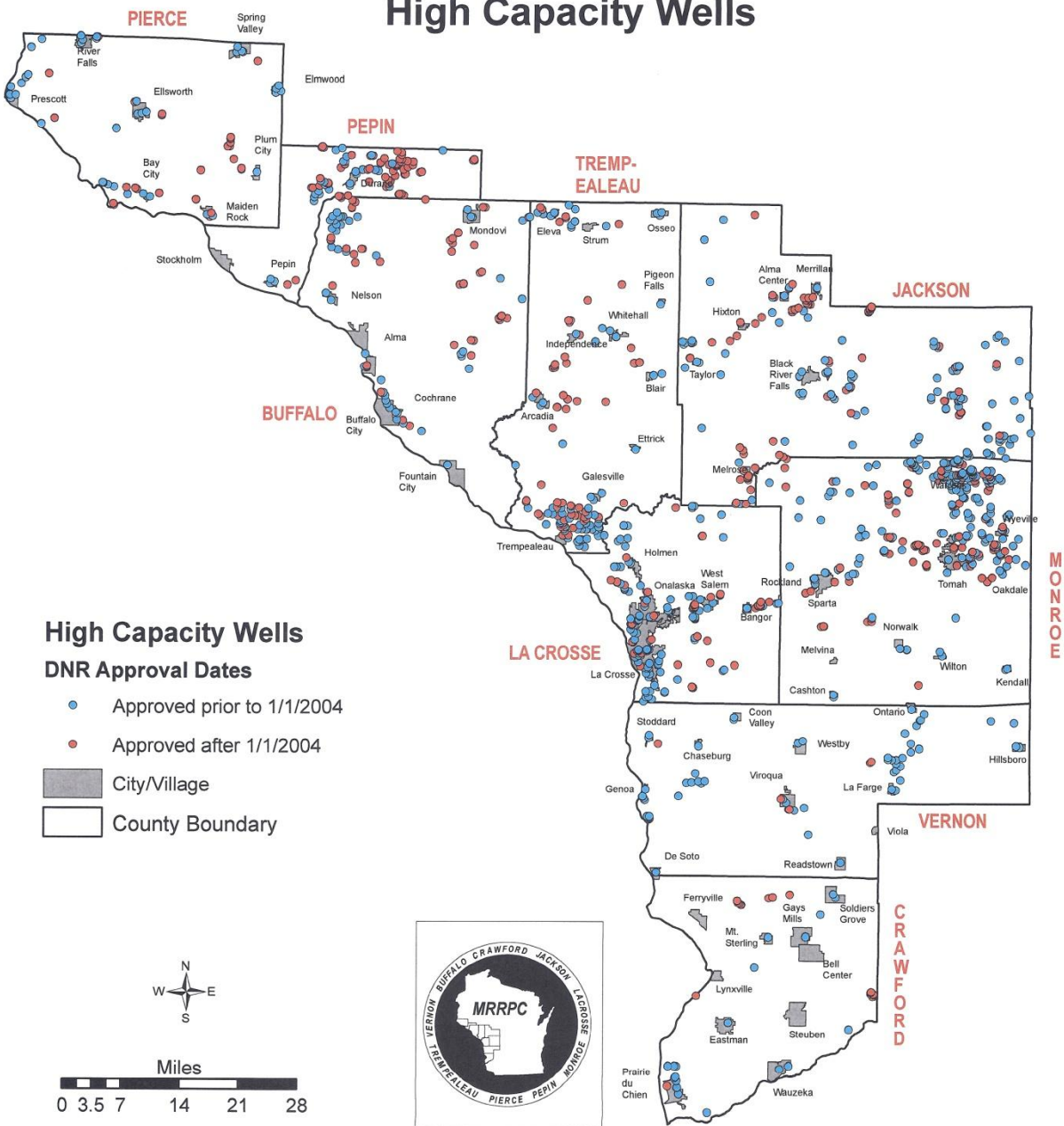
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## Map 5.09 Mississippi River Region Impaired Waters



Prepared by: Mississippi River Regional Planning Commission /dab

# Map 5.10 Mississippi River Region High Capacity Wells



Prepared by: Mississippi River Regional Planning Commission /dab  
Source: Department of Natural Resources 10/2014





## Map 5.12 Mississippi River Region Prominent Historic & Cultural Resources

