

Natural and Cultural Resources

Minnesota River Prairie Subsection

The Minnesota River State Trail is located in the Minnesota River Prairie subsection of the state's ecological classification system. A subsection is a distinct landscape of Minnesota defined by vegetation, geology and other resource criteria. See the map on the next page for the location of the Minnesota River Prairie subsection.

The source of the following description of the subsection is found on the DNR website:http://www.dnr.state.mn.us/ecs/prairie/ecs_q.html

Large till plains form the boundary on both sides of the Minnesota River. The unit is bounded to the southwest by the Prairie Coteau. A series of end moraines define the eastern boundary, starting with the Alexandria Moraine to the northeast and ending with end moraines associated with the Des Moines lobe in the southeast.

This subsection consists of a gently rolling ground moraine about 60 miles wide (Hobbs and Goebel, 1982). The Minnesota River occupies a broad valley that splits the unit in half. It was created by Glacial River Warren, which drained Glacial Lake Agassiz. (Matsch and Wright 1967).

Landform

Loamy ground moraine (till plain) is the dominant landform, but end moraines, and lake plains also occupy a significant area (Hobbs and Goebel 1982). Ground moraine topography is level to gently rolling. The steepest topography of the subsection is along the Minnesota River and on the Big Stone Moraine, which has both steep kames and broad slopes.

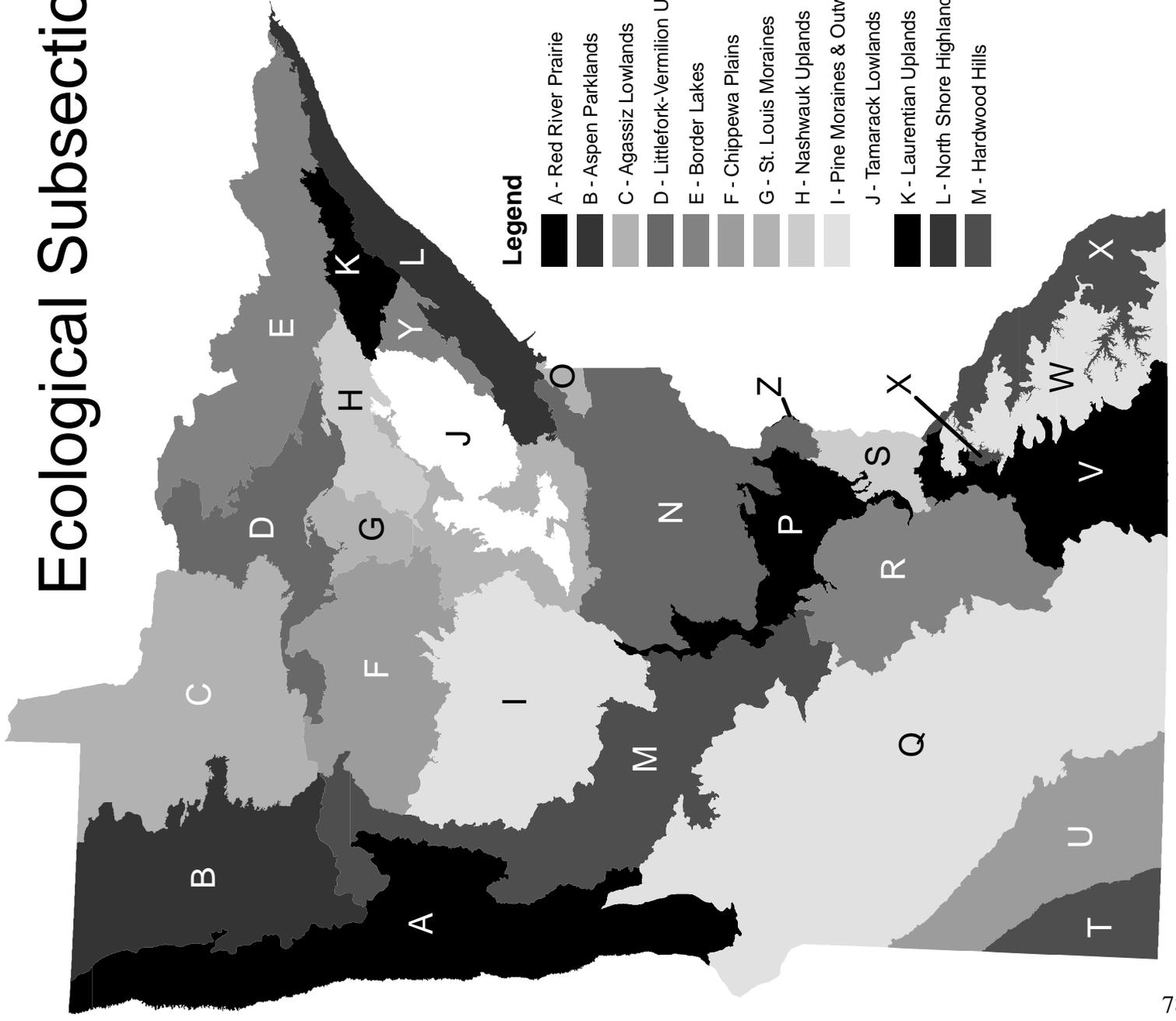
Bedrock geology

Most of this unit has a 100 to 400 foot covering of glacial drift (Olsen and Mossler 1982). Cretaceous shales, sandstones, and clays are the most common kinds of bedrock. Ordovician dolomite underlies the extreme southeastern edge (Morey 1976). There is a major area of exposed granite bedrock scoured by Glacial River Warren near Ortonville (Wheeler et al. 1992)

Soils

Well to moderately well drained loamy soils formed in gray calcareous till of Des Moines Lobe origin are dominant. Some soils are clayey and locally there are sandy and gravelly soils, but these account for only a small percentage of the subsection (Dept. of Soil Science, Univ. of Minnesota 1969, 1979, 1981). Cummins and Grigal (1981) show most of the division as Udolls and Aquolls on relatively level topography, generally with 15 feet or less of local relief. Dry prairie soils (primarily Ustolls) are also found on level to gently rolling topography. They occupy convex knobs on the landscape.

Ecological Subsections of Minnesota



Legend

- | | | | |
|---|------------------------------------|---|--|
|  | A - Red River Prairie |  | N - Mille Lacs Uplands |
|  | B - Aspen Parklands |  | O - Glacial Lake Superior Plain |
|  | C - Agassiz Lowlands |  | P - Anoka Sand Plain |
|  | D - Littlefork-Vermilion Uplands |  | Q - Minnesota River Prairie |
|  | E - Border Lakes |  | R - Big Woods |
|  | F - Chippewa Plains |  | S - St. Paul-Baldwin Plains and Moraines |
|  | G - St. Louis Moraines |  | T - Inner Coteau |
|  | H - Nashwauc Uplands |  | U - Coteau Moraines |
|  | I - Pine Moraines & Outwash Plains |  | V - Oak Savanna |
|  | J - Tamarack Lowlands |  | W - Rochester Plateau |
|  | K - Laurentian Uplands |  | X - The Blufflands |
|  | L - North Shore Highlands |  | Y - Toimi Uplands |
|  | M - Hardwood Hills |  | Z - St. Croix Moraine |

Climate

The climate is typical continental with extremes in temperature from summer to winter. Annual precipitation ranges from 25 inches in the west to 30 inches in the east, with 11 to 13 inches of growing season precipitation. Growing season length is approximately 147-152 days. Eleven percent of annual precipitation falls from November through February (Midwest Climate Center 1992). This results in extreme desiccation of most woody plants, and contributes to prairie grass dominance (Albert 1993).

Hydrology

This subsection is drained by the Minnesota River. Most smaller rivers and streams eventually empty into the Minnesota or the Upper Iowa Rivers. There is a poorly developed drainage network due to landscape characteristics. This unit has 150 lakes greater than 160 acres in size (Dept. of Soil Science, Univ. of Minnesota 1969, 1979, 1981a). However, many of these are shallow perched lakes. Wetlands were very common before settlement. Most are now drained and used for crop production.

Presettlement vegetation

The presettlement vegetation was primarily tallgrass prairie, with many islands of wet prairie (Kratz and Jensen 1983, Marschner, 1974). Forests of silver maple, elm, cottonwood, and willow grew on floodplains along the Minnesota River and other streams. Portions of the Big Stone Moraine supported dry and dry-mesic prairie (Wheeler et al. 1992). There were also dry gravel prairies on kames (Albert 1993).

Present vegetation and land use

Agriculture is the dominant land use. This unit is the heart of the Minnesota Cornbelt (Wright 1972). Wheeler et al. (1992) found upland prairie species to be common throughout most of the subsection (based on herbarium records). Remnant stands of tallgrass prairie are rare.

Natural disturbance

Fire was the most common natural disturbance before settlement. Fire suppression has allowed woodlands to develop from what was originally oak openings or brush prairies (Wheeler et al. 1992). Other causes of disturbance are floods and tornados.

Conservation concernsThe major conservation concern is water quality in the Minnesota River drainage area. There is a significant pollution problem throughout the unit. It is caused by intensive agricultural activities (fertilizers, pesticides, and animal waste). Another concern is preservation of existing wetlands and restoration of former wetlands that are presently drained.

Natural areas within the Minnesota River Prairie Subsection

There are a variety of significant natural areas within the Minnesota River Prairie Subsection. Only a small percentage of this geographic area remains natural. The vast majority of the landscape has been converted to agricultural use – 92%. The remaining natural areas are both publicly and privately owned. The public land is administered by a variety of government entities – federal, state, and local. These areas are important as individual units, but they take on added significance when considered as part of a natural corridor in the landscape. A connected system of natural areas is important for the ecological function of the landscape.

These natural areas present both opportunities and constraints for location of trail alignments. They present opportunities as connections and settings for the trail. They have the potential to provide valuable trail experiences because they are scenic and educational. Surveys of trail users indicate that they want to recreate in natural settings and this is what they most appreciate about their trail experiences.

Natural areas can also be constraints for trail alignments. Some of these lands are privately owned. In the case of some publicly owned land, trails may not be compatible with land managers' objectives for those lands. Land managers must be consulted early on in the process of siting a trail. When a trail can be accommodated on public land, it must be located so that it does not fragment high quality natural areas and negatively impact natural resources.

Identifying these lands is a first step in for trail planners as they move forward to identify specific trail alignments. Following is a list of the natural areas that need to be identified early in the planning process. Land managers responsible for their management should be invited into the planning process right away as well. See the natural areas map in the appendix for the location of these areas.

- U.S. Fish and Wildlife Service Waterfowl Production Areas
- National Wildlife Refuges
- Wildlife Management Areas
- Scientific and Natural Areas
- Minnesota River Wild and Scenic River District
- State Parks
- Conservation Easements – RIM and CREP
- Prairie Bank
- Location of species of special concern, threatened, or endangered according to the Natural Heritage database

Recommendations

Recommendation 1: The trail can be a tool for improving habitat quality by decreasing edge and increasing connectivity.

The trail can be used to smooth edges by planting edges of the trail corridor to make an edge more regular.

The trail can be used to connect patches of natural areas. Vegetation within the trail corridor should be planted and managed to form a contiguous habitat type.

The trail can be used to enlarge the existing size of natural habitat to create a larger continuous habitat.

Recommendation 2: Trail alignments should avoid fragmentation of high quality natural areas

Geology

Lake Agassiz and River Warren

Volumes of water from a gigantic lake and the powerful forces of a gigantic river carved the wide, deep Minnesota River Valley seen today. The gigantic lake and gigantic river had their origins from the melting of glaciers. Minnesota was covered by four major periods of glaciation. The most recent, the Wisconsin Glaciation, occurred 100,000 – 10,000 years ago. Lobes of ice advanced and retreated across the state, scouring and sculpting the landscape, removing, transporting, and redistributing rocks and minerals. Approximately 12,000 years ago, the glaciers melted and the gigantic lake, Lake Agassiz was formed behind the topographic divide near the North Dakota and South Dakota border. This lake covered 123,500 square miles and had a maximum depth of about four hundred feet. Figure 1 illustrates the area covered by Glacial Lake Agassiz.

Figure 1

Map adapted from John Tester's *Minnesota's Natural Heritage*. University of Minnesota Press, Minneapolis, 1995.



This is the total extent that Lake Agassiz reached in its during its lifespan.

A breach in the moraine damming the lake formed an outlet giving rise to the Glacial River Warren. This breach occurred near present day Browns Valley. The wide deep valley, (up to five miles wide in some places), is evidence of the gigantic powerful Glacial River Warren. The Glacial River Warren flowed south and carved the Minnesota River Valley. About 8,500 years ago the drainage shifted to Hudson Bay. Figure 2 illustrates the present day Minnesota River through the valley created by the Glacial River Warren.

Figure 2: Comparison of the current Minnesota River and Glacial River Warren Valley



Trail users will be able to experience the landscape features carved by the Glacial River Warren. There will be segments of the trail where vistas and views of the valley from the bluffs will be featured and segments where views of the bluffs from the valley floor will be featured. Various elevations of terraces formed by the Glacial River Warren will be experienced as well.

Significant Geological Features

Gneiss outcrops – 3.6 billion years old

Gneiss outcrops can be observed at various locations along the trail corridor. Gneiss is a banded, coarse-grained rock similar to granite, comprised of quartz, feldspar, and biotite and amphibolite. The Precambrian rocks of northeastern Minnesota are more than one billion years young than Morton Gneiss. The rocks exposed in southeastern Minnesota, of early Paleozoic age are more than two billion years younger.

One prominent outcrop of Morton Gneiss is located at the northeast corner of the intersection of Highway 71 and Highway 19 near Morton. Gneiss outcrops can also be observed near Granite Falls and Montevideo. Memorial Park at Granite Falls is a good location to view this geologic feature. Other good locations to observe and study gneiss outcrops are in Blue Devil Valley, Gneiss Outcrop, Cedar Mountain, and Swede’s Forest Scientific and Natural Areas.

Granite mines

Quarrying of granite occurs in several locations in the trail corridor. One mining location is near Ortonville. The Baxter Quarry was in production in 1886. A beautiful red granite, Mahogany granite, is quarried here.

Granite is also quarried in the Morton and the Granite Falls area. A granite known as Rainbow, Oriental or Tapestry is quarried in the Morton area. This beautiful granite is streaked with pink and red. Other attractive granites known as Ruby Red, Pearl White and a black granite are quarried in the valley.

New quarrying locations are being proposed at numerous locations. This is the result of new demands for crushed hard rock used to build and maintain roads.

Sand and gravel are also important resources quarried in the valley.

Geology Recommendations

Recommendation 1: Use native granite in the design and construction of trail amenities and support facilities such as parking lots, rest areas, benches, and interpretive facilities.

Recommendation 2: Interpret the geologic resources of the Minnesota Valley, including the mining industry – the need and use of the rock as well as the significance of the rock to the beauty and recreation of the valley.

Recommendation 3: The trail should connect to the significant geological features of the valley for scenic and educational reasons.

Water Resources

The Minnesota River

Minnesota River Basin

The Minnesota River drains 17,000 square miles of land (mostly in Minnesota) but also parts of Iowa, North Dakota and South Dakota. Fifteen thousand square miles and 37 counties in Minnesota are drained by the river – nearly 20% of the state. The Minnesota portion of the basin is comprised of 12 major watersheds totaling 9,570 acres. These twelve major watersheds are subdivided into 1,113 minor watersheds. The predominant land use in the basin is agriculture. The population totals approximately 700,000.

Water quality

The Minnesota River is one of the most polluted rivers in the United States. Eighty percent of the pollution is nonsource point pollution, such as runoff from agricultural fields. High levels of nutrients enter the water from throughout the Minnesota River Basin.

Pollutants include pathogens, sediment, phosphorus, and nitrogen. These are of concern because they affect human health, fish and aquatic organisms, drinking water, and recreation experiences.

Both government entities and citizens groups are actively working to improve the Minnesota River through monitoring of pollutants, identifying and implementing improved land use practices, and through education and awareness of the condition of the river and its importance to the state. Agricultural management practices that improve water quality include conservation tillage; use of sediment basins and animal waste management facilities; use of grassed waterways, filter strips and riparian buffer strips; soil testing prior to use of fertilizer and manure; and use of guidelines for application of manure and fertilizer.

Description of the River

The Minnesota River begins near Ortonville and Big Stone Lake as a small, winding stream 25 feet wide and one foot deep. The river increases in size and volume as it flows downstream. The river drops 274 feet in elevation, with an average gradient of less than 0.8 feet per mile. The Minnesota River converges with the Mississippi River at Fort Snelling.

The first segment of river flows through a chain of large lakes - Big Stone Lake, Marsh Lake and Lac qui Parle Reservoir. Pelicans, tundra swans, snow geese, sandhill cranes and Canada geese migrate through this area in impressive numbers.

The next segment of river from the end of the chain of lakes to downstream from Montevideo is slow and meandering. Floodplain forest comprised of cottonwood, silver maple, ash, and basswood line the banks, which are often six feet high. The water is relatively clear in this segment. The next segment of river has the steepest gradient. Steep granite banks and boulders flank the river along this stretch creating rugged scenery. The river's only set of rapids – Patterson's Rapids is located 20 miles downstream from Granite Falls. Two natural waterfalls are located in this segment near Granite Falls.

Between Redwood Falls and New Ulm, the valley opens up and the bluffs are located further apart. The river is extremely winding in this segment of river.

Flooding in the valley has been a significant problem throughout the years. Low stream gradient, low channel capacity and watershed characteristics are factors that make the Minnesota River susceptible to flooding. The river has an altered hydrology from agricultural drainage and is relatively unstable in its channel size relative to the amount of water it must handle. This results in greater downcutting and sidecutting in susceptible locations. Improved land use practices and community redevelopment are being used to address this issue.

There are six dams on the Minnesota River. One is at Ortonville and controls the water level of Big Stone Lake. Three dams (Big Stone Refuge, Marsh Lake, and Lac qui Parle) are used for flood control. A dam at Granite Falls is used to impound water for hydroelectric production. A dam at Minnesota Falls is used for river level control.

Tributaries

The tributaries of the Minnesota River play a significant role in the Minnesota Valley landscape in providing recreational settings and opportunities; valuable natural areas are located in their valleys, and they are an educational resource for understanding the ecology and land use issues of the Minnesota valley. The trail will intersect these tributaries providing the opportunity for trail users to experience and connect with these settings.

Lac qui Parle River

The Lac qui Parle River flows 66 miles in a northeasterly direction through Lac qui Parle, Lincoln, and Yellow Medicine counties. Its watershed drains 1,156 square miles of the Coteau des Prairies in southwestern Minnesota. The river empties into Lac qui Parle Lake. Trail users will connect with the Lac qui Parle River in Lac qui Parle State Park

Pomme de Terre River

This 106 mile tributary flows from the north with a gradient of 3 1/2 feet per mile draining 977 square miles. It begins in the lakes and ponds of the glacial moraines of the lake region. It flows through lakes and cattail marshes. Wildlife management areas and federal waterfowl production areas are located in the watershed.

Chippewa River

The Chippewa River has its source in Chippewa Lake in Douglas County near Alexandria. It flows 120 miles in a southerly direction. It joins the Minnesota River in Montevideo, one of the communities in the trail corridor.

“The Chippewa River control works, diversion channel, and weir are part of the Lac qui Parle flood control system. A rolled earth fill dam is located on the Chippewa River, east of the Watson Sag. A 3,500 foot diversion channel runs from above the dam to the Watson Sag where diverted water flows over a concrete weir with a fixed crest at 938.8 feet. During the spring, inflow usually exceeds 1,500 cfs on the Minnesota River and 1,000 cfs on the Chippewa River. Lac qui Parle Lake. When the Chippewa River flow drops to 1,000 cfs, water diversion to Lac qui Parle Lake

through the Watson Sag is reduced but maintained at 3 to 6 cfs to prevent stagnation. (Lac qui Parle Area Management Plan, Minnesota Department of Natural Resources, January 15, 1997)

Yellow Medicine River

The 107-mile long Yellow Medicine River drains 653 square miles. It flows into the Minnesota River at Upper Sioux Agency State Park.

Redwood River

The Redwood River flows 80 miles north and east from its source in Pipestone County. The river flows through Redwood Falls, one of the communities in the trail corridor. The mean annual discharge rate is 125 cubic feet per second.

Lakes

There are three lakes in the trail corridor search area described below:

Big Stone Lake is located on the South Dakota/Minnesota border. It is 30 miles in length and provides a variety of recreational opportunities including fishing and boating. Resorts, permanent, and seasonal homes are located along the shores. Ortonville and Big Stone Lake State Park are located on the lake.

Marsh Lake is 4,500 acres in size. It is a shallow lake with a maximum depth of 5 feet and dense beds of submergent vegetation. The shoreline is 26.2 miles. Eighty percent of the adjacent watershed is Wildlife Management Area. The lake has an abundance of aquatic plants. The dominant bottom substrate is silt, clay and muck. The water clarity is .6 feet. Marsh Lake provides significant waterfowl habitat.

“Marsh Lake is impounded by an earth fill dam, approximately 11,800 feet long with a fixed crest concrete spillway and a 90 foot grouted riprap auxiliary overflow section. The elevation of the main spillway is 937.6 feet and the auxiliary spillway is 940 feet. A 2 foot square lift gate is located in the dam at 934.5 feet and allows drawdown of the lake through a concrete conduit. Since the elevation of the Marsh Lake dam cannot be regulated, discharges and the level of Marsh Lake are determined mainly by inflows and the Marsh Lake dam provides very little flood control benefit. The level of Marsh Lake is typically about 938 feet but ranged from 927.75 –to 944.55 feet” (Lac qui Parle Area Management Plan, Minnesota Department of Natural Resources, January 15, 1997)

Lac qui Parle is 5,589 acres in size and is managed by the U. S. Army Corps of Engineers as a flood control impoundment. The maximum depth is about 15 feet and there are 37.7 miles of shoreline.

“The Lac qui Parle (Churchill Dam) is 4,100 feet long and comprised of 2 rolled earth fill dikes and a 237 foot long concrete control structure. A paved County State Aid Highway has been constructed to cross the river via the dam. The west section of the dam is an emergency spillway with an elevation of 941.1 feet”. (Lac qui Parle Area Management Plan, Minnesota Department of Natural Resources, January 15, 1997)

The U.S. Army Corps of Engineers is responsible for operating the Lac qui Parle dam primarily for flood control benefits, but secondarily for recreation benefits.

Minnesota Wild and Scenic River Designation

The Minnesota River is one of the state's six rivers which have segments designated as wild, scenic, or recreational under the state's Wild & Scenic Rivers Program. The Wild & Scenic Rivers Program was established in 1973 to protect rivers with significant natural, scenic, geographic, historic, cultural, and recreational values.

Each of the 7 designated river segments in Minnesota has a management plan which outlines the rules and goals for that waterway. These rules in conjunction with local zoning ordinances protect the rivers from pollution, erosion, overdevelopment, and degradation. They address such issues as development.

The segment between the Lac qui Parle dam to TH 212 in Montevideo is classified as scenic. From TH 212 in Montevideo to the Great Lakes Pipeline ¼ mile downstream of the Minnesota Falls dam in Granite Falls is classified as recreational. The segment from the Great Lakes Pipeline ¼ mile downstream of the Minnesota Falls dam to the Redwood County state aid highway 11 bridge near Franklin is classified as scenic.

Minnesota River Canoe and Boating Route

The Minnesota River is designated as a Canoe and Boating Route between Ortonville to Fort Snelling. The Department of Natural Resources publishes canoe and boating maps with descriptions of river segments, location of public access points, campsites, rest areas, navigational features and river miles. The Pomme de Terre and Chippewa rivers, tributaries of the Minnesota River are also designated Canoe and Boating Routes. The Redwood River is the state's newest Canoe and Boating Route, designated as such during the 2007 legislative session.

Water resources recommendations

Recommendation 1: There are state statutes and rules that pertain to the Wild and Scenic designation of the Minnesota River. The Division of Trails and Waterways will work with the local units of government and the Division of Waters when a specific alignment is being proposed to ensure that standards are being met.

Recommendation 2: Minimize trail development and maintenance impacts to adjacent water resources through the use of mulching, geo-textiles, silt screens and seeding to establish vegetation.

Recommendation 3: Strive to limit water crossings and obtain appropriate permits for any crossings.

Recommendation 4: Interpretive displays should emphasize the significance of the river, create an awareness of the water quality issues and river conservation efforts.

Recommendation 5: The trail can serve as a filter strip and riparian buffer strip. The benefit of the trail in this regard should be considered when the location of alignments are being determined .

Recommendation 6: Connections to the river and tributaries should be made whenever possible.

Recommendation 7: A trail too close to the river may be subject to bank failure affecting the alignment over time. Trail location must consider the potential impact of bank failure as preventing or mitigating this process is costly.

Vegetation

Vegetation of the Minnesota River Valley at the Time of the 1853 –1854 Public Land Survey

The map on the next page illustrates the vegetation of the Minnesota River Valley present in 1853-1854 as interpreted by Francis J. Marchner using the Public Land Survey records from 1853-1854. The contemporary names used today for the natural community types defined by Marschner are listed in parentheses after Marchner's names.

Prairie (mesic prairie, hill prairie, gravel prairie)

Tall-grass or mesic prairie characterized by big bluestem and Indian grass once existed across the counties adjacent to the Minnesota River. (Nearly all of this area has been cultivated or converted to pastures of eurasian grasses). Representative of the true prairie ecosystem, these areas blended into areas of oak woodland and brushland. Midsize grasses such as little bluestem were dominant on drier areas, sandy river terraces, and on steep south-facing bluffs and cliffs. Many of these areas have become overgrown with red cedar and other brush in the absence of fires.

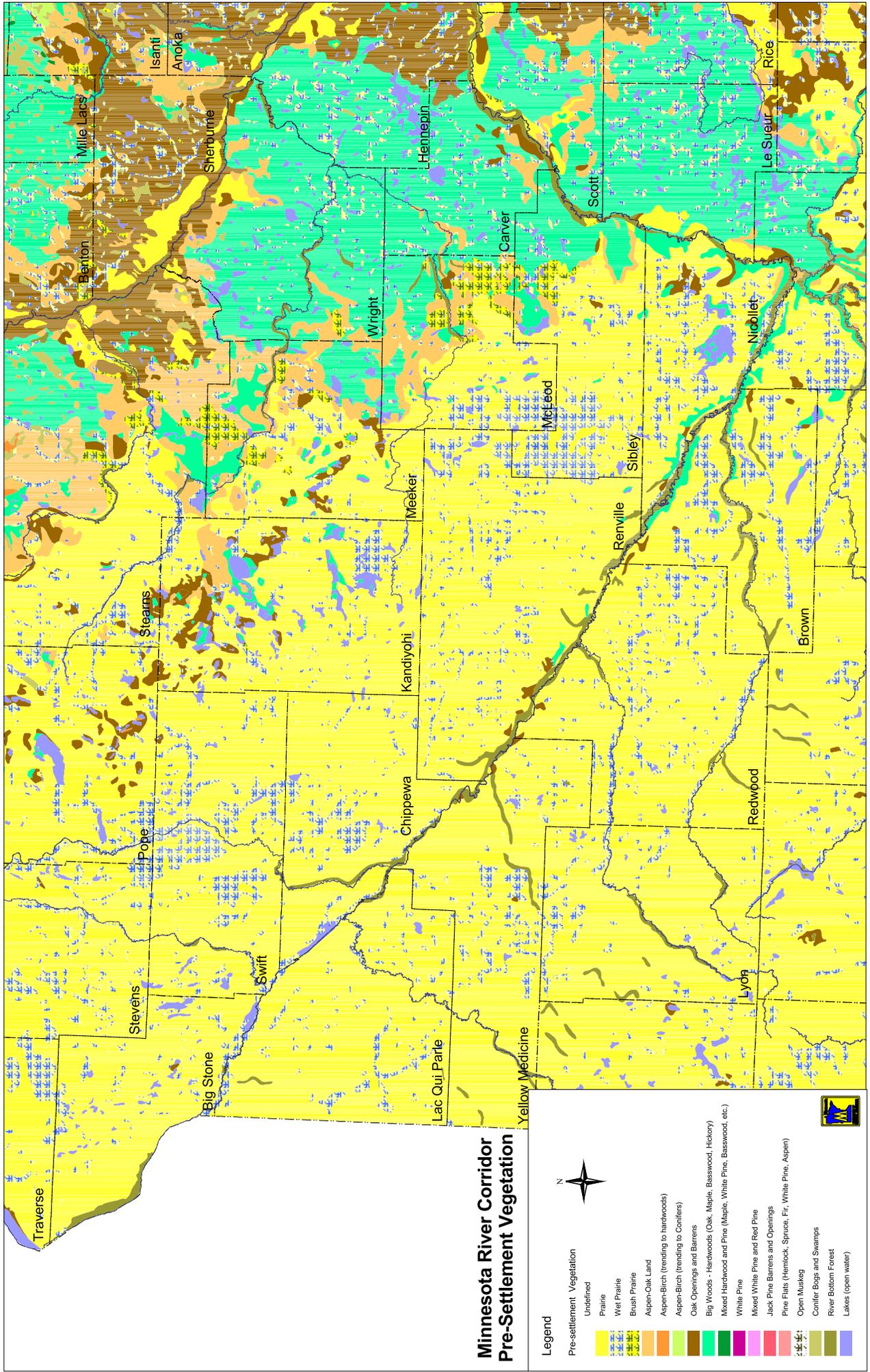
Wet prairies, marshes, and sloughs (wet prairie, seepage meadow, wet meadow, calcareous seepage fen)

Large prairie wetlands were in the floodplains of all major waterways. Smaller prairie wetlands were found along streams and other small tributaries, in seepage areas, and old oxbow sloughs. Prairie wetlands were also found in upland swales. Rushes, reeds, sedges, cattails, blue-joint grasses and cordgrass dominated these areas.

River bottom forest (floodplain forest)

These forests characterized the valley of the Minnesota River and its tributaries. These lowland sites were subject to periodic flooding and drought. Frequent spring flooding enriched the soil by depositing silt over the forest floor. Dominant trees included silver maple, American elm, green ash, black willow, and cottonwood. Sedges, woody climbers, poison ivy, and stinging nettle were among the most common understory plants.

The majority of the counties the Minnesota River flowed through were covered by upland prairie. The defining plants of upland prairie are big bluestem, little bluestem, Indian grass, needle grass and grama grasses. Floodplain forest was found in the valley. Silver maple, elm, cottonwood, and willow were the dominant species of this community. Scattered areas of prairie wetland were also found. Bluejoint grass, cordgrass, cattails, rushes and sedges defined this type.



Minnesota River Corridor Pre-Settlement Vegetation



- Legend**
- Pre-settlement Vegetation
 - Undefined
 - Prairie
 - Wet Prairie
 - Brush Prairie
 - Aspen-Oak Land
 - Aspen-Birch (tending to hardwoods)
 - Aspen-Birch (tending to Conifers)
 - Oak Openings and Barrens
 - Big Woods - Hardwoods (Oak, Maple, Basswood, Hickory)
 - Mixed Hardwood and Pine (Maple, White Pine, Basswood, etc.)
 - White Pine
 - Mixed White Pine and Red Pine
 - Jack Pine Barrens and Openings
 - Pine Flats (Hemlock, Spruce, Fir, White Pine, Aspen)
 - Open Muskeg
 - Conifer Bogs and Swamps
 - River Bottom Forest
 - Lakes (open water)

Vegetation of the Minnesota River Valley Today

Natural Communities

The vegetation pattern present at the time of the public land survey has been drastically altered. Most of the counties the trail will pass through have been converted to cropland or to pastureland. There are remnants of native plant communities. The Minnesota County Biological Survey (MCBS) inventoried and mapped the existing natural communities in the counties adjacent to the Minnesota River. The location of these communities can be found on the DNR website or by contacting the MCBS.

The location of these communities is an opportunity and constraint for trail acquisition and development. They are of interest to trail users as scenic amenities and also for educational purposes. Trail alignments can provide access to them, but should not fragment these natural communities.

Prairie was the largest ecosystem in North America. Only small patches remain. Prairie is comprised of grasses and composite family and legumes. Less than ½ of 1% remains of this once largest ecosystem in the United States.

The Minnesota County Biological Survey (MCBS) surveyed and mapped the rare plant and native plant communities in the Minnesota River Valley from 1987 – 2002. This information should be used as specific trail alignments are selected. The list of species that has been recorded for each segment is listed in the Appendices. The following report is an excellent reference for identifying the location of native plant communities and rare species in the Minnesota river Valley. This document should be consulted when trail alignments are being determined. Minnesota County Biological Survey. 2007. *Native plant communities and rare species of the Minnesota River valley counties*, Biological Report in Preparation, Saint Paul: Minnesota Department of Natural Resources.

Vegetation Management Recommendations

Recommendation 1: Revegetate areas disturbed by construction or in need of rehabilitation with plant species native to the area by collecting seeds from remnant prairie communities or by purchasing local genotype seed from a certified vendor. Native shrubs and trees should be used in landscaping trail access sites and waysides.

Recommendation 2: Efforts will be made to avoid impacting wetlands. Wetlands will be inventoried and a wetland mitigation plan will be prepared to address any identified impacted wetlands.

Recommendation 3: Complete a comprehensive inventory of the vegetation as segments of the trail are acquired.

Recommendation 4: Develop a vegetation management plan for the trail including plans for future prairie management and restoration.

Recommendation 5: Avoid planting and control any of the plants listed below; all of these plants are invasive non-native plants; most will diminish the health of native plant communities.

<i>Carduus nutans (Musk thistle)</i>	<i>Elaeagnus angustifolia (Russian olive)</i>
<i>Centaurea maculosa (Spotted knapweed)</i>	<i>Elaeagnus umbellata (Autumn olive)</i>
<i>Cirsium arvense (Canada thistle)</i>	<i>Glechoma hederacea (Creeping Charlie)</i>
<i>Cirsium vulgare (Bull thistle)</i>	<i>Hieracium aurantiacum (Orange hawkweed)</i>
<i>Euphorbia esula (Leafy spurge)</i>	<i>Lonicera tartarica (Tartarian honeysuckle)</i>
<i>Lythrum salicaria (Purple loosestrife)</i>	<i>Lotus corniculatus (Birdsfoot trefoil)</i>
<i>Rhamnus cathartica (Common buckthorn)</i>	<i>Melilotus alba (White sweet clover)</i>
<i>Rhamnus frangula (Glossy or Alder buckthorn)</i>	<i>Melilotus officinalis (Yellow sweet clover)</i>
<i>Robinia pseudoacacia (Black locust)</i>	<i>Digitalis lanata (Grecian foxglove)</i>
<i>Sonchus arvensis (Sow thistle)</i>	<i>Morus alba (Mulberry)</i>
<i>Acer ginnala (Amur maple)</i>	<i>Phalaris arundinacea (Reed canary grass)</i>
<i>Acer platanoides (Norway maple)</i>	<i>Iris pseudacorus (Yellow iris)</i>
<i>Berberis thunbergii (Japanese barberry)</i>	<i>Linaria vulgaris (Common toadflax)</i>
<i>Bromus inermis (Smooth brome grass)</i>	<i>Pastinaca sativa (Wild parsnip)</i>
<i>Cannabis sativa (Hemp or Marijuana)</i>	<i>Polygonum cuspidatum (Japanese knotweed)</i>
<i>Chrysanthemum leucanthemum (Oxeye daisy)</i>	<i>Tanacetum vulgare (Common tansy)</i>
<i>Caragana arborescens (Siberian peashrub)</i>	<i>Taraxacum officinale (Dandelion)</i>
<i>Convolvulus arvensis (Field bindweed)</i>	<i>Ulmus pumila (Siberian elm)</i>
<i>Alliaria petiolata (Garlic mustard)</i>	<i>Vicia cracca & Vicia villosa (Cow & Hairy vetch)</i>
<i>Berteroa incana (Hoary alyssum)</i>	<i>Coronilla varia (Crown vetch)</i>
<i>Butomus umbellatus (Flowering rush)</i>	<i>Miscanthus sacchariflorus (Amur silver grass)</i>
<i>Daucus carota (Queen Ann's lace)</i>	

Recommendation 6: Avoid negative impacts on rare and endangered species, and avoid fragmentation or disturbance of significant native plant communities identified by the Minnesota County Biological Survey.

Wildlife

The Minnesota River Valley Landscape provides habitat for a diversity of species. The natural areas in the valley are of particular importance and have the richest species diversity.

Birds

The following excerpt from the publication *Birding Trail: Your Guide to Great Birding Along the Minnesota River* describes the species of migrating birds that can be observed in the Minnesota River Valley.

Depending on Minnesota's fickle weather, the spring bird migration can start early in the Minnesota River valley. Horned Lark and Bald Eagle are often the first migrants, appearing in the valley while the fields are still snow covered and rivers and lakes are frozen solid. As the March sun climbs higher in the sky and its returning strength creates shallow snow melt pools and small open spots on area lakes, geese and ducks begin to move back into the region.

Canada and Greater White-fronted Geese are the first to arrive, followed by Snow Geese and occasionally Ross's Geese, a rare sighting in Minnesota. Ring-billed and Herring Gull and Common Merganser are the first to show up on the slowly thawing lakes and rivers. Waterfowl, especially "puddle" ducks: like Mallard, Northern Pintail, Gadwall, Northern Shoveler, American Wigeon and Green-winged Teal flock to the open water along with the geese. As the amount of open water increases, an array of diving ducks – Lesser Scaup, Redhead, Canvasback, Hooded Merganser, Common Goldeneye, Bufflehead and Ring-necked Duck – put in an appearance.

By late March, raptors, especially Red-tailed Hawk, Northern Harrier and American Kestrel, move into the valley. As the days grow warmer, large flocks of Red-winged and Rusty Blackbird, Common Grackle and groups of Eastern Bluebird and American Robin flood into the region. Eastern Phoebe and Song Sparrow start singing along the edges of flowing streams.

By early to mid-April, the Minnesota River is usually open and most of the lakes are at least partially free of ice. Water birds including heron abound. Early April is the time when Tundra Swan return from Chesapeake Bay to their traditional resting and feeding areas, especially in the Minnesota Valley National Wildlife Refuge. Long-eared Owl and Northern Saw-whet Owl are not often considered migrants, but early April is a good time to search for them in the stands of Red Cedar found in many of the river valley's wildlife management areas. While Tree Swallow have already been back for a week or two, mid-April sees the arrival of other swallow species along with the Yellow-rumped Warbler; Brown Thrasher; Hermit Thrush; Winter Wren; Northern Flicker; Yellow-bellied Sapsucker; Ruby-crowned Kinglet; Purple Finch; Red-breasted Nuthatch; and Fox, Vesper and White-throated Sparrow. By late April more species of Sparrow such as Lincoln's and Savannah Sparrow arrive. Early warblers – Pal, Orange-crowned, Nashville and Black-and-white – appear the last few days of the month. When May begins migration picks up speed and intensity. Baltimore Oriole; Rose-breasted

Grosbeak; Gray Catbird; Swainson's, Gray-cheeked and Wood Thrush; Veery; flycatchers; and of course warblers and vireos stream into the woods and brush areas of the watershed. On a good birding day during the first two weeks of May, it is possible to log 100 or more species in many parts of the valley. Spring migration is usually over by the end of May as late migrants like Marsh and Sedge Wrens, Eastern Wood-Pewee, cuckoos and Mourning Warblers move in the area.

While nesting season has begun for some species by the end of May, it really begins in earnest in June. In July the woods become relatively quiet as fall migration approaches. Early in the month the first retuning shorebirds – Lesser Yellowlegs and Least, Pectoral and Solitary Sandpipers – arrive and stay if suitable mud flats are available. If not, they move on.

Migration in the fall is a much more leisurely and drawn out event than in the spring. Birds wander in and out of the valley, staying in one location for days, their activity noticeably less intense than in the spring. By the last two weeks of August, migrant warblers, flycatchers and vireos put in an appearance. Early to mid-September, songbird migration is in full swing, but it is a more relaxed rerun of what happened in May that plays out in the watershed's woods and fields.

Beautiful weather with cool, sunny days and lots of birds make October a favorite month for many birders. It is also the month when many of the rarer, casual or accidental species show up in the river valley and the rest of Minnesota. White-crowned, Harris's, Lincoln's and White-throated Sparrow are commonly spotted in the brushy edges along woods and roads. Look for LeConte's Sparrow in wet, grassy areas on a calm, frosty, sunny October morning. Just after sunrise is the best time to look for them. American Pipit, which are more common in the fall, frequent wet areas and shores in and around the valley. This is also a good time to look for Smith's Longspurs at the Red Rock Prairie in Cottonwood County. Geese and waterfowl migrate through the river valley in large numbers as raptors use the updrafts along the river bluffs to speed their way through the area. Flocks of Lapland Longspur feed on upland fields of harvested soybeans and grain.

As November progresses, the first signs of winter birding appear. Flocks of Dark-eyed Junco and American Tree Sparrow replace the sparrows that have already moved south. The first Northern Shrike and Golden Eagle appear in the valley by late November and good numbers of Bald Eagle, both adult and immature, are watched as they move through the valley. By Thanksgiving, the watershed settles into its winter mode and resident Black-capped Chickadee, crows, woodpeckers, Great Horned and Barred Owl, White-breasted Nuthatch, pheasants and Wild Turkey take over the landscape. American Robin, Cedar Waxwing, a few Eastern Bluebird and if you're lucky a Townsend's Solitaire may be found wintering in the cedars along the river bluffs, especially in Renville and Redwood Counties.

The relative quiet of winter in the watershed from late December through late February is just a prelude to the rush of migrants that will start to appear again in early March.

Mammals

The Minnesota River Valley provides habitat for a diversity of mammals. The white tailed deer is a commonly observed species in the valley and uses the wooded bottomlands as its primary wintering habitat. Other species include: eastern cottontail, white-tailed jackrabbit, gray squirrel, fox squirrel, raccoon, deer, beaver, muskrat, mink, coyote, red fox, gray fox, badgers, weasels, and skunks. Otter are beginning to recover within the Minnesota River and its adjacent tributaries, and utilize wooded riparian areas as shelter. Smaller mammals include white-footed mouse, deer mouse, shorttailed shrew, meadow jumping mouse, meadow vole, prairie vole, masked shrew, and redbacked vole.

Invertebrates

Numerous species of invertebrates inhabit the Minnesota River Valley, including some of management concern. These include the regal fritillary butterfly, the Ottoe skipper, and the Arogos skipper. These are prairie dependant species that require remnant prairie for survival and are negatively affected by habitat fragmentation and habitat deterioration due to exotic species and invasive native red cedar.

Reptiles and Amphibians

Rocky outcroppings and other dry areas provide habitat for reptiles. The wetland areas provide habitat for a variety of amphibians. Following is a list of reptiles and amphibians that may be seen in the valley spring through fall.

Smooth soft-shell turtle	Smooth green snake
Western spiny soft-shell turtle	Brown snake
Snapping turtle	Milksnake
Western painted turtle	Mudpuppy
Five-lined skink	Eastern tiger salamander
Northern prairie skink	Redback salamander
Red-bellied snake	American toad
Red-sided garter snake	Dakota toad
Plains garter snake	Great plains toad
Plains garter snake	Canadian toad
Bull snake	Western chorus frog
Fox snake	Swampy tree frog
Hog nose snake	Gray tree frog
	Northern leopard frog

Fish

Minnesota River

The DNR, Section of Fisheries conducted a fish population assessment (Minnesota Department of Natural Resources, 2000) in the Minnesota River in August of 1998. The purpose of the survey was to compile a species list for the Minnesota River. In addition, information on relative abundance, distribution, age, and growth was also obtained. Electrofishing, trapnetting, trotlining, and seining methods were used to sample the population. River sampling segments were similar to those utilized in a 1992 assessment.

A total of 33,777 fish were caught in the 1998 assessment. These fish represented 15 families and 68 species. In 1992, 17,603 fish representing 15 families and 64 species were caught. Table 1 lists the fish represented in the 1998 assessment. The redbfin shiner, blue sucker, and slender madtom were documented for the first time. Over 50% of the sample was collected with ¼ inch mesh trap nets. The most numerous fish sampled were orangespotted sunfish. Northern pike, channel catfish, flathead catfish, smallmouth bass, largemouth bass, sauger, and walleye totaled 3.2% of the fish caught in the sample.

Fish found river wide included northern pike, walleye, black crappie, white crappie and channel catfish. Greater numbers of walleye and northern pike were collected in the upper segment (Browns Valley to Watson) of river. Twenty species including redbfin shiner, blue sucker, shovelnose sturgeon, American eel, flathead catfish, smallmouth bass and sauger were collected below Minnesota Falls. Fourteen species were only caught above Minnesota Falls. Flathead catfish and smallmouth bass were collected in the upper segment in 1992, but were absent in 1998.

Minnesota Falls and the dam at Granite Falls impede movement for many species except during high flow. Other habitat differences may also account for limited species diversity above Granite Falls.

Sediment, nutrients and pathogens have negatively impacted the Minnesota River in terms of its attraction for recreational use including fishing. However concerted efforts are being made by government entities and citizen groups to improve the quality of the river.

Table 1: Species collected during the 1998 Minnesota River Population Assessment

shovelnose sturgeon	fathead minnow	brook stickleback
shortnose gar	blacknose dace	white bass
bowfin	creek chub	rock bass
American eel	river carpsucker	hybrid sunfish
gizzard shad	quillback	green sunfish
goldeye	highfin carpsucker	pumpkinseed
mooneye	white sucker	orangespotted sunfish
northern pike	blue sucker	bluegill
common carp	northern hog sucker	smallmouth bass
brassy minnow	smallmouth buffalo	largemouth bass
hornyhead chub	bigmouth buffalo	white crappie
golden shiner	silver redhorse	black crappie
pugnose shiner	golden redhorse	Iowa darter
emerald shiner	shorthead redhorse	Johnny darter
river shiner	greater redhorse	banded darter
common shiner	black bullhead	yellow perch
blacknose shiner	yellow bullhead	logperch
spottail shiner	brown bullhead	blackside darter
rosyface shiner	channel catfish	slenderhead darter
spotfin shiner	slender madtom	sauger
sand shiner	stonecat	walleye
redfin shiner	tadpole madtom	freshwater drum
bluntnose minnow	flathead catfish	

Species sampled in 1998 of particular interest include sturgeon and paddlefish, - primitive fishes with skeletons comprised mostly of cartilage, and few bones. Shovelnose sturgeon are not common or abundant but have been found in the segment of river between Fort Snelling and Granite Falls. Lake sturgeon, the largest of Minnesota's fishes, have been recorded, but are considered rare.

Blue catfish, shovelnose sturgeon, lake sturgeon, paddlefish and brook lamprey have been designated as Special Concern fishes by the Minnesota Department of Natural Resource's Heritage Program. A species is considered a species of special concern if, although the species is not endangered or threatened, it is extremely uncommon in Minnesota, or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations.

Lakes

Three lakes (Big Stone, Marsh, and Lac qui Parle) are located in the upper reaches of the Minnesota River and provide angling opportunities for the public. The following information about the fishery in these lakes is summarized from DNR Lake Information Reports.
<http://www.dnr.state.mn.us/lakefind/results.html>

Big Stone Lake

Big Stone Lake is managed primarily for walleye and yellow perch by the Minnesota Department of Natural Resources in cooperation with South Dakota Department of Game, Fish and Parks. Regulations regarding the number and size of fish are monitored, assessed, and modified on an ongoing basis to provide a good fishery. Between 1996 and 2003, a 14-inch minimum size limit on walleye was in place. It was concluded that this created an over abundance of slow growing walleye and the 14 inch size limit was changed. In 2004, a daily limit of four walleye, one of which could be 20 inches or larger was instituted. Impacts of the special regulations are being evaluated, and it appears this strategy is increasing the abundance of walleye. Walleye are also stocked in Big Stone Lake. Fry stocking has been responsible for maintaining the Big Stone Lake walleye population. Natural reproduction is also contributing substantially to the population.

Yellow perch were abundant in 2005. It is anticipated that anglers will see an increase in the size of perch caught. White bass are reproducing well. In 2005, bluegill were low in abundance, but anglers experienced best success in late summer and late winter. Sampling in 2005 indicated that freshwater drum were abundant in 2005. This species is important food for walleye. Black crappie, channel catfish, largemouth bass and northern pike were sampled in low abundance. Fisheries' management for this lake includes annual fisheries assessments, annual monitoring of winter dissolved oxygen and angling pressure, stocking as needed, and improvement of water quality and habitat within the watershed.

Marsh Lake

Marsh Lake is managed primarily for northern pike. There is good spawning and rearing habitat for northern pike in the seasonally flood wetlands in the watershed. According to the DNR Lake Information Report, northern pike were moderately abundant in 2003. Yellow perch were moderately abundant as well. Common carp were abundant, which could negatively impact gamefish habitat. Twenty-five additional species were sampled during the 2003 assessment, including low numbers of black crappie, bluegill, largemouth bass, white bass, and white crappie. The fisheries management plan for Marsh Lake includes continued support of local, state or federal agencies in their efforts to improve water quality and fisheries habitat, annual monitoring of winter dissolved oxygen and fishing pressure, annual assessment of young of the year walleye abundance, stocking as needed, and assessments every third year to evaluate fish populations.

Lac qui Parle Lake

DNR manages Lac qui Parle primarily for walleye and northern pike. A 15 inch limit, implemented in 1996, was determined ineffective in increasing the average size of walleye and may have caused an overabundance of small walleye. This size regulation was abolished in 2005 and changed to a limit of four fish, one of which can be 20 inches or larger. Walleye was stocked in the fall of 2004 and spring of 2005. Stocking contributed the abundance of walleye and the population has improved. Sampling in 2005 indicated that northern pike abundance was typical for the lake. Construction of a northern pike spawning area, completed in the summer of 2004, contributed to improved reproduction. Most recent sampling indicated that channel catfish were present at the upper end of the normal range and that reproduction was high. Black and white crappie were at the lower end of the normal range when last sampled and anglers have reported fair success in spring and winter. White bass abundance was high. Bluegill and yellow perch abundance was low, although bluegill anglers reported fair success in 2005. Fisheries management activities include stocking walleye fry, monitoring of winter dissolved oxygen, monitoring of fishing pressure, and population assessments.

Mussels

In 1989, the DNR Division of Wildlife surveyed mussel populations in the Minnesota River. (Bright, R.C., Gatenby, C., Olson, D., & Plummer, El, 1990). The purpose of this study was to obtain information on the diversity, distribution, abundance, and reproductive success of mussels in the Minnesota River. Fifty-nine sites were surveyed and 1,268 mussels, representing 20 species, were studied.

The fossil record in the valley indicates that mussels were abundant and diverse before European settlement. Forty native species have been reported in the river since the 1800s. Results of the 1989 survey concluded that 17 species have been extirpated. Many species, present in the river today, are considered at risk. The survey found that there were no signs of reproduction or recruitment (additions to the population by juveniles that don't die) at many of the sites studied. Reproduction or recruitment ranged from good to poor at other sites. Density was found to be low at most sites. Highest densities and diversity were found just below dams.

The main stem of the Minnesota River was again surveyed in the summer of 2006. Results indicate that there is some evidence of mussel recovery in terms numbers of mussels. The data have not been extensively summarized at this time.

Limiting factors for mussel populations include drought, unstable substrates, siltation and chemical pollution. Natural and human effects have affected the mussel population in the Minnesota River. A quote from the 1998 survey concluded the following:

“Extreme natural events have always caused periodically high mussel mortality, but the fauna has recovered. These include such phenomena as periodic droughts that restrict or eliminate habitat and permit abnormally high water temperature, periodic low DO's (dissolved oxygen) induced by algal booms, and cyclic spring floods that create high turbidity. Human alteration of the river from various chemical additives, increased runoff

and siltation caused by the spread of agriculture in the basin, and commercial clamming have all contributed additional stress to the system in historical times. This combination of natural and human effects has suppressed the abundance of mussels in the Minnesota River and therefore has increased their chance of extirpation to the point that many local communities are continually prohibited from complete recovery.” (p.32).

A list of the mussels present in the river and detailed description of the survey results are contained in the report, “A Survey of the Mussels of the Minnesota River”, 1989 by Robert C. Bright, Catherine Gatenby, Dawn Olson, and Elizabeth Plummer, published by the Bell Museum of Natural History, 1990.

Special Concern, Threatened or Endangered Animal Species

A search of the Minnesota Natural Heritage database indicated the endangered, threatened or special concern species that have been documented within the trail corridor. These species are protected by state law. Protecting their habitat should be considered during trail planning, development and maintenance. Before specific trail alignments are selected, the Minnesota Natural Heritage database should be consulted for locations where these species have been identified. A list of them is included in the appendices.

Angling

Angling is a popular and important recreational activity on the Minnesota River. The DNR, Division of Fish and Wildlife conducts creel surveys to determine angling use and satisfaction. This type of survey was conducted on 110.5 miles of the Minnesota River between May and October in 1998, (Minnesota Department of Natural Resources, Division of Fisheries, 2001). Results of this survey determined that 49,311 hours of angling occurred on the river, with an average of 448 hours/mile. The most sought after species were channel catfish and flathead catfish. Carp, channel catfish, and freshwater drum were the most frequently caught fish out of nineteen species caught by anglers. This survey also estimated the amount of money spent by anglers. An estimated \$15,807 were spent by anglers. An average of \$18 per trip were spent for residents and \$82 per trip for non-residents. Anglers rated their satisfaction with numbers and sizes of fish caught as low.

Wildlife Recommendations

Recommendation 1: Create angling and education opportunities where the trail intersects angling opportunities and fish (aquatic) habitat.

Recommendation 2: Trails and Waterways will work with the DNR Section Fisheries in trail design where the trail intersects with the Minnesota River and its tributaries to ensure that angler, fish (aquatic) habitat, and trail user needs are met.

Recommendation 2a: Assess the trail-river intersections as to suitability for development of shore fishing sites and “fishing pads” which promote the use of the river for fishing by all people, including those with disabilities.

Recommendation 2b: Trail construction at water crossings should not occur between October 15th and April 15th so that it does not coincide with spawning or migration of fish or other aquatic organisms. Silt plumes that may result can negatively affect habitat for fish, native mussels and other aquatic organisms.

Recommendation: 2c: Develop and maintain areas of quiet and solitude for resource enthusiasts, including but not limited to anglers.

Recommendation 3: Hydrologically engineered bridges are the preferred alternative for crossing rivers, creeks and streams. In-stream water crossings should be avoided to prevent destruction of in-stream fish (aquatic) habitat and to prevent erosion, silt suspension and movement of sediment downstream.

Recommendation 4: Minimize floodplain encroachment and impacts,

There are several land protection and land management programs (federal, state, and non profit) that are working to preserve plant and animal habitat in the Minnesota River Valley on public and private lands.

Wildlife Management Areas

Wildlife management areas (WMAs) are established to protect lands and waters that have a high potential for wildlife production, public hunting, trapping, fishing, and other compatible recreational uses. They are the backbone to DNR's wildlife management strategy through:

Protection of wildlife habitat for future generations,
provision of opportunities for hunting, fishing and wildlife watching
promotion of significant wildlife-based tourism in the state.

The habitats protected and managed range from prairies and wetlands to forests and brushlands. Hundreds of thousands of hunters use these public wildlife lands. Pheasants, waterfowl, deer, and ruffed grouse are the major game species hunted, but WMAs also provide wild turkey, sharp-tailed grouse, rabbit, and squirrel hunting. Wildlife resources are very important to Minnesota; 15 percent of Minnesotans hunt and 52 percent of Minnesota residents watch wildlife, the highest participation rate in the country. Hunting and wildlife watching are a \$1 billion dollar industry in Minnesota.

Wildlife managers' work is directed toward protecting and enhancing wildlife habitat on WMA lands. For instance, prairie and grasslands are planted to provide prime nesting cover critical to waterfowl and pheasant production. Wetlands are restored and enhanced to benefit waterfowl and other wetland wildlife species. Pheasants also find excellent winter cover in cattails and other marsh vegetation. Prescribed burning done to maintain grasslands, prairies, and brush lands is important to sharp-tailed grouse and prairie chickens. Forest openings and regeneration projects benefit ruffed grouse, wild turkeys, deer, and moose. Wildlife food plots are managed to feed both resident and migratory wildlife. Woody shelter belts are planted to provide winter cover and nesting sites for upland birds and a variety of nongame species as well.

There are 10 wildlife management areas within the trail corridor search area. They are both an opportunity and a constraint for acquisition and development of the trail. Current policy does not allow the development of trails on WMA's. However, bringing the trail to and past WMA's will provide trail users the opportunity to access these areas which are scenic and great places to observe wildlife and native plants.

Conservation Reserve Enhancement Program (CREP)

CREP is a land retirement program focused on the 37 counties that make up the Minnesota River Watershed. Landowners receive cash payments for acres that they retire. The program's primary benefits include enhancement of wildlife habitat and improvement of the water quality of the Minnesota River and its tributaries.

Federal Waterfowl Production Areas

Waterfowl Production Areas are managed by the U.S. Fish and Wildlife Service and are part of the National Wildlife Refuge System. The purpose of Waterfowl Production Areas is to preserve wetlands and grasslands critical to waterfowl and wildlife. Approximately 95% of WPAs are located in the prairie pothole areas of North and South Dakota, Minnesota and Montana.

Prairie Bank

In 1987, the Minnesota state legislature created the Native Prairie Bank program as part of the Reinvest in Minnesota legislation. This program allows landowners to protect native prairie on their property through a conservation easement with the Minnesota Department of Natural Resources(DNR). Permanent easements receive priority.

Easements reward landowners and their families for preserving prairie in its natural state. Landowners receive payment for their native prairie land while keeping it in private ownership, to pass on to future generations. Certain agricultural practices are included in some easements, such as livestock grazing, mowing for hay or harvesting of native seed.

References

Bright, R.C., Gatenby, C., Olson, D., & Plummer, El (1990). A survey of the mussels of the Minnesota River, 1989.

Minnesota Department of Natural Resources. "Big Stone Lake". Lake information report. <http://www.dnr.state.mn.us/lakefind/showreport.html?downum=06015200>

Minnesota Department of Natural Resources. "Lac qui Parle". Lake information report. <http://www.dnr.state.mn.us/lakefind/showreport.html?downum=37004600>

Minnesota Department of Natural Resources. "Marsh Lake". Lake information report. <http://www.dnr.state.mn.us/lakefind/showreport.html?downum=06000100>

Minnesota Department of Natural Resources, Division of Fisheries. (2001). Angler Creel Survey of a 110 Mile Segment of the Minnesota River 1 May 1998 – 31 October 1998.

Minnesota Department of Natural Resources. (2000) Completion report: assessment of the fish populations of the Minnesota River.

Historical

The following section in italics is excerpted from the *Upper Sioux Agency State Park Management Plan*, Minnesota Department of Natural Resources, Division of Parks and Recreation, 2006.

Paleoindian Tradition 12,000 – 8000 years ago

*This period of time witnessed significant changes in landscape, climate and vegetation in the Minnesota River Valley. Prior to the beginning of this period, portions of Minnesota were still covered by glacial ice and the river valley as we now know it, had not yet been formed. Then over a period of several thousand years, Glacial Lake Agassiz began to drain to the south, releasing melt waters that eventually created the current Minnesota River Valley. As the post-glacial climate warmed, the vegetation during this period changed from tundra and spruce forest to mixed deciduous and coniferous forest, with prairie to the west. The Paleo-Indian tradition is thought to have included small, nomadic groups of people who hunted large mammals such as woolly mammoth and the giant bison (*Bison occidentalis* – now extinct) present in the region. As early as 10,000 years ago bison were hunted without the use of horses or bow and arrow. On the southwest side of Granite Falls, is the Peterson bison kill site. The University of Minnesota conducted research at this private site and estimated that the artifacts are from 5,000 to 9,000 years ago. Little is known about these earliest people in the Minnesota River Valley for they left very little evidence. Archaeologists estimate these people followed a nomadic lifestyle from about 12,000 to 8,000 years ago. This cultural period is associated with various forest types and it probably witnessed the warming climate and the changing of forest to grassland in this part of North American and Minnesota. The other evidence of these people is at the head of the Minnesota River Valley at Brown's Valley, Minnesota and at the Hildahl bison kill site above Granite Falls, Minnesota.*

Archaic Tradition 8,000 – 3,000 years ago

The Archaic tradition in the Minnesota River Valley is characterized as having shifting climate and environmental changes. For the first half of the period, the climate gradually became warmer and drier, and the vegetation became more prairie-like. And then for the remainder of the period, the climate became cool and moist, and the deciduous forest became more prominent, invading from the east. The cultures living at the time are thought to have been the more western prairie inhabitants who hunted bison, in addition to the more eastern woodland inhabitants who were general hunters and gatherers.

Woodland Tradition 3,000 – 350 years ago

During the Woodland tradition, changes in the landscape, climate and vegetation of the Minnesota River Valley were slowing down and the resulting cultures are thought to have been more stable or least more sedentary. Ceramics, earthen mounds and horticulture started to appear during this time.

Plains Village/Oneota/Mississippian/Missouri Traditions 1,000 –350 years ago

This time period was a cultural transition period. Traditional nomadic hunting and gathering was slowly becoming a basic subsistence and settlement pattern. This change was made possible through the development of limited horticulture and ceramics. Crops such as corn, beans and squash were cultivated. There is evidence of long-distance trading between complex regional

cultures. People of this cultural time period located habitation sites on islands, peninsulas, and isthmuses of lakes. Later they moved to terraces above floodplains, which allowed them easy access to floodplain gardens that were easily cultivated and watered.

Evidence for this cultural time period in the Minnesota River Valley is limited. The Minnesota Historical Society site file indicates there are 57 recorded archaeological sites along the Minnesota River Valley between Redwood Falls and Montevideo. Many are in the area of Granite Falls and east along the river bluffs. Since the Minnesota River was a major travel route and hunting area for people of their cultural period, it is not uncommon to find Indian artifacts along its bluffs. Some artifacts were found during historical research excavations by MHS, which indicate use of the park bluffs for Indian camps prior to European immigration. An archeological survey of the entire park has not been completed.

Dakota People And Culture circa 300 years ago to present

The Dakota have lived in the Lower Minnesota River Valley since at least 1700 A.D. Accounts of the Dakota Culture can be found alive today in the stories told by current members of the tribes (Mdewakanton, Wahpeton, Sisseton and Wahpekute) and by historical records from European explores, missionaries, traders and settlers. In essence, their lives centered on the changing seasons and the resources that were seasonally available in the Minnesota River Valley for use in food, shelter and clothing. They were the dominant culture in central and southern Minnesota.

The Sisseton and the Wahpeton Dakota occupied a territory that was centered on the Minnesota River, and extended south into the Prairie des Coteau region, northwest towards Big Stone and Traverse Lakes area, and east into the Alexandria Moraine complex of central Minnesota, and into the Big Woods area. The Dakota also had the opportunity to interact with other tribes on the edges of their territories.

Jerome William De Wolfe, a descendent of the Iyangmani, reports that Iyangmani's village was in the meadow along what is now the park shop road, where the trail loops around a little meadow and back to the shop road. The village gardens were in the bottomlands of the Yellow Medicine River. According to a tribally sponsored archaeological survey, Iyanmani's village was along the ridgeline about one mile west of the park.

De Wolfe also confirms that Mazomani's "brick home" once stood on the terrace above the campground sanitation building. There is also a hand drawn map in the park files that shows this location.

European Contact

Wanderers and adventurers probably made contact with the Dakota in the early 1600s. Religious missionaries made contact with the Dakota in the 1680s and recorded their encounters. With the arrival of French and English explorers in the early 1700s, and later, fur traders, the Dakota way of life was to change forever. Trading posts were established and treaties were signed. Entrepreneurs began a growing trade with the Dakota in the late 1700s. One such trading post was located several miles southeast of the park near a place called Patterson's Rapids. By the early 1800s, British, French, and American fur companies had extensive fur trade networks and contacts with the Dakota.

Treaties and the Agencies

The United States government had a strong interest in acquiring the lands occupied by the Dakota people. Several attempts were made to buy portions of Dakota lands during the 1830s and 1840s through treaties. Although the early treaties were agreed upon by Dakota and U. S. Government officials, Congress never provided enough money to pay the amounts or deliver the services stipulated in the treaties, or failed to ratify the treaties altogether. The pressure on the Dakota to sell more of their land to the U.S. Government increased. There were four tribes of Santee Dakota (Sioux): the Mdewakantons, Wahpekutes, Sissetons, and Wahpetons.

In 1837, as wild game and opportunities for livelihood decreased, the Dakotas agreed to sell about 5 million acres of their land to the federal government for \$1million. The government did not fulfill its obligations.

On July 23, 1851, one of the most significant Indian treaties in our nation's history was signed at Traverse des Sioux. The Treaty of Traverse des Sioux by which the upper Dakota bands (Sisseton and Wahpeton) ceded all of their lands in Iowa and Minnesota east of the Red River-Lake Traverse-Big Sioux River in return for a tract of land ten miles wide on both sides of the Minnesota River from Traverse Lake to the Yellow Medicine River. Two weeks later at Mendota, a treaty was signed with the lower bands of the Dakota (Mdewakanton and Wahpekute). The government established two administrative centers, the Upper and Lower Sioux agencies that would administer the terms of these treaties. These treaties were instrumental in opening the American west to European settlement. The result of these treaties was that essentially all Dakota land west of the Mississippi, except for the specified reservations, was ceded to the U.S. government.

Over 24 million acres in Minnesota were ceded by the Dakota in exchange for reservation lands and for \$3 million to be paid over a 50-year period in annual annuities of goods and money – about 12 cents an acre for some of the finest agricultural land in the country. Before ratifying the Treaty, the U.S. Senate added amendments that weakened the Dakota position. Even with the changes, the terms of the treaty were not entirely honored by the U.S.

In return the Wahpeton and Sisseton would receive annual payments and provisions, and have schools established for them. The terms of the treaty would be administered at an agency site in their traditional homeland. That agency was eventually located at a site where the Minnesota and yellow Medicine River meet and would be know as the Yellow Medicine or Upper Sioux Agency. The treaties left about 7,000 Dakota with two reservations, each 20 miles wide and 70 miles long, with a 10-mile strip on each side of the Minnesota River.

Construction of the Yellow Medicine Agency (Upper Sioux) began in 1854 on the west bank of the Yellow Medicine River. Because of flooding and poor building sites on the west bank, construction was concentrated on a bluff overlooking the Minnesota River. All buildings were built of locally manufactured brick. In 1862, the buildings at the agency included a warehouse with an attached doctor's office, offices and quarters for the agent, a stable, a two-story manual labor school, numerous employee residences, a jail, a bake house and oven. Five cisterns stored the agency's water supply. Besides the necessary government buildings there were several stores and the village

had at one time, sixty-two inhabitants. Doctor Wakefield, the government doctor at the agency, was the first to live in the house that now stands reconstructed.

There are a number of sites in the Minnesota River Valley that document the major historic themes of the valley.

Early exploration

The earliest European explorer in the valley was Joseph Nicollet, who, in 1838, was charged with mapping and looking for resources.

Fur trading

The fur traders arrived first. Both French and British fur traders trapped beaver and other animals and established fur trading posts. Fort Renville is one of these posts. Built by Joseph Renville, an independent fur trader. Patterson Rapids is another site of a fur trading post.

Oxcarts were used to transport furs to markets. Wagon ruts can be seen today in Lac qui Parle Village.

Settlement

Farmers came next. Early settlers used the river for transportation. The construction of railroads accelerated settlement and conversion of prairie to farmland. The county historical museums tell the stories of early settlement and farming. Historic farm buildings are prevalent in the area.

Railroads

Historical Context

European settlement of the Minnesota River Valley area became possible after the Traverse des Sioux Treaty of July 23, 1851 and the Mendota Treaty of August 5, 1851, which ceded most of the Dakota lands of southern Minnesota west of the Mississippi River to the federal government. Following the U.S. Congressional Act of August 4, 1854 (10 Statute 576) these lands became available for pre-emption claims, despite the fact that the land being claimed may have not yet been surveyed by the U. S. General Land Office. The public response to this opening of lands was profound. Settlers packed aboard steamboats by the thousands and headed for Minnesota.

With a rush towards settlement, “wheat production on the river terraces and surrounding prairies of southeastern Minnesota stimulated the prosperity of farmers, and many small “flouring mills” were set up on the streams. Flour was a “money” crop that made some people affluent. Ox teams carried wheat through river valleys to market and brought lumber on the return trip.” (Waters, p.251). With the pressure to process wheat into flour, millwrights were searching for mill locations throughout the newly opened lands. Above Saint Anthony Falls, the Elk, Crow and Rum rivers were claimed for grist mill sites. Below the falls, the Vermillion, Cannon, Zumbro and Root rivers were harnessed, and the Minnesota River was searched as far up as the Indian reserved lands, including mills on the Big Cottonwood, Blue Earth, Watonwan, Le Sueur and smaller tributary rivers (Frame, p. 16).

Railroad corporate and building histories illustrate how the agricultural market areas of the Minnesota River Valley were connected to a growing Minneapolis and Saint Paul market dominated

by the flour mills of Saint Anthony Falls. Secondly, with growing rail networks, these markets were linked to Duluth, Milwaukee, Chicago and other places hundreds of miles from Minnesota. The information in these timelines will help corroborate and date local railroad history and help to understand how local rail lines were eventually merged into national rail networks.

A quick glance at the 1917 Minnesota River Valley railroad map will show a great cluster of activity between Saint Peter and Mankato. This comprises an area of concentrated dolomitic limestone quarries. Settlers in the Minnesota Valley built foundations of this material, and railroad builders, before the days of concrete, found this stone admirable for bridges, culverts and roadbeds. J. J. Hill, builder of the Great Northern railroad, used this stone to build his stone arch bridge in the Minneapolis milling district. By the time concrete replaced this structural stone (known as Kasota stone) for heavier construction, quarrying and finishing tools had been vastly improved, and it was possible to use this stone much more widely as finishing stone for buildings. Architects throughout the United States began demanding this stone for important buildings. One of these buildings was the Telephone Building in downtown Minneapolis (Federal Writer's Project, 1985, p. 99).

The following timeline will document when and by whom railroads began to eclipse steamboat trade. Riverboats extended, under optimum conditions, from Saint Paul to Mankato and beyond. By river, the distance from Saint Paul to Mankato was 148 miles, but it was only 84 miles by rail. By river, the distance from Saint Paul to New Ulm was 208 miles, but it was only 110 miles by rail. Rail followed most of the natural route of the Minnesota River Valley, with the exception of only two stretches between New Ulm and Redwood Falls, totaling about 55 miles. To piece together the railroad history of the Minnesota River valley, a useful source is the *1917 Railroad Commissioner's Map of Minnesota*. This map gives a snapshot-in-time from an era when railroad alignments were reaching their peak development.

Rail Network in the Minnesota River Valley Fairfax to Ortonville

Based Upon Railroad Commissioner's Map of Minnesota, 1917

Legend	Railroad Abbreviation Key
— Abandoned Rail	CGWRR: Chicago Great Western Railway
 Active Railroad	CMSP: Chicago Milwaukee and Saint Paul Railway Company
 River	CNW: Chicago and North Western Railway
 Lake	CSPMO: Chicago Saint Paul Milwaukee and Omaha Railway
 Upper and Lower Souix	GN: Great Northern Railway Company
 State Park	MSLR: Minnesota and Saint Louis Railway
 State Recreation Area	MSPRD: Minneapolis Saint Paul Rochester and Dubuque Electric Traction Company
 State Wayside	Company
 County Boundary	
 PLS Townships	
 Place Name	





Agriculture

Farming began in the mid 1850s. The first farmers had the daunting task of breaking the thick prairie sod. The typical farm was 40 – 50 acres in size. Animals raised included chickens, hogs, horses, and sheep. In the 1870s, wheat was the primary crop grown. In the late 1880s mechanization drastically changed farming. There was a change from animal power to steam power. Labor required was reduced and it allowed additional land to be put into production.

Wheat declined and corn became dominant crop at the turnoff the century. By the early 1900s all acres that could be plowed were in production. At this time, additional cropland was made available by draining wetlands via ditching and tiling. At the time of World War 1, gas powered

machinery further revolutionized farming. Years of prosperity ensued for the farmers in the Minnesota Valley landscape.

Difficulties ensued for farmers during the depression, and prices dropped from 1919 to 1933. Continued modernization and mechanization occurred during the 1930s.

At the time of World War II, yields increased with less labor required. Farmers experienced prosperity at this time.

In the 1960s and 1970s the number of farms decreased, and the size of farms increased. Rural population declined. Communities experienced the loss of businesses and services. Main streets declined and church and school consolidations

Agriculture is the predominant land use today. Ninety-two percent of the land use is associated with agricultural activity. Forty one percent of Minnesota's corn, 51% of its soybeans, 11% of its hogs, and 22% of its beef are produced here.

<http://www.soils.agri.umn.edu/research/mn-river/doc/mbtext.html>

Ethanol

Ethanol production is revitalizing the farm economy. The trail can interpret energy issues by connecting trail users with the sites and resources used in energy production.

Interrelationship With Other Tourism Routes and Road Designations

The trail will intersect and/or overlap a number of other tourism routes and road designations. These intersections and overlaps are opportunities for cross marketing. Information at these junctures will make trail users aware of additional opportunities in area. Travelers on these other routes can learn about the Minnesota River Trail. These special designations and routes include the Minnesota River Valley Scenic Byway, Green Routes, Prairie Passage, and Minnesota River Valley Birding Trail.

Minnesota River Valley Scenic Byway

	<p>The Minnesota River Valley Scenic Byway is a 287 mile route between Belle Plain and Brown's Valley located on existing roads within a 10 mile corridor on each side of the Minnesota River. The Byway is identified by a distinctive sign and maps and information are available via brochure and website.</p>
---	---



The Minnesota River Valley Scenic Byway and the Minnesota River Trail will share the same corridor along the river creating opportunities for coordination and cooperation.

Established in 1995 and extended in 1996, the byway received National Scenic Byway Status in 2002. Travelers of the byway will experience the scenic beauty of the Minnesota River Valley and connect with the scenic, natural, cultural, historic, recreational, and archeological resources (termed intrinsic qualities by the National Scenic Byway Program at the Federal Highway Administration) that define this unique landscape.

The Corridor Management Plan for the Minnesota River Valley Scenic Byway documents the significance of the intrinsic qualities in the corridor.

History and culture are the two predominant intrinsic qualities of regional and national significance that link together each and every mile of this Byway. In addition, the natural intrinsic quality is a foundation theme that will run beneath and support the two primary themes. These themes are summarized below.

Historical Theme: Struggles for a Home
The Minnesota River Valley has a national story to tell about the European settlement of the West as it relates to both the native people and immigrants seeking to either keep or win a place on the land, a home...

Cultural Theme: Food for a Nation
The Minnesota River Valley has a regional, national and international story to tell of the growth and development of the American system of agriculture...

Natural Theme: The Evolution of a River Valley
From the Minnesota River's beginnings in the plains to the west to its entry into the Mississippi River, the river and its valley tell interesting tales of the ancient history and rich ecological diversity of the Midwest. (Minnesota River Valley Scenic Byway Alliance, 2001, pp1-2 and 1-3).

The Minnesota River Trail will be a complementary facility to the byway. It will provide an additional recreational opportunity along the byway attracting more people to the area and perhaps enticing them to stay longer.

Interrelationship of the Minnesota River Valley Scenic Byway and the Minnesota River State Trail

There are opportunities for coordination of the byway and trail for the benefit of the user of both and for the efficiency and effectiveness of implementing agencies. These opportunities are described below.

Use of the byway as indicator for trail location

The byway is located on the most scenic roads in the valley and adjacent uplands that connect the significant natural and cultural resources. Trail alignments in those locations, if feasible, would also take advantage of these most scenic and significant locations and contribute to trail users' understanding of the themes described above.

Joint development of amenities and support facilities such as rest areas and interpretive sites.

The trail and byway will intersect at many significant cultural and natural sites. Collaborative development of rest areas and interpretive facilities will bring more resources to such projects than a single entity could alone.

Joint marketing of trail and byway

Marketing the trail and byway together will increase their exposure to people and attract additional visitors to the area.

Green Routes

Green Routes promotes the discovery of local resources that promote sustainability and the local economy. Travelers can discover and experience unique local resources by checking out Green Routes sites. Green Routes identifies restaurants, lodging, and recreation opportunities that meet the following criteria.

Contributes to the local economy by employing local residents, using local products and growers, and supporting local businesses

Conserves and/or enhances the natural resource base by use of renewable energy, recycling, green building techniques, wildlife habitat protection

Use of sustainable produced or organically grown products

Use of interactive techniques that educate people about the natural and cultural resources of the area.

Prairie Passage

The signed Prairie Passage route in Minnesota is part of a larger national route.

The Federal Highway Administration funded the Departments of Transportation in Minnesota, Iowa, Missouri, Kansas, Oklahoma and Texas to form a partnership that protects native grasses and wildflowers along roadside rights-of-way, plants native grasses and wildflowers along roadside rights-of-way and educates people about the natural and cultural resources of the prairie.

The Prairie Passage sites that are located within the Minnesota River Trail corridor are Plover Prairie, and Chippewa Prairie in Lac qui Parle County, Upper Sioux Agency State Park in Yellow Medicine County, Birch Coulee Battlefield in Renville County, and the Lower Sioux Agency Historic Site in Redwood County.

Minnesota River Valley Birding Trail

The Minnesota River Valley Birding Trail maps existing roads, paths and bike trails to link 132 birding sites within the Minnesota River Watershed. Recommended routes and sites are mapped for birders to follow.

Natural Preservation Route

A portion of the byway is Minnesota's first Natural Preservation Route. This designation was made so that sensitive rock formations and resource areas along this section of road can be protected.

The Meander Art Crawl

The Meander Art Crawl is a cooperative effort among the artists in Big Stone, Chippewa, Lac qui Parle, Swift and Yellow Medicine counties and the Western Minnesota Prairie Waters Convention & Visitors Bureau. Visitors can use a map and stop at artists' studios in the area. Many of these studios are open all year round as well as during the Meander weekend..

Interrelationship of Green Routes, Prairie Passage, Minnesota River Valley Birding Trail, Natural Preservation Route, the Meander Art Crawl and the Minnesota River State Trail

There are opportunities for coordination of these routes with the trail similar to the coordination opportunities described for the Scenic Byway (as an indicator for trail location, joint development of amenities and support facilities such as rest areas and interpretive sites, and joint marketing).

References

Minnesota Department of Natural Resources. (2006). Upper Sioux Agency State Park Management Plan

Minnesota Department of Natural Resources (1997). Lac qui Parle Area Management Plan.

Minnesota River Valley Birding Trail. (2003).

Upham, W. (1969). Minnesota Geographic Names. St. Paul: Minnesota Historical Society

<http://www.fws.gov/midwest/BigStone>

<http://www.fws.gov/refuges/profiles/index.cfm?id=32640>

Waters, T. (1977). The Streams and Rivers of Minnesota. St. Paul: University of Minnesota

<http://newdeal.feri.org/guides/mn/ch08.htm>

Appendices

Table 1: Big Stone lake State Park to Ortonville
***Special Concern, Threatened, Endangered, NON Species**

Scientific Name	Common Name	Category	Status
<i>Atrytone arogos</i>	Arogos Skipper	Invertebrate	Special concern
<i>Hesperia dacotae</i>	Dakota Skipper	Invertebrate	Threatened
<i>Cicindela lepida</i>	Little White Tiger Beetle	Invertebrate	Threatened
<i>Hesperia leonardus pawnee</i>	Pawnee Skipper	Invertebrate	Special Concern
<i>Hesperia ottoe</i>	Ottoe Skipper	Invertebrate	Threatened
<i>Oarisma powesheik</i>	Powesheik Skipper	Invertebrate	Special concern
<i>Speyeria idalia</i>	Regal Fritillary	Invertebrate	Special concern
<i>Calcaeus ornatus</i>	Chestnut-collared Longspur	Invertebrate	endangered
<i>Acipenser fulvescens</i>	Lake Sturgeon	Vertebrate	Special concern
<i>Alosa chrysochloris</i>	Skipjack Herring	Vertebrate	Special concern
<i>Bartramia longicauda</i>	Upland Sandpiper	Vertebrate	NON
<i>Phalaropus tricolor</i>	Wilson's Phalarope	Vertebrate	Threatened
<i>Escobaria vivipara</i>	Ball Cactus	Vascular Plant	Endangered
<i>Alopecurus carolinianus</i>	Carolina foxtail	Vascular Plant	NON
<i>Eleocharis parvula</i>	Dwarf Spike-rush	Vascular Plant	Special Concern
<i>Myosotis verna</i>	Forget-me-not	Vascular Plant	NON
<i>Callitriche heterophylla</i>	Larger Water-starwort	Vascular Plant	Special concern
<i>Astragalus lotiflorus</i>	Low Milk-vetch	Vascular Plant	NON
<i>Triglochin palustris</i>	Marsh Arrow-grass	Vascular Plant	NON
<i>Astragalus missouriensis</i>	Missouri Mile-vetch	Vascular Plant	Special Concern
<i>Cerastium brachypodium</i>	Mouse-ear Chickweed	Vascular Plant	NON
<i>Myosurus minimus</i>	Mousetail	Vascular Plant	NON
<i>Limosella aquatica</i>	Mudwort	Vascular Plant	Special Concern
<i>Desmanthus Illinoensis</i>	Prairie Mimosa	Vascular Plant	Special Concern
<i>Botrychium campestre</i>	Prairie Moonwort	Vascular Plant	Special Concern
<i>Aristida purpura</i> var. <i>longiseta</i>	Red Three-awn	Vascular Plant	Special Concern
<i>Najas marina</i>	Sea Naiad	Vascular Plant	Special Concern
<i>Astragalus flexuosus</i>	Slender Milk-Vetch	Vascular Plant	Special Concern
<i>Cypripedium candidum</i>	Small White Lady's-slipper	Vascular Plant	Special Concern
<i>Solidago mollis</i>	Soft goldenrod	Vascular Plant	Special Concern
<i>Elatine trianda</i>	Three Stamened Waterwort	Vascular Plant	NON
<i>Schedonnardus paniculatus</i>	Tumblegrass	Vascular Plant	Special Concern
<i>Ruppia maritime</i>	Widgeon-grass	Vascular Plant	Special Concern
Colonial Waterbird Nesting Area	Colonial Waterbird nesting Site	Animal Assemblage	
Freshwater Mussel Concentration Area	Mussel Sampling site	Animal Assemblage	
Dry hill prairie (southern) type)	Dry Hill Prairie (Southern)	Terrestrial Community	
Mesic prairie (southern) type	Mesic Prairie (Southern)	Terrestrial Community	
Southern bedrock outcrop class	Southern Bedrock Outcrop	Terrestrial Community	
Wet prairie (southern) type	Wet Prairie (Southern)	Terrestrial Community	

*A species is considered endangered if the species is threatened with extinction throughout all or a significant portion of its range within Minnesota.

A species is considered threatened if the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range within Minnesota.

A species is considered a species of special concern if, although the species is not endangered or threatened, it is extremely uncommon in Minnesota, or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations.

A species is classified as NON if it has no legal status, but which may be rare and the Natural Heritage and Nongame Research Program is gathering data for possible future listing.

Table 2: Ortonville to Appleton
***Special Concern, Threatened, Endangered, NON Species**

Buellia nigra	lichen	Fungus	Endangered
Atrytone arogos	Arogos Skipper	Invertebrate	Special Concern
Ligumia recta	Black Sandshell	Invertebrate	Special Concern
Lasmigona compressa	Creek Heelsplitter	Invertebrate	Special Concern
Hesperia dacotae	Dakota Skipper	Invertebrate	Threatened
Alasmidonta marginata	Elktoe	Invertebrate	Threatened
Cicindela lepida	Little White Tiger Beetle	Invertebrate	Threatened
Actinonaias ligamentina	Mucket	Invertebrate	Threatened
Hesperia leonardus pawnee	Pawnee Skipper	Invertebrate	Special Concern
Oarisma powesheik	Powesheik Skipper	Invertebrate	Special Concern
Aflexia rubranura	Red Tailed Prairie Leafhopper	Invertebrate	Special Concern
Speyeria idalia	Regal Fritillary	Invertebrate	Special Concern
Pleurobema coccineum	Round Pigtoe	Invertebrate	Threatened
Botaurus lentiginosus	American Bittern	Vertebrate	Special Concern
Pelecanus erythrorhynchos	American White Pelican	Vertebrate	Special Concern
Haliaeetus leucociphalus	Bald Eagle	Vertebrate	Threatened
Emydoidea blandingii	Blanding's Turtle	Vertebrate	Threatened
Calcarius ornatus	Chestnut-collared Longspur	Vertebrate	Endangered
Sterna fosteri	Forester's Tern	Vertebrate	Special Concern
Tympanuchus cupido	Greater Prairie-chicken	Vertebrate	Special Concern
Ammodramus henslowii	Henslow's Sparrow	Vertebrate	Endangered
Acipenser fulvescens	Lake Sturgeon	Vertebrate	Special Concern
Calamospiza melanocorys	Lark bunting	Vertebrate	Endangered
Lanius ludovicianus	Loggerhead Shrike	Vertebrate	Threatened
Limosa fedoa	Marbled Godwit	Vertebrate	Special Concern
Onychomys leucogaster	Northern Grasshopper Mouse	Vertebrate	NON
Asio flammeus	Short-eared Owl	Vertebrate	Special Concern
Bartramia longicauda	Upland Sandpiper	Vertebrate	NON
Heterodon nasicus	Western Hognose Snake	Vertebrate	Special Concern
Phalaropus tricolor	Wilson's Phalarope	Vertebrate	Threatened
Puccinellia nuttalliana	Alkali Grass	Vascular Plant	NON
Escobaria vivipara	Ball Cactus	Vascular Plant	Endangered
Buchloe dactyloides	Buffalo Grass	Vascular Plant	Special Concern
Poa arida	Bunch Speargrass	Vascular Plant	NON
Alopecurus carolinianus	Carolina Foxtail	Vascular Plant	NON
Machaeranthera pinnatifida	Cutleaf Ironplant	Vascular Plant	Special Concern
Eleocharis parvula	Dwarf Spike-rush	Vascular Plant	Special Concern
Agalinis auriculata	Eared False Foxglove	Vascular Plant	Endangered
Eleocharis quinqueflora	Few-flowered Spike-rush	Vascular Plant	Special Concern
Myosotis verna	Forge-me-not	Vascular Plant	NON
Rhynospora capillacea	Hair-like Beak-rush	Vascular Plant	Threatened
Carex hallii	Hall's Sedge	Vascular Plant	Special Concern
Callitriche heterophylla	Larger Water-starwort	Vascular Plant	Special Concern
Hordeum pusillum	Little Barley	Vascular Plant	NON
Astragalus lotiflorus	Low Milk-vetch	Vascular Plant	NON
Triglochin palustris	Marsh Arrow-grass	Vascular Plant	NON
Astragalus missouriensis	Missouri Milk-vetch	Vascular Plant	Special Concern
Cerastium brachypodium	Mouse-ear Chickweed	Vascular Plant	NON
Myosurus minimus	Mousetail	Vascular Plant	NON
Limosella aquatica	Mudwort	Vascular Plant	Special Concern
Desmanthus illinoensis	Prairie Mimosa	Vascular Plant	Special Concern
Botrychium campestre	Praire Moonwork	Vascular Plant	Special Concern
Astragalus flexuosus	Slender Milk-vetch	Vascular Plant	Special Concern

DRAFT

DRAFT

Cypripedium candidum	Small White Lady's Slipper	Vascular Plant	Special Concern
Solidago mollis	Soft Goldenrod	Vascular Plant	Special Concern
Elatine triandra	Three Stamened Waterwort	Vascular Plant	NON
Schedonnardus paniculatus	Tumblegrass	Vascular Plant	Special Concern
Bacopa rotundifolia	Water-hyssop	Vascular Plant	Special Concern
Ruppia maritime	Widgeon-grass	Vascular Plant	Special Concern
Colonial Waterbird Nesting Area	Colonial Waterbird Nesting	Animal Assemblage	
Freshwater Mussel Concentration Area	Mussel Sampling Site	Animal Assemblage	
Calcareous fen (southwest) type	Calcareous Fen (Southwest)	Terrestrial Community	
Dry hill prairie (southern) type	Dry Hill Prairie (Southern)	Terrestrial Community	
Dry sand- gravel prairie (southern) type	Dry Sand – Gravel Prairie Southern	Terrestrial Community	
Mesic prairie (southern) type	Mesic Prairie (Southern)	Terrestrial Community	
Southern bedrock outcrop class	Southern Bedrock Outcrop	Terrestrial Community	
Wet prairie (southern) type	Mesic Prairie (Southern)	Terrestrial Community	
Wet saline prairie (southern) type	Wet Saline Prairie (Southern)	Terrestrial Community	
Wet seepage prairie (southern) type	Wet Seepage Prairie (Southern)	Terrestrial Community	

*A **species is considered endangered** if the species is threatened with extinction throughout all or a significant portion of its range within Minnesota.

A **species is considered threatened** if the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range within Minnesota.

A **species is considered a species of special concern** if, although the species is not endangered or threatened, it is extremely uncommon in Minnesota, or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations.

A **species is classified as NON** if it has no legal status, but which may be rare and the Natural Heritage and Nongame Research Program is gathering data for possible future listing.

**Table 3: Appleton to Montevideo
*Special Concern, Threatened, Endangered Species**

Atrytone arogos	Arogos Skipper	Invertebrate	Special Concern
Ligumia recta	Black Sandshell	Invertebrate	Special Concern
Lasmigona compressa	Creek Heelsplitter	Invertebrate	Special Concern
Hesperia dacotae	Dakota Skipper	Invertebrate	Threatened
Alasmidonta marginata	Elktoe	Invertebrate	Threatened
Lasmigona costata	Fluted-shell	Invertebrate	Special Concern
Actinonaias ligamentina	Mucket	Invertebrate	Threatened
Hesperia leonardus pawnee	Pawnee Skipper	Invertebrate	Special Concern
Oarisma powesheik	Powesheik Skipper	Invertebrate	Special Concern
Speyeria idalia	Regal Fritillary	Invertebrate	Special Concern
Elliptio dilatata	Spike	Invertebrate	Special Concern
Botaurus lentiginosus	American Bittern	Vertebrate	Special Concern
Haliaeetus leucociphalus	Bald Eagle	Vertebrate	Threatened
Speotyto cunicularia	Burrowing Owl	Vertebrate	Endangered
Tympanuchus cupido	Greater Prairie-chicken	Vertebrate	Special Concern
Ammodramus henslowii	Henslow's Sparrow	Vertebrate	Endangered
Calamospiza melanocorys	Lark bunting	Vertebrate	Endangered
Lanius ludovicianus	Loggerhead Shrike	Vertebrate	Threatened
Limosa fedoa	Marbled Godwit	Vertebrate	Special Concern
Onychomys leucogaster	Northern Grasshopper Mouse	Vertebrate	NON
Buteo lineatus	Red-shouldered Hawk	Vertebrate	Special Concern
Asio flammeus	Short-eared Owl	Vertebrate	Special Concern
Bartramia longicauda	Upland Sandpiper	Vertebrate	NON
Heterodon nasicus	Western Hognose Snake	Vertebrate	Special Concern
Phalaropus tricolor	Wilson's Phalarope	Vertebrate	Threatened
Alopecurus carolinianus	Carolina Foxtail	Vascular Plant	NON
Agalinis auriculata	Eared False Foxglove	Vascular Plant	Endangered
Rhynospora capillacea	Hair-like Beak-rush	Vascular Plant	Threatened
Orobanche ludoviciana	Louisiana Broomrape	Vascular Plant	Special Concern
Astragalus lotiflorus	Low Milk-vetch	Vascular Plant	NON
Triglochin palustris	Marsh Arrow-grass	Vascular Plant	NON
Astragalus missouriensis	Missouri Milk-vetch	Vascular Plant	Special Concern
Myosurus minimus	Mousetail	Vascular Plant	NON
Botrychium campestre	Prairie Moonwort	Vascular Plant	Special Concern
Astragalus flexuosus	Slender Milk-vetch	Vascular Plant	Special Concern
Cypripedium candidum	Small White Lady's Slipper	Vascular Plant	Special Concern
Freshwater Mussel Concentration Area	Mussel Sampling Site	Animal Assemblage	
Proglacial river erosion (quaternary)	Proglacial River Erosion (Quaternary)	Other (Ecological)	
Sedimentary unit or sequence (quaternary)	Sedimentary Unit or Sequence (Quaternary)	Other (Ecological)	
Calcareous fen (southwest) type	Calcareous Fen (Southwest)	Terrestrial Community	
Dry hill prairie (southern) type	Dry Hill Prairie (Southern)	Terrestrial Community	
Mesic prairie (southern) type	Mesic Prairie (Southern)	Terrestrial Community	
Floodplain Forest	Native Plant Community, Undetermined Class	Terrestrial Community	
Wet prairie (southern) type	Wet Prairie (Southern)	Terrestrial Community	
Wet seepage prairie (southern) type	Wet Seepage Prairie (Southern)	Terrestrial Community	

***A species is considered endangered** if the species is threatened with extinction throughout all or a significant portion of its range within Minnesota.

A species is considered threatened if the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range within Minnesota.

A species is considered a species of special concern if, although the species is not endangered or threatened, it is extremely uncommon in Minnesota, or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations.

A species is classified as NON if it has no legal status, but which may be rare and the Natural Heritage and Nongame Research Program is gathering data for possible future listing.

Table 4: Montevideo to Joseph R. Brown State Wayside Rest Area
***Special Concern, Threatened, Endangered Species**

<i>Buellia nigra</i>	lichen	Fungus	Endangered
<i>Atrytone arogos</i>	Arogos Skipper	Invertebrate	Special Concern
<i>Ligumia recta</i>	Black Sandshell	Invertebrate	Special Concern
<i>Lasmigona compressa</i>	Creek Heelsplitter	Invertebrate	Special Concern
<i>Alasmidonta marginata</i>	Elktoe	Invertebrate	Threatened
<i>Venustaconcha ellipsiformis</i>	Ellipse	Invertebrate	Threatened
<i>Lasmigona costata</i>	Fluted-shell	Invertebrate	Special Concern
<i>Obovaria olivaria</i>	Hickorynut	Invertebrate	Special concern
<i>Quadrula metanevra</i>	Monkeyface	Invertebrate	Threatened
<i>Actinonaias ligamentina</i>	Mucket	Invertebrate	Threatened
<i>Tritogonia verrucosa</i>	Pistolgrip	Invertebrate	Threatened
<i>Hesperia leonardus pawnee</i>	Pawnee Skipper	Invertebrate	Special Concern
<i>Oarisma powesheik</i>	Powesheik Skipper	Invertebrate	Special Concern
<i>Speyeria idalia</i>	Regal Fritillary	Invertebrate	Special Concern
<i>Arcidens confragosus</i>	Rock Pocketbook	Invertebrate	Endangered
<i>Pleurobema coccineum</i>	Round Pigtoe	Invertebrate	Threatened
<i>Simpsonaias ambigua</i>	Salamander Mussel	Invertebrate	Threatened
<i>Elliptio dilatata</i>	Spike	Invertebrate	Special Concern
<i>Lampsilis teres</i>	Yellow Sandshell	Invertebrate	Endangered
<i>Haliaeetus leucociphalus</i>	Bald Eagle	Vertebrate	Threatened
<i>Ictiobus niger</i>	Black Buffalo	Vertebrate	Special Concern
<i>Cycleptus elongates</i>	Blue Sucker	Vertebrate	Special Concern
<i>Elaphe vulpine</i>	Eastern Fox Snake	Vertebrate	Special Concern
<i>Eumeces fasciatus</i>	Five-lined Skink	Vertebrate	Special Concern
<i>Pituophis catenifer</i>	Gopher Snake	Vertebrate	Special Concern
<i>Acipenser fulvescens</i>	Lake Sturgeon	Vertebrate	Special Concern
<i>Etheostoma microperca</i>	Least Darter	Vertebrate	Special Concern
<i>Polyodon spathula</i>	Paddlefish	Vertebrate	Threatened
<i>Buteo lineatus</i>	Red-shouldered Hawk	Vertebrate	Special Concern
<i>Scaphirhynchus platyrhynchus</i>	Shovelnose Sturgeon	Vertebrate	NON
<i>Bartramia longicauda</i>	Upland Sandpiper	Vertebrate	NON
<i>Reithrodontomys megalotis</i>	Western Harvest Mouse	Vertebrate	NON
<i>Heterodon nasicus</i>	Western Hognose Snake	Vertebrate	Special Concern
<i>Panax quinquefolius</i>	American Ginseng	Vascular Plant	Special Concern
<i>Alopecurus carolinianus</i>	Carolina Foxtail	Vascular Plant	NON
<i>Orobanche ludoviciana</i>	Louisiana Broomrape	Vascular Plant	Special Concern
<i>Myosotis verna</i>	Forget-me-not	Vascular Plant	NON
<i>Gymnocladus dioica</i>	Kentucky Coffee-tree	Vascular Plant	NON
<i>Hordeum pusillum</i>	Little Barley	Vascular Plant	NON
<i>Astragalus lotiflorus</i>	Low Milk-vetch	Vascular Plant	NON
<i>Astragalus missouriensis</i>	Missouri Milk-vetch	Vascular Plant	Special Concern
<i>Myosurus minimus</i>	Mousetail	Vascular Plant	NON
<i>Opuntia macrorhiza</i>	Plains Prickly Pear	Vascular Plant	Special Concern
<i>Aristida purpurea</i> var. <i>longiseta</i>	Red Three-awn	Vascular Plant	Special Concern
<i>Cyperus acuminatus</i>	Short-pointed Umbrella-sedge	Vascular Plant	Threatened
<i>Astragalus flexuosus</i>	Slender Milk-vetch	Vascular Plant	Special Concern
<i>Cypripedium candidum</i>	Small White Lady's Slipper	Vascular Plant	Special Concern
<i>Asclepias sullivantii</i>	Sullivant's Milkweed	Vascular Plant	Threatened
<i>Bacopa rotundifolia</i>	Water-hyssop	Vascular Plant	Special Concern
<i>Carex annectens</i>	Yellow-fruited Sedge	Vascular Plant	Special Concern
Colonial Waterbird Nesting Area	Colonial Waterbird Nesting	Animal Assemblage	

Freshwater Mussel Concentration Area	Mussel Sampling Site	Animal Assemblage	
Igneous intrusion (lower proterozoic)	Igneous Intrusion (Lower Proterozoic)	Other (Ecological)	
Igneous structure (archean)	Igneous Texture (Archean)	Other (Ecological)	
Igneous texture (archean)	Igneous Texture (Archean)	Other (Ecological)	
Metamorphic composition (archean)	Metamorphic Structure (Archean)	Other (Ecological)	
Metamorphic unit or sequence (archean)	Metamorphic Unit or Sequence (Archean)	Other (Ecological)	
Mixed unit or sequence (archean)	Mixed Unit or Sequence (Archean)	Other (Ecological)	
Mixed unit or sequence (archean, lower proterozoic)	Mixed Unit or Sequence (Archean, Lower Proterozoic)	Other (Ecological)	
Sedimentary unit or sequence (quaternary)	Sedimentary Unit or Sequence (Quaternary)	Other (Ecological)	
Sedimentary unit or sequence (quaternary)	Sedimentary Unit or Sequence (Quaternary)	Other (Ecological)	
Dry hill oak savanna (southern) type	Dry Hill Oak Savanna (Southern) Type	Other (Ecological)	
Dry hill prairie (southern) type	Dry Hill Prairie (Southern)	Terrestrial Community	
Elm-ash-basswood terrace forest type	Elm-Ash-Basswood Terrace Forest Type	Terrestrial Community	
Mesic prairie (southern) type	Mesic Prairie (Southern) Type	Terrestrial Community	
Oak Forest (Central)	Native Plant Community, Undetermined Class	Terrestrial Community	
Oak Forest (Central) Mesic Subtype	Native Plant Community, Undetermined Class	Terrestrial Community	
Floodplain Forest	Native Plant Community, Undetermined Class	Terrestrial Community	
Southern bedrock outcrop class	Southern Bedrock Outcrop	Terrestrial Community	
Southern dry prairie class	Southern Dry Prairie	Terrestrial Community	

*A **species is considered endangered** if the species is threatened with extinction throughout all or a significant portion of its range within Minnesota.

A **species is considered threatened** if the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range within Minnesota.

A **species is considered a species of special concern** if, although the species is not endangered or threatened, it is extremely uncommon in Minnesota, or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations.

A **species is classified as NON** if it has no legal status, but which may be rare and the Natural Heritage and Nongame Research Program is gathering data for possible future listing.

Table 5: Joseph R. Brown Wayside Rest to Franklin
***Special Concern, Threatened, Endangered Species**

<i>Buellia nigra</i>	lichen	Fungus	Endangered
<i>Atrytone arogos</i>	Arogos Skipper	Invertebrate	Special Concern
<i>Ligumia recta</i>	Black Sandshell	Invertebrate	Special Concern
<i>Alasmidonta marginata</i>	Elktoe	Invertebrate	Threatened
<i>Lasmigona costata</i>	Fluted-shell	Invertebrate	Special Concern
<i>Actinonaias ligamentina</i>	Mucket	Invertebrate	Threatened
<i>Hesperia ottoe</i>	Ottoe Skipper	Invertebrate	Threatened
<i>Speyeria idalia</i>	Regal Fritillary	Invertebrate	Special Concern
<i>Pleurobema coccineum</i>	Round Pigtoe	Invertebrate	Threatened
<i>Elliptio dilatata</i>	Spike	Invertebrate	Special Concern
<i>Botaurus lentiginosus</i>	American bittern	Vertebrate	NON
<i>Haliaeetus leucociphalus</i>	Bald Eagle	Vertebrate	Threatened
<i>Cycleptus elongates</i>	Blue Sucker	Vertebrate	Special Concern
<i>Elaphe vulpine</i>	Eastern Fox Snake	Vertebrate	Special Concern
<i>Eumeces fasciatus</i>	Five-lined Skink	Vertebrate	Special Concern
<i>Pituophis catenifer</i>	Gopher Snake	Vertebrate	Special Concern
<i>Ammodramus henslowii</i>	Henslow's Sparrow	Vertebrate	Endangered
<i>Polyodon spathula</i>	Paddlefish	Vertebrate	Threatened
<i>Scaphirhynchus platyrhynchus</i>	Shovelnose Sturgeon	Vertebrate	NON
<i>Bartramia longicauda</i>	Upland Sandpiper	Vertebrate	NON
<i>Reithrodontomys megalotis</i>	Western Harvest Mouse	Vertebrate	NON
<i>Panax quinquefolius</i>	American Ginseng	Vascular Plant	Special Concern
<i>Alopecurus carolinianus</i>	Carolina Foxtail	Vascular Plant	NON
<i>Eleocharis quinqueflora</i>	Few-flowered Spike-rush	Vascular Plant	Special Concern
<i>Myosotis verna</i>	Forget-me-not	Vascular Plant	NON
<i>Rhynospora capillacea</i>	Hair-like Beak-rush	Vascular Plant	Threatened
<i>Fimbristylis puberula</i> var. <i>interior</i>	Hairy Fimbristylis	Vascular Plant	Endangered
<i>Gleditsia triacanthos</i>	Honeylocust	Vascular Plant	NON
<i>Gymnocladus dioica</i>	Kentucky Coffee-tree	Vascular Plant	NON
<i>Besseyia bullii</i>	Kitten-tails	Vascular Plant	Threatened
<i>Hordeum pusillum</i>	Little Barley	Vascular Plant	NON
<i>Astragalus lotiflorus</i>	Low Milk-vetch	Vascular Plant	NON
<i>Triglochin palustris</i>	Marsh Arrow-grass	Vascular Plant	NON
<i>Cerastium brachypodium</i>	Mouse-ear Chickweed	Vascular Plant	MON
<i>Myosurus minimus</i>	Mousetail	Vascular Plant	NON
<i>Opuntia macrorhiza</i>	Plains Prickly Pear	Vascular Plant	Special Concern
<i>Monolepis nuttalliana</i>	Povertyweed	Vascular Plant	NON
<i>Lespedeza leptostachya</i>	Prairie-Bush Clover	Vascular Plant	Threatened
<i>Cyperus acuminatus</i>	Short-pointed Umbrella-sedge	Vascular Plant	Threatened
<i>Cypripedium candidum</i>	Small White Lady's Slipper	Vascular Plant	Special Concern
<i>Asclepias sullivantii</i>	Sullivant's Milkweed	Vascular Plant	Threatened
<i>Elatine Triandra</i>	Three Stamened Waterwort	Vascular Plant	NON
<i>Schedonnardus paniculatus</i>	Tumblegrass	Vascular Plant	Special Concern
<i>Cladium mariscoides</i>	Twig-rush	Vascular Plant	Special Concern
<i>Bacopa rotundifolia</i>	Water-hyssop	Vascular Plant	Special Concern
<i>Carex annectens</i>	Yellow-fruited Sedge	Vascular Plant	Special Concern
Freshwater Mussel Concentration Area	Mussel Sampling Site	Animal Assemblage	
Fold (archean)	Fold (Archean)	Other (Ecological)	
Fossil plant (quaternary)	Fossil Plant (Quaternary)	Other (Ecological)	
Igneous intrusion (lower proterozoic)	Igneous Intrusion (Lower Proterozoic)	Other (Ecological)	

Igneous structure (archean)	Igneous Structure (Archean)	Other (Ecological)	
Igneous texture (archean)	Igneous Texture (Archean)	Other (Ecological)	
Igneous unit or sequence (lower proterozoic)	Igneous Unit or Sequence (Lower Proterozoic)		
Metamorphic composition (archean)	Metamorphic Structure (Archean)	Other (Ecological)	
Metamorphic unit or sequence (archean)	Metamorphic Unit or Sequence (Archean)	Other (Ecological)	
Mixed unit or sequence (archean)	Mixed Unit or Sequence (Archean)	Other (Ecological)	
Mixed unit or sequence (archean, lower proterozoic)	Mixed Unit or Sequence (Archean, Lower Proterozoic)	Other (Ecological)	
Proglacial river erosion (quaternary)	Proglacial River Erosion (Quaternary)	Other (Ecological)	
Sedimentary unit or sequence (cretaceous, quaternary)	Sedimentary Unit or Sequence (Quaternary)	Other (Ecological)	
Weathering (jurassic, cretaceous)	Weathering (Jurassic, Cretaceous)	Other (Ecological)	
Calcareous fen (southwest) type	Calcareous Fen (Southwest)	Terrestrial Community	
Dry hill prairie (southern) type	Dry Hill Prairie (Southern)	Terrestrial Community	
Dry sand-gravel prairie (southern) type	Dry Hill Prairie (Southern)	Terrestrial Community	
Mesic prairie (southern) type	Mesic Prairie (Southern) Type	Terrestrial Community	
Wet Meadow	Native Plant Community, Undetermined Class	Terrestrial Community	
Oak Woodland-Brushland (Central)	Native Plant community, Undetermined Class	Terrestrial Community	
Oak Forest (Central) Mesic Subtype	Native Plant Community, Undetermined Class	Terrestrial Community	
Maple-Basswood Forest (Big Woods)	Native Plant Community Undetermined Class	Terrestrial Community	
Mesic Prairie (Southwest) Crystalline Bedrock Subtype	Native Plant Community Undetermined Class	Terrestrial Community	
Silver maple – (Virginia creeper) floodplain forest type	Native Plant Community, Undetermined Class	Terrestrial Community	
Southern bedrock outcrop class	Southern Bedrock Outcrop	Terrestrial Community	
Southern dry prairie class	Southern Dry Prairie	Terrestrial Community	
Wet prairie (southern) type	Wet Prairie (Southern)	Terrestrial community	

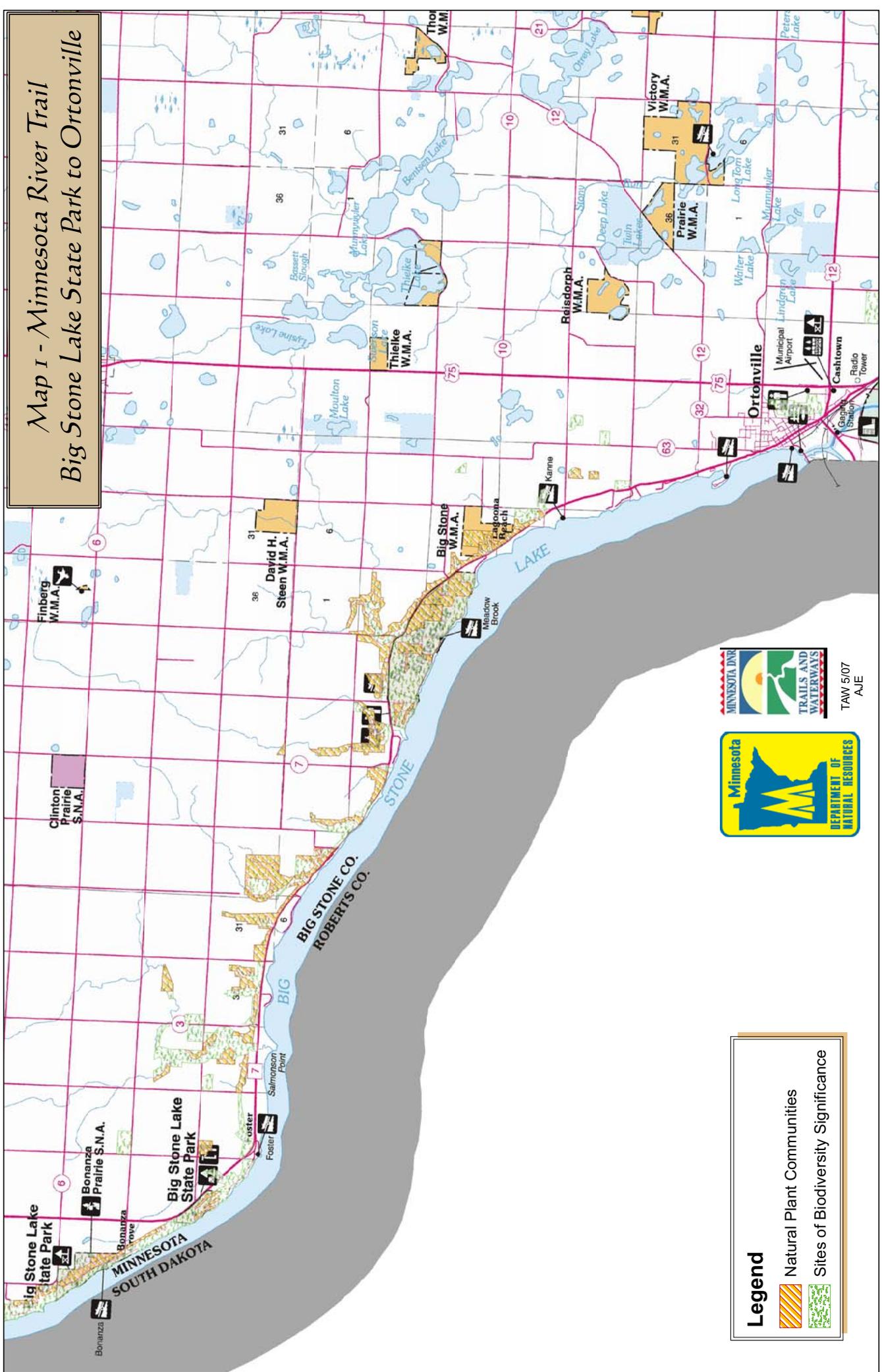
*A **species is considered endangered** if the species is threatened with extinction throughout all or a significant portion of its range within Minnesota.

A **species is considered threatened** if the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range within Minnesota.

A **species is considered a species of special concern** if, although the species is not endangered or threatened, it is extremely uncommon in Minnesota, or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations.

A **species is classified as NON** if it has no legal status, but which may be rare and the Natural Heritage and Nongame Research Program is gathering data for possible future listing.

Map 1 - Minnesota River Trail
Big Stone Lake State Park to Ortonville



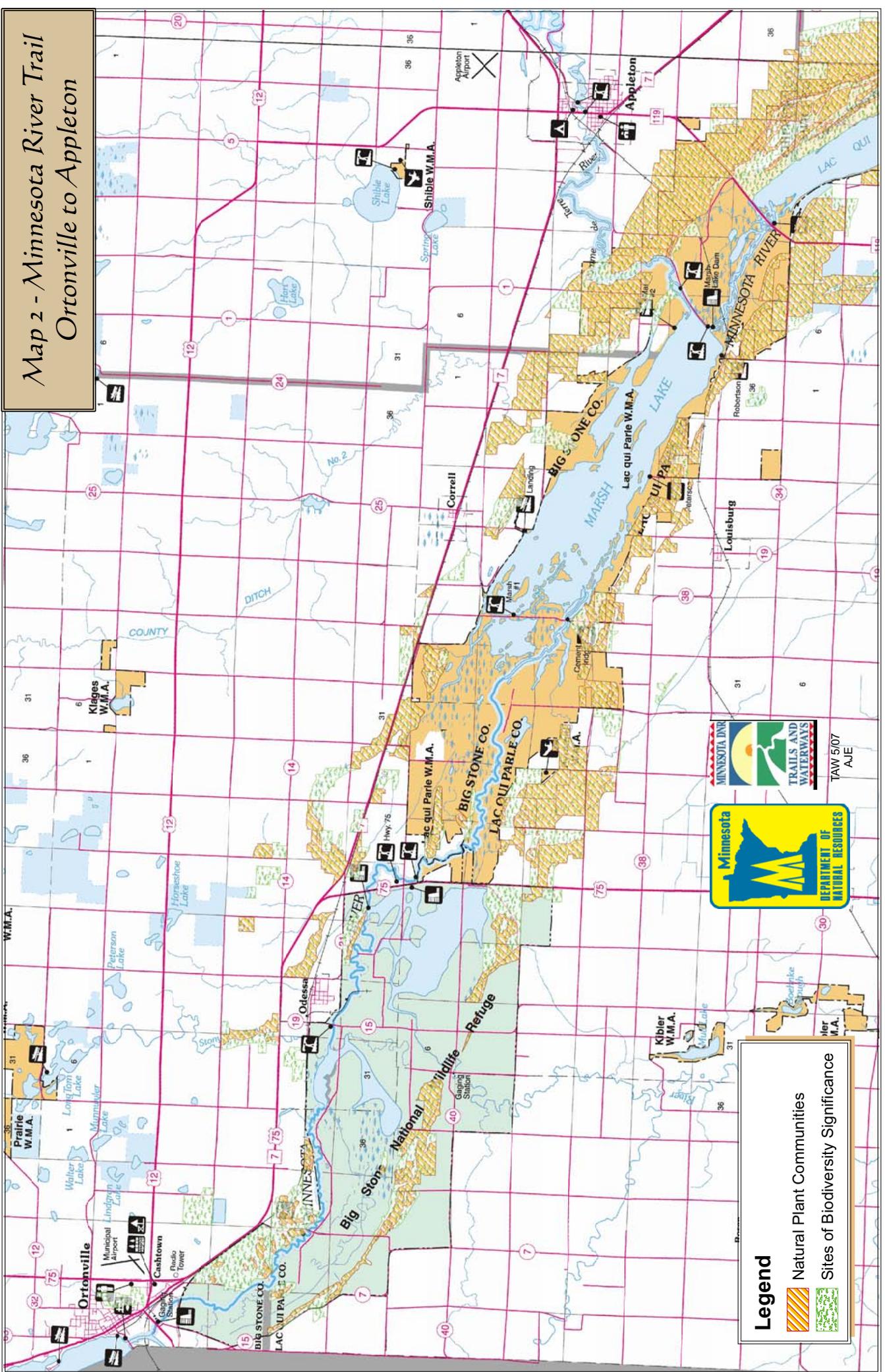
TAW 5/07
AJE



Legend

- Natural Plant Communities
- Sites of Biodiversity Significance

Map 2 - Minnesota River Trail Ortonville to Appleton

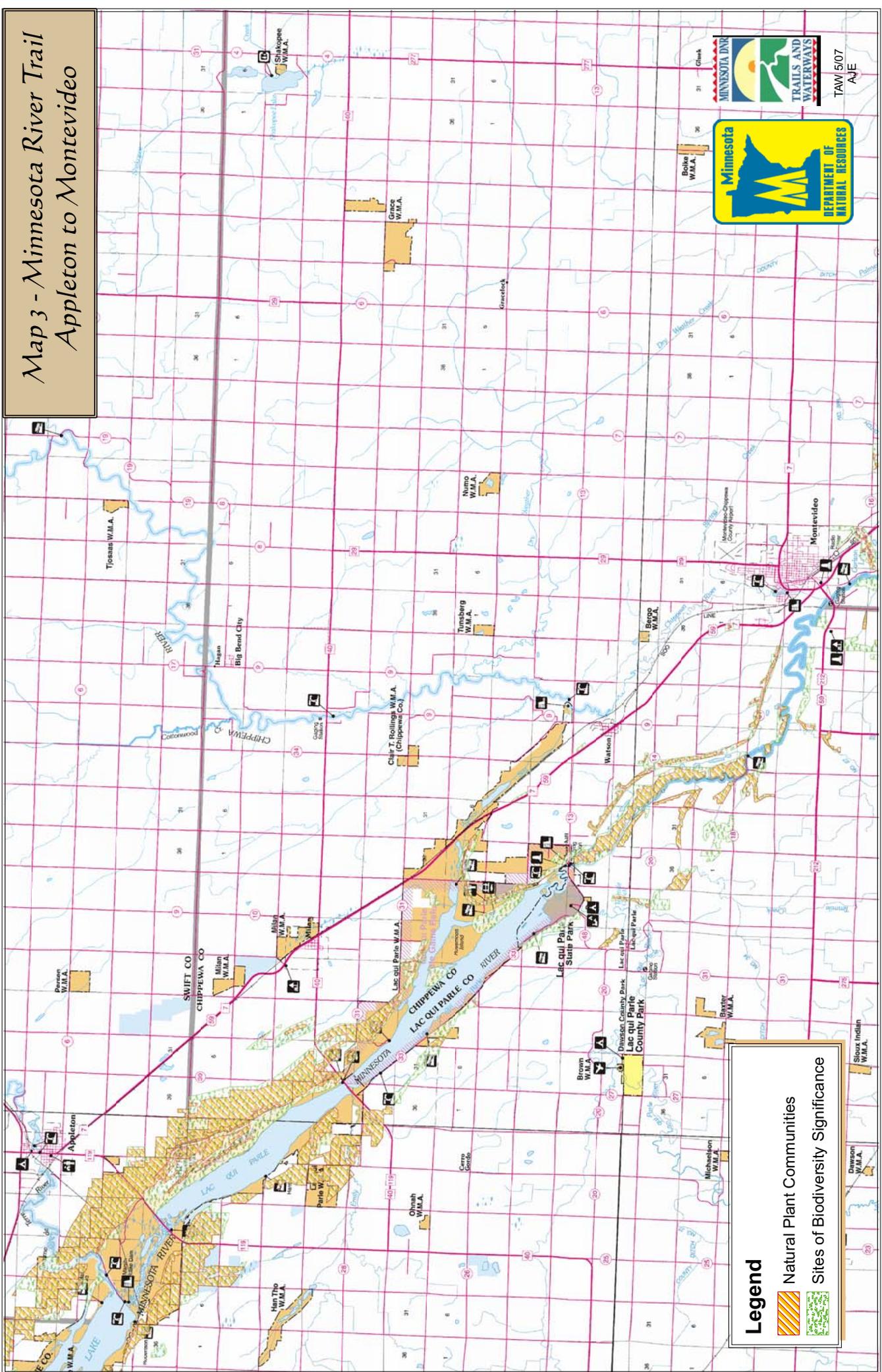


Legend
 Natural Plant Communities
 Sites of Biodiversity Significance



TAW 5/07
AJE

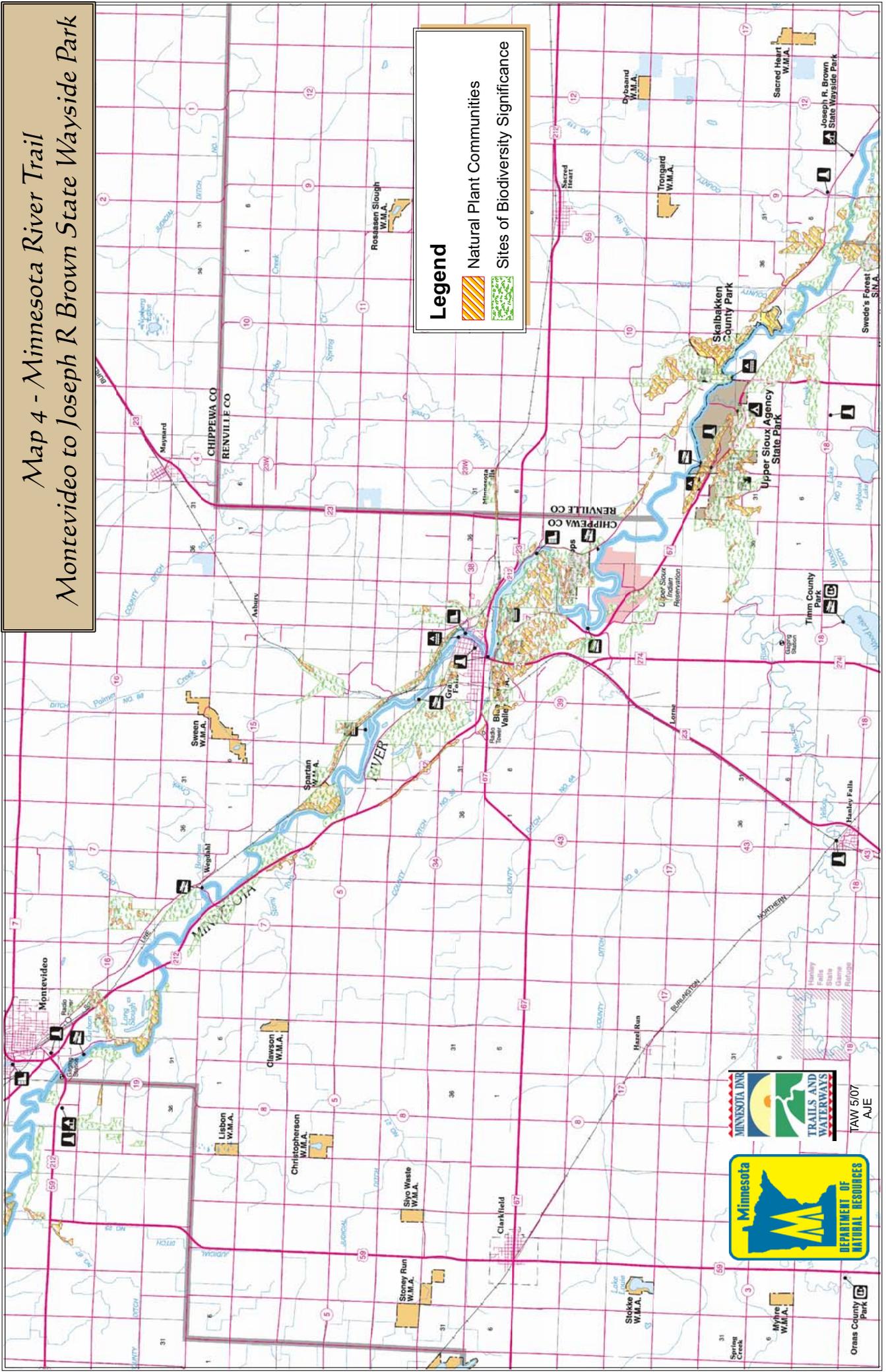
Map 3 - Minnesota River Trail Appleton to Montevideo



Legend

- Natural Plant Communities
- Sites of Biodiversity Significance

*Map 4 - Minnesota River Trail
Montevideo to Joseph R Brown State Wayside Park*



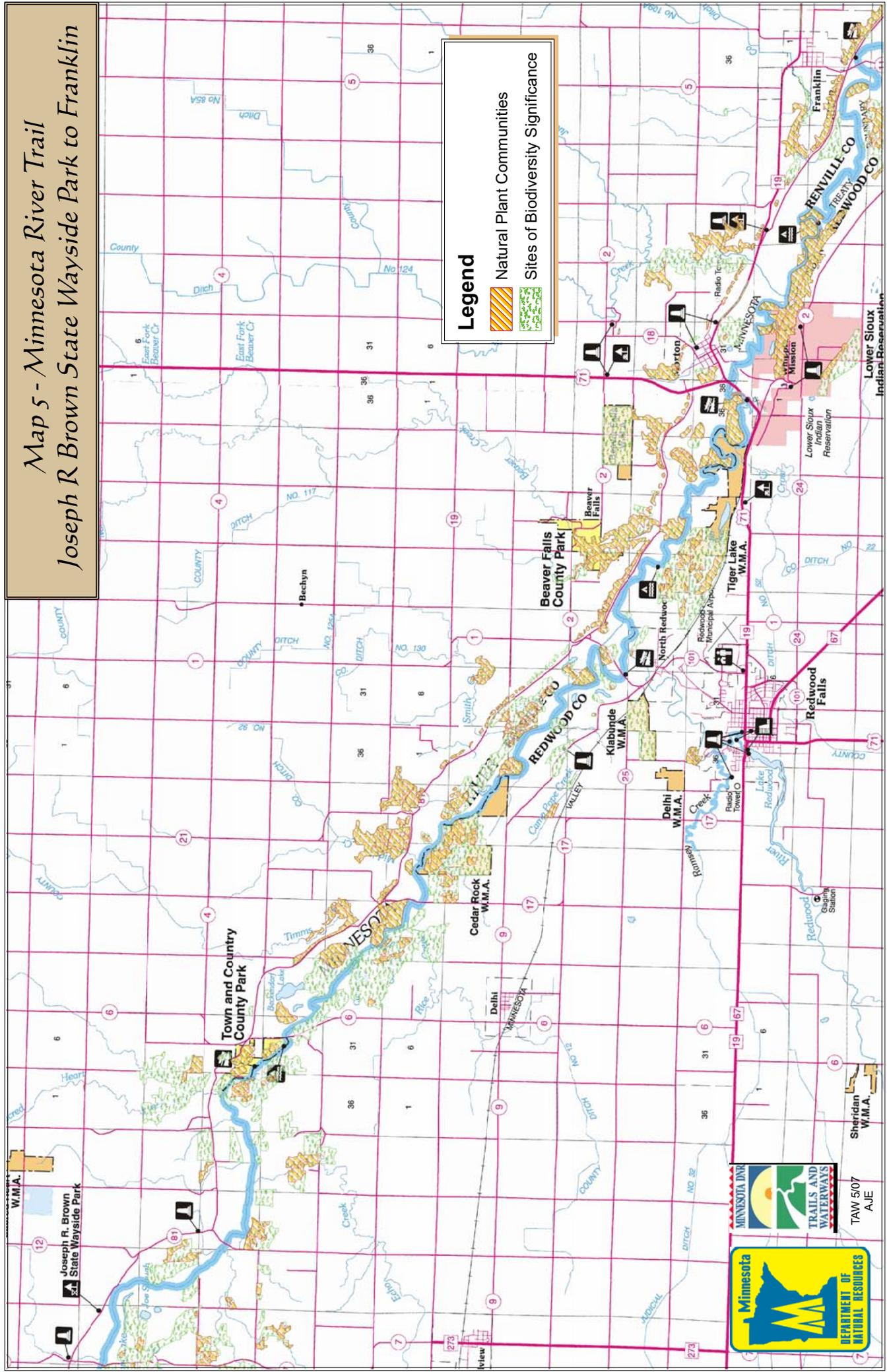
Legend

- Natural Plant Communities
- Sites of Biodiversity Significance



TAW 5/07
AJE

*Map 5 - Minnesota River Trail
Joseph R Brown State Wayside Park to Franklin*



Legend

-  Natural Plant Communities
-  Sites of Biodiversity Significance



MINNESOTA DNR
TRAILS AND WATERWAYS
TAW 5/07
AJE