This section is divided into the following resource topics:

- Geology and Soils, *Section 3.1.*
- Water Resources, *Section 3.2.*
- Air Quality, *Section 3.3.*
- Acoustic Environment, *Section 3.4.*
- Biological Resources, *Section 3.5.*
- Land Resources, *Section 3.6.*
- Visual Resources, *Section 3.7.*
- Transportation, *Section 3.8.*
- Historic/Cultural Properties, *Section 3.9.*
- Public Health and Safety, *Section 3.10.*
- Socioeconomics and Environmental Justice, *Section 3.11.*

The following sections are presented for each resource topic listed above:

Affected Environment – This section describes the environment of the areas that may be affected by the Proposal. Because resource topics are often interrelated, one section may refer to another.

Environmental Consequences –This section presents a scientific analysis of the direct and indirect environmental impacts and forms the analytic basis for the summary comparison of impacts presented in Section 2.0. All relevant documented submitted as part of the certification and permitting processes for Minnesota and Wisconsin were reviewed to independently evaluate and verify the accuracy and comprehensiveness of the information provided. Because resource topics are often interrelated, one section may refer to another.

Measures Incorporated to Reduce Impacts and Additional Potential Mitigation Measures – Measures incorporated to reduce impacts are measures that Dairyland has committed to implementing. Impacts have been assessed assuming that these

measures will be implemented. Additional mitigation is identified if appropriate. Mitigation includes measures not already included in the Proposal.[115] The CEQ states that mitigation measures must be considered even for impacts that would not be considered significant, and where it is feasible to develop them: “Mitigation measures must be considered even for impacts that by themselves would not be considered ‘significant.’ Once the Proposal itself is considered as a whole to have significant effects, all of its specific effects on the environment (whether or not ‘significant’) must be considered, and mitigation measures must be developed when it is feasible to do so” (CEQ 1981, Question 19). However, most appropriate measures to mitigate impacts have been incorporated into the Proposal.

Mitigation can include things such as: (1) avoiding an impact altogether by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of an action and its implementation; (3) rectifying an impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of an action; or (5) compensating for an impact by replacing or providing substitute resources or environments.

3.1 SOILS AND GEOLOGY

3.1.1 Affected Environment

Geologists think of earth materials in terms of bedrock (the in-place rock that lies beneath soil and loose rock) and the material that lies on top of the bedrock, which geologists refer to as unconsolidated material. The upper part of the unconsolidated material that plants use for growth is considered soil.

3.1.1.1 Bedrock

Bedrock in the Proposal Area consists of rocks that are hundreds of millions of years old. The deepest and oldest are from a time period referred to as Cambrian and consist primarily of sandstone, with some dolomite and shale. Above the Cambrian sandstone are Ordovician-age rocks that are mostly dolomite and limestone, with some sandstone and shale. The Ordovician-age rocks are the youngest bedrock in the area and are the

[115] 40 CFR 1502.14(f)

uppermost bedrock in most of the Minnesota part of the Proposal Area. In the Minnesota region of the Proposal area the Cambrian rocks are uppermost in the deep drainages leading to the Mississippi River, where the Ordovician rocks have eroded away (Minnesota Geological Survey 2006, 2011). In the Wisconsin region of the Proposal area, more of the Ordovician rocks have been eroded away and the Cambrian rocks are more dominant; in this area, Ordovician rocks are the uppermost bedrock in the higher parts of the hills (University of Wisconsin 2005). Fossils such as clams, snails, trilobites, brachiopods and corals can be found in the bedrock in the area, most notably in the Decorah Shale; collection sites are at road cuts and ditches where the bedrock has been exposed (Minnesota Geological Survey 1995).

3.1.1.2 Karst Areas

Limestone and dolomite are carbonate rocks (limestone is calcium carbonate and dolomite is a calcium magnesium carbonate) and as such are subject to dissolution by groundwater that moves through the rock along cracks. Areas underlain by limestone and dolomite are often, and to varying degrees, typified by features referred to as karst: caves, underground drainage systems, sinkholes and springs. The area underlain by limestone and dolomite in the Study Area is considered to be karst [Minnesota Pollution Control Agency (MPCA) 2011, Wisconsin Geological and Natural History Survey (WGNHS) 2009]. Karst features are most prevalent in the area approximately 5 miles south of Cannon Falls and in the area east of Oronoco near the Zumbro River.

3.1.1.3 Mines and Quarries

There are many mines in the carbonate rocks in the Study Area that are used for aggregate. In addition, the MDNR has identified the deposit of sand and gravel in the northwest corner of New Haven Township (just southwest of Pine Island) as important because it is within a regional scarcity area for Class C aggregate (MDC 2011c, p. 132).

3.1.1.4 Natural Geologic Areas

Some of the state natural areas in the Proposal area have unique geologic features. However, these natural areas are of more importance for their animal, plant, or natural community features, and are discussed in the biological resources section (Section 3.5).

3.1.1.5 Surficial Deposits

Throughout most of the Upper Midwest, the uppermost earth materials (surficial deposits) are glacial deposits that originated from the widespread continental glaciers that covered most of the area during several cold periods that occurred during the time from approximately 10,000 to 30,000 years ago called the Ice Age. The Proposal area is different in that most of the surficial deposits did not originate directly from Ice Age glaciation. Except for Dakota County in Minnesota, the Proposal area is part of the "driftless area" that was not blanketed by Ice Age deposits left by the glaciers. Surficial deposits in the far western part of the Proposal area consist of glacial till deposits from much earlier glaciation and are locally covered with loess, a silty wind-blown deposit. The driftless landscapes, especially in the eastern part of the Proposal area, feature more bedrock exposures, more rugged topography, and their rivers and streams are better developed than areas with more recent glaciation, resulting in more efficient drainage systems and more advanced erosion. Figure 3-1 shows the slopes in the driftless area, which covers most of the Proposal area. The steepest slopes are in the Blufflands area in the short stream drainages close to the Mississippi River.

Deposits in stream beds include alluvium, which consists of recent depositions of sand, gravel, silt and clay; and terrace deposits, which are usually coarser grained and lie at elevations above the modern-day alluvial deposits. A material called colluvium is found on the steep side slopes of the drainages. Colluvium is an unsorted slope deposit consisting of rock rubble in a matrix of finer material. Bedrock outcrops are common on these steep slopes. The ridgetops are loess-covered, over deposits of weathered fine-grained material developed from the underlying bedrock and remnant old drift (Clayton et al. 2006, Minnesota Geological Survey 2007, MDNR 2011c, Hobbs and Goebel 1982, MPCA 2009 Figure 2).

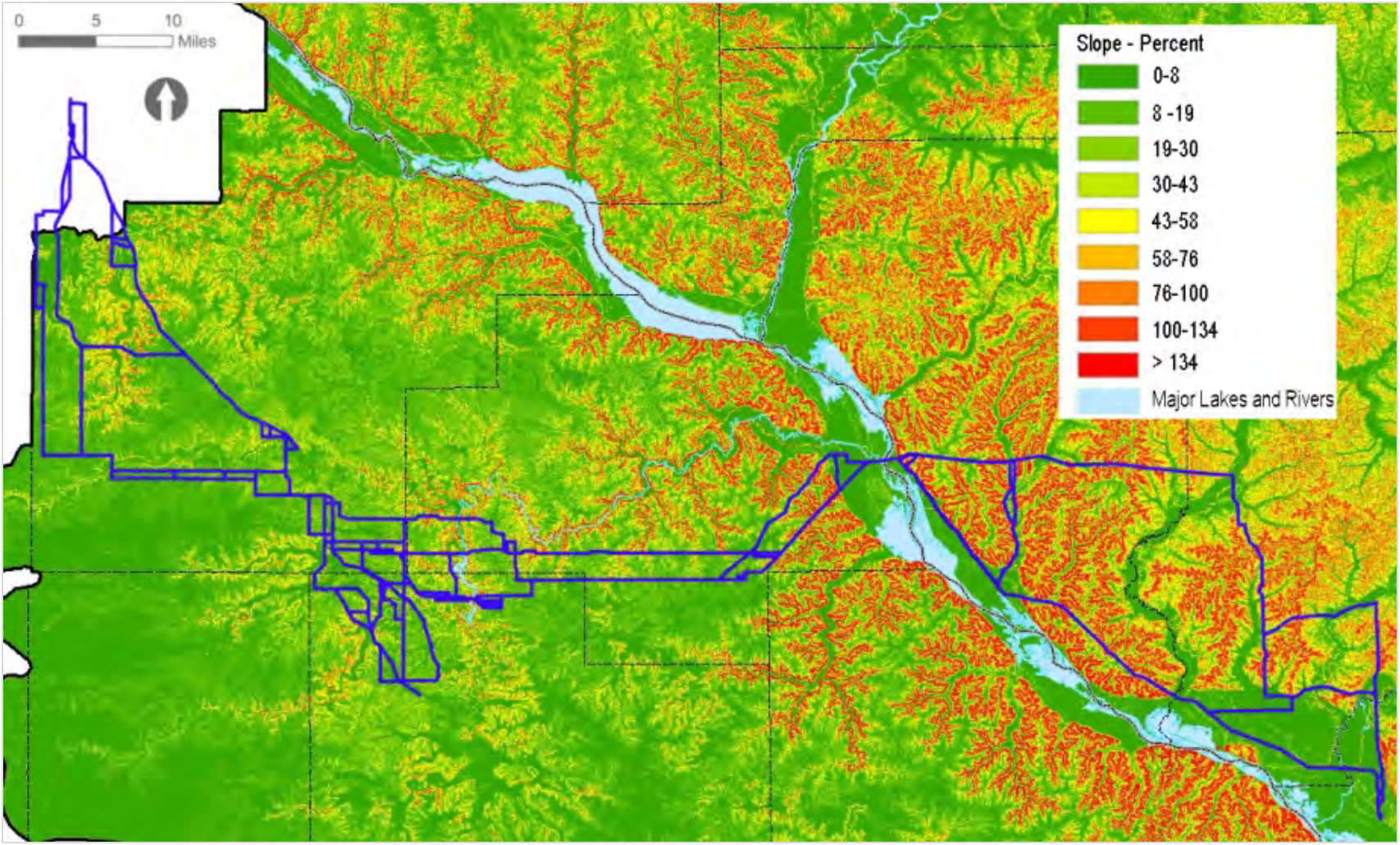

Figure 3-1: Slopes in Proposal Area

Source: Wilson n.d. 1.

Away from the stream valleys soils in the study area are primarily silt loam developed from loess and some sandy loam developed from the sandstone bedrock (WDNR 2006, Hobbs and Goebel 1982).

In Dakota County, which is mostly outside the driftless area, the soil is developed primarily on glacial outwash deposits and stratified drift. These are essentially glacial stream deposits and are much coarser –composed mostly of sand - than most of the soils in the driftless area (Hobbs and Goebel 1982).

Erosion Potential

Erosion potential is a function of rainfall, soil type, slopes and land cover. Soil types in the driftless area are generally more erodible than soil types in most other parts of Minnesota and Wisconsin. The US Department of Agriculture (USDA) estimates that 35 to 80 percent of the soils in the driftless area are highly erodible. USDA considers the value of the loss of topsoil in the Proposal area generally to be at a median value with respect to the U.S. overall (USDA ERS 1993 Figures 1.3.4 and 1.3.5). Figure 3-2 shows erosion potential for most of the Proposal area. The areas with steepest slopes generally do not have the greatest erosion potential. This is because the land cover influences the erosion potential more than the slopes; for example, areas with row crops on slopes would have high erosion potential.

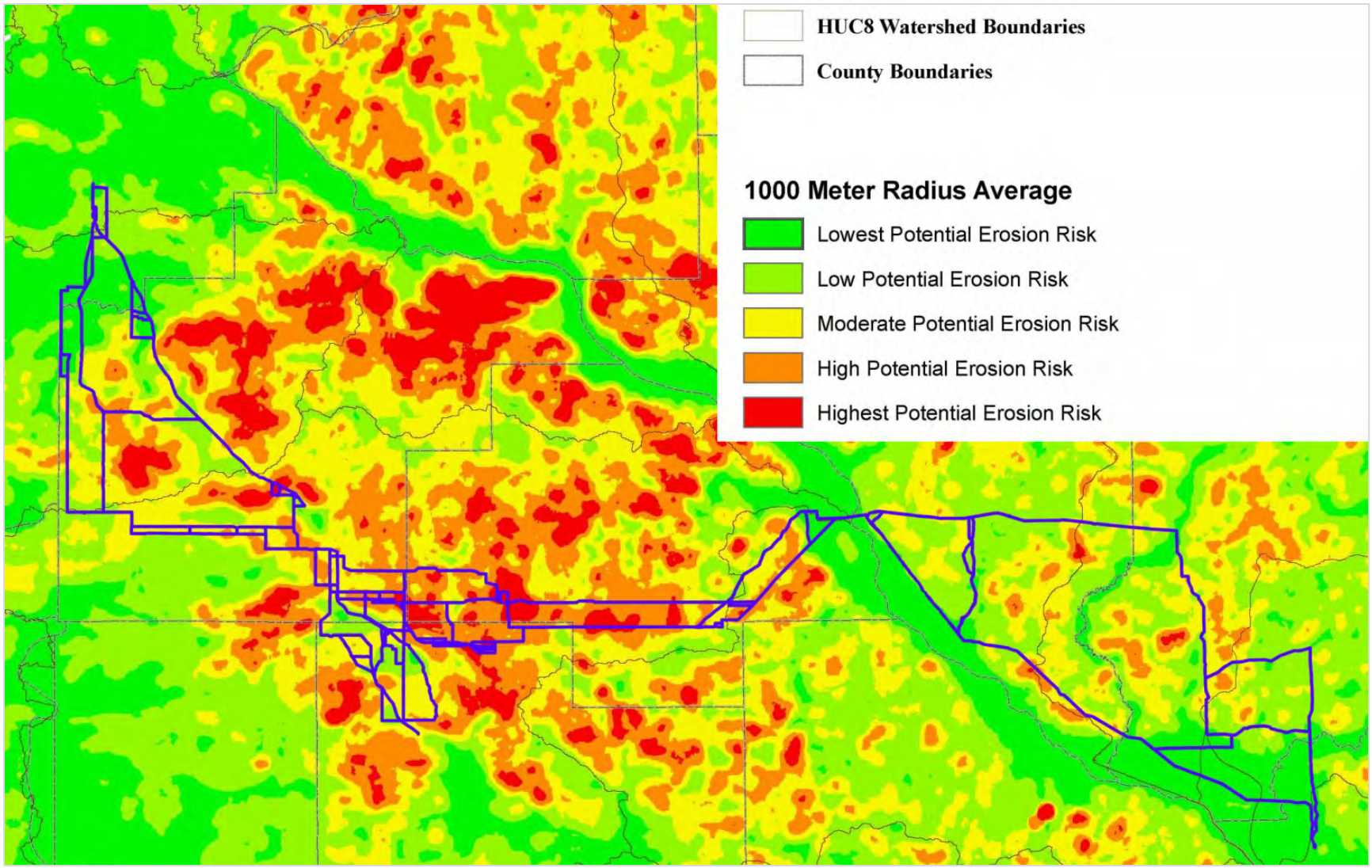

Figure 3-2: Erosion Potential
Source: Wilson n.d. 2.

3.1.2 Environmental Consequences

The alternative alignments under consideration are not expected to differ substantially in terms of geologic and soil impacts, and therefore are not discussed separately, with one exception. During the route development process, direct impacts to mines and quarries were avoided. One alternative is under consideration for avoidance of potential impacts to a quarry operation (Route 1P-007).

While erosion, slope failure and rockfall potential will be greater in areas of steep slopes in the Blufflands, all the alternative routes pass through this area. However, in Minnesota, Route 3B-003 does not follow an existing transmission line through the Blufflands, while Route 3P/3A does. The MRP Applicants have requested a modification to Route 3B-003 to provide additional route width to accommodate the steep wooded slopes. A map of the modification is included in Appendix J (Hillstrom 2011 p. 16 and Schedule 2).

3.1.2.1 Geologic Impacts of the Proposal

Because of the minimal grading and excavation, and the flexibility of pole placement location, especially in Minnesota where more karst features are expected, karst features would not be expected to be directly impacted with any Proposal alternative. Standard construction techniques would be used to ensure stable foundations. Karst features will be identified and evaluated by a geotechnical engineering consultant. The stationing between poles can be adjusted to position the poles a sufficient distance away from karst features so the construction does not disrupt drainage patterns or potentially unstable soil or rock. Pre-construction soil investigations will be conducted at each planned pole location to ensure that conditions are appropriate for the pole foundation and not compromised by solutioned bedrock. Where bedrock is present at depths less than 50 feet, subsurface imaging technologies such as electric resistivity or ground penetrating radar will be used to locate bedrock joints. Because unstable soil is located above bedrock joints, these areas will be avoided when engineering pole locations. At locations where the foundation extends to bedrock, planned foundation construction will involve excavation of the soil above the bedrock, which will uncover signs of solutioning that may affect the foundation stability. Indirect impacts to karst features could

potentially occur through storm water runoff. These impacts are discussed in Section 3.2.

Fossil collecting sites are at existing road cuts and ditches where construction has exposed the bedrock. Impact at these locations from construction of the Proposal would not be expected.

3.1.2.2 Soil Impacts of the Proposal

Direct soil impacts would occur at pole locations and at substations. Transmission line poles are generally designed for installation at existing grades. Typically, pole sites with 10 percent or less slope would not be graded or leveled. At sites with more than 10 percent slope, working areas would be graded level or fill would be brought in for working pads. If the landowner permits, it is preferred to leave the leveled areas and working pads in place for use in future maintenance activities. If the landowner does not wish to leave the leveled area, the site is graded back to its original condition as much as possible and all imported fill is removed from the site.

Direct, temporary soil impacts would occur during construction at access roads and staging areas and from grading at the substation areas. Where it is necessary to accommodate the heavy equipment used in construction, existing access routes may be upgraded or new routes may be constructed. New access routes may also be used when no current access is available, or the existing access is inadequate to cross roadway ditches or other obstructions. Disturbance at these areas may include clearing of vegetative cover, soil compaction, vehicular tracking and topsoil disturbance. An access path of approximately 16 feet would be needed. However, there may be areas where a greater width is required to allow for two lanes of construction traffic. The Environmental Features Maps included with the Wisconsin CPCN permit application, which show the locations of temporary access roads, are included as Appendix G.[116] Similar access routes would be needed in Minnesota. The Proposal would result in a maximum of approximately 1,000 acres of temporary soil disturbance during construction.

[116] The Environmental Features Maps were revised during the PSC completeness review. The final maps are included in Appendix G.

Permanent direct soil impacts of a maximum of approximately 40 acres would occur at pole locations and at the substation facilities. This does not include the buffer areas at substations.

Indirect impacts to soil would occur as a result of erosion and runoff when soil is exposed during construction.

3.1.2.3 Impacts of the No Action Alternative

The no action alternative would result in no impacts to the environment at the Proposal area. The Proposal would not be constructed or operated, and therefore, there would be no effects on geology or soils.

3.1.3 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

Runoff and erosion control best management practices (BMPs) would be required as part of the National Pollution Discharge Elimination System (NPDES) storm water permit approval process administered by the MPCA in Minnesota and by the WDNR in Wisconsin. A Storm Water Pollution Prevention Plan (SWPPP) would be required for construction activities under the NPDES program. Typical BMPs that would be part of a SWPPP include, but are not limited to, silt fencing, check dams, erosion control blankets, and seeding of exposed soils surfaces. BMPs would be inspected and maintained throughout Proposal construction. Measures to control erosion and sedimentation and protect water quality may also be permit requirements under Sections 404 and 401 of the CWA, as administered by the USACE, MDNR, WDNR and the U.S. Environmental Protection Agency (USEPA).

The following potential mitigation measures may be implemented to reduce soil and geologic impacts:

- Stockpiling, protecting, and re-using topsoil in areas of temporary construction disturbance.
- Using soil de-compaction methods, such as chisel plowing, as appropriate.
- Removing material excavated from foundations and disposing offsite.
- Employing standard engineering practices to prevent slope failures and rockfalls.

- As part of coordination with MnDOT and WisDOT, the MRP and CPCN applicants will request relevant information that the DOTs have regarding soil stability, potential for rock fall, and water drainage, and will employ measures recommended by the DOTs as appropriate.

3.2 WATER RESOURCES

Groundwater, surface water and associated features are discussed in this section. Wetlands and riparian areas are discussed in Section 3.5.

3.2.1 Affected Environment

3.2.1.1 Groundwater

Groundwater may be present in the spaces between particles such as sand grains (pore spaces) in a sand formation or sandstone bedrock. Pore spaces that existed when the rock formed, such those between sand grains in a sandstone, are called primary pore spaces. Secondary pore spaces are those that developed after the rock was formed. For example, the caves that may develop from dissolution of carbonate rock are secondary pore spaces. When pore spaces are plentiful and/or relatively large, and connected to each other, the formation has a relatively high permeability (water can move more quickly through the formation). When there are few and/or small pore space and they are not connected, permeability is relatively low. Highly productive groundwater reservoirs (aquifers) are generally characterized by large thickness of highly permeable saturated material capable of being replenished. The major aquifers in the Proposal area are in the limestone, dolomite and sandstone bedrock formations that underlie the area (MDNR 2001, Kassulke and Chern 2006; MDNR 2011b). Solutioned carbonate bedrock is most prevalent in the Minnesota part of the Proposal area, and present in the Wisconsin part of the Proposal area to a lesser extent. Karst areas are especially susceptible to groundwater contamination because the sinkholes provide a direct conduit to the groundwater, without the filtration that occurs for most groundwater. In Minnesota, all Proposal route alternatives are in the Southeast Groundwater Province, which is characterized by clayey glacial drift less than 100 feet thick overlying sandstone, limestone and dolomite (dolostone) aquifers, with karst features common in the carbonate rocks (MDNR 2001). Similar formations are present in Wisconsin (Kassulke and Chern 2006). These aquifers are fairly shallow and as such are

susceptible to contamination, especially the carbonate formations. Nitrate is frequently detected in the groundwater from these aquifers (MPCA 2005) and likely results from agricultural runoff (from synthetic fertilizer and manure). Nitrate is the most common contaminant found in Wisconsin's groundwater, with up to 90 percent attributable to agriculture [Wisconsin Groundwater Coordinating Council (WGCC) 2010, University of Wisconsin 2009].

Even though the Proposal area is mostly in the driftless area, there are localized glacial sand and gravel aquifers in the terrace deposits along stream beds and the outwash deposits in Dakota County, Minnesota (MPCA 2005). Sand aquifers are present primarily in the alluvial deposits along rivers (MPCA 2005).

3.2.1.2 Surface Water - General

General surface water features in the Proposal area are shown in Figure 3-3 and the 8-digit Hydrologic Unit Codes (HUC) are shown in Figure 3-4.

As shown in the figures, the Proposal falls mainly in the Cannon, Zumbro, Buffalo-Whitewater, Trempealeau and Black River watersheds. All alternatives cross the Cannon, Zumbro, Mississippi and Black Rivers.

The P Route alternatives would cross the Cannon River near Cannon Falls, while the A Route alternatives would cross the Cannon River near Randolph.

As described in Section 2, there are three options for crossing the Zumbro River. The P route alternatives would cross the Zumbro River at White Bridge Road. The A route alternatives would cross the Zumbro River north of the Zumbro Dam. Route 3P Zumbro would cross the Zumbro River at the Zumbro River Dam.

The proposed crossing for the Mississippi River would be the same for all route alternatives evaluated. The Proposal would cross the Mississippi River at Kellogg, Minnesota and Alma, Wisconsin.

Detailed descriptions of these crossing are included in Section 2.

Lakes in the area include Lake Byllesby in Segment 1 and Lake Zumbro in Segment 3. Both are recreational lakes and both are designated as MDNR Public Waters.

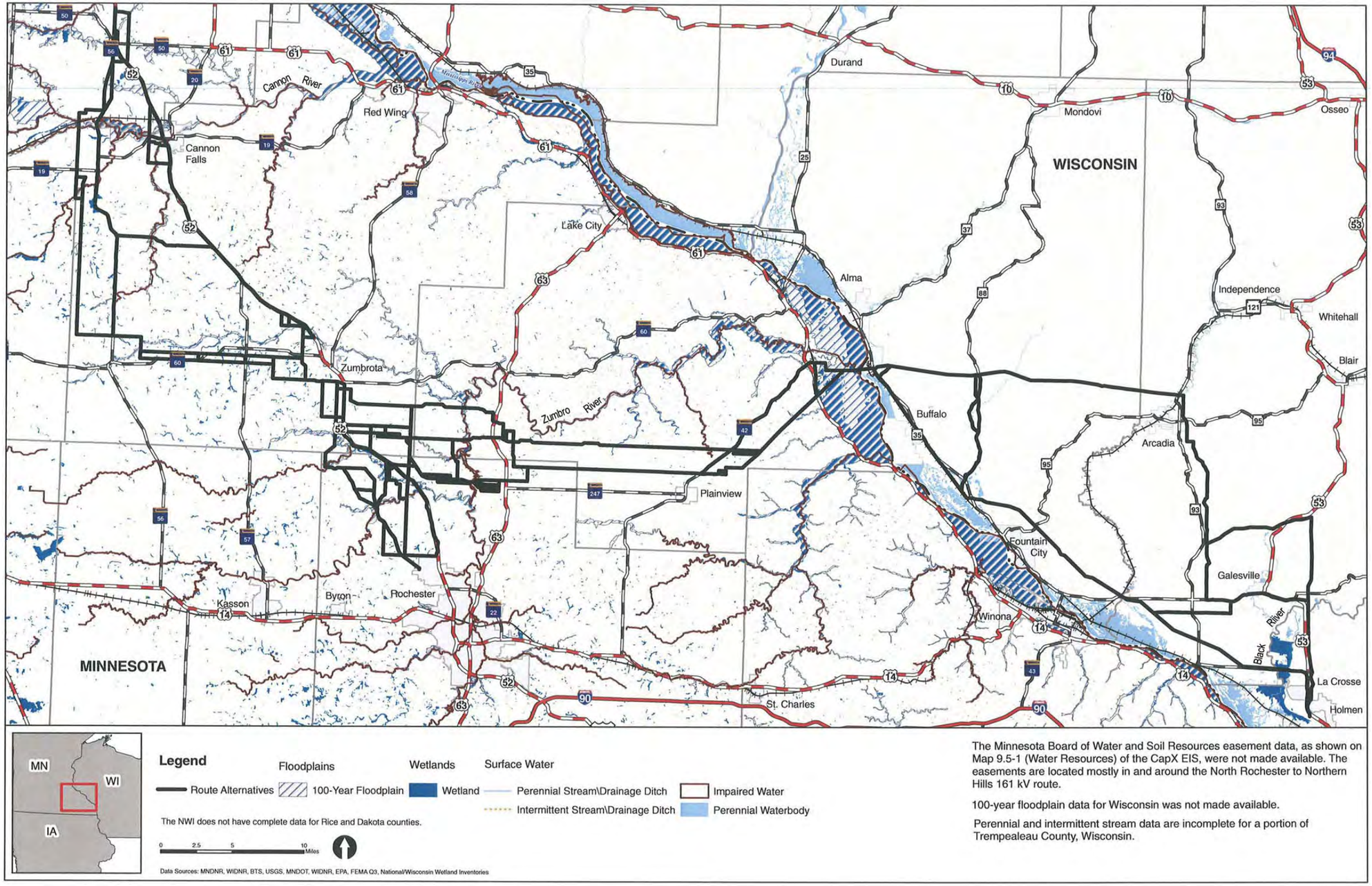

Figure 3-3: Surface Water Features in Proposal Area

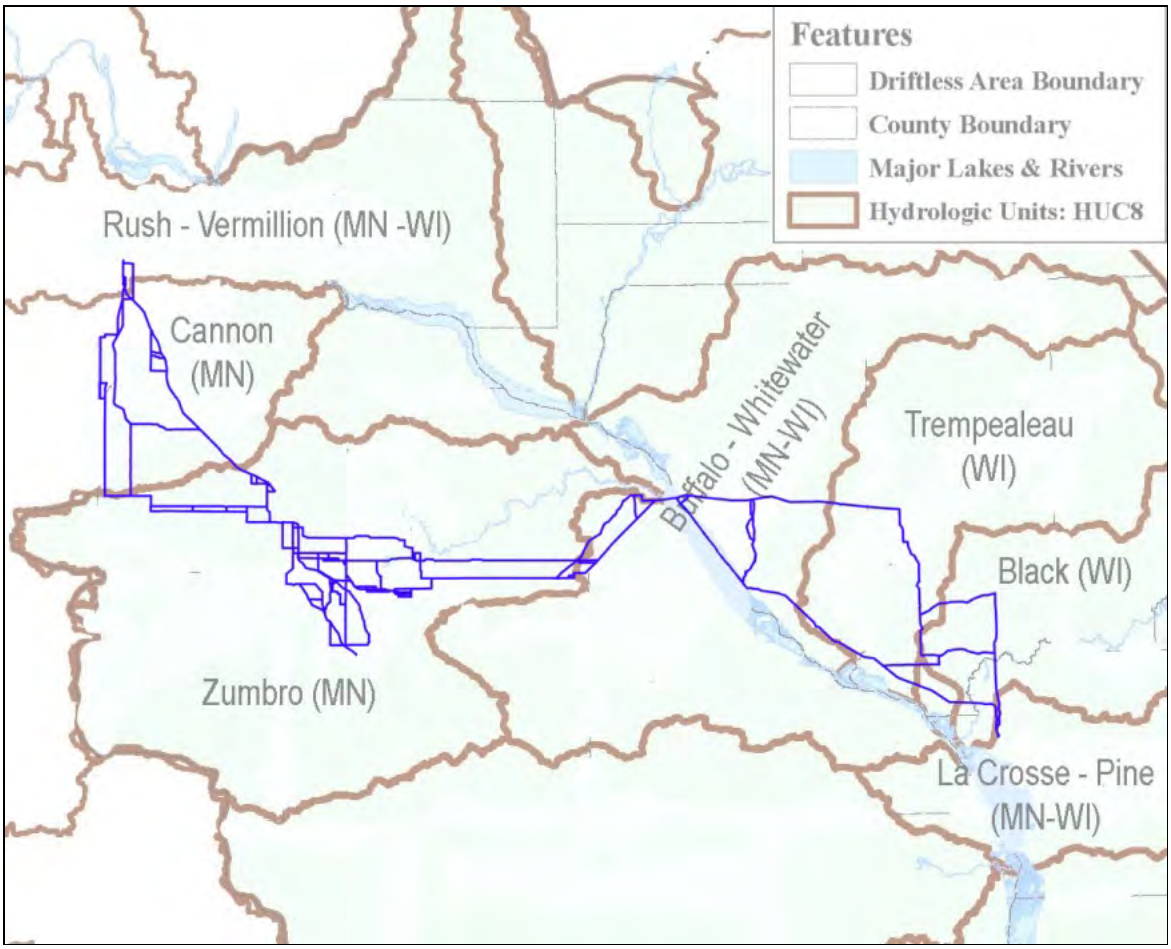

Figure 3-4: HUCs in Proposal Area

3.2.1.3 Surface Water – Impaired Waters

As shown in Figure 3-3, there are some waters designated as impaired in the Proposal Area. Section 303(d) of the CWA requires states to publish, every two years, a list of streams and lakes that are not meeting their designated uses because of excess pollutants (impaired waters). The list, known as the 303(d) list ("impaired" waters), is based on violations of water quality standards. In Minnesota, the MPCA has jurisdiction over determining 303(d) waters and in Wisconsin the WDNR has jurisdiction. Many route alternatives would require crossing MPCA/WDNR- designated impaired water streams. Reasons for impairment in the Proposal area include a number of chemicals, turbidity, and fecal coliform. This Proposal would have the potential to increase turbidity through increased sedimentation from construction activities. Turbidity is the only pollutant on the list of impairments that could be generated by the Proposal, and this would occur only during construction

3.2.1.4 Special Status Streams

National Wild and Scenic Rivers

Parts of two rivers in Minnesota and Wisconsin have been designated as federal Wild and Scenic Rivers (WSR) under the WSR Act: parts of the St. Croix River system in both Minnesota and Wisconsin and a portion of the Wolf River in east-central Wisconsin. The St. Croix River forms part of the boundary between Minnesota and Wisconsin north of its confluence with the Mississippi River (National Wild and Scenic River Council 2009). South of this confluence, the Mississippi River forms the boundary between the two states. Neither of these rivers is near the Proposal area.

National Rivers Inventory

The National Park Service (NPS) maintains a list, the National Rivers Inventory (NRI), enumerating more than 3,400 free-flowing river segments in the U.S. that it believes possess one or more "'outstandingly remarkable' natural or cultural values judged to be of more than local or regional significance." While the river segments on the NRI do not have specific legal protection, the CEQ specifies the need for coordination with the NPS and incorporation of feasible avoidance/mitigation measures when a stream is impacted as a result of a federal action.

A 20-mile segment of the Cannon River in Rice and Dakota Counties, Minnesota, from the spillway at Faribault to Waterford, was placed on the NRI in 1982 for its scenic and recreational value (NPS 2009a). This segment is upstream of the Proposal area and not affected.

A 56-mile segment of the Black River in La Crosse and Jackson Counties Wisconsin, from Black River Falls Dam to the confluence with the Mississippi River, was placed on the NRI in 1982 for its scenic, recreational and geologic value. The NPS describes this segment as follows:

> An outstanding river segment flowing through western Wisconsin hill country to the Mississippi River. Very little cultural intrusion. High sand banks, wooded shores and occasional limestone bluffs. Only 12 dwellings visible, except for village of North Bend; 4 road crossings on entire stretch. A sand bottom stream with good water quality and flow. Many large sandbars offer excellent recreation opportunities on this unspoiled stretch of river. Studied by the

State for possible inclusion in the State Wild Rivers System (NPS 2009b).

This segment is within the Proposal area and is unavoidably crossed by all alternatives.

Minnesota Wild and Scenic Rivers

The segment of the Cannon River from Faribault to the confluence with the Mississippi River was designated as a Minnesota Wild and Scenic River in 1980. This segment is within the Proposal area and unavoidably crossed by all alternatives. Parts of the segment are designated as "scenic," while others are designated as "recreational." A management plan was adopted in 1980; however, there is no planning process currently underway. All Proposal routes are within the "recreational" portion of the river. There are several other Minnesota-designated Wild and Scenic Rivers, none of which are near the Proposal area.

Wisconsin Wild Rivers

The Wisconsin system of designating State Wild Rivers has designated four Wild Rivers, all of which are in northern Wisconsin, well out of the way of the Proposal area.[117]

Minnesota Public Waters

Some rivers and streams are designated Public Waters and listed in the Public Water Inventory (PWI) by the State of Minnesota and are under the regulatory jurisdiction of the MDNR.[118] A permit from the MDNR is required to cross these features. These include the Cannon, Zumbro and Mississippi.

Designated Trout Streams

Trout streams designated by the State of Minnesota are shown in Figure 3-3. Designated trout streams are streams that have special restrictions of recreation fishing activities designed to protect and enhance Minnesota's trout resources. Some of the alternatives in Minnesota cross trout streams. No designated trout streams will be crossed by any of the alternatives in Wisconsin.

[117] Wis. Stat. 30.26
[118] Minn. Stat.103G.005 Subd 15 and 15a

Section 10

Section 10 of the Rivers and Harbors Appropriation Act of 1899 is administered by the USACE. Under Section 10, a permit is required in order to construct any structure that crosses in, over, or below any "navigable water of the U.S." Navigable waters of the U.S. is defined by the USACE as "those waters subject to the ebb and flow of the tide shoreward to the mean high water mark and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce."

Within the Proposal area, the Mississippi and Black Rivers (Wisconsin) are considered "navigable waters" that would be crossed by the Proposal. A Section 10 permit would need to be obtained from USACE for these river crossings.

State Water Trails

The Cannon, Zumbro, and Mississippi Rivers are among the 32 state-designated water trails in Minnesota, totaling 4,400 miles of mapped water routes. These waters are used for recreational boating such as canoeing and kayaking (MDNR 2011i). No information was found on any special protection for state water trails.

3.2.1.5 Floodplains

Major floodplains are shown in Figure 3-3. FEMA, through the National Flood Insurance Program (NFIP), has primary responsibility for developing and implementing regulations and procedures to control development in areas subject to flooding. The U.S. Congress established the NFIP with the passage of the National Flood Insurance Act of 1968. To implement the NFIP, FEMA prepares Flood Insurance Rate Maps (FIRMs) that show special flood hazard areas (SFHAs) where flood insurance is mandatory. The 100-year flood, or base flood, is defined as the flood having a one percent chance of being equaled or exceeded in any given year.

Floodplains may have value in the following areas (Smardon and Felleman 1996):

- Natural values for water resources: moderation of floods, water quality maintenance, and groundwater recharge. Forested floodplains provide the most water resource value.
- Natural values for living resources: fish, wildlife and plant resources. Forested floodplains also provide the most living resource value.
- Beneficial values for cultural resources: open space, recreation.
- Beneficial values for cultivated resources: agriculture, aquaculture and forestry.

Federal Executive Order 11988 directs federal agencies to take action to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. The Order also requires agencies to elevate structures above the base flood level whenever possible. The objective of the Order is to avoid the short- and long-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Executive Order 11988 also requires the following:

> If an agency has determined to, or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains. If the head of the agency finds that the only practicable alternative consistent with the law and with the policy set forth in this Order requires siting in a floodplain, the agency shall, prior to taking action, (i) design or modify its action in order to minimize potential harm to or within the floodplain, consistent with regulations issued in accord with Section 2(d) of this Order, and (ii) prepare and circulate a notice containing an explanation of why the action is proposed to be located in the floodplain.

3.2.2 Environmental Consequences

3.2.2.1 Groundwater and Surface Water – General

Most groundwater and surface water issues fall into the two broad categories: (1) potential adverse impacts on water quality from discharges associated with construction and/or operation and (2) potential changes in geohydrology or hydrology from water withdrawal or diversion. The Proposal will not involve groundwater or surface water withdrawals.

Drilled installation of pier concrete foundations does not involve dewatering and therefore will not affect groundwater levels, groundwater availability, or the well capacity/yield of existing wells. Once installed, these foundations will have no effect on groundwater availability. Leaching of potentially hazardous constituents from concrete foundations and treated timbers is negligible.

The types of materials used to treat timbers have a very low solubility and very low mobility in groundwater and therefore would not migrate more than a few feet from the foundation if leaching did take place.

There will be no discharges to groundwater, and the only discharges to surface water will be from storm water runoff during construction.

3.2.2.2 Construction Impacts on Water Quality and Streams

Construction activities have the potential to impact surface water primarily by exposing soil, which then may be eroded and deposited into streams and other water bodies. The maximum area of surface disturbance for construction of the Proposal would include approximately 1,000 acres, although this would not all occur at the same time. Areas that will be disturbed during construction include the substation areas, staging areas, access roads, and pole foundations. Short-term impacts to water quality could potentially result from spills, leaks, or improper disposal of construction materials or sediment and other contaminants carried in downstream runoff.

3.2.2.3 Rivers with Special Protection

All routes cross portion of the Cannon River designated as “recreational” under the Minnesota Wild and Scenic River Act. The Proposal crossing would require a permit and a demonstration that the route follows existing corridors to the extent feasible. [119]

A Section 10 permit would be obtained from the USACE for the Mississippi and Black River crossings. The Section 10 permit application will be included with the Section 404/401 permit applications. Section 401 of the federal CWA grants state agencies the authority to require certification of compliance with state and federal water quality

[119] Minn. R 6105.0180

regulations. Section 401 compliance is implemented by the MPCA in Minnesota and by the WDNR in Wisconsin.

The MDNR requires a permit to cross or change or diminish the course, current, or cross section of public waters by any means, including filling, excavating, or placing of materials in or on the beds of public waters.

3.2.2.4 Storm Water Runoff during Operation

Once the areas disturbed by construction are revegetated, runoff from the ROW and the substation areas would contain minimal sediment and would not be expected to impact surface water quality. To minimize impacts caused by maintenance activities, the same access routes and stream-crossing methods that were used for construction should be used.

3.2.2.5 Floodplains

Most floodplains can be spanned. In general, if a floodplain crossing is greater than 1,000 feet, pole(s) must be placed in the floodplain. The following crossings are greater than 1,000 feet:

Route 1P
4,500 feet – tributary of Butler Creek.
2,200 feet – Cannon River.
2,200 feet – Little Cannon River.
1,700 feet – North Fork Zumbro River.

Route 1A
1,300 feet – Northfield Boulevard, near Hampton.
1,800 feet – tributary of Cannon River.
1,500 feet – North Fork Zumbro River.

Routes 1P-001, -002 and -003
1,200 feet – Cannon River

Route 1P-004 and -005
2,500 feet – North Fork Zumbro River.

Route 1P-007
2,300 feet - North Fork Zumbro River

Route 1P-006
1,800 feet – North Fork Zumbro River (actual length of crossing is greater – this is only the length that lies entirely in Route 1P-006).

Routes 1B-005 and 1P-009
2,900 feet – Cannon River

Route 2P-002
2,500 feet – Middle Fork Zumbro River.

1,200 feet –South Branch of the Middle Fork Zumbro River.

Route 2B-001
3,600 feet – South Branch Middle Fork Zumbro River.

Route 2C3-001-2 (and -3)
1,200 feet – Middle Fork Zumbro River.
1,500 feet – Middle Fork Zumbro River.

Route 2C3-002-2, 2C3-003-2, 2C3-004-2, 2C3 and 2C3-007-2
1,500 feet – Middle Fork Zumbro River
1,500 feet – South Branch Middle Fork Zumbro River

Route 3A
2,000 feet – Zumbro River

All Routes – Minnesota and Wisconsin
1.4 miles – Mississippi River. In addition, poles would be required in the floodway.

Original Q1
3.0 miles – Black River

Q1- Highway 35
1.7 miles – Black River

Q1- Seven Bridges
1.8 miles – Black River

Arcadia

3,200 feet – Trempealeau River

3.2.2.6 Impacts of the No Action Alternative

The no action alternative would result in no impacts to the environment at the Proposal area. The Proposal would not be constructed or operated, and therefore, there would be no impacts on water resources.

3.2.3 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

3.2.3.1 Streams

All streams would be spanned, regardless of the route. Thus, no structures would be placed within these features and no direct impacts to lakes and watercourses are anticipated. Placement of structures within 100-year floodplain zones would be avoided unless there are no feasible alternatives.

3.2.3.2 Floodplains

As discussed above, the routes vary widely in lengths of floodplain crossings greater than 1,000 feet. While long-term floodplain impacts are limited to the minor amounts of fill associated with pole footprints, these impacts can be minimized by selecting a route with a shorter crossing.

Some counties and municipalities have floodplain ordinances, which require that floodplain impacts be avoided when feasible, and permitted (usually through a floodplain permit) if unavoidable. Mitigation may be required as part of a floodplain permit. Each structure placed within a floodplain would displace less than 100 cubic feet of flood storage volume. Based on the low volume of potential floodwater displacement, the structures are not anticipated to have an effect on flooding. The number of structures in floodplains can be minimized by using taller (greater than 150 feet) and/or stronger (reinforced H-frame) structures that can span longer than-standard distances. Increased engineering and construction costs may be necessary in order to design and construct structures within the floodplain.

Construction activities may have the potential to indirectly impact water bodies by increasing the turbidity from sedimentation; however, best management practices (BMPs) would be used to minimize impacts during construction, as required by the National Pollutant Discharge Elimination System (NPDES); construction permits for the

Proposal will be issued by the MPCA and the WDNR and as a condition of any route permit.

Any disturbance of soil greater than one acre (and even in some special cases, less than one acre) would require compliance with the condition of the states' construction stormwater permits. The types of activities associated with the construction of power lines which trigger the need for a stormwater construction permit include: ROW clearing, operations of staging areas, construction and use of access roads, landings for storage of equipment and timber, and any other types of activities which could disturb soil.

The construction stormwater permit requires the preparation of a Project specific stormwater pollution prevention plan (SWPPP) that identifies controls and practices that would be implemented during construction to prevent erosion and sediment from impacting surface waters. In addition, when construction projects are located near (within one mile) certain protected waters, such as trout streams or waters that have been designated as impaired, additional precautions, erosion controls, and sediment removal practices would be required.

3.3 AIR QUALITY

3.3.1 Affected Environment

3.3.1.1 Federal/State Regulation of Air Pollutants

The Clean Air Act[120] requires the USEPA to identify pollutants that may endanger public health or welfare. Under the Clean Air Act, the USEPA establishes National Ambient Air Quality Standards (NAAQS) for each pollutant for which air quality criteria have been issued. The USEPA is to set standards where "the attainment and maintenance are requisite to protect public health" with "an adequate margin of safety." Under these provisions of the Clean Air Act, the USEPA has established NAAQS for six pollutants: ozone, carbon monoxide, inhalable particulate matter, nitrogen dioxide, sulfur dioxide and lead.[121]

Currently, more than half the people in the U.S. live in areas that do not meet one or more of the NAAQS. The only area that USEPA currently reports as nonattainment for

[120] Pub. L. 88-206
[121] 40 CFR 50

any NAAQS in either Minnesota or Wisconsin is the Milwaukee area in far eastern Wisconsin (USEPA 2011).

3.3.1.2 Global Climate Change

Climate change refers to an emerging consensus within the scientific community which indicates that global climate, particularly changes in temperatures, are affected by human activities. Minnesota's Next Generation Energy Act (2007) initiated efforts to increase renewable energy use in the state, increase energy conservation, and decrease greenhouse gas emissions, especially carbon dioxide. The Act also set specific greenhouse gas emissions reductions percentages from a 2005 baseline date for the years 2015, 2025, and 2050. As part of 2005 Wisconsin Act 141, the Wisconsin Legislature established the current renewable portfolio standard (RPS), requiring investor-owned electric utilities, municipal electric utilities and rural electric coops (electric providers) to meet a gradually increasing percentage of their retail sales with qualified renewable resources (PSC n.d.).

3.3.2 Environmental Consequences

3.3.2.1 Air Quality

Proposal

Construction and operation of the Proposal Project would have some minor direct and indirect impacts on air quality. The magnitude of ambient air quality impacts would generally be similar for all build alternatives. Construction would result in short-term, localized exhaust emissions from construction equipment and some fugitive dust from exposed soil.

During operation of the Proposal, minor emissions of ozone and nitrogen oxides may occur near the conductor due to the development of a corona. Ozone is a major ingredient of urban smog. Nitrogen oxides are a group of highly reactive gasses that include nitrogen dioxide, are precursors to ozone, and can react with other materials in the atmosphere to form particulate matter. Corona consists of the breakdown or ionization of air within a few centimeters or less of the conductors. It usually occurs when the electric field intensity, or surface gradient, on the conductor exceeds the breakdown strength of the surrounding air. Physical damage, dust buildup, or water

buildup may induce conductor irregularity, and potentially some corona discharge. The ionization of air results in an energy loss that creates audible noise, radio noise, light, heat, and small amounts of ozone. Corona discharges can be minimized by the proper selection of conductors.

Studies of monitored concentrations of ozone that result from corona show no substantive incremental ozone concentration increases at ground level, and minimal (0.001 to 0.008 parts per million) concentrations at the transmission line elevation. Production of nitrogen oxides due to corona would be approximately one-fourth of the production of ozone due to corona. Relative to the NAAQS, increased concentrations of ozone resulting from corona would likely be on the order of one–hundredth to one-tenth of the standard near the elevated transmission line, and would be temporally or spatially negligible, as would any resulting nitrogen oxides. Thus, the Proposal would likely have a negligible impact on air quality during operation.

Corona has the potential to result in electromagnetic interference (EMI), discussed in Section 3.11.2.2.

3.3.2.2 Global Climate Change

Proposal

One other potential source of air emissions associated with operation is the release of sulfur hexafluoride (SF_6), an inorganic, colorless, odorless, non-toxic, and non-flammable gas that is used as an insulator for circuit breakers, switch gear, and other electrical equipment. SF_6 is a potent and long-term greenhouse gas. Several methods can be used to minimize SF_6 emissions from electric power systems, including improvements in the leak rate of new equipment, refurbishing of older equipment, and the use of more efficient operation and maintenance techniques. The USEPA SF_6 Emission Reduction Partnership for Electric Power Systems focuses on reducing the nation's SF_6 emissions through cost-effective operational improvements and equipment upgrades. SF_6 emissions have dropped dramatically since 1999 (Power Partners 2009). For the proposed Project, potential impacts from SF_6 emissions are expected to be limited and are not expected to vary by route.

Although the magnitude was not calculated for the Proposal, construction of the Proposal would reduce energy losses resulting from current transmission system inefficiency. Energy losses can be expressed as carbon dioxide emission equivalents. Because losses are related to route length, the use of shorter routes represents greater reductions in energy loss.

3.3.2.3 Impacts of the No Action Alternative

The no action alternative would result in no impacts to the environment at the Proposal area. The Proposal would not be constructed or operated, and therefore, there would be no direct impacts on air quality or climate change.

However, because the Proposal would not be constructed, the efficiency of the transmission system within the Midwest ISO would also be impacted, resulting in energy losses and, indirectly, negative impacts on air quality and climate change.

3.3.3 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

The substation equipment that would be installed as part of the Proposal includes state-of-the-art circuit breakers designed to minimize the risk of SF_6. The MRP Applicants currently participate in USEPA SF_6 Emission Reduction Partnership for Electric Power Systems. Program participants are active partners in applying strategies to minimize SF_6 emissions, including leak detection and repair, use of recycling equipment, and employee education and training.

3.4 ACOUSTIC ENVIRONMENT

3.4.1 Noise Terminology and Guidelines

Noise-sensitive receptors are anything that may be subject to stress or significant interference from noise. Residential dwellings, hotels, motels, hospitals, nursing homes, educational facilities, and libraries all fall under this category, while industrial, commercial, agricultural, and undeveloped land uses are generally not considered sensitive to ambient noise. The State of Minnesota has noise regulations, but the State of Wisconsin does not. However, various townships and municipalities within the Proposal area likely have noise ordinances; for example, the City of La Crosse has

limitations on time periods for construction noise, among other requirements.[122] Where no noise regulations or ordinances apply, or where guidelines are less specific or stringent, RUS will follow the standards established by the U.S. Department of Housing and Urban Development (HUD) as noted in this section.[123]

Acoustic Terminology

Noise is often considered to be unwanted sound; however, response to noise is highly individualized and is influenced by both acoustic and non-acoustic factors. Acoustic factors include the sound's amplitude, duration, frequency content, and fluctuations. Non-acoustic factors include the listener's ability to become accustomed to the sound, the listener's attitude towards the noise and the noise source, the listener's view of the necessity of the noise, and the predictability and consistency of the noise.

Amplitude and frequency physically characterize sound energy. Sound amplitude is unitized in decibels (dB), which are based on a logarithmic scale, and is a measure of the effective sound pressure of a sound relative to a reference value. A 3 dB change in a continuous broadband noise is generally considered "just barely perceptible" to the average listener. Similarly, a 5 or 6 dB change is generally considered "readily perceptible" and a 10 dB change is generally considered a doubling (or halving) of the apparent loudness (MPCA 2008 p. 7, FHWA 2011 p. 9).

Frequency is measured in hertz (Hz), which is expressed as the number of cycles per second. The typical human ear can hear frequencies ranging from approximately 20 to 20,000 Hz. Normally, the human ear is most sensitive to sounds in the middle frequencies (1,000 to 8,000 Hz) and is less sensitive to sounds in the low and high frequencies. As such, the A-weighting scale was developed to simulate the response (in Hz) of the human ear to sounds at typical environmental levels. The A-weighting scale emphasizes sounds in the middle frequencies and de-emphasizes sounds in the low and high frequencies. Any sound level to which the A-weighting scale has been applied is expressed in A-weighted decibels (dBA). Following are typical noise levels from

[122] City of La Crosse Ordinance 7.02
[123] 24 CFR 51

common sources: library, 50 dBA; ordinary conversation, 60 dBA; lawn mower at one meter, 90 dBA.

Noise in the environment is constantly fluctuating; examples include when a car drives by, a dog barks, or a plane passes overhead. Sound levels are designated by "L" with a subscript indicating the percent of time the level is exceeded for a specific period of time. Thus, the average sound level for a specific time period is called the L_{50}. The noise level that is exceeded 10 percent of the time for a specific time period is the L_{10}.

Minnesota MPCA Standards

The MPCA noise regulations are based on different permissible levels for each of three categories of land use activities and for daytime (7:00 a.m. to 10:00, p.m.) and nighttime (Table 3-1).[124] The regulations list a large number of land use activities for each category; Category 1 refers to the most sensitive activities and Category 3 to those that are least sensitive. The time period for the noise limits is one hour. To further clarify, the L_{10} is the level that can be exceeded 10 percent of the time (6 minutes) per hour.

Table 3-1: MPCA Noise Limits by Noise Area Classification (dBA)

Noise Area Classification	Daytime		Nighttime	
	L50	L10	L50	L10
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

Source: Minn. Rules 7030.0040

HUD Standards

The HUD has adopted environmental standards, criteria, and guidelines for determining acceptability of federally assisted projects and proposed mitigation measures that achieve the goal of a suitable living environment (Table 3-2).

[124] Minn. Rules ch. 7030.0400

Table 3-2: HUD Standards

Rating	Outdoor (dBA)
Acceptable	Not exceeding 65
Normally Unacceptable	65 to 75
Unacceptable	Above 75

Source: Title 24, Code of Federal Regulations, Part 51.103(c), Exterior Standards

3.4.1.1 Environmental Consequences of the Proposal

The primary source of audible noise from high-voltage transmission lines is corona, which was described in Section 3.3. The small local pressure changes that occur with corona result in a hissing and cracking sound that is sometimes accompanied by a 12-Hz hum. Because corona is primarily a foul-weather phenomenon, so is the noise that results from corona. Scratches or protrusion on the conductor surfaces can increase the incidence of corona events, as can insects or dust.

Noise from the proposed transmission lines was estimated using a model developed by the DOE Bonneville Power Administration to evaluate audible noise from high-voltage transmission lines (Xcel et al. 2010, Chartier and Stearns 1981, T. Dan Bracken 2006). The model is based on noise measurements collected in rain conditions from a number of transmission lines ranging from 240 to 2100 kV, and has been calibrated through additional measurements (Chartier and Stearns 1981). Where possible, the model was executed as a worst-case scenario benchmark, to ensure that noise was not under-predicted.

Table 3-3 presents the L_5 and L_{50} noise levels predicted for proposed transmission line structures and voltages for the Proposal.

Table 3-3: Noise - Single Circuit/Double Circuit/ Underbuild Transmission Line

Structure Type	Noise L_5 (Edge of ROW) (dBA)[1]	Noise L_{50} (Edge of ROW) (dBA)[1]
Single-Pole, Davit Arm, 345/345 kV Double-Circuit w/ one Circuit in Service	54.1	45.8
Single Pole, Davit Arm, 345/345 kV Double-Circuit w/ one Circuit operating at 161 kV	50.1	46.6
Single Pole, Davit Arm, 161 kV Single-Circuit	14.2	10.7
Single Pole, Davit Arm, 345/345 kV Double-Circuit w/ 69 kV Underbuild	53.7	45.6

1 Measurement is 3.28 feet aboveground.
Source: Xcel et al. 2010

The transmission line could produce noise levels that are approximately 46.6 to 50.1 dBA for a double-circuit 345 kV with both circuits in service and one circuit operating at 161 kV, and noise levels that are approximately 45.8 to 54.1 dBA when only one 345 kV circuit is in service. To put these numbers in perspective compared to everyday noise sources, it is unlikely that the transmission line would create noise that can be heard above and beyond the pre-existing everyday sources of noise.

For cumulative increases resulting from sources of different magnitudes, the rule of thumb is that if there is a difference greater than 10 dBA between noise sources, there would be no additive effect. Only the louder source would be heard, and the quieter source would not contribute to noise levels. Therefore, predicted noise levels associated with the transmission line are typically much lower than the ambient noise in the Proposal area and would not increase the existing background noise levels.

3.4.1.2 Impacts of the No Action Alternative

The no action alternative would result in no impacts to the environment at the Proposal area. The Proposal would not be constructed or operated, and therefore, there would be no direct impacts on the acoustic environment.

3.4.2 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

Impacts are minimized by siting transmission lines and substations away from sensitive receptors to the extent practicable, and by providing a buffer at substations.

3.5 BIOLOGICAL RESOURCES

3.5.1 Affected Environment

3.5.1.1 Natural Communities, Forests, and Other Vegetation

Figure 3-5 shows the existing land cover the Proposal area. As shown, the western part of the area is primarily cropland with some grassland and patches of forest. The eastern, blufflands part of the area is wooded with grassland and cropland.

In pre-settlement Minnesota, most of what is now rolling agricultural land was prairie and savanna (oak openings and barrens). There were forested strips along the Mississippi River and other major rivers (MDNR 2011a). The Wisconsin parts of the Proposal Area were primarily oak forests, oak openings and barrens, and "brush," with a few prairie areas (WDNR as presented by Great Lakes Ecological Assessment, n.d.).

Nearly all the forests in the area were clear-cut, primarily in the late 19th century (WDNR 2001a). By the early 20th century, nearly all the prairie and savanna had been converted to agricultural land. Remaining areas of natural communities and rare plants identified by the MDNR are shown in Figure 3-6.[125] Characteristics of these communities within the Proposal area are discussed below.

[125] Similar information for Wisconsin is not available.

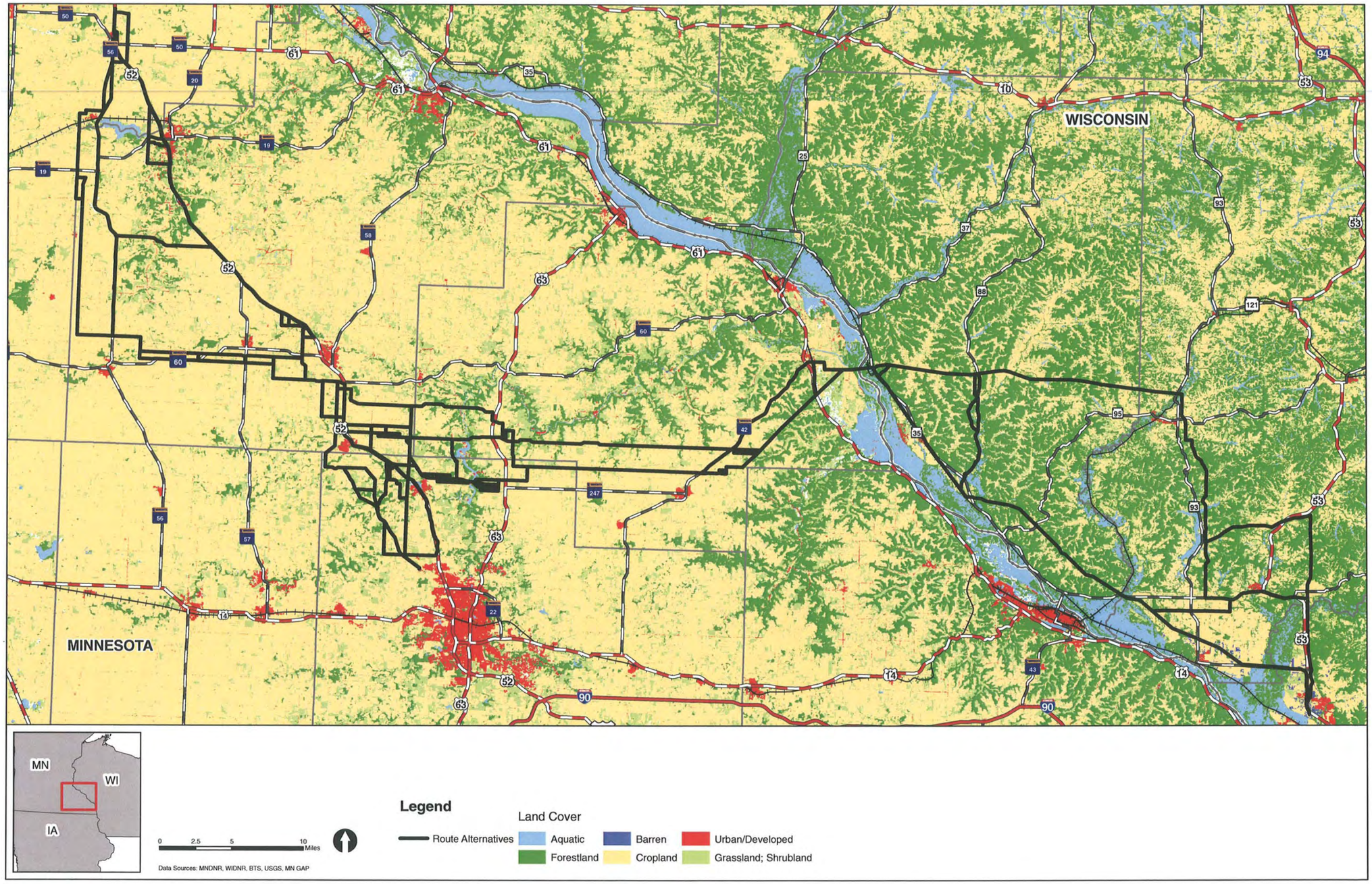

Figure 3-5: Existing Land Cover in Proposal Area

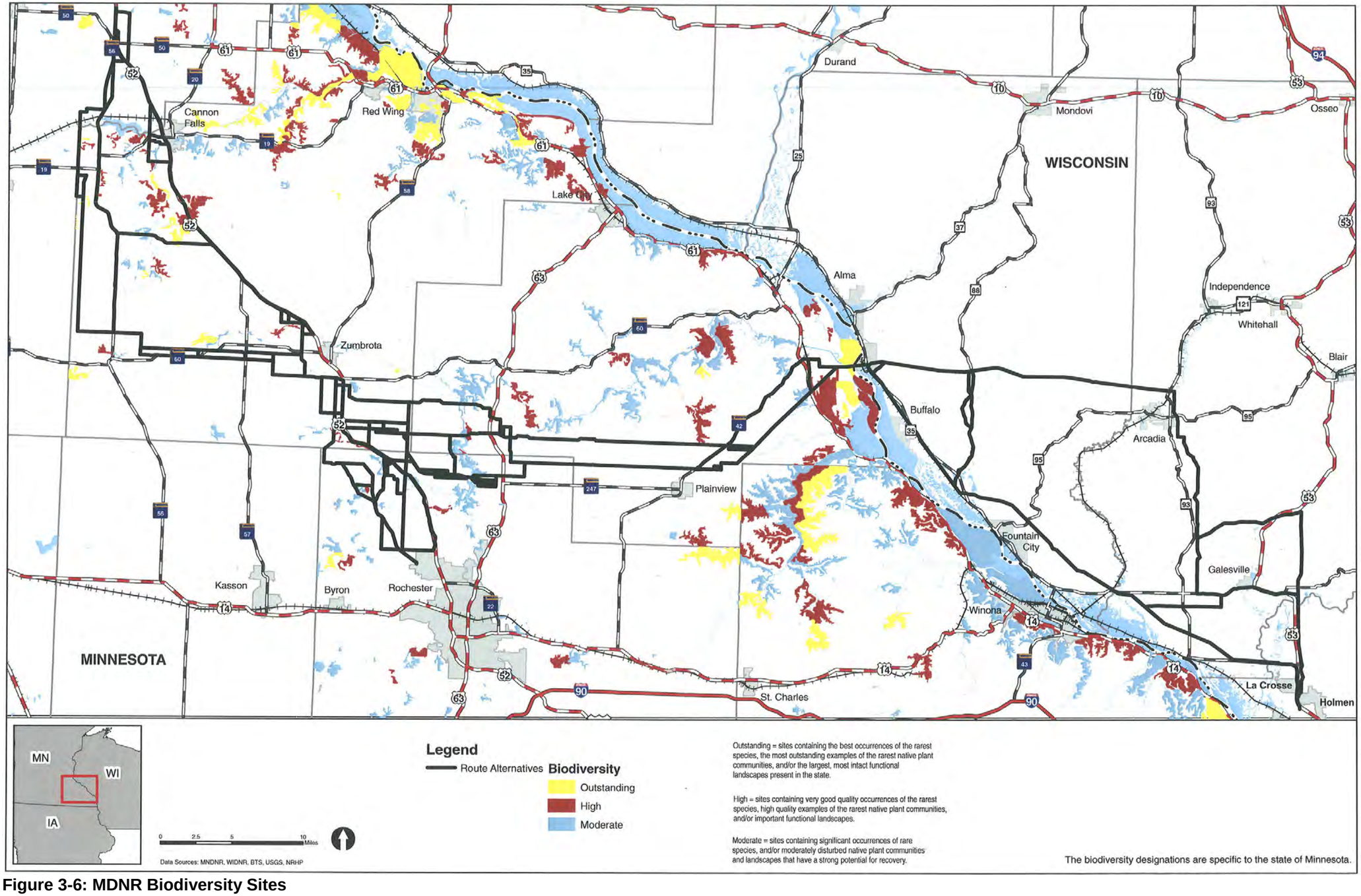

Figure 3-6: MDNR Biodiversity Sites

Minnesota

South of Lake Byllesby in the Spring and Prairie watersheds there are several dry prairies of the bedrock bluff subtype. These are formed on thin loess over bedrock on steep south- to west-facing bluffs, with rock outcrops common. Common species include little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii)*, Indian grass (*Sorgastrum nutans*), side-oats grama (*Bouteloua curtipendula*) and others (Dunevitz and Epp 1995).

Along Prairie Creek there is also a mesic subtype oak forest. These form on loess, glacial, till, or alluvium, with the canopy dominated by oak species, including northern red oak (*Quercus rubra*), bur oak (*Quercus marocarpa*), northern pin oak (*Quercus ellipsoidalis*) and white oak (*Quercus alba*). Basswood (*Tilia americana)*, black cherry (*Prunus serotina*), aspen (*Populus tremuloides*) and paper birch (*Betula papyrifera*) are common associates (Dunevitz and Epp 1995).

In the watersheds of the Little Cannon and the Middle Fork of the Zumbro River there are a number of tracts of maple-basswood forest. These form on glacial till, alluvium and loess on steep north- to east-facing slopes. The canopy is dominated by sugar maple (*Acer saccharum*), basswood, and northern red oak (Dunevitz and Epp 1995). Both these watersheds also have some floodplain forests, with the canopy dominated by silver maple (*Acer saccarinum*), or a mix of silver maple, cottonwood (*Populus deltoides*), and black willow (*Salix nigra*). There are several tracts of mesic subtype oak forest and few floodplain forests near the Zumbro River in the vicinity of Zumbro Lake (MCBS 1997b).

The Upper Mississippi National Wildlife and Fish Refuge (Upper Mississippi Refuge) and the Trempealeau National Wildlife Refuge are dominated by floodplain forests. McCarthy WMA, located in the Mississippi floodplain, has a meadow-marsh-swamp complex community. This is a mosaic of wet meadow, emergent marsh, and shrub old swamp in old channels of the Zumbro River near its confluence with the Mississippi. The wet meadow most often occurs as dense sedge mat floating on 2-5 feet of water. Emergent marsh occurs in areas where the mat has disintegrated and around margins of open water; both types grade into shrub swamp (MCBS 1997c).

Wisconsin

Aside from wetlands, which are discussed in Section 3.5.1.3, the primary natural communities in the Wisconsin part of the Proposal area are forests.

Forested upland communities along the Q1-Highway 35 Route are primarily southern dry-mesic forest communities, typically dominated by trees such as red oak (*Quercus rubra)*, shagbark hickory (*Carya ovata*), *Populus spp*. and paper birch (*Betula papyrifera*). Red cedar is an important tree species in the southern dry-mesic forests of the Q1-Highway 35 Route. Southern dry-mesic forests along the Q1-Highway 35 Route include higher densities of black cherry (*Prunus serotina*) and white oak. Other common tree species include American elm, American basswood and box elder. Most forested areas are privately owned; however some is part of the Van Loon Wildlife Area.

Forested upland communities along the Arcadia Route and the southern portion of the Q1-Galesville Route are primarily southern mesic and southern dry-mesic forest communities, and all are on private land. Dominant trees include red oak, white oak, shagbark hickory, box elder, black cherry, black walnut, large-tooth aspen (*Populus grandidentata)*, and quaking aspen. Forested upland communities along the northern part of the Arcadia Route are comprised more of *Populus spp*., pin oak, black cherry, and paper birch. Upland forests along the southern part of the route have a greater presence of red oak, white oak, shagbark hickory, American basswood, and black walnut. Other common tree species include American elm, silver maple, Fraxinus spp., slippery elm, black oak, bur oak, and white pine (*Pinus strobus*).

3.5.1.2 Invasive Species and Noxious Weeds

Executive Order 13112 (Invasive Species) directs federal agencies to expand and coordinate their efforts to combat the introduction and spread of plants and animals not native to the U.S. Noxious species are those regulated by statute (municipality, county, state, or federal) and listed in the USDA Noxious Weeds List for Minnesota and Wisconsin. Both Minnesota and Wisconsin have their own noxious weed laws.[126] Landowners are required to remove noxious weeds from their property.

[126] Minn. Stat. 18, Wis. Stat. Ann. 66.96 et. seq.

Unlike noxious species, invasive species is a broader term without regard to statute. In a recent USFWS survey, the top five invasive weeds identified in Region 3, the area that includes Minnesota and Wisconsin, were purple loosestrife (*Lythrum salicaria*), reed canary grass (*Plalaris arundinacea*), Canada thistle (*Cirsium arvense*), leafy spurge (*Euphorba esula*), and spotted knapweed (*Centaurea stoebe*) (Knutson et al. 2006 pp. 2 and 3). In the Upper Mississippi Refuge, purple loosestrife (non-native) is a large-scale, refuge-wide problem, controlled mainly by biological agents (beetles) and pulling. Purple loosestrife has invaded thousands of acres of the Refuge, "replacing large blocks of native vegetation, decreasing species diversity and affecting local wildlife populations by reducing available wetland habitat" (USFWS 2006, p. 69, Table 8). Spotted knapweed (non-native) is a problem in sand prairies that is controlled by mowing. Reed canary grass (both native and non-native ecotypes) is a widespread problem and a threat to forest regeneration (USFWS 2006 Table 8). It has "invaded Refuge wetlands" and the Refuge is supporting research to develop effective means to stop it (USFWS 2006 pp. 69 and 70).

3.5.1.3 Wetlands and Riparian Areas

Wetlands perform many important hydrologic functions, such as flood abatement, maintaining stream flows, slowing and storing floodwaters, stabilizing stream banks, nutrient removal and uptake, groundwater drainage and recharge, sediment control, and water quality. Wetlands also serve as important resources for wildlife habitat and food web support. A number of wetland classification systems have been developed, but the Cowardin et al. (1979) classification methods are the most widely recognized system and have been used for wetland classification within the regional area. Of the five wetland systems described by Cowardin et al., palustrine, riverine, and lacustrine systems occur within the Proposal area. Palustrine refers to smaller (less than 20 acres), shallow (less than 6.5 feet) wetlands. Riverine wetlands are those associated with streams and rivers. Lacustrine wetlands are larger wetlands typically associated with open water areas.

Broad-scale locations of wetlands in the Proposal area are shown in Figure 3-3.

The jurisdictional authority for protection of Waters of the U.S. is derived from several sources, beginning with the Clean Water Act of 1972 (CWA). Section 404 of the CWA authorizes the USACE to grant permits for discharges of dredged or fill materials into Waters of the U.S., and it gives the USACE authority to enforce against violations. Executive Order 11990 directs federal agencies to take action to minimize the destruction, loss, or degradation of Waters of the U.S.

Pursuant to Section 404 of the CWA, the USACE defines wetlands in as those areas that are "inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."[127] Jurisdictional wetlands must possess three essential characteristics: "(1) a dominance by hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology" (USACE 1987). For an area to be classified as a jurisdictional wetland under the federal guidelines, all of the above criteria must be met, and the wetland must have a hydrologic connection to a water of the U.S. Interstate wetlands or those which could affect interstate commerce may be considered jurisdictional.

In 2010, the Ramsar Convention on Wetlands, an international treaty on wetlands signed in 1971, designated the Upper Mississippi River Floodplain Wetlands as a Ramsar Site of international importance. The site consists primarily of flowing main and side channel habitats, backwater marshes and floodplain forests. The following areas in or near the Proposal area are included in the Ramsar Site: the Upper Mississippi River National Wildlife and Fish Area and associated U.S. Army Corps of Engineers lands and water, McCarthy Lake Wildlife Management Area, Kellogg-Weaver Dunes Scientific and Natural Area, Trempealeau National Wildlife Refuge, Perrot State Park, and Van Loon State Wildlife Area (USFWS 2010e, Ramsar Convention on Wetlands 2010).

Minnesota

In Minnesota, both jurisdictional and non-jurisdictional wetlands (those that do not have a hydrologic connection to a body of water of the U.S.) are protected under the Wetland

[127] 33 CFR 328.3b

Conservation Act (WCA).[128] Although the Board of Water and Soil Resources (BWSR) administers the WCA on a statewide basis, local government units implement the WCA. Wetlands may also be regulated by the MDNR if they are listed as PWI wetlands. The WCA regulates wetland draining and filling activities on all wetlands not covered by the MDNR Public Waters Work Permit Program. The MDNR requires a permit to cross or change or diminish the course, current, or cross section of public waters by any means, including filling, excavating, or placing of materials in or on the beds of public waters. Local governments may also have their own wetland ordinances.

Some wetlands also are listed in the PWI, and some of the wetlands that may be in alternative routes are in the PWI. The MRP Applicants would obtain utility crossing permits from the MDNR for any of the PWI water or wetland crossed.

Wetland habitats in the Minnesota part of the Project area include floodplain forests, wet forests, lakeshores, wet meadows, and marshes. Floodplain forests are riparian hardwood forests located along the Mississippi River Valley and its tributaries and are typically dominated by green ash, American elm, cottonwood, and hackberry. Wet forests are in areas of groundwater seepage, often on level stream terraces and at the base of slopes. The canopy is often dominated by black ash, basswood, and American elm with an herbaceous layer containing various sedges, grasses, and forbs. Lakeshore systems are generally dominated by species of willow, rushes, sedges, and emergent aquatic plants near shore. Wet meadows are characterized by grasses, sedges, rushes, and various broad-leaved plants. Marshes are emergent herbaceous communities that are typically are heavily dominated by cattails, bulrushes, and sedges.

Wisconsin

In the Wisconsin part of the Proposal area the most notable wetlands are the forested wetlands in the Mississippi River and Tank Creek/Black River floodplains. Forested wetland communities in the Mississippi River floodplain are dominated by trees such as eastern cottonwood (*Populus deltoides*), box elder (*Acer negundo*), black willow, American elm (*Ulmus americana*) and black birch (*Betula nigra*). Other common tree species include black oak (*Quercus velutina*), silver maple, green ash (*Fraxinus*

[128] Implemented under Minn. R. 8420

pennsylvanica), red cedar (*Juniperus virginiana*) and red maple (*Acer rubrum*). Dominant tree species in the floodplain forests of Tank/Black River include American elm, silver maple, swamp white oak (*Quercus bicolor*) and black birch. Part of this segment is in the Van Loon State Wildlife Area.

The majority of wetlands along routes support a fresh (wet) meadow plant community. Those communities observed in the field are typically degraded and contain low plant diversity, often being dominated by reed canary grass. Other plant species occasionally observed in this community type include jewelweed (*Impatiens capensis*), stinging nettle (*Urtica dioica*), cattail (*Typha spp.*), sedges (*Carex spp.*), purplestem angelica (*Angelica atropurpurea*) and various facultative agricultural weeds.

Numerous wetlands along the routes also support a mix of plant communities, with forested wetlands and shrub carr being the most common, in addition to the wet meadow community. Based on field observations, these wetlands are also typically degraded with a relatively low level of vegetative diversity. Dominants typically observed in forested wetland communities include boxelder (*Acer negundo*), quaking aspen (*Populus tremuloides*), eastern cottonwood (*Populus deltoides*), green ash (*Fraxinus pennsylvanica*) and willow species (*Salix spp.*). Shrub carr wetlands are typically dominated by boxelder (*Acer negundo*) and green ash saplings (*Fraxinus pennsylvanica*), spirea species (*Spirea spp.*), buttonbush (*Cephalanthus occidentalis*), willow species (*Salix spp.*), dogwood species (*Cornus spp.*) and elderberry (*Sambucus canadensis*), with elements of the wet meadow community described above.

Despite generally low vegetative diversity of wetlands observed along the alternative routes, several wetlands along these areas would be considered sensitive based on community type, association with a specific water body and/or floristic quality. The State of Wisconsin has specific criteria for determining whether wetlands are considered sensitive (PSC 2011e, pp. 19 and 20). By the Wisconsin criteria, wetlands are considered sensitive if they are in or adjacent to certain areas of special natural resource interest, including, among others, the Mississippi River, which is specifically listed; and Eagle Creek and the Trempealeau River, which Wisconsin also considers “areas of special natural resource interest” because of associated Natural Heritage

Inventory features (found in the WDNR designated waterways database). Based on the Wisconsin criteria, other sensitive wetlands include, but are not limited to, deep marsh, northern or southern sedge meadow not dominated by reed canary grass, wet or wet-mesic prairie not dominated by reed canary grass, fresh wet meadows not dominated by reed canary grass, floodplain forest, and ephemeral ponds in wooded settings (PSC 2011e, Section 2.4.13.4.14.) The sensitive wetlands based on the Wisconsin criteria are summarized in Table 3-4. Locations of these features are shown in the detailed route maps from the CPCN application, included as Appendix G.

Table 3-4: Sensitive Wetland by Community Type and/or Floristic Quality

Route	Segment	Wetland ID Number	Description
Q1-Highway 35 Route	1	1-FW1	Floodplain forest adjacent to the Mississippi.
	1	1-FW2	Floodplain forest adjacent to the Mississippi.
	2A3	2A-FW2	Floodplain forest adjacent to an unnamed tributary (UNT) to the Mississippi.
	2B	2B-FW1	Floodplain forest adjacent to Mississippi backwater slough
	2E	2E-FW2	Floodplain forest fringe adjacent to Mississippi backwater slough
	2E	2E-FW4	Floodplain forest and emergent aquatic wetland adjacent to an UNT to the Mississippi
	2F	2F-FW1	Floodplain forest adjacent to Waumandee Creek
	2F	2F-W1	Sedge meadow component adjacent to Eagle Creek
	2F	2F-FW2	Floodplain forest adjacent to Eagle Creek
	2G	2G-W1	Sedge meadow not dominated by reed canary grass and floodplain forest adjacent to Eagle Creek
	2G	2G-W2	Sedge meadow not dominated by reed canary grass adjacent to Eagle Creek
	2I	2I-W1	Emergent aquatic wetland complex adjacent to the Trempealeau River West Channel
	2I	2I-W2	Emergent aquatic wetland complex associated with the Trempealeau River
	2I	2I-W3	Emergent aquatic wetland complex adjacent to the Trempealeau River
Q1-Highway 35 Route	8B	8B-FW1	Floodplain forest adjacent to Tank Creek
	8B	8B-FW2	Floodplain forest adjacent to Tank Creek

Route	Segment	Wetland ID Number	Description
	8B	8B-W2	Wet meadow, shrub carr, and emergent aquatic wetland complex not dominated by reed canary grass
	8B	8B-FW3	Floodplain forest adjacent to the Black River
	8B	8B-FW4	Floodplain forest adjacent to the Black River and the Black River New Channel
	8B	8B-FW5	Floodplain forest adjacent to the Black River New Channel
Arcadia Route	1	1-FW1	Floodplain forest adjacent to the Mississippi
	1	1-FW2	Floodplain forest adjacent to the Mississippi
	10C	10C-FW1	Floodplain forest adjacent to Little Waumandee Creek
	10C	10C-FW2	Floodplain forest adjacent to an UNT to Waumandee Creek
	10C	10C-W2	Wet prairie not dominated by reed canary grass
	10C	10C-W3	Southern sedge meadow not dominated by reed canary grass
	10C	10C-FW3	Floodplain forest adjacent to an UNT to Waumandee Creek
	10C	10C-FW5	Floodplain forest adjacent to an UNT to the Trempealeau River
	10C	10C-W8	Emergent aquatic wetland component associated with the Trempealeau River
	10C	10C-FW6	Floodplain forest adjacent to the Trempealeau River
	10C	10C-FW7	Floodplain forest adjacent to the Trempealeau River
	10C	10C-W9	Emergent aquatic wetland and floodplain forest complex - Trempealeau River
	11B	11B-FW1	Floodplain forest - Turton Creek
	11B	11B-FW2	Floodplain forest adjacent to Turton Creek
	11D	11D-W1	Southern sedge meadow component not dominated by reed canary grass
	11G	11G-FW1	Floodplain forest associated with an UNT to Tamarack Creek
	11G	11G-FW2	Floodplain forest associated with an UNT to Tamarack Creek
Arcadia Route	11G	11G-W1	Southern sedge meadow not dominated by reed canary grass

Route	Segment	Wetland ID Number	Description
	11G	11G-W2	Southern sedge meadow component not dominated by reed canary grass
	13B1	13B1-FW1	Ephemeral pond in wooded setting type habitat within mesic forest
	13B2	13B2-FW1	Floodplain forest adjacent to an UNT to Beaver Creek
	13B2	13B2-W1	Sedge meadow and deep marsh complex
	13B2	13B2-FW2	Floodplain forest adjacent to Beaver Creek
Q1-Galesville Route	1	1-FW1	Floodplain forest adjacent to the Mississippi
	1	1-FW2	Floodplain forest adjacent to the Mississippi
	2A3	2A-FW2	Floodplain forest adjacent to an UNT to the Mississippi
	2B	2B-FW1	Floodplain forest adjacent to Mississippi backwater slough
	2E	2E-FW2	Floodplain forest fringe adjacent to Mississippi backwater slough
	2E	2E-FW4	Floodplain forest and emergent aquatic wetland adjacent to an UNT to the Mississippi
	2F	2F-FW1	Floodplain forest adjacent to Waumandee Creek
	2F	2F-W1	Sedge meadow adjacent to Eagle Creek
	2F	2F-FW2	Floodplain forest adjacent to Eagle Creek
	2G	2G-W1	Sedge meadow not dominated by reed canary grass and floodplain forest adjacent to Eagle Creek
	2G	2G-W2	Sedge meadow not dominated by reed canary grass adjacent to Eagle Creek
	2I	2I-W1	Emergent aquatic wetland complex adjacent to the Trempealeau River West Channel
	2I	2I-W2	Emergent aquatic wetland complex associated with the Trempealeau River
	2I	2I-W3	Emergent aquatic wetland complex adjacent to the Trempealeau River
	13B2	13B1-FW1	Ephemeral pond in wooded setting type habitat within mesic forest
	13B2	13B2-FW1	Floodplain forest adjacent to an UNT to Beaver Creek
	13B2	13B2-W1	Sedge meadow and deep marsh complex
	13B2	13B2-FW2	Floodplain forest adjacent to Beaver Creek

3.5.1.4 Birds and Other Wildlife Resources

Any construction involves some wildlife impacts. Aside from potential impacts to threatened or endangered species (Section 3.5.1.5) or to rare or uncommon species that may be related to natural communities (Section 3.5.1.1), the greatest wildlife concerns from the Proposal are potential impacts to birds. In the U.S., migratory birds are protected under the Migratory Bird Treaty Act, and eagles, while protected under the Migratory Bird Treaty Act, are also protected under the Bald and Golden Eagle Protection Act. This section focuses on birds in the Proposal area, and also discusses other relevant wildlife not discussed elsewhere.

Several sites in the Proposal area have been designated as Important Bird Areas (IBAs), either through the Audubon Society (state-level IBAs) or the American Bird Conservancy (global IBA) (Figure 3-7). In the Proposal area both the upland forests and the Mississippi River and associated floodplains provide important bird habitat, as do other lake and riverine areas such as Lake Byllesby on the Cannon River and the Black River Bottoms.

Upper Mississippi Globally Important Bird Areas

In the Proposal area, only the 240,000-acre Upper Mississippi National Wildlife and Fish Refuge, plus the associated USACE lands, and the 6,200-acre Trempealeau National Wildlife Refuge have been identified by the American Bird Conservancy as globally important bird areas (global IBA). This designation has been in place since 1998 because of exceptionally high bird use during migration and during the breeding season (American Bird Conservancy 2010a, 2010b; Knutson et al. 2000, p. 577). The approximately 500 global IBAs that the American Bird Conservancy has designated in the U.S. each meet one or more of the following criteria (American Bird Conservancy 2010c):

- It must contain a significant population of a federally-listed endangered or threatened species.
- It must have significant populations of species listed on the U.S. Watch List. These are bird species of conservation concern. Many of the birds on the

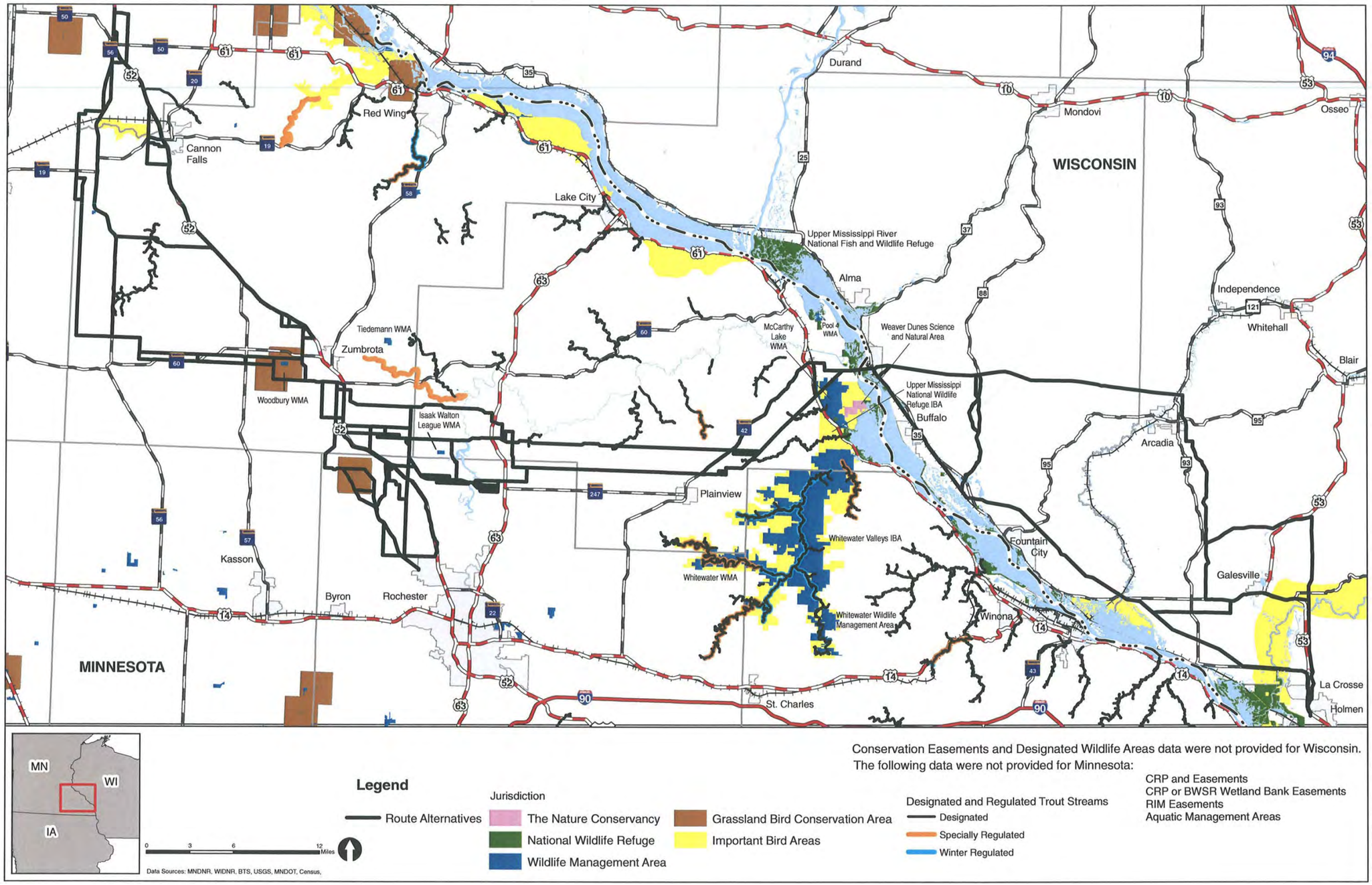

Figure 3-7: Conservation Areas

- USFWS list of birds of conservation concern for the region that includes the Proposal area (USFWS 2008) are on the U.S. Watch list.
- It must contain significant populations of species with restricted ranges.
- It must have large concentrations of migratory birds during some part of the year.

The Upper Mississippi Refuge has 306 species of birds and hosts up to 50 percent of the world's canvasback ducks and up to 20 percent of the eastern U.S. population of tundra swan during fall migration. It has had 167 active bald eagle nests, a peak of 2,700 bald eagles during spring migration, and approximately 5,000 heron and egret nests in up to 15 colonies (USFWS 2006, pp. 1-2). Four main groups of waterfowl frequent the Refuge: diving ducks, puddle (or dabbling) ducks, geese and swans.

Diving ducks have small wings relative to body size and they must use rapid wing beats when they fly. Most patter along the water when launching into flight. They frequent deeper water and dive to feed on aquatic plants and fish. Common Refuge species are the canvasback, lesser scaup, common goldeneye, ring-necked duck, bufferhead, ruddy duck, and mergansers. The most common puddle ducks on the Refuge are the wood duck, mallard, blue-winged teal, wigeon, gadwall, pintail and green-winged teal. Puddle ducks feed by dabbling on the water surface and tip rather than dive.

The Upper Mississippi Refuge includes 11 pools created from dams built for navigation on the Mississippi River (Figure 3-8). The Proposal would cross the river at Pool 5. The area of potential direct impacts on Refuge birds is limited to the Proposal crossing of Refuge property (Figure 3-9). Holmen, the southern terminus of the Proposal, is shown in Figure 3-8. Refuge pools and nearby alternative routes south of the proposed Mississippi River crossing are shown in Figures 3-10 through 3-12. Pools 7, 8, 9, and 13 have by far the highest use by waterfowl, although use of Pools 4 and 5 has increased since implementation of plans to increase the number of areas within these pools that are closed to migratory bird hunting, and sometimes to other uses that disturb waterfowl, such as the use of motors (closed areas) (Nelson 2008). Closed areas are designated by cross-hatching on Figures 3-9 through 3-12. Pool 7 is in the Black River area, and the others are further south.

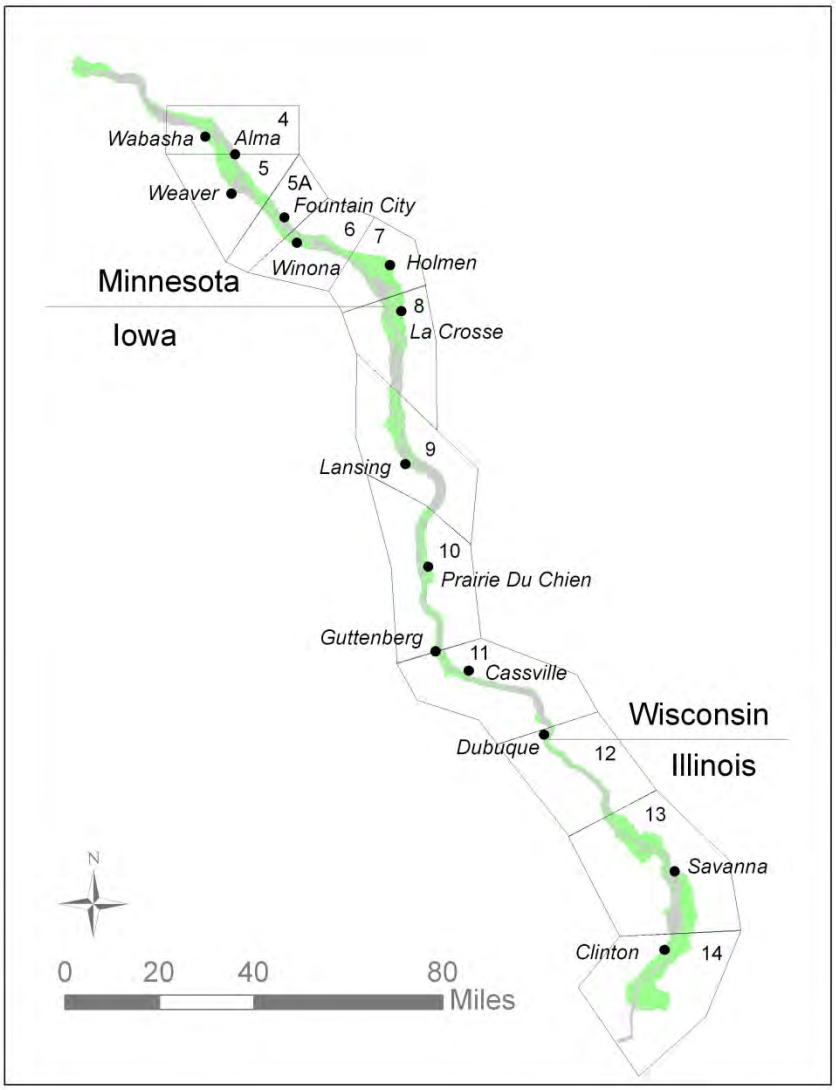

Figure 3-8. Upper Mississippi Refuge and Navigation Pools 4 to 14
Source: USFWS 2011d.

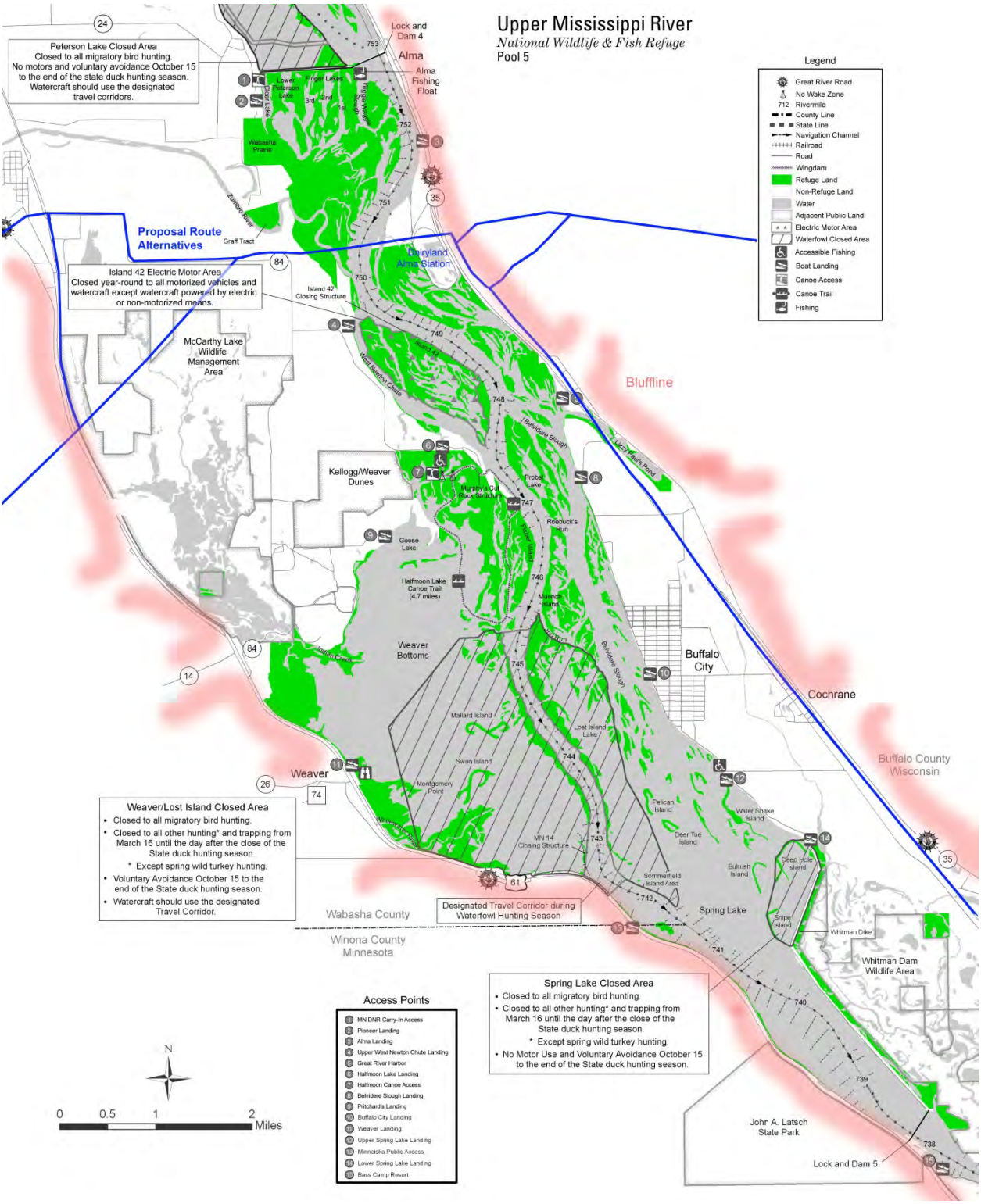

Figure 3-9. Proposal Crossing of Upper Mississippi Refuge –Pool 5.
Sources: USFWS 2011e and 2011f (with route alternative and bluffline information added)

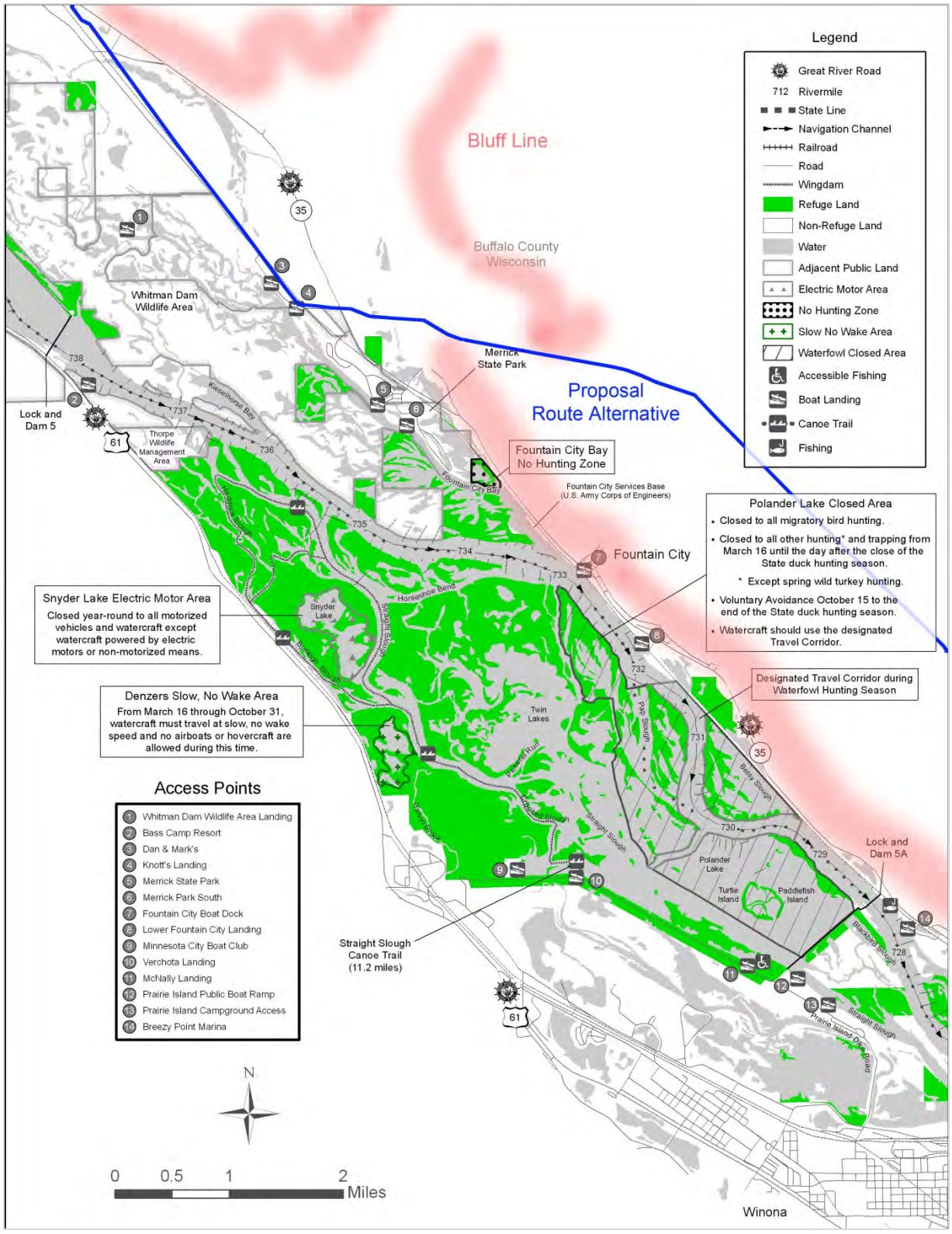

Figure 3-10. Upper Mississippi Refuge – Pool 5A.
Source: USFWS 2011g (with route alternative and bluffline information added)

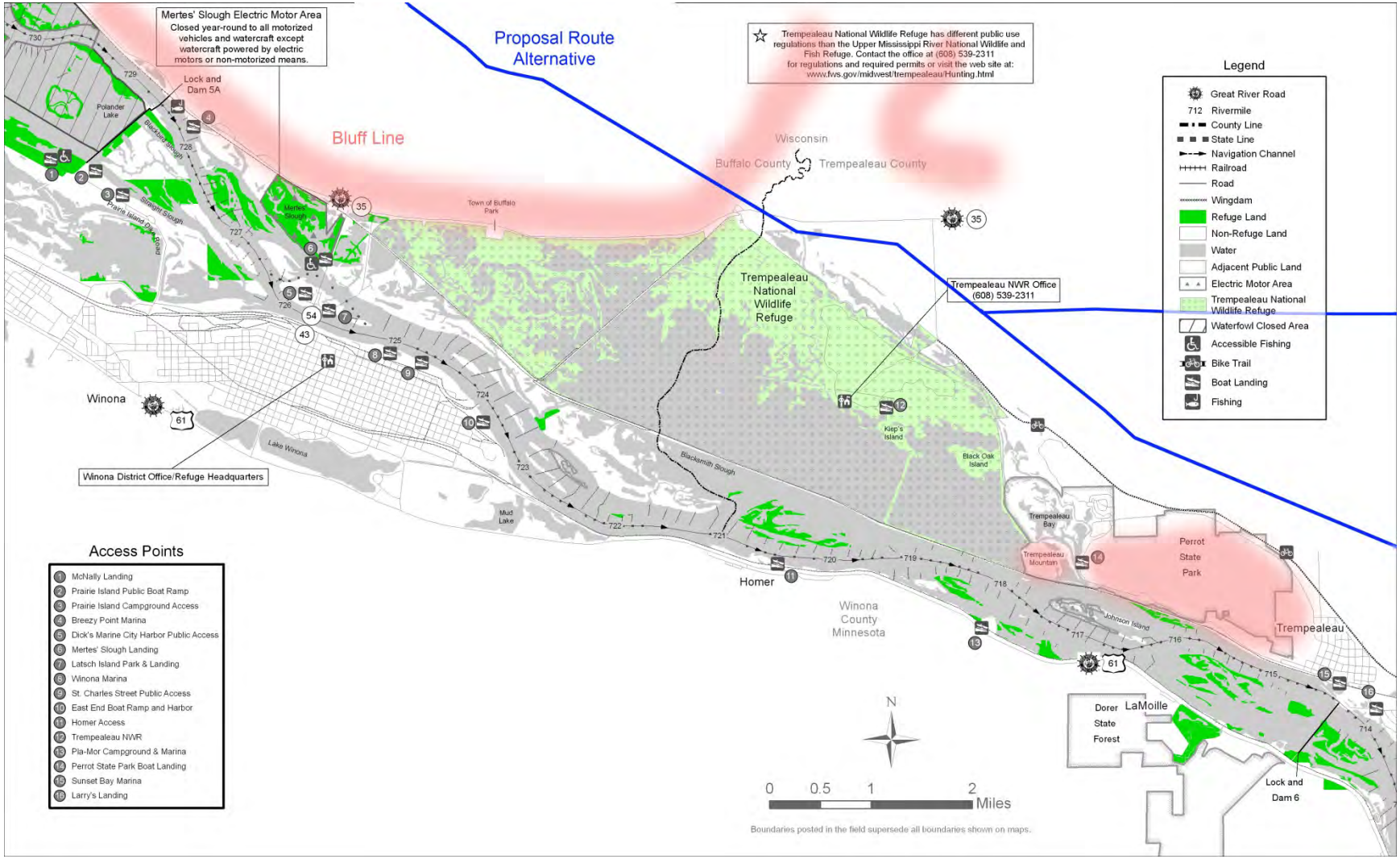

Figure 3-11. Upper Mississippi River Refuge – Pool 6 and Trempealeau Refuge.
Source: USFWS 2011h (with route alternative and bluffline information added)

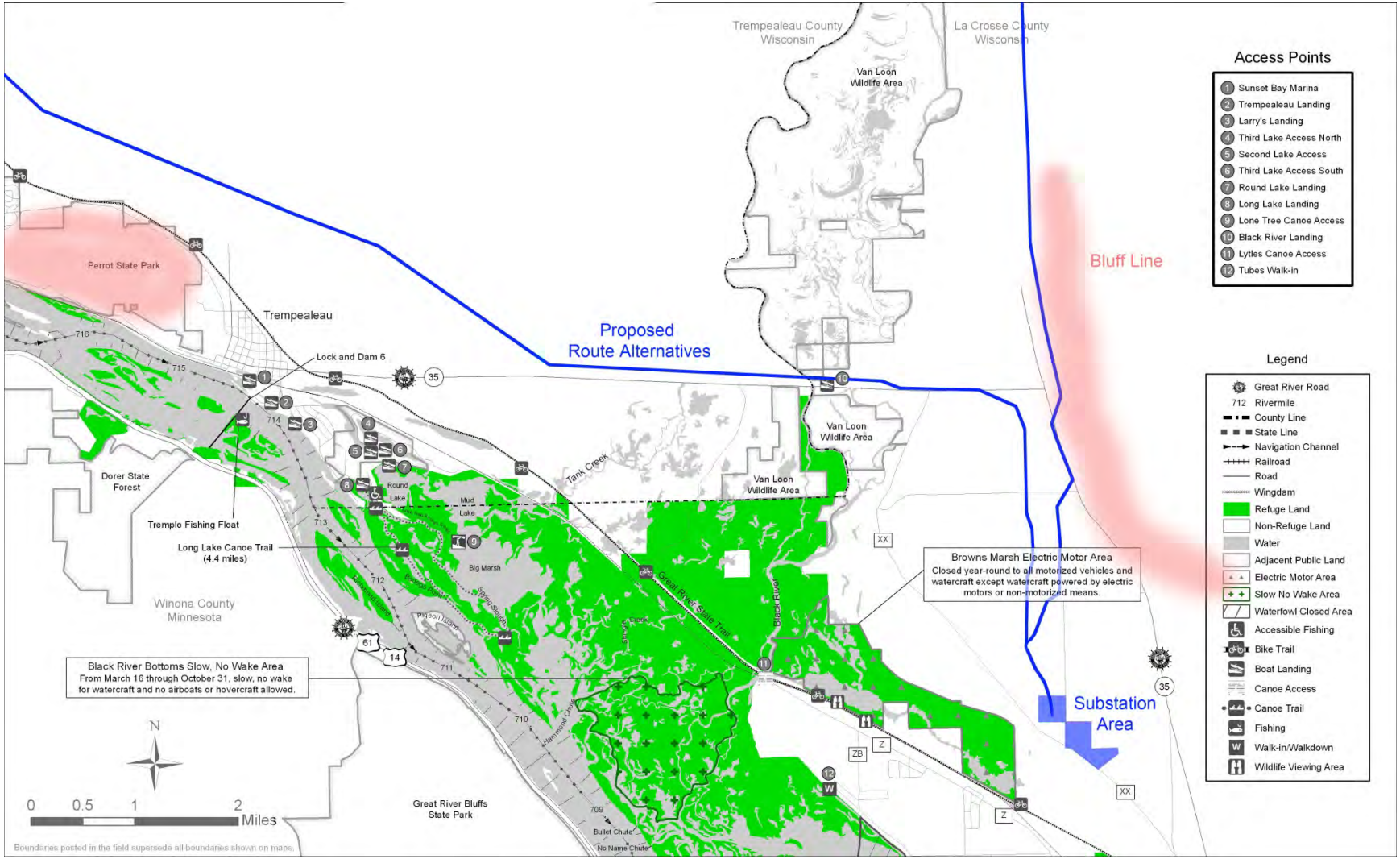

Figure 3-12. Upper Mississippi Refuge – Upper Pool 7.
Source: USFWS 2011h (with route alternative and bluffline information added)

Pools 7, 8, 9 and 13 have near-optimal conditions of abundant food and low levels of human disturbance. Four major factors of human disturbance to waterfowl, in order of decreasing disturbance are: rapid overwater movement with load noise (e.g., motorboat); overwater movement with little noise (e.g., canoe), little overwater movement (e.g., wading); and shoreline activities (e.g., bank fishing) (USFWS 2006, pp. 50-58).

As shown in Figure 3-9, the nearest closed area to the Proposal crossing of Refuge lands is at Peterson Lake in Pool 4, approximately 2 miles north of the Proposal crossing.

The Upper Mississippi Refuge's classification of land for potential acquisition reflects the value the Refuge places on specific bird species. "Resource Classification A" land is "high value fish and wildlife habitat which is unique and irreplaceable on a national basis or in the ecoregion" (USFWS 2006 p. 547). In addition to "known or very probable federal endangered species habitat" and "essential habitat for state endangered species", the USFWS considers lands that are essential production habitat or concentration areas for the wood duck, mallard, ring-necked duck, canvasback, tundra swan, osprey, peregrine falcon and bald eagle as Resource Classification A. Nesting colonies (including a ¼-mile buffer area) of herons, egrets, cormorants and terns are also Resource Classification A (USFWS 2006 p. 547). The USFWS defines Resource Classification B lands as "valuable fish and wildlife habitat which is relatively scarce or becoming scarce on a national basis or in the ecoregion" (USFWS 2006 p. 547). These lands include prime waterfowl habitat for the wood duck, mallard, ring-necked duck and Canada goose, and primary habitat for the northern pintail, American black duck, redhead, greater white-fronted goose, snow goose, trumpeter swan, greater sandhill crane, American woodcock, least tern, mourning dove, and golden eagle. Primary habitat for at least three of the five major Refuge wildlife groups (fish, waterfowl, furbearers, raptors and water/shore birds) using the river is included as Resource Classification B, as are areas where state threatened or endangered species are known to occur (USFWS 2006 pp. 547-548). Conservation status of birds specifically identified

as Resource Conservation A or B, and/or Refuge-monitored species, is summarized in Table 3-5.

Monitored Bird Species. In accordance with the requirement of the National Wildlife Refuge System Improvement Act of 1997 to "monitor the status and trends of fish, wildlife, and plants in each refuge,"[129] the USFWS monitors a number of bird species during fall migration. The USFWS' monitoring of bird species on the Refuge generally reflects the major Refuge values as described in the Resource Classifications A and B above, although not all species are monitored. Refuge staff conduct surveys of these species each fall, at approximately one-week intervals from late September to early December. The number of individuals of each species is counted and categorized by open and closed areas within each pool. Trempealeau National Wildlife Refuge counts are combined with Pool 6. Refuge staff also conducted a spring count of Pools 4 through 9 at the end of March 2009. The surveyed species are summarized in Table N-1 in Appendix N. All these birds are protected under the Migratory Bird Treaty Act.

Summary of relevant characteristics of Refuge-monitored bird species. Table N-1 in Appendix N summarizes characteristics of Refuge-monitored species used in the assessment of potential impacts. These characteristic include breeding status, occurrence on the Refuge by season, results of monitoring for the entire Refuge and for the pools near the Proposal Area, and feeding habits. In Table N-1, the pools that are considered to be within or near the Proposal area are the open areas of Pools 5, 5A, and 7; Pool 6/Trempealeau (which has no closed areas); and the closed areas of Pools 5 and 5A. The closed area of Pool 7 lies south of the Proposal area. The table also contains information on populations and hunting harvests. The Basis for the population information is described below.

[129] Public Law 105-57, Section 5.

Table 3-5: Refuge-Monitored Species and Resource Class A and B Species

Bird	Threatened (T) or Endangered (E) in Minnesota?	Threatened (T) or Endangered (E) in Wisconsin?	USFWS Midwest Birds of Concern (USFWS 2010d)	Partners in Flight Breeding Birds, Region 32 (PIF 2005)	WatchList of U.S. Birds (Butcher et al 2007)
Monitored Birds					
Tundra swan	--	--	Migratory game bird	Not applicable (NA)	--
Trumpeter swan	T*(MDNR 2011d)*	--	Migratory game bird	--	Yellow (rare)
Mute swan	--	--	--	--	--
Canada goose	--	--	Migratory game bird; resident population superabundant	--	--
Greater white-fronted goose	--	--	--	NA	--
Lesser snow goose	--	--	Superabundant	NA	--
Mallard	--	--	Migratory game bird	--	--
American black duck	--	--	Migratory game bird	NA	(listed in 2002, off in 2007)
Northern pintail	--	--	Migratory game bird	NA	--
Gadwall	--	--	--	NA	--
American wigeon	--	--	--	NA	--
Northern shoveler	--	--	--	NA	--
Blue-winged teal	--	--	Migratory game bird	--	--
Green-winged teal	--	--	--	NA	--
Wood duck	--	--	Migratory game bird	--	--
Redhead	--	--	--	NA	--
Canvasback	--	--	Migratory game bird	NA	--
Ring-necked duck	--	--	--	NA	--
Lesser scaup	--	--	Migratory game bird	NA	--
Common goldeneye	--	--	--	NA	--
Bufflehead	--	--	--	NA	--

Bird	Threatened (T) or Endangered (E) in Minnesota?	Threatened (T) or Endangered (E) in Wisconsin?	USFWS Midwest Birds of Concern (USFWS 2010d)	Partners in Flight Breeding Birds, Region 32 (PIF 2005)	WatchList of U.S. Birds (Butcher et al 2007)
Hooded merganser	--	--	--	--	--
Great blue heron	--	--	--	--	--
Great egret	--	T *(WDNR 2011d)*	--	--	--
Bald eagle	--	--	Rare or declining	Listed primarily because of relatively small population and expected decline in future breeding conditions	--
American coot	--	--	--	--	--
American white pelican	--	--	--	NA	--
Double-crested cormorant	--	--	Superabundant	--	--
Other Birds Specifically Listed in Resource Classification A or B					
Osprey	--	--	--	Listed primarily because of relatively small population, expected decline in future breeding conditions, and uncertain trend.	--
Peregrine falcon	T *(MDNR 2011e)*	E *(WDNR 2011e)*	Rare or declining	Listed primarily because of population size, expected decline in future breeding conditions, and uncertain trend.	(Listed some time before 2002; off list because of wide distribution and large population increase)
Terns					
Black tern	--	--	Rare or declining	--	--
Forster's tern	--	E *(WDNR*	--	--	--

Bird	Threatened (T) or Endangered (E) in Minnesota?	Threatened (T) or Endangered (E) in Wisconsin?	USFWS Midwest Birds of Concern (USFWS 2010d)	Partners in Flight Breeding Birds, Region 32 (PIF 2005)	WatchList of U.S. Birds (Butcher et al 2007)
		2011f)			
Caspian tern	--	E *(WDNR 2011h)*	--	NA	--
Common tern	T *(MDNR 2011f)*	E *(WDNR 2011g)*	Rare or declining	NA	--
Sandhill crane	--	--	Migratory game bird	--	--
Mourning dove	--	--	Migratory game bird	NA	--
Golden eagle	--	--		NA	--

Population goals for ducks and geese. Except for the great blue heron (*Ardea herodias*), the great egret (*Casmerodius albus*), the bald eagle (*Haliaeetus leucocophalus*), the American white pelican (*Pelecanus erythrothynchos*), and the cormorant (*Phalacrocorax auritus*), populations of the Refuge-monitored birds are addressed in the North American Waterfowl Management Plan (NAWMP), established in 1986 by the USFWS and the Canadian Wildlife Service. The NAWMP was revised in 1994 and 1998 by the NAWMP Committee, which then included the USFWS, the Canadian Wildlife Service, and the Mexican Sedesol (NAWMP Committee, 1994 and 1998).

The NAWMP Committee published additional guidance and strategy documents in 2004 (NAWMP 2004a and 2004b). The NAWMP identifies population objectives for ducks, geese and swans. For ducks, the NAWMP was based on the conclusion that North American duck populations in the 1970s, with the exception of a few species, met the needs of all users. These 1970s duck populations were established as goals.[130]

Goose population objectives were based on the following: optimal population size for population maintenance, breeding ground carrying capacity, demand for consumptive and non-consumptive human uses, landowner tolerance of crop depredation, and potential for disease outbreaks. Objectives were established for two populations of tundra swan (eastern and western) and three populations of trumpeter swan (USFWS and Canadian Wildlife Service 1986, NAWMP Committee 1998, pp. 24 and 25). In 1998 and 2004, populations of all geese and swans for which data were available were either increasing or showed no trend (NAWMP Committee 1998, Tables 3 and 4; and 2004a, Tables 3 and 4).

Every year the USFWS reports on waterfowl status in the U.S. For those birds included in the NAWMP, population estimates are compared to the NAWMP goals. These reports are published in summer and are used to aid in the development of waterfowl harvest regulations for the following fall and winter hunting seasons (USFWS 2011i, p.

[130] The overall goal has been reported as breeding population of 62 million and a fall flight of 100 million under average weather conditions (drought conditions heavily impact birds dependent on wetlands) (NAWMP Committee 1998, p. 17). However, the estimated total 2011 North American duck population of 45.5 million is an all-time high since monitoring began in 1955 (USFWS 2011i, Figure 2).

2). These results are summarized in Table N-1. As shown in the table, populations of all the monitored swans and geese are above their NAWMP population goals. For two of the species, the Canada goose and the lesser snow goose, populations have expanded so rapidly that USFWS is taking measures, or is considering measures beyond manipulating hunting takes and seasons to reduce the populations (See "Other Notes" in Table N-1.) While total duck 2011 populations were at an all-time high, some species are below their NAWMP goals (USFWS 2011i, Figure 2). Of the duck species with NAWMP population goals, the mallard, gadwall, northern shoveler, blue-winged teal, green-winged teal, redhead and canvasback are all at or above their goals (and several are far above their goals) while the black duck, northern pintail, wigeon and lesser scaup are all below their goals (Table N-1).

General information on monitored species and Resource Conservation A and B species, other than swans, geese and ducks, is presented below.

Great blue heron *(Ardea herodias) and* ***great egret*** *(Casmerodius albus).* There are approximately 5,000 heron and egret nests in up to 15 colonies on the Refuge; these are predominantly heron nests (USFWS 2006, pp. 3 and 248). Herons and egrets use floodplain forest trees (usually silver maple, cottonwood or swamp white oak) in colonies (rookeries) containing 15 to 1,000 nests each. Colonies are often on islands or in the upper third of pools where forests are most extensive (USFWS 2006, pp. 247-248). The great blue heron population on the Refuge has more than doubled since the early 1960s (USFWS 2006, p. 248). Great blue herons generally feed near their colony on the floodplain and do not venture near other colonies (USFWS 2006, p. 248). The heron eats fish, insects, crustaceans, amphibians and reptiles, and other animals. It usually feeds in shallow water (Natureserve 2011).

Great egrets, which were rarely seen on the Refuge before the 1950s, occur in three to five colonies dominated by the great blue herons, and have approximately 100 to 400 nests (USFWS 2006, p. 248). The great egret is listed as threatened in Wisconsin (WDNR 2011c). The WDNR reports that protection of "large blocks of bottomland forest" and "large inland wetland complexes with riparian woods" is needed to provide nesting

habitat (WDNR 2011c). The great egret feeds primarily on aquatic animals (WDNR 2011c).

Bald eagle *(Haliaeetus leucocephalus).* The bald eagle is found only in North America. Bald eagles feed opportunistically on fishes, injured waterfowl, various mammals and carrion (NatureServe 2011). The USFWS considers the availability of nest sites and food as the limiting factors for raptor population. In areas with limited nesting sites, adults breed only when an existing breeding territory becomes vacant. In areas where nest sites are widely available, breeding density fluctuates based on food supply (USFWS 2008e, p. 35). Bald eagles typically nest within approximately 2.5 miles of water bodies where fish and waterfowl are available for food (NatureServe 2011). In 1991 the total population was estimated at 70,000, with all but 10,000 in Alaska and western Canada (NatureServe 2011). At that time, there were approximately 3,000 nesting sites in the lower 48 states (NatureServe 2011). At the time the bald eagle was removed from the list of endangered and threatened species in 2007, the USFWS estimated approximately 9,800 breeding pairs in the lower 48 states.[131] There are currently more than 200 active eagle nests on the Refuge. In winter, over 1,000 bald eagles fish in the open water below the locks and dams on the Mississippi River (USFWS n.d. 2).

American coot *(Fulica americana).* The American coot is a superficially duck-like wetland bird approximately 16 inches in length.

American white pelican *(Pelecanus erythrothynchos).* The American white pelican is a common spring and fall migrant on the Refuge that feeds on fish.

Double-crested cormorant *(Phalacrocorax auritus).* The double-crested cormorant is a superabundant colonial water bird that shares rookeries with herons and egrets. It feeds opportunistically on fishes.

Resource Classification A and B Birds – Not Monitored. Of the species (other than threatened or endangered species) the USFWS considers in Resource Classification A

[131] 72 FR 37346, July 9, 2007

or B, the osprey, peregrine falcon, terns, greater sandhill crane, mourning dove and golden eagle are not monitored. These birds are discussed below.

Osprey (*Panion haliaetus*). The osprey is a raptor that feeds on fish by hovering, then plunging feet-first into the water (Sibley 2001 p. 128). The osprey was formerly listed as threatened in Wisconsin; however, it has since been delisted (USFWS 2006 p. 653; WDNR 2011d). The USFWS reports that the osprey is a breeding bird on the Refuge and is uncommon in spring and summer and common in fall (USFWS 2006 p. 653). The USFWS reports that there are "probably less than 10 osprey nest sites" on the Refuge (USFWS 2006 p. 249). The Minnesota Breeding Bird Atlas (MBBA) reports 191 confirmed osprey nest sites in Minnesota, mostly in two clusters: one centered around Hennepin County near Minneapolis and the other further north, centered around Crow Wing County near Brainerd (MBBA nd1). One confirmed site appears to be on or near the Upper Mississippi Refuge (MBBA n.d.1). The Wisconsin Bird Breeding Atlas (WBBA) reports over 200 confirmed osprey nests in Wisconsin, mostly in the northern part of the state (WBBA 2003b). Three of the confirmed sites appear to be on or near the Upper Mississippi Refuge (WBBA 2003b).

Peregrine Falcon (*Falco peregrinus*). The peregrine falcon hunts mainly medium-sized birds from high above in spectacular swoops (Sibley 2001 p. 133). It is reported as "probably the most wide-ranging land bird in the world" (MDNR 2011e). It prefers open, non-forested areas for hunting (MDNR 2011e). In the past, falcons in the area nested on cliff ledges along lakes or rivers. Presently they nest primarily on buildings and bridges in urban areas (MDNR 2011e). The USFWS has reported that the peregrine falcon occurs on the Upper Mississippi Refuge (USFWS 2006 p. 250); however, no specific information was found. The USFWS considers the peregrine falcon to be a breeding bird on the Refuge and uncommon spring through fall (USFWS 2006 p. 651). The blufflands surrounding the Refuge have nesting potential for the peregrine falcon (USFWS 2006 p. 19). The peregrine falcon, which is still recovering from non-banned pesticide poisoning that occurred from 1946 to 1962, is listed as threatened in Minnesota (MDNR 2011e) and endangered in Wisconsin (WDNR 2011e). The MBBA reports nine confirmed peregrine falcon nesting sites in Minnesota, with one in Olmstead County and none near the Upper Mississippi Refuge. The WBBA reports 11

confirmed peregrine falcon nests in Wisconsin, with one at or near the Upper Mississippi Refuge in the northern part of the Proposal area (WBBA 2003c). The WDNR reports 23 counties with documented occurrences, including Buffalo and La Crosse Counties, which lie adjacent to the Upper Mississippi Refuge (WDNR 2011e).

Terns. Terns are in the same family as gulls and generally smaller and more slender. Most feed exclusively on small and most feed by plunge-diving (Sibley 2001 p. 203). Not counting two species considered accidentals, the USFWS lists four tern species on the Upper Mississippi Refuge. Two may breed on the Refuge: the black tern (*chlidonia niger*), which is reported as common in spring and summer and uncommon in fall; and Forster's tern (*Sterna forsteri*), which is reported as common in spring and uncommon in summer and fall (USFWS 2006 p. 652). The Caspian tern (*Sterna caspia*) and the common tern (*Sterna hirundo*) are migrants that are uncommon in spring, summer and fall (USFWS 2006 p. 652). The USFWS has identified the black tern and common tern as Midwest Birds of Conservation Concern because of rarity or declining population (USFWS 2010d). None of these terns are on the latest WatchList for U.S. Birds, although the common tern had been on a previous WatchList (Butcher et al 2007). No terns are included in the Partners in Flight (PIF) list for breeding birds for Bird Conservation Region (BCR) 23 – Prairie Hardwood Transition, the BCR region that includes the Proposal area (PIF 2005).

Black terns prefer shallow-water marsh and backwater lake habitat (USFWS 2006 p. 248). A 1992 survey of Pools 4 through 8 found seven black tern colonies (USFWS 2006 p. 248-249). In 2006 the USFWS reported that one of the largest nesting colonies of black terns on the Upper Mississippi River was located on Pool 8 (USFWS 2006 p. 778). Designation of additional closed areas in recent years is expected to reduce disturbance to black tern colonies (USFWS 2006 p. 167). No other Refuge-specific tern information was found.

The WBBA shows 22 confirmed Forster's tern nesting sites in Wisconsin, all in the southeastern part of the state; one probable nest is shown in Buffalo County, includes part of the Upper Mississippi Refuge (WBBA 2003d). The WDNR shows 13 counties with documented occurrences, including Buffalo County (WDNR 2011f).

In Wisconsin all documented occurrences of both the common and Caspian terns are in the eastern and northern parts of the state (WDNR 2011g, 2011h).

Greater Sandhill Crane (*Grus canadensis*). The USFWS reports that the sandhill crane is an uncommon breeder on the Refuge (USFWS 2006 p. 647). No other Refuge-specific information was found. The MBBA reports 112 confirmed nesting sites in Minnesota and the WBBA reports hundreds of nesting sites throughout the state of Wisconsin (MBBA nd3, WBBA 2003e).

The primary breeding range of the eastern population of the greater sandhill crane generally includes the states of Wisconsin and Michigan and parts of southern Ontario (USGS 2006 p. 6), although the range is currently expanding in all directions (Van Horn et al 2010 p. 6). The International Crane Foundation (ICF) reports that sandhill cranes occur "at their highest breeding density in habitats that contain open sedge meadows in wetlands that are adjacent to short vegetation in uplands" (ICF n.d.). Sedge meadows are dominated by sedges, a grass-like plant, growing on saturated soils (USGS 2006b). Many of the important sandhill crane staging areas in Wisconsin (where flocks gather in large groups to begin fall migration) have extensive sedge meadows, for example, Crex Meadow Wildlife Area (WDNR 2010), White River Marsh (Wisconsin Bird Conservation Initiative [WBCI] nd1), Grand River Marsh-Grasslands (WBCI n.d. 2), Comstock-Germania Bog (WBCI n.d. 3), and Necedah National Wildlife Refuge (WBCI n.d. 4) (WDNR n.d.). One of the most important sandhill crane breeding and staging areas in Minnesota is the Crane Meadows National Wildlife Refuge in central Minnesota, which includes large expanses of sedge meadow wetland and supports over 30 nesting pairs of sandhill cranes (USFWS 2009e). Each fall, migrating birds gather in staging areas of ever-increasing size, with an important staging area at the Jaspar-Pulaski Fish and Wildlife Area in northern Indiana, where tens of thousands of sandhill cranes stop before continuing on to wintering areas in Florida and Georgia (Indiana DNR n.d.; Van Horn et al 2010 p. 6).

Sandhill cranes are omnivorous and feed on a wide variety of small animals, plant tubers, seeds and grain. Cranes uproot germinating seeds of corn and winter wheat. Losses can be substantial; for example, in the spring of 2007, the State of Wisconsin

Agriculture Department reported 84 sandhill crane crop damage complaints with an estimated loss of $260,000 (Van Horn et al 2010 p. 19).

The sandhill crane was nearly extirpated in the late 19th century; however, its success it recent years is such that the USFWS has proposed allowing hunting for the eastern population (USFWS 2011n). The USFWS reports that populations increased by an average of 3.9 percent per year from 1979 to 2009 and that the current population is roughly 50,000 (USFWS 2011l, p. 9). The USFWS proposal is based on a multi-agency management plan that would tie maximum hunting permit allocations to USFWS population survey data: hunting would be allowed when the 3-year average from the fall survey is above 30,000 (USFWS 2011l, p. 9; Van Horn et al 2010). In the absence of hunting, the USFWS expects the population to reach levels "where crop depredation problems continue to be an issue with local agricultural interests" (USFWS 2011n). Lack of management through hunting could also adversely impact wetlands and other wetland species (USFWS 2011n).

Mourning Dove (*Zenaida macroura*). The mourning dove, a Refuge breeder, is reported as common in spring, summer and fall (USFWS 2006 p. 648). No other Refuge-specific information was found. The WDNR reports that mourning doves are one of the most widely distributed birds in North America and Wisconsin, that 4 to 5 million migrate from Wisconsin each fall and that continent-wide hunting mortality is estimated at 10 to 15 percent of the fall population. Mourning doves feed on weed seeds and grains (WDNR 2008). Doves are also abundant through most of the Minnesota part of the Proposal area (MDNR

Golden Eagle (*Aquila chrysaetos*). The golden eagle is a migrant, previously rare in spring and winter and uncommon in fall (USFWS 2006 p. 653). However, in recent years there has been a substantial winter population on and near the Refuge. The golden eagle feeds mainly on small mammals (Natureserve 2011). USFWS has indicated that take permits will not be issued for the golden eagle.

Other Birds. The Refuge hosts several migratory songbirds of priority for conservation in several habitat associations, including bottomland forest, emergent wetland, mixed wetland/upland, prairie, upland forest/bluff and wet meadow. These birds, all of which

have potential to be nesters on the Refuge, are the sedge wren, golden-winged warbler, cerulean warbler, black-billed cuckoo and red-headed woodpecker (pp. 58-59).

Colonial nesters on the Refuge include species that nest on floating mats of aquatic vegetation, such as the black tern, and tree-nesting species, including great blue herons, double-crested cormorants, great egrets, and green herons. The herons, egrets and cormorants use floodplain forest trees in colonies (rookeries) containing 15 to 1,000 nests. Colonies are often on islands and/or located in the upper third of pools where forests are more extensive (USFWS 2006, p. 62). Many members of the Upper Mississippi bird community are heavily dependent on the presence of a tall-canopied forest for breeding and feeding. Other birds that nest in the upper canopy of Upper Mississippi River floodplain forests include, bald eagles, red-shouldered hawks, great horned owls, flycatchers, blue-gray gnatcatchers, yellow-throated vireos, warbling vireos, red-eyed vireos, yellow-throated warblers, cerulean warblers, and Baltimore orioles (Knutson et al. 1998, p. 145).

Floodplain forests are also important to cavity-nesting birds such as wood ducks, hooded mergansers, barred owls, pileated woodpeckers, great crested flycatchers and prothonotary warblers. At least 23 species of cavity-nesting birds breed in the UMR forests. In parts of the floodplain that are infrequently flood, understory shrubs and vines provide nesting habitat for yellow warblers, indigo buntings, and American redstarts (Knutson et al. 1998, p. 145).

Diversity in floodplain forest bird communities is high. Researchers have found that abundance in the Upper Mississippi River floodplains is double that of the adjacent uplands, and that Midwest floodplain forests provide habitat that is not found elsewhere for some species at risk of population decline, especially neotropical migrant birds (Knutson et al. 1998, p. 144). Researchers have also found that fragmentation of floodplain forests is not necessarily detrimental to songbird nesting habitat as it is in upland forests, where predation and nest parasitism is most common at the forest edges. In a floodplain forest, predation is the major cause of nesting failure, and predators are more common in larger forest tracts. Small tracts of floodplain forest

within a large river system can provide valuable nesting habitat for songbirds (Knutson et al. 2000).

State-Level IBAs

Lake Byllesby is a state-level IBA with an annual representation of shorebirds that, in terms of number and diversity of species "is not found elsewhere in eastern Minnesota" (National Audubon Society 2011). Under its current management plan the lake level is lowered until May 15, to reduce groundwater impacts on crop planting. This lower level results in exposed mudflats and shallow water that is preferred habitat for many migratory bird species, including "shorebirds, ducks, geese, swans, herons, pelicans, gulls and terns" (National Audubon Society 2011).

The Van Loon State Wildlife Area is a state-designated IBA – the only one in the Proposal area in Wisconsin - noted for yellow-crowned night-herons, Acadian flycatchers, cerulean warblers, and prothonotary warblers that breed there (WDNR 2009).

Other Wildlife

Floodplain forest habitat. Floodplain forests are also very important habitat for Blanding's turtle (*Emdoidea blandingii*), wood turtle (*Clemmys insculpta*) and the massasauga rattlesnake (*Sistrurus catenatus*) (Knutson et al. 1998, p. 145).

Upland forest bird habitat. While not as important as floodplain forest, upland forests in the Proposal area can also provide important nesting habitat for songbirds. In a multi-year study that involved thousands of nests at several sites in the driftless area, researchers found that, despite a low proportion of forest cover, bird populations in the driftless area were stable or increasing for the majority of the forest-nesting birds they studied, including six species of conservation concern, for both upland and floodplain forests (Knutson et al. 2006a).

Deer and chronic wasting disease (CWD). CWD is a progressive, degenerative, fatal neurological disease that affects North American deer, elk and moose [USDA Animal and Plant Health Inspection Service (APHIS) 2002; Department of Health and Human Services Centers for Disease Control (CDC) 2011]. It appears to be caused by

abnormal proteins called prions (APHIS 2002 p. 1). The CDC reports that the “mode of transmission is not fully understood, but evidence supports the possibility that the disease is spread through direct animal-to-animal contact or as a result of indirect exposure to prions in the environment (e.g., in contaminated feed and water sources)” (CDC 2011). Soil may also act as a reservoir of infected prions (CDC reports that “to date “no strong evidence of CWD transmission has been reported” and “Several epidemiologic studies provide evidence that, to date, CWD has not been transmitted to humans” (CDC 2011). There have also been no documented occurrences of livestock contracting CWD from free-ranging deer or elk (WDNR n.d. 2, p. 5). During two decades of monitoring, researchers did not find evidence of transmission to domestic cattle under natural conditions (APHIS 2002 p. 2).

CWD has been discovered in the deer population in southeast Minnesota. MDNR has implemented a management and monitoring program to reduce prevalence and limit spread. A deer feeding ban covering all of Dodge, Goodhue, Olmstead and Wabash counties is in effect. MDNR has created a CWD management zone, which is designated deer permit area 602 (bounded by US 60 on the north, MN 57 on the west, US 14 on the south, and US 63 and MN 22 on the east). Within this area, deer hunting opportunities have been expanded, mandatory CDW testing of carcasses is required, and carcasses cannot be removed from the area until a CWD-negative test is reported (MDNR 2011h).

3.5.1.5 Special Status Species

This section discusses species that are protected as threatened or endangered, either under federal or state law. Rare species were addressed in Section 3.5.1.1. Birds of conservation concern and birds protected by other federal laws are discussed in Section 3.5.1.4.

The purposes of the Endangered Species Act (ESA) are to provide a means for conserving the ecosystems upon which endangered and threatened species depend and a program for the conservation of such species.[132] The ESA directs all federal agencies to participate in conserving these species. Specifically, Section 7 (a)(I) of the ESA charges federal agencies to aid in the conservation of listed species, and Section 7 (a)(2) requires the agencies, through consultation with the USFWS, to ensure that their activities are not likely to jeopardize the continued existence of listed species or adversely modify designated critical habitats.

The MRP and CPCN Applicants are responsible for protection of legally-protected species and are working closely with the USFWS, the MDNR and the WDNR to avoid impacts. The information in this Draft EIS is based on published records, and is intended to be a general discussion of potential impacts, and not all-inclusive. If the USFWS, the MDNR or the WDNR determine that field surveys are needed for any particular species, the MRP and/or the CPCN Applicants will work with the applicable agency to conduct the appropriate surveys. The USFWS may determine that consultation under Section 7 of the Endangered Species Act is needed. For the Minnesota part of the Proposal, federally- or state-listed species that may be found within the 150-foot corridor of Routes 1A and 1P are listed in Table 2-4. For Wisconsin, specific species are not discussed, and Table 2- lists the number of species that may be found within 2 miles of each route.

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[132] Endangered Species Act of 1973 (as amended through Public Law 107-136), Section 2(b)

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Federally-Listed Species

Based on published information, the only federally-listed species that may be found within the 150-foot corridor of any routes in Minnesota is prairie bush clover (*Lespedeza leptostachya*), in Route 1A. The prairie bush clover inhabits remnants of native tall grass prairie.

The Minnesota dwarf trout lily may be present in forested floodplains or slopes within its potential range in southeastern Minnesota, which includes parts of Goodhue County and southern Dodge County (USFWS 2011c). Recorded populations occur along the Cannon River, Little Cannon River, Zumbro River, North Fork Zumbro River, and Prairie Creek watersheds in Goodhue County. Surveys are incomplete, especially in the upper reaches of the Middle Fork Zumbro River watershed in Dodge and Goodhue Counties (USFWS 2011c).

No activity is planned within any watercourses. If this changes, additional evaluation would be needed for federally-listed aquatic species, especially for the Mississippi River and other streams within the Upper Mississippi National Wildlife and Fish Refuge and the Trempealeau National Wildlife Refuge.

State-Listed Species- Minnesota

State Threatened. The loggerhead shrike (*Lanius ludovicianus*) is a migratory song bird that inhabits relatively open land with some shrub cover and may be found in Routes 1P and 1A. The loggerhead shrike is also a USFWS species of concern (Section 3.5.1.4).

The paddlefish (*Polydon spathula*) may be present in streams within Segment 1 and Segment 3; however, all streams will be spanned and no impacts would be expected. Similarly, no impacts would be expected to the mussel species mucket (*Actinonaias ligamentina*), elktoe (*Alasmidonta marginata*), rock pocketbook *(Arcidens confragosus)* (State Endangered), or sheepnose (*Plethobasus cyphyus*) (State Endangered),

Indian-plantain (*Cacalia suaveolens*) has been primarily documented on native moist prairies, with few documentations of this species on bluff prairies. The tuberous Indian-plantain *(Arnoglossum plantagineum)* has been found within the ROW of 2P, 2P-001, 2P-002 and all of the C route alternatives. The tuberous Indian-plantain has been documented within the ROW of 22 of the 31 route alternatives in Segment 3.

The timber rattlesnake (*Crotalus horridus*) inhabits forested bluffs, rock outcrops, and bluff prairies. The timber rattlesnake has been documented within the ROW of route alternatives 2A, 2A-001, and 2A- 002 and within the ROW of all route alternatives in Segment 3.

State-Listed Species – Wisconsin

Specific information on threatened and endangered species within or near the route alternatives in Wisconsin is not publicly available.

3.5.2 Environmental Consequences

3.5.2.1 Natural Communities and Forests

In general, impacts to vegetation may include both temporary and permanent effects. The impacts include localized physical disturbance caused by construction equipment during site preparation, such as grading, excavation, and soil stockpiling. There may be clearing of local vegetation for access roads or staging areas. In forested areas, trees or shrubs that interfere with safety and equipment operation would be removed. Permanent vegetative changes would take place at each new pole footprint (approximately 50 to 80 square feet) and within the ROW that occurs in the forested communities. The rest of this section describes impacts on native communities by route.

Route 1A

There are a number of sites designated by MDNR as biodiversity sites of medium, high or outstanding significance and/or Natural Heritage Sites (NHS) within or near the Route 1A 1,000-foot route width. Most of these are associated with stream crossings or areas of remnant prairie. Route 1A crosses 500 feet of a mesic prairie Minnesota Biodiversity Site of Medium Significance (BSMS) along Northfield Boulevard near the north end of the Proposal, and has a nearby 1,300-foot floodplain crossing [Minnesota County Biological Survey (MCBS) 1997, MDNR database, MDC 2011c Appendix A, Sheet NR1]. North of the Cannon River Route 1A crosses a 1,800-foot floodplain associated with a tributary of the Cannon River. No associated biological features were noted at this crossing (MDC 2011c, Appendix A, Sheet NR 24). Upstream of Lake Byllesby Route 1A crosses Chub Creek, a major tributary of the Cannon River, and the Cannon River. There are many zoological NHSs in the river near the crossing, including one within the 1,000-foot route width, but not within the estimated ROW. There is one zoological NHS just outside the 1,000-foot route width at the Chub Creek crossing, with an influence radius that encompasses the full route width (MDC 2011c, Appendix A, Sheet NR 26). Both the 300-foot wide wetland crossing at Chub Creek and the 200-foot wide wetland crossing at the Cannon River have an associated narrow strip of forest (MDC 2011c, Appendix A, Sheet NR 26). South of the Cannon River, Route 1A passes within 1,000 feet of the 40-acre McKnight Prairie, a bedrock bluff subtype of dry prairie that has been designated by MNDR as a Biodiversity Site of Outstanding Significance (BSOS) (Dunevitz and Epp 1995; MDNR database; MDC 2011c, Appendix A, Sheet NR27). Although no direct impacts to this prairie would be expected, MDNR has identified several NHS sites associated with the prairie and the potential area of influence of two of them overlaps the 1,000-foot route width. Just south of the McKnight Prairie Route 1A crosses 1,400 feet of the same type of prairie, designated as a BSHS. Two zoological NHSs associated with these prairies have areas of influence that overlap the majority of the 1,000-foot route width (Dunevitz and Epp 1995; MDNR database; MDC 2011c, Appendix A, Sheets NR 27 and 28). Just north of Dennison, Route 1A crosses 1,700 feet of the same prairie type, which MDNR has designated as (BSOS). This prairie has a botanical NHS in the 1,000-foot route width and one

zoological NHS outside the route width; however the potential area of influence overlaps part of the route width (Dunevitz and Epp 1995; MDNR database; MDC 2011c Appendix A, Sheets NR30 and 31). Route 1A has one other floodplain crossing greater than 1,000 feet in width: a 1,500-foot crossing at the North Fork of the Zumbro River. There are wooded wetlands within the 1,000-foot route width at this location; however there are none in the estimated ROW (MDC 2011c, Appendix A, Sheet NR40).

Route 1P

Potential impacts are detailed below. The major impact on Route 1P would be the clearing of approximately 3,000 feet of the edge of a BSHS maple-basswood forest south of Butler Creek on US-52.

In the vicinity of the US-52/MN-50 interchange south of Hampton, Route 1P has three zoological NHSs within the 1,000-foot route width. The first of these is on the opposite side of the interchange from the proposed alignment, and the designated area of potential impact does not extend across the interchange. The second is south of the interchange, on the opposite side of US-52 from the proposed alignment; however, the area of influence is shown extending across most of the 1,000-foot route width. The third is shown as being on US-52, within the proposed ROW of both the highway and the 345 kV line; however, this one has no area of influence shown. Route 1P crosses a 4,500-foot floodplain on a minor tributary of Butler Creek in southern Dakota County; however, no noted biological features are associated with this floodplain, which appears to be primarily in agricultural land (MDC 2011c, Appendix A, Sheet NR5). Route 1P crosses the Cannon River at the US-52 crossing in Cannon Falls, where the floodplain is 1,300 feet wide. Wetland mapping shows 300 feet of wetland crossed; however, this appears to be primarily open water. A small amount of floodplain forest would be impacted to accommodate the additional ROW for the 345-kV line (MDC 2011c, Appendix A, Sheet NR7). In the south part of Cannon Falls, just south of the US-52/MN-19 interchange, Route 1P crosses 1,800 feet of the Little Cannon River floodplain, including 100 feet of wetlands. A zoological NHS near the edge of the floodplain and immediately south on the interchange, on MN-19, lies within the estimate ROW of the 345-kV line and has an area of influence that encompasses the entire 1,000-foot route width (MDC 2011c, Appendix A, Sheet NR8). South of Butler Creek Route 1P crosses

approximately 3,000 feet of a BSHS maple-basswood forest (Dunevitz and Epp 1995; MDNR database; MDC 2011c, Appendix A, Sheet NR12). This forest is present on both sides of US-52 and would be unavoidable on this route. However, through this section the forest is already bisected by US-52 and the existing 69-kV line. The 345-kV line would replace the existing 69-kV line. The additional ROW required for the wider ROW of the 345-kV line would have the effect of pushing the forest edge further in in an area where the forest is disturbed by several roadways leading to residences along US-52 within the forested tract. West of Zumbrota, just south of where Route 1P diverges from US-52, it crosses 1,700 feet of floodplain on the North Fork of the Zumbro River. No potential biological impacts were noted for this crossing (MDNR database; MDC 2011c, Appendix A, Sheet NR18).

Route 1P-002

Route 1P-002 rejoins Route 1P at the US-52/MN-19 interchange just north of the Little Cannon River and would be affected by the same zoological NHS as Route 1P at that location (discussed under Route 1P above).

Route 1P-003

South of the point where it leaves Route 1P-001, Route 1P-003 would at least partially impact a maple-basswood forest HSBS, where it runs along the site for 300 feet (Dunevitz and Epp 1995; MDNR database; MDC 2011c, Appendix A, Sheet NR9). The forest surrounds a golf course, and the edge that Route 1P-003 adjoins has less dense trees than the rest of the site. In the east-west segment of Route 1P-003, where it heads back toward Route 1P, at the Little Cannon River Route 1P-003 crosses 700 feet of a floodplain forest BSMS site. There are no existing roads or utilities at this location, and the forest would be bisected by the line.

Route 1P-004 and 1P-005

These routes have a joint 2,500 foot long floodplain crossing of the North Fork of the Zumbro River, at a curve in the river. The joint routes cross the river twice at this curve, and end up on the same side of the river that they started from. There is a zoological NHS along the river in this section, and within the 1,000-foot route width. The influence area for the NHS site encompasses the full 1,000-foot route width. There is a botanical

NHS site just outside the 1,000-foot route width with an area of influence that encompasses a large part of Routes 1P-004 and 1P-005. This botanical site is associated with a BSHS site just south of the routes, along the North Fork of the Zumbro River.

Routes 1B-005 and 1P-009

Route 1P-009 coincides with Route 1B-005 for the MN-56 portion. These routes cross the Cannon River near the upstream end of Byllesby Lake, with a 2,900-foot floodplain crossing. There are forested areas of the floodplain at the crossing location (MDC 2011c, Appendix A, Sheet NR 26). South of the Cannon River Route Routes 1P-009/1B-005 cross 500 feet of wetland is partially forested. Further south, near the Spring Creek crossing, a zoological NHS located just outside the 1,000-foot route width has an area of influence that overlaps the estimated alignment centerline (MDC 2011c, Appendix A, Sheet NR 27). Further south, near the Stanton Airport, which Routes 1P-009/1B-005 bypass just to the east, there is a zoological NHS within the 1,000-foot route width (MDC 2011c, Appendix A, Sheet NR 28). Further south, the joint routes pass just west of a BSHS oak forest along Prairie Creek (Dunevitz and Epp 1995; MDNR database; MDC 2011c, Appendix A, Sheet NR 29). The routes do not directly impact this forest; however, several zoological and ecological NHSs associated with the oak forest and/or the Prairie Creek floodplain have areas of influence that overlap the estimated alignment centerline. Further south, along a tributary of Prairie Creek, the joint routes cross 1,800 feet of a wetland, bordering a BSHS (MDC 2011c, Appendix A, Sheet NR30). On the east side of MN-56 at this location, the wetland is a BSHS emergent marsh. The creek itself parallels MN-56 on the west, limiting the options for the transmission line route at this location. There are two zoological NHSs within the 1,000-foot route width at this location, both of which have areas of influence that appear to overlap the alignment ROW (Dunevitz and Epp 1995; MDNR database; MDC 2011c, Appendix A, Sheet NR 29). Another constraint occurs along this same tributary, further south. At this location there is 2,300 feet of wetland adjacent to MN-56 on the west; on

the east there are two residences next to the highway[133] (MDC 2011c, Appendix A, Sheet NR 31).

Route 1B-005 diverges from Route 1P-009 at County Highway 9. On the County Highway 9 portion of Route 1P-009, just east of the Little Cannon River, the route crosses 1,900 feet of a BSMS maple-basswood forest that lies on both sides of County Highway 9. The Little Cannon River floodplain crossing is 1,300 feet long. Two botanical NHSs lie within the 1,000-foot route width, one of them plus another just outside the route width, have areas of influence that overlap the entire route width. A zoological NHS along the Little Cannon River to the south has an area of influence that overlaps the full route width (Dunevitz and Epp 1995; MDNR database; MDC 2011c, Appendix A, Sheet NR52). Further east, a BSOS maple-basswood forest lies adjacent to County Highway 9 on both sides, with only a narrow cleared ROW along the roadway. The route crosses 700 feet of the forest. There is a botanical and an ecological NHS just outside the 1,000-foot route width, with areas of influence for both overlapping the entire route width (Dunevitz and Epp 1995; MDNR database; MDC 2011c, Appendix A, Sheet NR53).

Route 1A-001

There is a zoological NHS on Spring Creek within the 1,000-foot route width, with an area of influence that overlaps most of the route width. Route 1A-001 also crosses 300 feet of a BSOS willow swamp, south of Spring Creek (Dunevitz and Epp 1995; MDNR database; MDC 2011c, Appendix A, Sheet NR41).

Route 1A-003

It has four zoological NHSs within the estimated ROW, plus one in the 1,000-foot route width with an area of influence that overlaps the estimated alignment, and another just outside the 1,000-foot route width with an area of influence that overlaps the estimated alignment. One of these NHSs occurs within a BSMS. The route crosses 1,200 feet of this BSMS (MDC 2011c, Appendix A, Sheets NR29 and 30).

[133] These residences are visible on NR31; however, only one is marked in MDC 2011b and neither are in MDC 2011c.

Route 1A-004

The short north-south section of Route 1A-004 that forms a connection between Route 1A to the north and the longer east-west portion of Route 1A-004 is 2,500 feet long and passes through a BSOS willow swamp (wetland) along Spring Creek for 1,700 feet of that length (Dunevitz and Epp 1995; MDNR database; MDC 2011c, Appendix A, Sheet NR41).

Route 2P

Route 2P has a 1,000-foot floodplain crossing of the Middle Fork of the Zumbro River, along an existing roadway. Five hundred feet of the floodplain crossing is forested, and the area of influence of a zoological NHS in the 1,000-foot route width overlaps the entire route width (MDC 2011c, Appendix A, Sheet NH15).

Route 2A

Route 2A crosses 1,100 feet of the floodplain of the North Branch of the Middle Fork of the Zumbro River at an existing transmission line location. Within this crossing is 300 feet of a forested floodplain BSHS site and 600 feet of wetlands. The entire 1,000-foot route width at this location is within the area of influence of a zoological NHS just outside the route width. Just to the south Route 2A crosses another tributary to the North Branch with a 200-foot crossing of BSHS floodplain forest (Dunevitz and Epp 1995; MDNR database; MDC 2011c, Appendix A, Sheet NH4). Route 2A has a 3,500-foot floodplain crossing at the Middle Fork of the Zumbro River, with a right angle turn in the floodplain. The crossing includes 700 feet of forested floodplain and 300 feet of wetlands. There is no existing route at the crossing (MDC 2011c, Appendix A, Sheet NH5). Further south Route 2A crosses the Douglas State Trail and parallels it for several thousand feet. Within this area there are three zoological NHSs on the trail within the 1,000-foot route width. All of them have areas of influence that overlap the entire route width. At the south end of the section through which Route 2A parallels the Douglas Trail it crosses 2,800 feet of the floodplain of the South Branch of the Middle Fork of the Zumbro River. Along the river there is another zoological NHS that with an area of influence that overlaps the entire 1,000-foot route width (MDC 2011c, Appendix A, Sheet NH8).

Route 2P-002

Route 2P-002 crosses the Middle Fork of the Zumbro River with a 1,200 foot floodplain crossing, along US-52. The crossing includes 1,000 feet of wetland. A botanical NHS with a very large area of influence lies on the ROW in this section, along existing US-52 (MDC 2011c, Appendix A, Sheet NH15).

Route 2A-002

The east-west section of Route 2A-002 is in an area of an oak forest, part of which is designated as a BSHS and part a BSMS. Route 2A bisects 1,500 feet of the BSMS forest, then follows the edge of it for another 2,300 feet, then it follows along the edge of the BSHS site for 600 feet. The region of influence for a botanical NHS located within the BSHS oak forest overlaps the alignment centerline of Route 2A-002 (Dunevitz and Epp 1995; MDC 2011c, Appendix A, Sheet NH7).

Route 2B-001

Route 2B-001 has a 3,600-foot floodplain crossing at the South Branch of the Middle Fork of the Zumbro River. Two zoological NHS have areas of influence that overlap the entire 1,000-foot route width (MDC 2011c, Appendix A, Sheet NH8).

Route 2C3-001-2

Route 2C3-001-2 has multiple crossings of a continuous BSHS forested floodplain wetland at the Middle Fork of the Zumbro River, adjacent to US-52 near and then east of the County Road 11 interchange. These crossing lengths are 500, 1,300 and 300 feet long. A subdivision adjacent to US-52 on the north constrains the transmission line location (MDC 2011c, Appendix A, Sheets NH 4 and 13). Associated with this forested floodplain are two zoological NHSs with areas of influence that overlap the estimated alignment centerline (MDC 2011c, Appendix A, Sheet NH 14).

Route 2C3-002-2, 2C3-003-2, 2C3-004-2 and 2C3-007-2

All these routes have a 1,500 foot floodplain crossing with the Middle Fork of the Zumbro River, and also with the South Branch of the Middle Fork of the Zumbro River. There are wetlands (non-forested at Middle Fork and forested at the South Branch) at both crossings; one is within the area of influence of a botanical NHS and one is within

the area of influence of a zoological NHS (MDC 2011c, Appendix A, Sheets NH15 and NH16).

Route 3P at Zumbro River

Route 3P crosses the Zumbro River at the existing crossing of White Bridge Road, with an 800-foot floodplain crossing. On the east side of the river, just outside the floodplain, Route 3P crosses 500 feet of BSMS oak forest, along the edge of the roadway ROW. Route 3P then moves northeast away from the roadway and generally follows the boundary between agricultural fields and the BSMS forested tract that continues for several thousand feet, with a few southward extensions that cross the ROW. The Route 3P alignment follows this boundary and crosses the forest at the southward extensions. Total forest crossing is approximately 1,600 feet, with no existing roadway or transmission line ROW (MCBS 1997b, MDC 2011c, Appendix A, Sheets MR10 and 11). By following the forest edge, Route 3P reduces agricultural impacts.

Route 3A at the Zumbro River

Route 3A crosses the Zumbro River north (downstream) of Zumbro Lake, at a location where there is no existing road or transmission line. The floodplain crossing is 2,000 feet long, includes 400 feet of BSMS floodplain forest wetlands, and lies within the area of influence of two NHSs. On the east side of the river the ROW bisects two tracts of BSMS forest with a total length of 1,500 feet (MDC 2011c, Appendix A, Sheets MR 28 and 29). East of the Zumbro River, at Long Creek, a Zumbro River tributary, Route 3A crosses another MSBS forested area, first for a distance of 700 feet, then 1,000 feet, again at a location with no existing transmission line or roadway (MDC 2011a, Appendix A, Sheets MR33 and 34). Further east, on Indian Creek Route 3A crosses a BSOS forested area for a distance of 1,000 feet, in an area of influence of two NHSs (MDC 2011c, Appendix A, Sheet MR36).

Route 3P Zumbro

Route 3P Zumbro is the third alternative for crossing the Zumbro River, and it crosses at the Lake Zumbro dam, where there is no existing roadway or transmission line. Just east of the dam, Route 3P Zumbro crosses 2,800 feet of BSHS forest, mostly oak.

Within this region the route is in the area of influence of four NHSs (MCBS 1997b, MDC 2011c, Appendix A, Sheet MR45).

Route 3P/3A

Routes 3P and 3A are coincident for the eastern part of the route and the Mississippi River crossing, where the joint route follows an existing transmission line. As Route 3A/3P moves away from agricultural land and into the steeply wooded blufflands, it has the following crosses of BSMS upland forest (RJD State Forest), along the existing transmission line ROW: one at 600 feet, one at 1,100 feet, then another at 600 feet. This section also passes through the area of influence of two zoological NHSs (MDC 2011c, Appendix A, Sheets MR 20 and 21). Route 3P/3A, still following the existing transmission line, then enters the Mississippi/Zumbro River floodplain just beyond the point where Route 3P/3A crosses US-61. The route also crosses part of the McCarthy Lake WMA in the Mississippi River floodplain. Most of this area is also wetland, and much of the wetland is BSHS meadow-marsh-swamp complex. The route crosses 1,400 feet of continuous wetland, and then passes out of wetland and then crosses another 6,000 feet of continuous wetland. The part of the route within the floodplain lies within the area of influence of three zoological NHSs (MCBS 1997c, MDC 2011, Appendix A, Sheets MR22 and MR23).

Route 3P-009

Route 3P-009 also crosses a cove of Zumbro Lake, at an 800-foot floodplain crossing. For several thousand feet north of the crossing it borders a large tract of BSMS oak forest along the ROW of the roadway it follows (MDC 2011c, Appendix A, Sheet MR 8).

Route 3P – Kellogg

Route 3P Kellogg crosses 4,000 feet of wetland along US-61, within an area of influence of six NHSs that originates in the McCarthy Wildlife Management Area, and/or the Mississippi River floodplain area that the Route 3P Kellogg follows (MDC 2011c, Appendix A, Sheets MR42 and MR23).

Wisconsin Routes

The major natural community impacts in the Wisconsin part of the Proposal area would be to forests.

Increasing the easement areas for the Arcadia Route, Arcadia-Alma Option and Q1-Galesville Route would have a negative impact on the forests intersected. In these circumstances, tree removal would be required in the portions of these woodlots that extend into the proposed easement area for the route. In such areas, shrubs and other low-growing vegetation would be allowed to re-establish once construction is completed.

The estimated acreage of tree removal by route is summarized in Table 2-5.

3.5.2.2 Invasive Species and Noxious Weeds

Noxious weeds and invasive species can be spread by construction equipment contaminated with seeds or vegetative material. Disturbed soil surfaces can encourage noxious weeds and invasive vegetation because these plants are more aggressive than others in establishing themselves. Once introduced, invasive species will likely spread and impact adjacent properties with the appropriate habitat.

3.5.2.3 Wetlands and Riparian Areas

Executive Order 11990, Protection of Wetlands, requires each federal agency to minimize the destruction, loss or degradation of wetlands when providing federally undertaken, financed, or assisted construction and improvements, as well as other activities. Each agency shall avoid new construction located in wetlands unless “the agency finds (1) that there is no practicable alternative to such construction, and (2) that the Proposal includes all practicable measures to minimize harm to wetlands which may result from such use.”

Wetland impacts are dependent upon type and length of crossing. Transmission lines cannot be safely or reliably operated with trees growing under and up into them. Therefore, existing trees must be removed throughout the entire ROW, including forested wetlands. Because of this, forested wetlands within the ROW would undergo a permanent vegetation type change to emergent or shrub/ scrub vegetation.

Permanent impacts in the form of fill in wetlands would take place where poles must be located within wetland boundaries. Wetland crossings of less than 1,000 feet can typically be spanned. If a wetland crossing is greater than 1,000 feet, but less than 1,500 feet, one pole would be placed in the wetland. Two poles would be needed for

wetlands between 1,500 and 2,500 feet and so on. Wetland impacts due to permanent pole placement would result in approximately 50 to 80 square feet of permanent impacts per standard single-pole. Between 5,000 square feet (0.11 acres) and 9,200 square feet (0.21 acres) of temporary wetland impact per pole would occur during construction, depending on which construction access option is chosen.

Wetlands crossed are discussed by segment below. Note that these comparisons are indicators of impact; the actual wetlands impacted will depend on the length of the crossing for non-forested wetlands, and will be limited to pole locations. For forested wetlands, for those routes that follow an existing roadway or transmission corridor, the actual acreages would be reduced by the acreage of forested wetland within the ROW that is already cleared for a utility line or roadway. The comparison tables in Section 2 account for these reductions.

Minnesota Segments

Wetland areas in the Minnesota part of the Proposal area have been preliminarily identified by use of the USFWS' National Wetland Inventory (NWI). These are summarized for the P and A routes in Table 3-6 and Table 3-7. The 150-foot ROW of the P routes crosses seven different types of NWI wetlands in 16 different locations, including one location mapped as a MDNR PWI wetland. The total area of NWI wetlands within the 150-foot ROW of the P routes is approximately 8.9 acres, or 1.3 percent of the total ROW acreage. The 150-foot ROW of the A route crosses 13 different types of NWI wetlands in 29 different locations totaling 16 acres, or 1.82 percent of the total ROW acreage (Table 3-7). No areas are mapped as MDNR PWI wetlands.

Segment 1 NWI Wetland Comparisons with MN DEIS Scoping Routes. The A route alternatives all cross more acres of wetland than the P routes. Within the P alternative routes from the MN DEIS scoping, use of Route 1P-009 in place of Route 1P greatly increases (nearly doubles) the number of acres of NWI wetlands within the ROW. Use of Route 1P-003 slightly increases the wetland acreage within the ROW, use of Route 1P-001 slightly decreases the acreage, and use of the other alternative routes has negligible effect. Route 1P has no forested wetlands within the ROW. Route 1P-003 has

nearly two acres, Routes 1P-001, -002 and -009 each have less than one acre, and the other scoping routes have no forested wetland within the ROW (MDC 2011c, Figure 8.1.4.8-2). Within the A alternative routes, use of Routes 1B-001, -005, or -004 increases the acreage of NWI wetlands within the ROW and use of Routes 1B-003 or 1A-001 decreases the acreage. However, all A and B routes within Segment 1 cross more acres of NWI wetlands than any of the P routes. All the alternative A and B routes, with the exception of Route 1B-003, cross 4 to 5 acres of NWI forested wetland. Route 1B-003 crosses approximately 2.5 acres of forested wetland (MDC 2011c, Figure 8.1.4.8-2).

In addition to forested wetlands, of particular note are any wetland crossings greater than 1,000 feet. As mentioned in Section 3.5.2.1, on a tributary of Prairie Creek, Route 1P-009/1P-005 crosses 1,800 feet of a BSHS emergent marsh wetland and 2,300 feet of another wetland. Route 1A-004 crosses 1,700 feet of a BSOS willow swamp (wetland) along Spring Creek.

Table 3-6: NWI Wetlands Crossed by 150-foot ROW of P Routes

Wetland Type	Total NWI Wetlands			Number of MDNR PWI Wetlands Crossed
	Count	Acres in ROW	% of ROW	
NWI Total	**16**	**8.9**	**1.3**	**1**
PEMC	7	73.6	0.5	0
PEMCd	2	1.2	0.2	0
PSS1C	3	1.4	0.2	0
PEMCx	1	1.0	0.2	0
R3UBH	1	0.8	0.1	0
L1UBHh	1	0.4	0.06	1
PSS1B	1	0.5	0.08	0

NWI Wetlands based on NWI data; % of ROW calculated as acreage within the ROW; Source: USFWS NWI, MDNR PWI. PEMC—Palustrine, Emergent, Seasonally Flooded wetlands.
PEMCd—Palustrine, Emergent, Seasonally Flooded, Partially Drained/Ditched wetlands.
PSS1C—Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded wetlands. PEMCx—Palustrine, Emergent, Seasonally Flooded, Excavated wetlands.
R3UBHh—Riverine, Upper Perennial, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded wetlands. L1UBHh—Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded wetlands. PEMCh—Palustrine, Emergent, Seasonally Flooded, Diked/Impounded wetlands.
PSS1B—Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Saturated wetlands.

Table 3-7: NWI Wetlands Crossed by 150-foot ROW of A Routes

Wetland Type	Total NWI Wetlands			Number of MDNR PWI Wetlands Crossed
	Count	Acres in ROW	% of ROW	
NWI Total	**29**	**16.00**	**1.82**	**0**
PEM/FO1Cd	1	1.06	0.12	0
PEMA	1	0.42	0.05	0
PEMAd	2	0.13	0.01	0
PEMB	1	0.68	0.08	0
PEMC	9	3.20	3.20	0
PEMCd	3	3.90	3.90	0
PFO1/EMA	1	0.72	0.08	0
PFO1/EMB	1	2.14	0.24	0
PFO1A	4	1.39	0.16	0
PFO1C	1	0.48	0.05	0
PSS1C	3	0.96	0.11	0
PUBGh	1	0.09	0.01	0
R2UBH	1	0.83	0.09	0

NWI Wetlands based on NWI data; percentage of route calculated as acreage within the ROW; Source: USFWS NWI, MDNR PWI. PEM/FO1Cd—Palustrine, Emergent, Forested, Broad-Leaved Deciduous, Seasonally Flooded, Partially Drained/Ditched wetlands. PEMA—Palustrine, Emergent, Temporarily Flooded wetlands.
PEMAd—Palustrine, Emergent, Temporarily Flooded, Partially Drained/Ditched wetlands. PEMB—Palustrine, Emergent, Saturated wetlands.
PEMC—Palustrine, Emergent, Seasonally Flooded wetlands.

Segment 2 NWI Wetlands Comparisons with MN DEIS Scoping Routes. Route 2P crosses approximately 1.5 acres of NWI wetland, most of which is forested. Route 2A crosses approximately 2.5 acres of NWI wetland, most of which is forested. Use of Route 2A-001 results in nearly 9 acres of wetland crossed, including nearly 2 acres of forested wetland. Use of Route 2C3-001-2 results in over 7 acres of wetland crossed, nearly all of which is forested. Use of Routes 2C3-002-2, 2C3-003-2, 2C3-004-2 or 2C3-007-2 results in 4.5 to 5.5 acres of wetlands crossed, approximately half of which is forested. Routes 2A-002 and 2A-003 are very similar to Route 2A. Use of Route 2P-001 results in the least acreage of wetland crossed, at approximately one-half acre (MDC 2011c, Figure 8.2.4.8-2).

Two alternatives in Segment 2 have wetland crossings greater than 1,000 feet: Routes 2A-001 and 2C3-001-2. Along the alignment it shares with the Douglas Trail, Route 2A-001 crosses two areas of forested wetland: one 2,200 feet long and one 1,400 feet long (MDC 2011c, Appendix A, Sheets NH9 and 10). Route 2C3-001-2 has multiple crossings of a continuous BSHS forested floodplain wetland at the Middle Fork of the Zumbro River, adjacent to US-52 near and then east of the County Road 11 interchange. These crossing lengths are 500, 1,300 and 300 feet respectively.

Segment 3 NWI Wetland Comparisons to MN DEIS Scoping Routes. Route 3P crosses 39 acres of NWI wetland, including 13 acres of forested wetland. Route 3A crosses 39 acres of NWI wetland, including 15 acres of forested wetland. Because most of these wetlands occur in the Mississippi/Zumbro River floodplain in the McCarthy WMA, use of alternatives that avoid the McCarthy WMA - Route 3A-003, which follows MN-42 or Route 3A-Kellogg, which follows US-61- substantially reduces the number of wetland acres crossed. Route 3B-003 crosses 14 acres of NWI wetlands, including 7 acres of forested wetlands. Route 3P/3A Kellogg crosses 23 acres of NWI wetlands, including 10 acres of forested wetlands. (Note that these acreages do not account for the acreage already removed from the corridor by the existing transmission line or roadway.) Most other route options in Segment 3 have little effect on the acreage of wetland crossed, either forested or non-forested (MDC 2011c, Figure 8.3.4.8-2).

Wetland crossings greater than 1,000 feet in length in Segment 3 occur in the Mississippi/Zumbro River floodplain. In the McCarthy Lake WMA in the Mississippi River floodplain, Route 3P/3A crosses 1,400 feet of continuous wetland, then passes out of wetland and then crosses another 6,000 feet of continuous wetland. Route 3P/3A Kellogg crosses 4,000 feet of wetland along US-61 in the Mississippi/Zumbro River floodplain.

All routes cross 2,800 feet of wetland/open water at the Mississippi River crossing.

Summary. Expected wetland impacts are summarized in Table 2-4 for the P and A routes. As shown, no permanent wetland impacts are expected in Segment 1 for either route. Less than one acre of permanent wetland impacts is expected for Segments 2 and 3. Temporary wetland impacts in Segment three are expected to be 2 acres for Route 2P and 3 acres for Route 2A. Seven acres of temporary wetland impacts are expected for both Routes 3P and 3A.

Forested wetlands would be impacted by being converted to emergent or scrub/shrub wetlands. In Segment 1, Route 1P is not expected to have any forested wetlands impacts, while Route 1A has 4.7 acres. In Segment 2, Route 2P has 1.3 acres and Route 2A has 1.7 acres. In Segment 3, both Routes 3P and 3A have 7 acres.

As discussed above, some other the other route alternatives would result in more impacts and some in less impacts. The more substantial of these are included in the summary Tables R-5 through R-7 in Appendix R.

Wisconsin

The first part of all the routes in the Wisconsin part of the Proposal area begins with an approximate 2900-foot section of open water and forested wetland. The state line is roughly in the middle of the river, and the first 700 feet is open water. The route then crosses an island with forested wetland (400 feet), another 200 feet of open water, then 1,600 feet of forested wetland. This section (Segment 1 in the CPCN Application) follows an existing transmission line. All routes then cross the Dairyland Alma plant site and from there rise up out of the floodplain. Another substantial floodplain forest impact is at the WI-35 crossing of the Black River. At that location, the proposed transmission line alignment centerline would be parallel to and approximately 400 feet from the

roadway. The purpose of this distance is to avoid the scenic easements associated with the Great River Road, and to provide a buffer of a strip of wooded land. In addition, the transmission line would cross several hundred feet of the Van Loon State Wildlife Area which results in greater impacts to the forested wetlands.

In addition to the Mississippi River floodplain crossing described above, that is shared by all routes - greater than 1,000 feet are summarized below (Xcel et al. 2011, Appendix T, Appendix E).

Q1/Highway 35 Route:

- 1,750 feet of wet meadow/shrub Carr at River Harbor Road
- 1,800 feet of mesic/wet mesic forest at County Highway OO
- 1,100 feet of sedge meadow at Genoa Drive
- 1,300 feet of shrub Carr/emergent aquatic/wet meadow on WI 35
- 10,000 feet of primarily forested wetlands with some open water

Arcadia Route:

- 1,900 feet of southern sedge meadow at County Highway E
- 1,200 feet of emergent aquatic/floodplain forest at a railroad
- 1,700 feet of mesic forest/deciduous wetland/ephemeral basin in wooded setting at Wright Road
- 1,600 feet of wet meadow/sedge meadow/deep marsh at County Highway K
- 2,200 feet partially forested wetland at the Trempealeau River

Q1/Galesville:

- 1,750 feet of wet meadow/shrub Carr at River Harbor Road
- 1,800 feet of mesic/wet mesic forest at County Highway OO
- 1,100 feet of sedge meadow at Genoa Drive
- 1,300 feet of shrub Carr/emergent aquatic/wet meadow on WI 35
- 1,600 feet of wet meadow/sedge meadow/deep marsh at County Highway K
- 1,700 feet of mesic forest/deciduous wetland/ephemeral basin in wooded setting at Wright Road

Wetland impacts for the various route combinations involving the Q1 Black River crossing are summarized in Table 2-16.

Summary. Expected wetland impacts are summarized in Table 2-. As shown, less than one acre of permanent wetland impacts is expected for all routes. Temporary impacts range from 4.7 acres for the Arcadia Ettrick Connector option of the Arcadia Route to 6,3 acres for the Q1/Highway 35 Route.[134]

Forested wetlands would be impacted by being converted to emergent or scrub/shrub wetlands. Forested wetland impacts would be least for the Q1 – Galesville Route and greatest for the WI-88 Option A Connector to the Q1 – Galesville Route (Table 2-).

3.5.2.4 Birds and Other Wildlife Resources

The primary potential impacts for birds are loss of habitat through tree clearing and collision with power lines.

Habitat Loss

The primary potential impact for other wildlife is loss of habitat. Forest birds, especially nesters, would have the most potential for impact in IBAs with forest removal (Upper Mississippi Refuge; Van Loon State Wildlife Area, for those alternatives that pass through the Black River Bottoms) Since these are high quality habitat areas, forest removal at these areas would likely have the most potential impact on other wildlife as well.

Bird Collisions with Power Lines

Bird collisions with power lines are associated with a complex set of variables such as habitat use, weather, line placement and configuration, time of day, flight and flocking behavior, age and sex of birds (IEEE 2010 p. 3). Relatively high fatality rates have been reported when a large flock was flushed near a power line (e.g., Blokpoel and Hatch 1976 as summarized in Dahlgren et al 1992). In a study of sandhill cranes, Murphy et al (2009) found most collisions occurred when flocks were roosting within 1,800 feet of a power line and were disturbed. Relatively high fatality rates have also been reported when a transmission line separates a roost site from an adjacent feeding site (e.g.,

[134] Not all Wisconsin data was available for the Pre-Draft.

Anderson 1978; Rusz et al 1986; McNeil et al 1985; Faanes 1987; Woodin and Michot 2002, as summarized in CEC 2011; IEEE 2010; APLIC 1994). McNeil et al (1985) found most of the pelican casualties at a span where the roosting and feeding sites were separated by only 700 feet.

Bird size and maneuverability are factors in evaluating species' vulnerability to colliding with overhead wires (IEEE 2010 pp. 3-4), however, the importance of this factor for most birds is not clear from the literature. Bevanger classified birds according to their relative susceptibility to collision based on flying ability, which defined as poorer for heavy-bodied birds with high wing loading (Bevanger 1998, Figure 1). Of the birds listed in Table 3-5, only the American coot, the double-crested cormorant and the mourning dove were listed as "poor flyers" by Bevanger. These are not birds frequently reported as collisions casualties (Table N-2 in Appendix N). However, as summarized in Table N-2 and frequently reported, heavy bodies and high wing loading do seem to be relevant to susceptibility to collision, at least to some extent (IEEE 2010, p. 4; APLIC 1994).

Flying in flocks also restricts maneuverability and increases collision risk. Weather is also an important factor in collisions. Birds are able to avoid transmission wires in clear weather unless the birds are preoccupied or distracted. During storm events, reduced visibility and high winds may make it more difficult for birds to cross wires (IEEE 2010 p. 4).

Migrating birds unfamiliar with the location of power facilities are more likely to have collision incidents than resident bird individuals who become habituated to their presence and avoid the obstacles (IEEE 2010 p.-4).

Migrating songbirds do not appear to be particularly susceptible to power line collision during migration: The USFWS has reported that passerines fly at "various heights above 700 feet in nocturnal migration" (Faanes 1987 p. 22), more than three times higher than the tallest proposed poles. Others have reported that songbirds generally fly at heights above 500 feet when migrating (Smithsonian n.d.; Elrich et al 1988; Lincoln 1979 p. 34).

Many studies have focused on short sections of power lines known to have many bird collisions; thus it is difficult to judge what an average or expected rate might be. Reported estimates vary from 0.1 to nearly 80 casualties/km/year (Jenkins et al. 2010).

The configuration (height and span length) of the line and placement with respect to other structures or topographic features can also have an effect on collision risk [Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) 2005, p. 11].

Guy wires, which are often used to support poles at locations where the line changes direction, can also present bird hazards. However, the Proposal design relies on self-supporting structures. In a few areas with difficult access guying may be considered to reduce the structure size.

At least one study suggests that some waterfowl may avoid flying over power lines in open (e.g., marsh) habitats, preferring instead to fly over the lines where they cross through forested habitats and are below tree-top levels In a multi-year study of greater white-fronted geese daily travel patterns at a lake near rice fields, where the geese's daily trip involved crossing a power line, researchers in Japan found that geese traveling from their roosting areas at the lake to rice fields where they grazed more frequently took a less direct route over a wooded area rather than a more direct route across open fields. The cables were clearly visible over the open fields but rarely visible above the treetops. The researchers concluded that the geese may have taken the less direct route because it "presented less of a hazard" (Shimana 2001, pp. 427 -428).

Potential Impacts – Power Line Collisions

The two areas of most concern for potential bird-power line collisions are the Upper Mississippi/Trempealeau Refuges and Lake Byllesby, which are discussed below.

Upper Mississippi/Trempealeau Refuges. Table N-2 in Appendix N summarizes an assessment of collision potential for Refuge-monitored species and Refuge Resource Classification A and B species. The conclusions of the assessment for each of these species are presented below. These conclusions are based on the information for each species presented in Tables N-1 and N-2 in Appendix N.

For those species that may fly from Refuge pools to nearby agricultural fields to feed (listed as such in Table N-2), and that could potentially be impacted by the alternative alignment that parallels the river, refer also to Figures 3-9 through 3-12. As shown in Figure 3-9, in the vicinity of Pool 5, the alignment that parallels the river (Q1) is adjacent to the bluff. The bluff is much higher than the river, and the birds flying over the line would be well above the power line elevation, in order to clear the bluff. At Pool 5A, the alignment is approximately two miles from the river, in the Blufflands (Figure 3-10). At Pool 6, Upper Pool 7 and Trempealeau National Wildlife (Figures 3-11 and 3-12), the alignment is in the broad Black River/Mississippi River floodplain; however, it is over a mile from the pools where the birds concentrate. Also, except for the Black River crossing, the Q1 Alternative follows the existing Q1 69-kV transmission line, although the Proposal would have taller poles. Therefore, considering the relative positions of the bluff line and the Q1/Highway 35 Route for most of its length (Figures 3-9 and 3-10), the distance of the Q1/Highway 35 alignment from the river where the bluff is not present along the river (Figures 3-11 and 3-12), and the fact that there is an existing transmission line except for the Highway 35 segment at the Black River, the Q1 Highway 35 Route appears to present little risk to those birds that may fly back and forth between Refuge pools and nearby agricultural fields to feed.

Tundra swan. Based on the literature review (summarized in Table N-2), tundra swans do not appear to have a high susceptibility to power line collisions. Based on the information on feeding habits (Table N-1), tundra swans would not be expected to move off the Refuge during migration to feed in agricultural fields, an activity that may increase their potential for collision. Based on the analysis as presented in Table N-2, no impacts to Refuge populations are expected.

Trumpeter swan. While, based on the literature survey, the trumpeter swan is susceptible to collisions with power lines, negligible to no impacts are expected to any Refuge populations of trumpeter swans, as they are small and far from the Proposal area (Tables N-1 and N-2). Mitigation measures may be taken if at-risk trumpeter swans are identified in other parts of the Proposal area, especially in Minnesota. Note that while the trumpeter swan is still listed as threatened in MN, the State of Minnesota goal

of 500 individuals has been exceeded (the current Minnesota population is estimated at 2,400) (MDNR 2011d). The total interior NAWMP population goal is 2,000.

Mute swan. Mute swans, while collision-prone, are an introduced species and are rarely present on the Refuge. No impacts are expected.

Canada goose. Based on the literature review, Canada geese are not particularly susceptible to collisions. Only a small percent of the Refuge population is found in the Proposal area. While Canada geese may make daily flights between the Refuge and nearby agricultural fields to feed, the route alternative that parallels the river (Q1/Highway 35) is expected to pose little risk, as discussed above. Several hundred Canada geese may be at Pool 6/Trempealeau National Wildlife Refuge during fall migration and may fly across the Q1/Highway 35 alignment to access agricultural fields; however, the line would be more than a mile from the water. No impacts to Refuge populations are expected.

Greater white-fronted goose. Greater white-fronted geese do not appear to be collision-prone and are present in very small numbers on the Refuge. No impacts are expected.

Lesser snow goose. Snow goose populations in North America have expanded rapidly, resulting in levels that are damaging to breeding areas. The current USFWS management goal for light geese, which includes the lesser snow goose is a 50 percent population reduction from late 1990s levels (USFWS 2007b, p. ii). While the lesser snow goose seems to be susceptible to collision, no population impacts are expected because of the low population at the Refuge and the superabundant overall population.

Mallard. Based on the literature review, mallards are not particularly susceptible to collisions. Only a small percent of the Refuge population is found in the Proposal area (Table N-1). The current mallard population is well above the NAWMP goal, in spite of large annual harvests (2.2 million in the Mississippi Flyway alone) (Tables N-1 and N-2). While mallards may make daily flights between the Refuge and nearby agricultural fields to feed, no lines paralleling the river would be close to pools. No impacts to Refuge populations are expected.

American black duck. Given that almost no black ducks have been documented near the Proposal area, impacts to black ducks are not expected.

Northern pintail. Based on the literature review, Northern pintails are not particularly susceptible to collisions. Only a small percent of the Refuge population is found in the Proposal area. No impacts to Refuge populations are expected.

Gadwall. Based on the literature review, gadwalls are not particularly susceptible to collisions. Only a small percent of the Refuge population is found in the Proposal area. While gadwalls may make daily flights between the Refuge and nearby agricultural fields to feed, no lines paralleling the river would be close to pools. No impacts to Refuge populations are expected.

American wigeon. Based on the literature review, wigeons are not particularly susceptible to collisions. Only a small percent of the Refuge population is found in the Proposal area. Although wigeon populations are below their NAWMP goal and may still be declining, over 100,000 are harvested annually in the Mississippi Flyway. Any losses from the Proposal would be expected to be negligible by comparison to the hunting harvest. No impacts to Refuge populations are expected.

Northern shoveler. Northern shovelers are very abundant, however very few are found in the Proposal area, and they would not be expected to travel between the Refuge and agricultural fields to feed. No impacts to Refuge populations are expected.

Blue-winged teal. Based on the literature review, blue-winged teals are not particularly susceptible to power line collisions, they are very abundant, only a small percent of the Refuge population is found in the Proposal area, and they would not be expected to fly back and forth to agricultural fields. No impacts to Refuge populations are expected.

Green-winged teal. Green-winged teals are very abundant on the Refuge, however very few are found in the Proposal area. No impacts to Refuge populations are expected.

Wood duck. Based on the literature review, wood ducks are not particularly susceptible to power line collisions. While they are reported as abundant or common, relatively few are found on the Refuge. Very few have been found near the proposed

Mississippi River crossing area. Compared to an annual Mississippi Flyway harvest of nearly one million, any impacts would be negligible.

Redhead. Based on the literature review, redheads are not particularly susceptible to power line collisions, they are very abundant, almost none have been found near the Proposal area, and they would not be expected to fly back and forth to agricultural fields. No impacts to Refuge populations are expected.

Canvasback. Because of the large number of birds in the general vicinity of the Proposal, there may be an occasional encounter with a power line. While the Refuge is an important stopover for migrating canvasbacks, the current North American population is 160,000 above the NAWMP goal. No impacts to Refuge populations are expected.

Ring-necked duck. Because of the large number of birds in the general vicinity of the Proposal, there may be an occasional encounter with a power line. However, compared to the 2010 Mississippi Flyway hunting harvest of 268,000, any effects from the Proposal would be negligible. No impacts to Refuge populations are expected.

Lesser scaup. While lesser scaup have a higher presence in the study area than most other species, based on the literature review they appear to have a relatively low risk for collision. Also, scaup would not be expected to fly off the Refuge to feed in agricultural fields. Any impacts would be expected to be negligible compared to the annual Mississippi Flyway hunting harvest of 150,000.

Common goldeneye. As with the lesser scaup, goldeneyes have a higher presence in the study area than most other species; however, based on the literature review they appear to have a relatively low risk for collision. Also, goldeneye would not be expected to fly off the Refuge to feed in agricultural fields. Any impacts would be expected to be negligible compared to the annual Mississippi Flyway hunting harvest of 34,000.

Bufflehead. Based on the literature review, buffleheads are not particularly susceptible to power line collisions, only a small percent of the Refuge population has been found near the Proposal area, and they would not be expected to fly back and forth to agricultural fields. No impacts to Refuge populations are expected.

Hooded merganser. Based on the literature review, hooded mergansers are not particularly susceptible to power line collisions, none have been found near the proposed crossing, and they would not be expected to fly back and forth to agricultural fields. No impacts to Refuge populations are expected.

Ruddy duck. Based on the literature review, ruddy ducks are not particularly susceptible to power line collisions, almost none have been found near the proposed crossing, and they would not be expected to fly back and forth to agricultural fields. No impacts to Refuge populations are expected.

Great blue heron. Based on the literature review, great blue herons may have a relatively higher susceptibility to power line collisions than most of the other birds addressed. However, they do not travel in large flocks and the proposed crossing is not located near rookeries. Herons do not winter in Minnesota. During their breeding season, as well as spring and fall migration, herons (and egrets) are generally found in river bottom backwaters and ox bows, rather than in deep water or around locks and dams. Herons generally arrive in the spring February-March (depending on the severity of the winter), and migrate sound again in October to November. During surveys performed to find eagle nests (described under *Bald and golden eagle* below), or during other project surveys, the USFWS recommends heron rookeries be surveyed and noted when found. The Upper Mississippi National Wildlife Refuge may have maps of known heron rookeries. Because herons are vulnerable to line collision, the USFWS recommends including these birds in any migratory bird surveys. FWS also recommends marking river crossings with bird flight diverters, not only in areas of deep open water, but also in marshy wetlands where herons and egrets are likely to gather.

Great egret. Based on the literature review great egrets appear to be much less susceptible to collisions than great blue herons. This may be at least in part due to their weight (2 lbs vs 5 lb for the heron). They do not travel in large flocks and would not be expected to travel back and forth from agricultural fields to feed. Egrets should be included in any surveys that include herons. Egrets generally arrive later in the spring

than herons and depart earlier in the fall. All egrets and herons will have returned in the spring by April 1st. No impacts to Refuge populations are expected.

Bald eagle and golden eagle. Based on the literature review, bald eagles have a low susceptibility to power line collisions, and under most conditions they would be expected to spend most of their time between the tall roost trees bordering the river, and the river where they fish, as fish is their primary food.

However, eagles sometimes congregate in other areas and the USFWS is concerned about potential impacts to bald and golden eagles from collisions (and possible electrocutions on the rebuilt lines) with the Proposal transmission lines, both during construction and operation of the Proposal. The USFWS is working with RUS and the Applicant to obtain additional information to assess the potential for impacts, which will then be evaluated in more detail in the Final EIS. Areas of potential concern are those locations in the vicinity of the Proposal where bald eagles are likely to congregate. Following are examples of such areas or potential areas:

- The Proposal crossing of the Mississippi River bottoms, which includes the Mississippi River and the Zumbro River bottoms.
- The Proposal crossing of the Cannon River.
- The Proposal crossing of the Trempealeau and Black River Bottoms.
- The Proposal crossing of other rivers or large creeks.
- Chicken production areas in the vicinity of the Proposal, where eagles may feed on chicken carcasses.
- Areas around locks and dams, where the river does not freeze and where eagles feed in the open water.
- Other areas that may attract eagles, such as spring-fed portions of streams that do not freeze over, or river areas where “promiscuous fishing” may lead to accumulation of fish on the ice.
- Locations where the proposed transmission line may pass between a nesting area (bald eagle only) or an eagle roost and a foraging area. The MDNR eagle nest database is current only as of 2007; therefore, USFWS recommends nest surveys near bodies of water.
- Areas where predictable roadkill, such as deer, may attract eagles.
- Areas where the transmission line is taller than the surrounding vegetation or topography. Golden eagles forage on the bluffs above the river bottoms, and therefore there may be potential for golden eagle strikes with the lines on the bluffs.

American coot. The literature review found conflicting results for collision susceptibility for coots, probably due to differing site conditions. Because of the large number of birds in the general vicinity of the Proposal, there may be an occasional encounter with a power line. However, compared to the 2010 Mississippi Flyway hunting harvest of 206,000, any effects from the Proposal would be negligible. No impacts to Refuge populations are expected.

American white pelican. The literature review found conflicting results for collision susceptibility for pelicans, probably due to differing site conditions. Many migrating pelicans have been documented near the Proposal area. However, none of the pools where pelicans may be found are located near the proposed Mississippi River crossing, and pelicans would not be expected to travel back and forth to agricultural fields. No impacts to Refuge populations are expected.

Double-crested cormorant. Because double-crested cormorants are over-abundant, the crossing is not near rookeries, and the cormorants would not be traveling back and forth to feed in agricultural fields, no adverse impacts to Refuge populations are expected.

Osprey and peregrine falcon. Based on the literature review, raptors have a generally low susceptibility to collision. Because of this and the very low Refuge population, impacts to the osprey and the peregrine falcon are not expected.

Terns (all species). Based on the literature review, terns have a generally low susceptibility to power line collision (except possibly the Caspian tern, which is an uncommon migrant). Insufficient information on Refuge populations is available to assess impacts; however, the information available does not suggest a risk.

Sandhill crane. Based on the literature review, sandhill cranes are most susceptible to collision when roosting in large flocks in staging areas close to power lines. They are also at risk if their daily flights from roosts to agricultural fields involve a low-level crossing of a power line. Sandhill cranes do not use the Refuge for staging and the only Refuge Comprehensive Conservation Plan reports are for areas miles from the Proposal area (USFWS 2006). In addition, the eastern population has increased in

recent years such that the USFWS has proposed allowing hunting for the eastern population (USFWS 2011n). No impacts are expected.

Mourning dove. While doves are reportedly poor flyers and may travel back and forth to agricultural field, no Refuge-specific available information was available to assess impacts. However, the mourning dove is a game bird and is common and widespread in suburban and agricultural settings. No population-level impacts are expected.

Lake Byllesby. Alternative crossings at Lake Byllesby would have varying degrees of risk, depending on proximity to the lake and whether or not the route is on an existing transmission line. In particular, Alternatives 1P-009 and 1B-005 are adjacent to the exposed mudflats and shallow water that is preferred habitat for many migratory bird species, including "shorebirds, ducks, geese, swans, herons, pelicans, gulls and terns" (National Audubon Society 2011). As discussed in Section 3.5.1.4, Lake Byllesby is an IBA and waterbirds are important.

Other Wildlife

Deer and chronic wasting disease (CWD). Grading and clearing for the transmission line corridors or excavation for new structure foundations may occur in areas where CWD infected deer have shed CWD prions onto the upper soil surface. It is possible that infected soil could be moved as part of construction activities. However, it is unlikely that activities associated with construction of the Proposal would increase the probability of an uninfected deer coming into contact with infectious material.

3.5.2.5 Special Status Species

Federally-Listed Species

If Route 1A is identified as preferred, or if one of the other alternatives is identified as preferred, further evaluation of the presence of prairie bush clover would be needed. While Route 1P is not near areas of native prairie remnants, if the corridor were to be shifted within the 1,000-foot route width, it may need to be re-evaluated.

Surveys for Minnesota dwarf trout lily may be warranted where the proposed project would affect forested slopes or floodplains within its potential range.

State-Listed Species

Minnesota Threatened. The loggerhead shrike may be found in Routes 1P and 1A.

No impacts to aquatic species would be expected with any alternative, as all water bodies will be spanned.

Indian-plantain may be present within the ROW of 2P, 2P-001, 2P-002 and all of the C route alternatives. The tuberous Indian-plantain has been documented within the ROW of 22 of the 31 route alternatives in Segment 3.

The timber rattlesnake may be present within the ROW of route alternatives 2A, 2A-001, and 2A- 002 and within the ROW of all route alternatives in Segment 3.

The Blanding's turtle may be present within the ROW of route alternatives 2A, 2B-001 and 2P-001 and within the ROW of all route alternatives in Segment 3.

Wisconsin. This document summarizes general rare species information. Specifics of rare species occurrences and their locations are confidential information and were submitted by the CPCN Applicants. Information concerning the presence of rare species, including threatened, endangered or special concern, within 2 miles of the Q1-Highway 35 Route, Arcadia Route, Arcadia-Alma Option and Q1-Galesville Route was obtained through a review of the Wisconsin Natural Heritage Inventory (WNHI) database dated March 15, 2010 by a qualified environmental specialist with Natural Heritage Inventory (NHI) Screening and Methodology Training. Both historic (pre-1970) and non-historic (current since 1970) element occurrence records were evaluated. The CPCN Applicants also consulted extensively with local WDNR personnel to verify and refine the rare species studies presented in the CPCN Application. The WNHI database notes the presence of 33 threatened, endangered or special concern species (historic occurrences) within 2 miles or the routes. The WNHI database notes the presence of 78 threatened, endangered or special concern species (non-historic occurrences) and 16 natural communities within 2 miles of the routes. Several of these species and natural communities occur more than once along the routes.

As discussed in Section 2.3.2.1, the Black River Bottoms is one of only a few sites in Wisconsin that provide habitat for the eastern massasauga rattlesnake, Wisconsin's

most endangered reptile. Massasaugas are also a candidate species for federal listing (USFWS 2009a). The Black River Bottoms also provide habitat for the Blanding's turtle (Wisconsin - threatened) red-shouldered hawk (Wisconsin - threatened) (USFWS 2009a). The existing Q1 Route, the Q1/Highway 35 Route and the Seven Bridges Route (considered for the Q1 Rebuild only) all pass through the Black River Bottoms.

The need for Incidental Take Authorization would be determined based on consultation with the WDNR. The CPCN Applicants would work with the WDNR to develop and implement avoidance protocols for identified threatened or endangered species for the approved route. However, if complete avoidance cannot be achieved, the CPCN Applicants would consult the WDNR to determine whether Incidental Take Authorization is necessary.

3.5.2.6 Impacts of the No Action Alternative

The no action alternative would result in no impacts to the environment at the Proposal area. The Proposal would not be constructed or operated, and therefore, there would be no impacts on biological resources within the Proposal area.

3.5.3 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

3.5.3.1 Natural Communities, Forests and Other Vegetation

Native plant communities and rare species were avoided to the extent practicable in locating the routes. The majority of routes under consideration for the Proposal use existing ROWs, including roads, transmission lines, and agricultural field lines, most often adjacent to cultivated row crops. In many cases, impacts to areas containing native vegetation communities could be mitigated by spanning these areas; however, this would not apply to forested areas.

When native vegetation communities cannot feasibly be spanned, impacts could be minimized by using the fewest possible number of structures within these communities. All areas disturbed by construction of the transmission lines will be reseeded using a native seed mix appropriate to the site.

Clearing for access roads would be limited as much as practicable, to a maximum of 20 feet wide between pole locations. In forested areas, only trees or stands that interfere with safety and equipment operation would be removed.

Co-locating with existing corridors through wooded areas would reduce the impact to trees on the river valley bluffs.

To minimize impacts caused by maintenance activities, the same access routes and stream-crossing methods that were used for construction should be used.

Tree mitigation for trees removed could be considered.

3.5.3.2 Invasive Species and Noxious Weeds

If it is evident that transmission line construction activities could spread invasive plant species to new areas, appropriate protection measures would be implemented. These measures may include avoidance of infested areas, removal or control of small populations of plants, cleaning construction equipment before leaving an area infested with invasive species, scheduling construction activities during the plant's dormant period, utilizing construction mats and geotextile fabric as a barrier to equipment or cleaning equipment prior to accessing uninfested areas.

Wisconsin regulations require implementation of BMPs to control invasive species. [135] The regulations establish a classification system for invasive species and prohibit activities that result in the spread of invasive species in certain categories. The regulations also require preventive measures to help minimize the spread of invasive species, including BMPs for construction. Post-construction monitoring is required, and if new infestations are found, measures should be taken to control the infestations. Control techniques may include the use of herbicides, biological agents, hand pulling, controlled burning, and cutting or mowing (PSC 2011d). To comply with Wisconsin invasive species regulations, the CPCN Applicants will take additional measures as described in the CPCN application (Xcel et al. 2011 Section 2.3.4.2).

Compliance with federal and state noxious weed control laws will be required during construction.

[135] WAC ch. NR 40

3.5.3.3 Wetlands and Riparian Areas

Placement of alignments within existing corridors reduces impacts to forested wetland crossings, as part of a cleared ROW can be used and the forest is not bisected. This has been done to the extent practicable.

To the extent feasible, wetland impacts can be avoided by avoiding alternatives with wetland crossings too wide to be spanned and by avoiding forested wetlands.

Pole placement will be planned to span wetlands to the extent practicable.

Final route selection will incorporate the criterion to avoid wetland impacts when other feasible alternatives are available.

The USACE will require wetland mitigation for permanent wetland losses. The required mitigation would be determined based on consultation with the USACE. However, mitigation ratios are likely to be 2:1 for permanent impacts (loss of wetland). For conversions of forested wetland to emergent or shrub/scrub, mitigation is likely to be 0.25:1 for replacement in kind and 0.5:1 for other replacement.

To minimize impacts caused by maintenance activities, the same access routes and stream-crossing methods that were used for construction should be used.

3.5.3.4 Birds and Other Wildlife Resources

Impacts to floodplain forest habitat are reduced by routing lines in existing corridors. The Applicants have been working closely with USFWS to develop a design for the Mississippi River crossing that will minimize impacts on floodplain forest land. Impacts to floodplain forests at the Black River crossing could be minimized by selecting the route with the shortest crossing of floodplain forest (i.e., Q1 Galesville or one of the Arcadia options).

In general, an important potential impact to birds from the Proposal is collision with power lines. As Jenkins et al. (2010, pp. 273-274) state: “The surest ways to prevent birds from colliding with a proposed power line are either not to build it, to bury it underground, or to route it well away from areas known or considered likely to support collision-prone species.” The no action alternative - not constructing the Proposal – is

addressed in this Draft EIS. Undergrounding has been addressed and determined to be not feasible (Section 2.4.2.1).

Potential impacts to birds from collisions may be reduced by locating new lines in existing transmission lines corridors, as opposed to creating new corridors. Since birds most often strike the shield wire, which is the highest and thinnest wire, risk could be reduced by removing the shield wire (Jenkins et al., p. 274). However, these wires are needed to conduct current from lightning strikes to the ground, and while removal of the shield wire may be feasible at some locations with infrequent thunderstorms, in the Midwest removal of the shield wire is not a feasible alternative. RUS requires shield wires (also called overhead ground wires) in all locations where the isokeraunic level (which is an indicator of the frequency of thunderstorms) is above 20 (USDA RUS 2009, p. 8-6).

The National Bald Eagle Management Guidelines (USFWS 2007) will be followed. APLIC guidelines (APLIC 2005) will be followed for reconstruction of 69-kV lines, to prevent electrocution of eagles and other raptors.

Bald eagle nest surveys will be conducted in the Proposal area prior to construction to identify any bald eagle nests in close proximity to the proposed transmission line. Take permits under the Bald and Golden Eagle Protection Act are available for nest disturbance and possibly nest removal (if needed).[136] There are currently no permits available for the take (lethal or disturbance) of the eastern Golden Eagle population.

The Upper Mississippi Refuge may impose more stringent avoidance, minimization and mitigation measures than those required under the Bald and Golden Eagle Protection Act and the National Bald Eagle Management Guidelines (USFWS 2007) in areas that affect refuge eagles.

The Applicants plan to install flight diverters on the shield wires at the Mississippi River crossing. Based on previous studies, this is expected to be an effective measure.

Flight diverters may be installed in other areas, if collision risk is identified. The Applicant's approach for mitigation of collision risk is consistent with the APLIC 1994

[136] 50 CFR 22.26 and 22.27

guidance. APLIC is planning to update the guidance soon. If the new guidance is issued prior to construction, the Applicants will consider the new guidance.

Impacts at Lake Byllesby could be avoided by selecting a route away from the lake; Routes 1P-009 and 1B-005 are especially close to bird concentration areas.

Deer and CWD

Information from the MDNR indicates that avoiding construction work within the fence of the Elk Run Development may help avoid the movement of prions. In addition, the DNR has suggested that BMPs typically used to control the spread of invasive species, including the removal of soil from construction equipment may help to minimize the risk of CWD spread (MDC 2011c, p. 51).

3.5.3.5 Special Status Species

Known threatened and endangered species habitat has been avoided by route siting to the extent practicable. If necessary, surveys will be completed and the MRP/CPCN Applicants will work closely with the USFWS and the DNR agencies to assess impacts and take appropriate avoidance and/or mitigation measures. Except for specific forested slopes and floodplains where the dwarf trout lily may be present, most species are not expected to inhabit forests, so in most cases tree-clearing is unlikely to affect threatened or endangered species. In many cases, plants or non-forested habitat could be spanned. Post-construction management plans would need to be developed to ensure long-term protection.

The MRP/CPCN Applicants will conduct pre-construction surveys if habitat suitable for federal or state-listed threatened or endangered species will be impacted, or if more information is needed to address areas with limited data.

The Applicants may also apply for an Incidental Take Permit if it is possible that construction activities could result in the harm or “take” of a threatened or endangered species. If granted, the permit would allow the applicant to take certain actions that may be harmful to a threatened or endangered species, within the conditions and limitations of the permit.

While the Proposal is outside the mapped range of the federally-listed endangered Karner blue butterfly (*Lycaeides Melissa samuelis*) (USFWS 2011p; University of Wisconsin 2008), at least one landowner has reported the butterfly on his property. Some ROWs in Wisconsin are being actively managed to provide habitat for the Karner blue butterfly (PSC-WDNR 2011 p. 63). If necessary, the Applicants will work with landowners, the USFWS, RUS, and MNDNR and/or WDNR to protect listed species and their habitat.

3.6 LAND RESOURCES

3.6.1 Affected Environment

As shown in the figure depicting land cover, agriculture is the predominant land use in the Minnesota part of the Proposal area. This is supported by a review of land use plans, zoning ordinances and public policies of the counties and cities within the Proposal area (Xcel et al. 2010, 2011). Agriculture use consists primarily of planted row crops such as corn and soybeans, and includes substantial areas of open pasture and agricultural grassland. Developed land covers a very small part of the land area within the Proposal footprint and includes cities and rural towns, roads and railroads, and commercial and industrial sites; and open water and wetland areas. Parks, Refuge lands, and other public areas are included in land uses.

3.6.1.1 Land Use and Zoning

Zoning is a regulatory device used by local governments to geographically restrict or promote certain types of land uses. Land use and zoning are described in detail in the MRP application and the Wisconsin CPCN (Xcel et al. 2010, 2011).

Minnesota

Minnesota statutes provide local governments with zoning authority so long as the restrictions promote the public health and general welfare.

The proposed Project, however, is subject to Minnesota's Power Plant Siting Act (PPSA). Under this statute, the route permit issued for a high voltage transmission line (HVTL) "…shall be the sole site or route approval required to be obtained by the utility. Such permit shall supersede and preempt all zoning, building, or land use rules,

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regulations, or ordinances promulgated by regional, county, local, and special purpose government."[137]

Wisconsin

In Wisconsin, local government units can regulate locations of transmission lines to some extent. A few municipalities in the Proposal area have ordinances that address transmission lines. However, the PSC CPCN preempts all local jurisdiction and zoning. The city of Buffalo City has an adopted zoning ordinance that allows the construction, reconstruction and maintenance of aboveground and underground public utility service lines. The city's Board of Appeals may designate reasonable conditions and safeguards to public utility buildings, structures and lines. The village of Cochrane has an adopted zoning ordinance that allows transmission lines in all zoning districts as long as they are located a minimum of 50-feet from any residential district lot line. Transmission lines are exempt from the village's height limitations and yard setbacks. The Trempealeau County Comprehensive Plan addresses utilities. The plan encourages and supports the burial of utility lines when and where feasible. The La Crosse County code of ordinances exempts transmission poles and lines from height requirements. Transmission lines are permitted in Agricultural District "B" as well as the location of the poles between the setback lines and the highway. The utilities element of the village of Holmen comprehensive plan does not directly address electrical transmission lines and substations. However, it does provide direction for the coordination of growth with the provision of utilities, the development of utilities between 700 and 900 feet above sea level and preserving the maximum amount of native vegetation where utilities would be sited (Xcel et al. 2011 pp. 2-117 to 2-121).

3.6.1.2 Prime Farmland and Farmland of Statewide Importance

As shown in Figure 3-13, area covered by prime farmland and farmland of statewide importance decreases from west to east across the Proposal area.

3.6.1.3 Formally Classified Lands/Recreation

Formally classified lands are shown in Figure 3-14. Some of the formally classified lands in the Minnesota part of the Proposal area have been funded with matching

[137] Minn. Stat. 216E.10

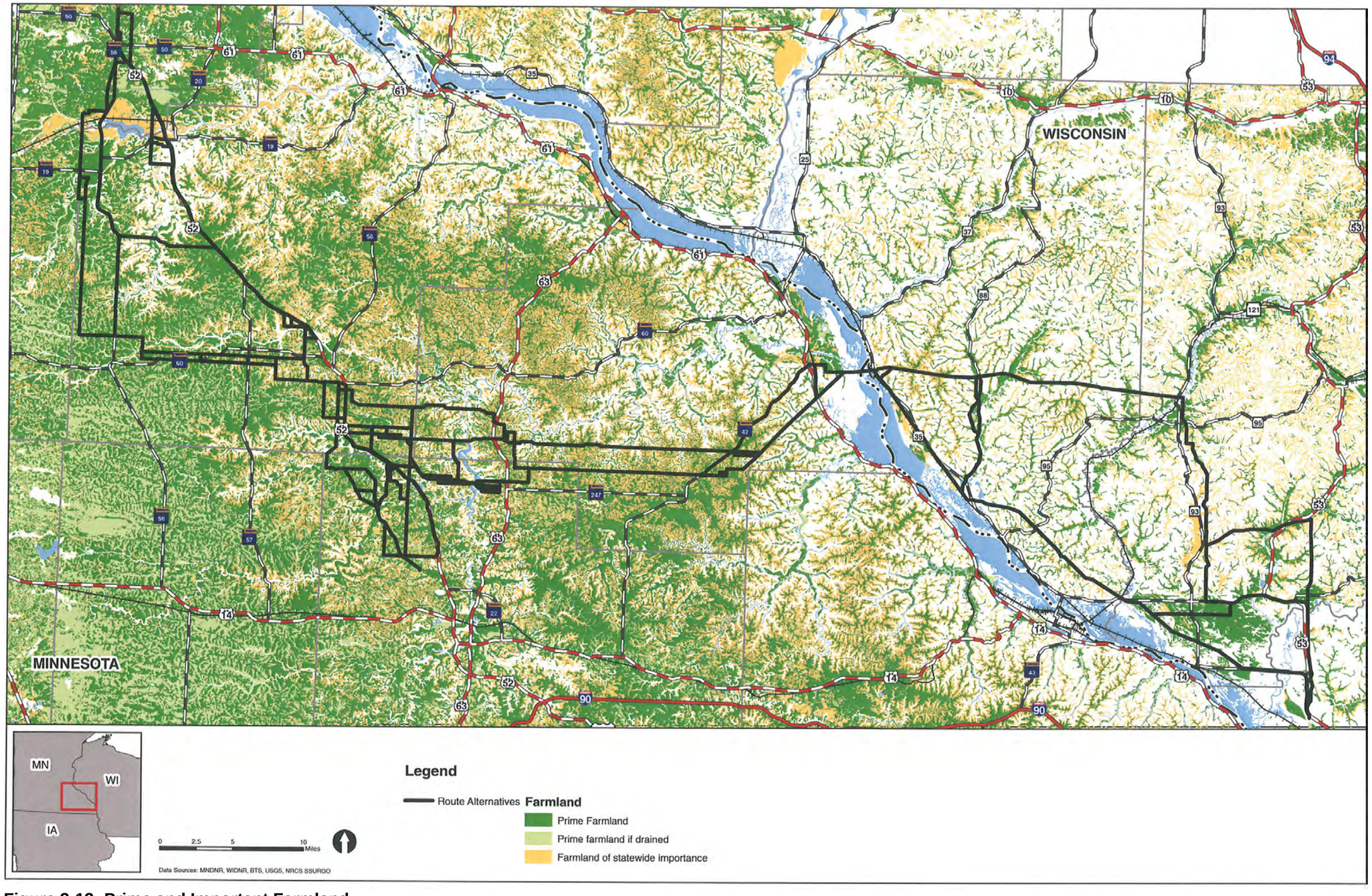

Figure 3-13: Prime and Important Farmland

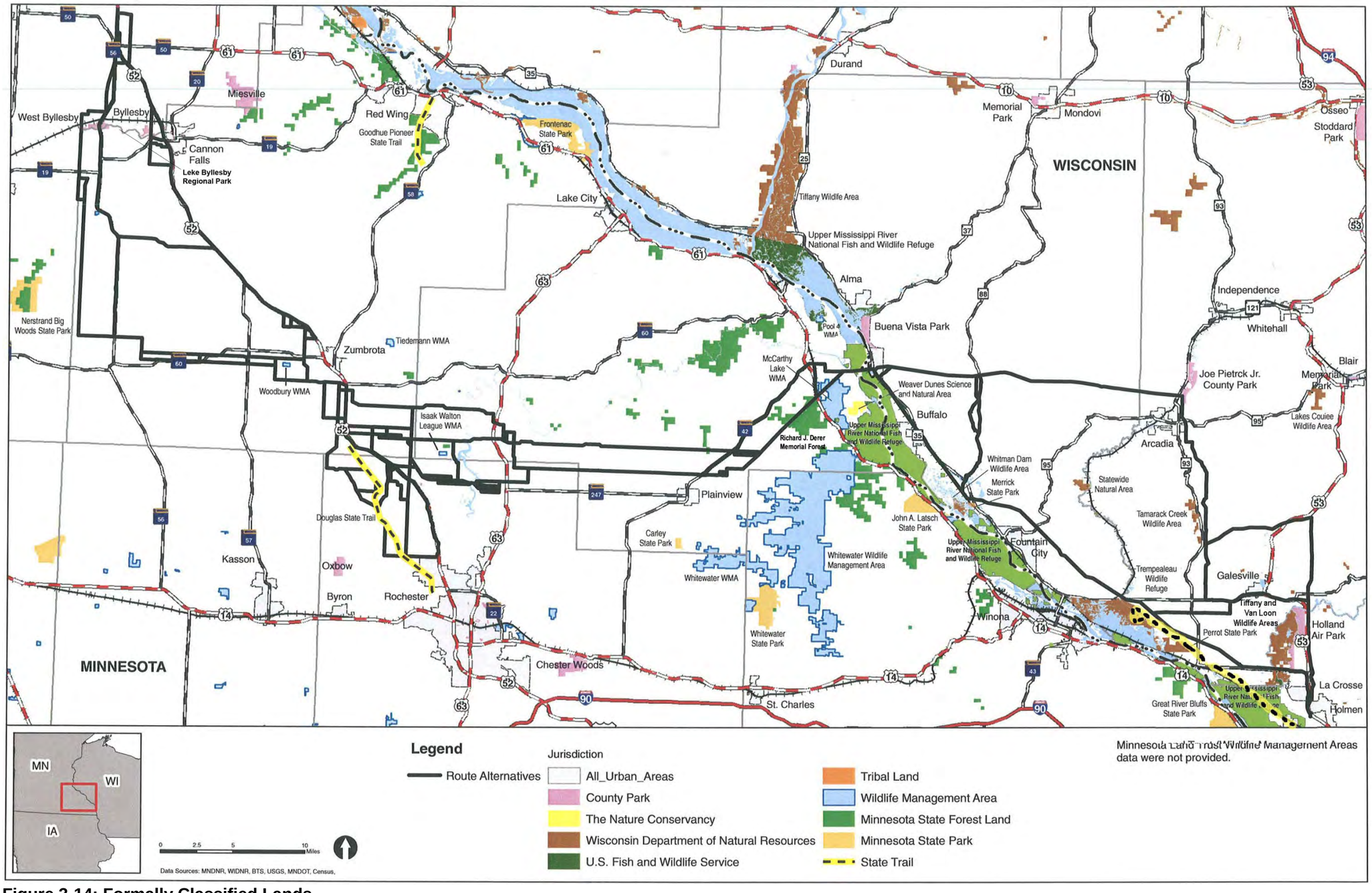

Figure 3-14: Formally Classified Lands

federal grants from the Land and Water Conservation Fund (LWCF).[138] Land acquired by states through LWCF grants must remain in recreational use in perpetuity, unless the Secretary of Interior approves the conversion of land to another use[139] (Congressional Research Service 2006 p. CR-3).

LWCF grants have been used for the following lands:

- Snake Creek Management Unit of Richard J. Dorer State Forest
- Douglas State Trail
- Lake Byllesby Regional Park

In addition, the Lake McCarthy WMA has received funding through the Pittman-Robertson Federal Aid in Wildlife Restoration Act (Pittman-Robertson Act).[140] A route through the Lake McCarthy WMA would require authorization under this Act, through agreement between MDNR and the USFWS.

Upper Mississippi and Trempealeau National Wildlife and Fish Refuges

The Upper Mississippi River National Wildlife and Fish Refuge (Upper Mississippi Refuge) was established by an Act of Congress on June 7, 1924 "a. as a refuge and breeding place for migratory birds included in the convention between the United States and Great Britain for the protection of migratory birds, concluded August 16, 1916, and b. to such extent as the Secretary of Interior may by regulations prescribe, as a refuge and breeding place for other wild birds, game animals, fur- bearing animals, and for the conservation of wild flowers and flowering plants, and c. to such extent as the Secretary of Interior may by regulations prescribe as a refuge and breeding place for fish and other aquatic animal life."

The Upper Mississippi Refuge is part of the National Wildlife Refuge System, which has its beginning in 1903 when President Theodore Roosevelt used an executive order to set aside tiny Pelican Island in Florida as a refuge and breeding ground for birds.

The system has grown since then to over 550 refuges, conserving critical habitats for all kinds of fish and wildlife across all 50 states. "Upper Miss" is the flagship refuge of the

[138] Established by the Land and Water Conservation Fund Act of 1965, 16 USC §§460*l*-4, et seq.
[139] 16 USC §4601*l*-8(f)(3)
[140] 16 USC §669 et seq.

Mississippi Flyway, where an estimated 40 percent of the North American Continent's waterfowl and a substantial portion of its other migratory birds travel, rest, feed and nest each year.

The goals of the Refuge system are to conserve a diversity of animal and plant life and their habitat, including threatened and endangered species; to maintain and develop a planned and managed network of habitats for migratory birds, certain fish and marine mammals; conserve important ecosystems, wetlands and plant communities; and provide opportunities to participate in compatible wildlife-dependent recreation (hunting, fishing, wildlife observation and photography and environmental education and interpretation) (USFWS 2006, Appendix G).

The 240,000-acre, 261-river-mile long Upper Mississippi River National Wildlife Refuge (Upper Mississippi Refuge) stretches from Rock Island, Illinois to near Wabasha, Minnesota (USFWS 2006 p. v). It includes 11 pools created from dams on the river that were built for navigation. These are numbered 4, 5, 5A, and 6 to 13, from north to south (USFWS 2006).

The 6,226-acre Trempealeau National Wildlife Refuge was established in 1936 and provides resting and feeding habitat for thousands of water fowl and other birds during spring and fall migration. The Refuge also includes more than 700 acres of native prairie and oak savanna (USFWS 2008d, pp. 1-2). The Refuge is more than 50 percent open water and lies mostly in the Mississippi River floodplain, but is cut off from the river by a railroad berm. It is part of the Refuge complex that includes the Upper Mississippi Refuge.

Richard J. Dorer Memorial Hardwood Forest

The Richard J. Dorer Memorial Hardwood State Forest (RJD Forest) is located along a large part of Route 1P/1A west of the Mississippi River (Figure 3-14). The RJD Forest covers approximately two million acres of land across seven Minnesota counties. Only 45,000 acres of this land is owned by the State of Minnesota. The MDNR has listed the RJD Forest as one of the best places in the state for bird watching, motorized trail riding, horseback riding, and mountain biking; the RJD Forest is also used for camping, picnicking, hiking, and fishing. The Snake Creek Management Unit, an LWCF property,

which is part of the RJD Forest, has several miles of designated trails for hiking, cross country skiing, motorcycles, ATVs, and snowmobiles. The Snake Creek Management Unit also offers opportunities for camping and fishing (Xcel et al. 2010).

Van Loon State Wildlife Area

Habitat on the 3,918-acre Van Loon State Wildlife Area consists primarily of floodplain forest, sand prairies, and oak savanna. Situated on sand and gravel deposits of the Black River, it features groves of scattered oak forest with green ash. The sparse canopy of the savanna has permitted the development of prairie grasses and forbs and the exceptionally rich ground layer has over 100 species documented. The mature floodplain forest situated between channels of the Black River contains canopy dominants of large silver maple, swamp white oak, and green ash. Associated species include river birch, cottonwood, yellowbud hickory, American elm, basswood, and black ash. Swamp white oak is reproducing well and there is good distribution of both size and age classes for most tree species (WDNR 2009). This is important because some parts of the Upper Mississippi River forested floodplains do not have a good age distribution and there is concern that invasive species may take over as aging forests die out.

The eastern massasauga rattlesnake, a state endangered and federal candidate species, is present at the Van Loon Wildlife Area, as are Blanding's and wood turtles (WDNR 2011).

The Van Loon State Wildlife Area is a state-designated IBA – the only one in the Proposal area in Wisconsin - noted for yellow-crowned night-herons, Acadian flycatchers, cerulean warblers, and prothonotary warblers that breed there. The site also supports red-headed woodpeckers, blue-winged warblers, and field sparrows. Several of these birds are USFWS species of concern, and the cerulean warbler is particularly rare and in decline. Waterbirds congregate in late summer and thousands of landbirds migrate through, particularly in the spring. The Van Loon Floodplain Forest State Natural Area and the Van Loon Floodplain Savanna State Natural Area are found within the wildlife area (WDNR 2009).

Great River State Trail

Great River State Trail is a 24-mile long rails-to-trails trail between Onalaska and Trempealeau National Wildlife Refuge in Wisconsin. It passes through the Black River part of the Upper Mississippi Refuge and Perrot State Park.

Douglas Trail

The 12.5-mile Douglas Trail is also on a former rail corridor, located near Pine Island, Minnesota. It has a paved track for cyclists, hikers, skaters and skiers, plus a natural trail for horseback and snowmobile. The Douglas Trail has received grants through the LWCF.

Wildlife Management Areas

The McCarthy Lake WMA is managed by the DNR to maintain diverse wildlife communities. It hosts one of the largest population of Blanding's turtle, a threatened species in Minnesota. The WMA is in the Mississippi floodplain, has a meadow-marsh-swamp complex community. This is a mosaic of wet meadow, emergent marsh, and shrub old swamp in old channels of the Zumbro River near its confluence with the Mississippi (MCBS 1997c).

A local birder reports that the primary species to observe at the WMA are the orchard oriole, lark sparrow and Bell's vireo; and that bald eagles are present in fall and winter. He reports that the lark and grasshopper sparrow, the dickcissel, and meadowlark may be present along the county highway, and that the orchard oriole, Bell's vireo and willow flycatcher can be observed in the tree and shrub area surrounding the lake (Ekblad n.d. 1 and n.d. 2).

Lake Byllesby Regional Park

Lake Byllesby Regional Park, which is managed by Dakota County, lies adjacent to various parts of Lake Byllesby. The park has a campground, picnic areas, beach, and hiking and snowmobile trails (Dakota County, MN 2006). Lake Byllesby is also an IBA. It is an important stopover for waterbirds. Lake Byllesby Regional Park has received funds from the LWCF.

3.6.2 Environmental Consequences

3.6.2.1 Land Use and Zoning

While local approvals are not required for construction and operation of the transmission line in Minnesota and in most places in Wisconsin, local ordinances and land use plans were examined for potential future impacts of the Proposal on future development plans. These ordinances and plans are available as part of the route permit application and available through each city and county government. In general, the Proposal's various route alternatives are not inconsistent with city and county ordinances and land use plans, with the exception of the routes that affect Lake Byllesby Regional Park, described in Section 3.6.3.3 below, and routes that may adversely affect certain protected land in Goodhue County. The Goodhue County Zoning Ordinance includes protections from development or encumbrance for aggregate resources, agricultural land, bluff lands, and shore lands. Portions of the Proposal that cross these resources or zoning districts could permanently impact the resources the county has sought to protect, and would not be subject to county scrutiny by way of a conditional use permit or zoning change (MDC 2011c, pp. 88-90).

No zoning conflicts were found within the Wisconsin part of the Proposal area.

3.6.2.2 Prime and Unique Farmlands

This section summarizes the prime and unique farmland that is within the ROW for Routes P and A in Minnesota, and for the Wisconsin routes. Other routes in Minnesota would be similar to Routes P and A, depending on the length of the route. Almost all the farmland within the ROWs will remain in place and available, except for the footprint of the posts. Farmland impacts (farmland taken out of production) are summarized in Tables 2-4 (Minnesota) and 2-5 (Wisconsin). Temporary impacts result from construction activities including access road, staging areas, and grading on steeper slopes. Permanent impacts will occur primarily at substation locations. When the preferred alternative is identified and all farmland impacts known, the NRCS Farmland Conversion Impact Rating for Corridor Type projects documentation will be completed and coordinated with the appropriate agencies.

Minnesota

The portion of ROW that is located on mapped NRCS Prime and Other Farmland Soils is summarized below by route and soil classification (Xcel et al. 2010 Appendix P, Xcel et al. 2011, pp. 2-142):

Route 1P:

- 677 acres of prime farmland soils (46 percent)
- 362 acres of farmland of statewide importance (22 percent)
- 70 acres of prime farmland if drained and/or protected from flooding (8 percent)

Route 1A:

- 793 acres of prime farmland soils (48 percent)
- 369 acres of farmland of statewide importance (22 percent)
- 131 acres of prime farmland if drained and/or protected from flooding (8 percent)

Wisconsin

The portion of ROW that is located on mapped NRCS Prime and Other Farmland Soils is summarized by route and soil classification here: •

Q1-Highway 35 Route:

- 113 acres of prime farmland soils (14 percent)
- 65 acres of farmland of statewide importance (8 percent)
- 12 acres of prime farmland if drained and/or protected from flooding (2 percent)

Arcadia Route:

- 189 acres of prime farmland soils (19 percent)
- 138 acres of farmland of statewide importance (14 percent)
- 60 acres of prime farmland if drained and/or protected from flooding (6 percent)

Arcadia-Alma Option (short segment only):

- 5 acres of prime farmland soils (22 percent)
- 6 acres of farmland of statewide importance (26 percent)
- No acres of prime farmland if drained and/or protected from flooding •

Q1-Galesville Route:

- 196 acres of prime farmland soils (22 percent)
- 99 acres of farmland of statewide importance (11 percent)
- 18 acres of prime farmland if drained and/or protected from flooding (2 percent)

3.6.2.3 Formally Classified Lands/Recreation

Upper Mississippi and Trempealeau Refuges

The Trempealeau National Wildlife Refuge would not be directly impacted by the Proposal; however, the Upper Mississippi Refuge would be impacted under any alternative, as the only crossing of the Mississippi River passes through a part of the Refuge. At the Mississippi River crossing, the route would pass through approximately 2,900 feet of Refuge property, at an existing transmission line location. Additional ROW requirements would be minimal; however the final area has not yet been determined. The process for selecting the route and the preliminary design are discussed in detail in Sections 2.3.1.1 and 2.4.2.1. The Upper Mississippi Refuge would also be impacted if the existing Q1 alignment through the Black River Bottoms were selected.

Richard J. Dorer Memorial Hardwood Forest

The Richard J. Dorer Memorial Hardwood State Forest (RJD Forest) is located along a large part of Route 1P/1A west of the Mississippi River (Figure 3-14). While this route follows an existing transmission line, additional clearing of forested area for the wider ROW would be needed at BSMS forests: one at 600 feet, one at 1,100 feet, then another at 600 feet. This section also passes through the area of influence of two zoological NHSs (MDC 2011c, Appendix A, Sheets MR 20 and 21).

Van Loon State Wildlife Area

Floodplain forest impacts at the Van Loon State Wildlife Area with any alternative that includes WI-35 at the Black River are discussed in Section 3.5.2.3. It is the opinion of the WDNR that the route that impacts the Van Loon Wildlife Area forested wetlands "would not meet the permitting criteria contained in NR 103, Wis. Adm. Code related to practical alternatives that avoid these impacts" (WDNR 2011). The WDNR further stated that it believes there are other feasible alternatives and therefore it "would not be able to

issue wetland permits for a route that includes 'Segment 8b'.." (WDNR 2011). The Seven Bridges Route (Q1 Rebuild only) would also cross the Van Loon Wildlife Area.

McCarthy Lake Wildlife Management Area

Route 1P/1A passes through a portion of McCarthy Lake WMA (Figure 3-7). Most of this area is also wetland, and much of the wetland is BSHS meadow-marsh-swamp complex. The route, which follows an existing transmission line, crosses 1,400 feet of continuous wetland, most of which is part of the WMA. An easement or license to cross public land would be needed from the DNR if this route is selected.

Lake Byllesby Regional Park

In Dakota County, Minnesota, 11 route alternatives would either cross through portions of Lake Byllesby Regional Park, or border the western edge of the park. Routes that cross the park may be inconsistent with Dakota County Park Ordinance #107, the goal of which is "…to provide for the protection and preservation of land in its natural state…." Lake Byllesby Regional Park is also subject to the requirements of the LWCF fund, discussed in Section 3.6.1.3. The route alternatives that would cross this park are 1B-001, 1B-003, 1B-005, 1P-001, 1P-002, 1P-003 and 1P-009. Routes 1A, 1A-001, 1A-003 and 1A-004 would border the western end of the park. In the area of Lake Byllesby, only Route 1P would not impact the park.

Lands with Conservation Easements

There are lands throughout the Proposal area that are part of various conservation programs including Reinvest in Minnesota (RIM), Conservation Reserve Enhancement Program (CREP) and FNAP. The applicant would likely work with landowners, local government entities administering such programs, and the sponsoring federal agency on a site-by-site basis to coordinate the approvals necessary for placing the transmission facilities on these lands (MDC 2011c, p. 200).

3.6.2.4 Impacts of the No Action Alternative

The no action alternative would result in no impacts to the environment at the Proposal area. The Proposal would not be constructed or operated, and therefore, there would be no impacts on land resources.

3.6.3 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

Farmland impacts would be avoided to the extent feasible by the single-pole footprint and by using maximum practical span lengths.

Impacts to the Upper Mississippi Refuge would be reduced by minimizing the length of Refuge crossing, by using an existing transmission line corridor, and by minimizing additional ROW requirements to the extent feasible while also keeping the height under 200 feet to avoid painting and lighting to meet FAA requirements.

Impacts from Routes 1P/1A on the RJD State Forest and the Lake McCarthy would be minimized by following an existing transmission line corridor, by use of the single pole structure, and by maximizing span lengths. The Applicant has been working with the MnDNR regarding impacts related to the routes and will continue to do so. Impacts could be avoided by selecting another alternative.

Impacts to the Van Loon Wildlife Area, could be minimized by using low impact construction methods such as helicopter installation of foundations and poles. Mitigation of impacts to the Van Loon Wildlife area could include removing one or two existing transmission line crossings of the Black River (the existing Q1 line and a 69 kV line near the Seven Bridges Trail). Under the Applicants proposal, these two lines could be co-located along with the new 345 kV line adjacent to Highway 35 across the Black River. Impacts to the Douglas Trail area could be minimized by locating the transmission line right of way outside of the trail right of way thus avoiding tree clearing along the trail. Impacts to Lake Byllesby Regional Park could be avoided by selecting another alternative.

3.7 VISUAL RESOURCES

3.7.1 Affected Environment

Visual impacts would result from new transmission line and substation structures, conductors, and new or expanded right-of-way (ROW). The degree of these impacts depends upon the extent of corridor sharing, the degree of shielding by terrain and vegetation and the amount of existing human modification to the landscape. In agricultural areas transmission line structures would likely represent the tallest features

of the landscape, and the power poles would be visible on clear days for up to four miles. In forested areas and areas with more pronounced topography the visibility of poles and conductors would be more limited; however, new or expanded ROW through forested areas, for example, would have additional impact on visual and aesthetic quality.

The existing landscape character across the Project area varies from towns and suburban developed areas to farmsteads and agricultural lands to forested lands and riparian and river environments. The landscape's topography varies from mostly flat to rolling agricultural land and from rolling forested areas to blufflands near the Mississippi River.

The proposed transmission line and structures would add to the changing landscape of the area in more developed urban and semi-rural areas. There are areas where the transmission line structures would clearly be visible along roads and through private lands. There would however be opportunities to construct the transmission line in areas that lessen the potential visual impacts. Moreover, these areas are already characterized by a relatively high proportion of visible human-made landscape elements.

3.7.1.1 Great River Road

The Great River Road (GRR) has been recognized as a scenic highway by both Minnesota and Wisconsin for many years, and more recently has been designated as a National Scenic Byway (NSB). Within the Proposal area, the GRR includes US-61 in Minnesota and WI-35 in Wisconsin.

The NSB program is part of the U.S. Department of Transportation Federal Highway Administration (FHWA). It is discussed in this section because, in the Proposal area, it is more relevant to visual impacts than to transportation. The program was established by law in 1991, expanded in 1998, and re-authorized in 2005.[141] For program

[141] The NSB program was established by the Intermodal Surface Transportation Efficiency Act of 1991, re-authorized and expanded by a similar law in 1998 ("TEA-21" and again in 2005 under the Safe, Accountable, Flexible, Efficient Transportation Act – a Legacy for Users (SAFETEA-LU). SAFETEA-LU expired in 2009 but was repeatedly extended and is currently extended until September 2011. Implementing regulations are at 23 CFR 162.

implementation FHWA is guided by its 1995 interim policy document.[142] To be designated as a NSB, a highway must have "special scenic, historic, recreational, cultural, archeological, and/or natural qualities that have been recognized as such through legislation or some other official declaration."[143] Moreover, an NSB refers not only to the highway itself "but also to the corridor through which it passes."[144] As of 2004, there were 635 designated byways in the U.S.

The Great River Road National Scenic Byway (GRRNSB), managed by the Mississippi River Parkway Commission (MRPC), extends the full length of the Mississippi River. The MRPC was originally established in the 1930s, long before the designation of the NSB program (Lorenz 2011). The GRRNSB consists of separate units that have been designated and are administered by the states along the river. The Wisconsin MRPC (WI-MRPC) and the Minnesota MRPC (MN-MRPC) oversee the sections in their respective states. Minnesota has several NSBs; the only one in Wisconsin is the GRR (Kelley 2004). In both Minnesota and Wisconsin, in addition to the Mississippi River itself, the Blufflands, the nearby wildlife refuges, wildlife management areas, state parks, historic sites and natural communities all contribute to the value of the GRRNSB.

In Wisconsin, the state purchased scenic easements along the GRR in the 1950s to help preserve the value of the GRR. The WI-MRPC was established by law in 1961, for the purpose of coordinating the development, preservation and promotion of the GRR.[145]

3.7.1.2 Other Minnesota Visual Resources

The existing landscape character of the Proposal area in Minnesota segments is composed of three types: (1) towns and suburban developed areas, (2) farmsteads and agricultural lands, and (3) forests and riparian areas. In addition, there are parks, recreational areas and wildlife areas in the Proposal area.

[142] Federal Register on May 18, 1995, Volume 60, No. 96, pp. 26759-26762.
[143] Federal Register on May 18, 1995, Volume 60, No. 96, p. 26760; 23 CFR 162(a)
[144] Federal Register on May 18, 1995, Volume 60, No. 96, p. 26760.
[145] Wis. Stat. 14.85.

3.7.1.3 Other Wisconsin Visual Resources

In Wisconsin, the alternatives are primarily along the Mississippi River, in the blufflands, in agricultural land, and in developed areas.

3.7.2 Environmental Consequences

Visual impacts would result from new transmission line structures and conductors, and the new or expanded ROW through forested areas. The height of the structures would range from 130 to 175 feet, and create additional lines and forms within the viewshed. The extent to which these additional lines and forms affect scenic quality depends upon whether the new transmission line follows an existing linear corridor, such as transmission lines, roadways, and railroads; the degree to which it is shielded from view by terrain and vegetation; and the types of other visual elements (such as mining operations, communications towers, industrial areas, farmsteads and forests) that already exist in the landscape.

The greatest individual visual impact will be to people living very close to the transmission line; therefore, there is a direct relationship between individual visual impact and the number of residences in proximity to the transmission line (Table 2-4 and 2-5; and Table R-2 through R-4 in Appendix R). The rest of this section discusses specific areas of impact along the alternative routes.

Potential visual impacts on sites on the National Register of Historic Places (NRHP) are discussed in Section 3.9.

Minnesota

Depending on the alternative, the transmission line could be a visual intrusion from parks at Lake Byllesby, recreation areas near Zumbro Lake, the RJD State Forest and the McCarthy WMA. The Upper Mississippi Refuge would be affected with any alternative; however, the impact would be incremental as there is an existing transmission line at the proposed crossing location. The Douglas Trail would be impacted by Route 2A-001, which follows the trail.

P Route. The P Route (1P, 2P and 3P) would likely be visible from multiple vantage points near Hampton and Cannon Falls depending upon degree of screening from vegetation, terrain, and surrounding buildings. It would likely be visible to a higher

number of viewers than the A Route because of its location along US-52 and the proximity of the Preferred Route to Cannon Falls.

Due to vegetative screening, the P Route is not expected to impact the Cannon Falls Commercial Historic District viewshed. The viewshed from the Cannon Golf Club course towards US-52 would be impacted because the Preferred Route is located along the same (west) side of US-52 with limited vegetative screening between the golf course and the highway.

Rows of crops, fence lines, and local roads create linear patterns across the rolling terrain similar to linear patterns formed by transmission lines. Most of the P Route in agricultural land follows US-52 or an existing 69 kV transmission line, and other vertically oriented linear features such as communication towers and distribution lines that exist in this landscape. Where the Preferred Route is not located parallel to existing linear corridors, aesthetic impacts would be more pronounced.

Aesthetic impacts could occur where the Proposal crosses forested and riparian areas. These areas would be impacted where tree removal within the 150-foot ROW creates new or expanded openings, increasing the visibility of the transmission line. The 345 kV transmission line generally would be visible 50 to 95 feet above tree canopies, which is estimated to be an average of 80 feet high.

The P Route ROW may require the removal of trees at the Cannon River where it is designated as a Recreational River. Visual impacts to recreationists on the Recreational River segment would depend upon final structure proximity to the river banks and the degree of vegetative screening from the viewer's standpoint. Based on a field review conducted in April 2009, it is not anticipated that the designated Scenic River segment of the Cannon River would be negatively impacted by the P Route.

In addition to the Cannon River crossing, crossings of the other Minnesota State Water Trails – the Zumbro and Mississippi Rivers – would result in visual impacts to boaters on the rivers. However, as there is already a transmission line at the proposed Mississippi River crossing, the impact there would be incremental.

A Route. The transmission line would likely be visible from multiple vantage points in or near the communities of Randolph, Stanton, Dennison, Wanamingo, and Zumbrota, depending upon degree of screening from vegetation, terrain, and the surrounding buildings. A transmission line along the Alternative Route would likely be visible to a lower population of viewers than the Preferred Route, due to its location in a primarily rural area with small communities. Because the A Route does not follow existing transmission lines, impacts to aesthetic values along the A Route would be more pronounced than impacts associated with the P Route along US-52.

Agricultural lands within the A Route have similar visual characteristics, including linear patterns on the landscape and vertically-oriented visual elements, compared to the agricultural lands within the Preferred Route. Aesthetic values crossing forested and riparian areas and windbreaks would be impacted by the Alternative Route similar to the Preferred Route. The A Route crosses less forested areas than the P Route, and therefore likely will require less tree clearing. Tree clearing would be required where the A Route crosses the Cannon River southwest of Randolph, where the river is a designated as a Recreational River. Visual impacts to recreationists on the Recreational River segment would depend upon final structure proximity to the river banks, but would likely be limited due to vegetative screening on both sides of the river and the variation in the direction of the river channel.

In addition to the Cannon River crossing, crossings of the other Minnesota State Water Trails – the Zumbro and Mississippi Rivers – would result in visual impacts to boaters on the rivers. However, as there is already a transmission line at the proposed Mississippi River crossing, the impact there would be incremental.

The A Route borders Lake Byllesby Regional Park's western parcel boundary, and would likely be visible from some locations inside the park where not obscured by trees and/or terrain. The A Route would also likely be visible from the Douglas Trail in the area where it parallels the trail.

GRRNSB. There are three alternatives at the US-61 GRRNSB (Route 3P/3A, Route 3P/3A Kellogg, and Route 3B-003) and all unavoidably cross the US-61 GRRNSB. The Route 1P/1A crossing is at an existing transmission line and the Route 3B-003 crossing

is at MN-42. One of the route alternatives, Route 3P/3A Kellogg, would also parallel the scenic byway for approximately 1.3 miles. Photo simulations prepared by the MRP/CPCN Applicants are included in Appendix K.

Wisconsin

In Wisconsin nearly all the routes, except the WI-88 portion of the WI-88 alternative and a short segment of the Arcadia route near the river, follow existing transmission lines (Figure 3-15). The exceptions are the WI-88 portion of the WI-88 alternatives, a short segment of the Arcadia route near the Mississippi river, and part of the Q1/Highway 35 alternative near the Black River crossing. A primitive canoe launch is located on the Black River at Hunters Bridge at US-53/WI-93. In addition, a rustic campsite is present on the south bank of the Black River two-thirds of a mile downstream from Hunters Bridge in the Van Loon Wildlife Area. The new line might be visible from the canoe launch. It would be a new, industrial feature at the canoe launch by Hunters Bridge if the Q1-Galesville or Arcadia Routes or the Arcadia Route with the Ettrick Connector was selected. It might also be visible from the campsite, but the bridge and highway traffic would probably be more dominant and the campers' attention might more often be focused inward toward the Van Loon Wildlife Area and downstream. Visual impacts are reduced by using an existing transmission line corridor. The WI-88 alternatives follow WI-88, which also reduces visual impact. The Q1/Highway 35 alternative at the Black River is discussed with the GRRNSB below.

GRRNSB. The CPCN Applicants prepared a GRRNSB visual impact assessment, including before-and-after photo simulations along the GRRNSB, which is included in the CPCN Application (Xcel et al. 2011 Appendix O). The photo simulations are included in Appendix K of this EIS. The Chairman of the WI-MRPC has expressed concerns about the impact of the Q1/Highway 35 alternative on the scenic value of the GRRNSB (Lorenz 2010) and has requested that the PSC not approve the Q1 alignment (PSC-WDNR 2011 p. 133). The CPCN Applicants had been working with the WisDOT to resolve issues related to the appropriateness of transmission lines within scenic easements, the value and exact locations of the easements, as well as to make alignment adjustments and design changes to reduce impacts. As requested by the WisDOT (WisDOT 2011d), the CPCN Applicants have mapped the easements,

assessed the property value, and schedule a meeting with the WisDOT and the WI-MRPC to evaluate avoidance and mitigation options for the GRRNSB. However, the WisDOT has recently concluded that under federal regulations[146] it "lacks authority to issue permits or authorize use of its Wisconsin scenic easements in the GRRNSB viewshed" and has requested a letter of concurrence for this position from the FHWA (WisDOT 2011e).

The northern 12 miles of the Q1/Highway 35 Route (same as the Q1/Galesville Route in this area), where there is an existing transmission line, are in the vicinity of the GRRNRSB. This is the part of the Q1/Highway 35 Route that would be avoided by use of the WI-88 Route. The PSC-WDNR (2011) reports that a consultant for WisDOT conducted an assessment for visual quality along this section of the GRRNSB around 1997, based on views to the river, views to the bluffs, road alignment and the level of intrusion created by utility structures and the railroad. The consultant classified this section as being of poor visual quality, with the potential classifications of high, good, moderate, poor and low. The new line could potentially cause the evaluation to drop from poor to low (PSC-WDNR 2011 p. 134).

The Q1/Highway 35 Route also parallels the GRRNSB for 4.7 miles at its crossing of the Black River. At this location the route is entirely outside the 350-foot GRR scenic easements allowing for preservation of a tree buffer from the road. The southern end of all the routes parallels the GRR for approximately 3 miles near the proposed Briggs Road Substation, where there is an existing transmission line (Xcel et al. 2011, Appendix O).

3.7.2.1 Impacts of the No Action Alternative

The no action alternative would result in no impacts to the environment at the Proposal area. The Proposal would not be constructed or operated, and therefore, there would be no impacts on visual resources.

[146] 23 CFR 645.209(h)

3.7.3 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

The Proposal has incorporated the following measures to reduce visual impacts to the extent practicable. Some routes fulfill these measures to a greater extent than others.

- Select route alternatives that maximize ROW sharing with existing linear corridors (transmission lines, roadways, and railroads) to minimize the proliferation of visual impacts to open spaces and developed areas alike.
- Avoid routing through areas with high-quality, distinctive viewsheds, including scenic highways, river crossings, and similar areas where feasible.
- Cross rivers and streams using the shortest distance possible (perpendicular to the water body).
- Use uniform structure types to the extent practical. The height of the structure may be reduced (including using the shorter H-frame structures) to minimize impacts within scenic areas.
- Construct the lines carefully so as to prevent any unnecessary destruction, scarring or defacing of the natural surroundings in the vicinity of the work.
- Avoid placing lines in close proximity to residential areas.
- Provide a buffer around substations.

The following mitigation measures are specific to the Great River Road (GRR) section of the Q1/Highway 35 route in Wisconsin:

- Remove existing 161 kV and 69 kV transmission lines from a three-mile segment adjacent to the GRR (Segment 4) and re-routing it farther away from the road (Figure 5, Sheet Maps 1 through 3).
- Modify structure types along a segment south of Alma to narrow the right-of-way to retain a screen of trees.
- Reduce the number of poles located in scenic easements and the length of GRR scenic easements containing transmission facilities.

- Consolidate the proposed transmission line with an existing transmission line on new structures.
- Use alternative pole finishes such as galvanized (gray) or self-weathering (brown) to allow the structures to better blend into the surrounding landscape.
- Move pole locations as requested by WisDOT to make them less visible.
- Utilize alternative structure designs in locations requested by WisDOT to make them less visible.
- Remove the existing transmission line facilities from scenic easement areas when possible.

Impact could also be avoided at the GRRNSB in both Minnesota and Wisconsin by selecting another route.

3.8 TRANSPORTATION

3.8.1 Roads and Traffic

Major roadways in the area (along with transmission lines) are shown in Figure 3-15.

At all locations of ROW sharing on US or state highways, the MRP/CPCN Applicants will follow the requirements of the MnDOT Utility Accommodation Policy (MnDOT 2005) and the WisDOT Utility Accommodation Policy (WisDOT 2011c), which describe the policies and procedures governing use and sharing of state trunk highway ROWs by utilities. These policies are discussed in Section 2.4.2.2. DOT Permits will be required for work within ROWs of US or state highways. For county and local roads, the Applicants will coordinate with the appropriate local government unit.

The MnDOT has a long-range plan to develop US-52 between the Twin Cities and Rochester (MnDOT 2002). These projects – completed, on-going and planned - are discussed in Section 4.4.1.2. Some of these roadway changes are substantial and would impact the location of Route 1P. Also, if Route 1P is selected, roadway and transmission line construction activities would need to be coordinated. The MRP Applicants will work with the MnDOT to coordinate these efforts. The MRP Applicants have requested a wider route width to allow consideration of ROW options that avoid conflict with MnDOT plans.

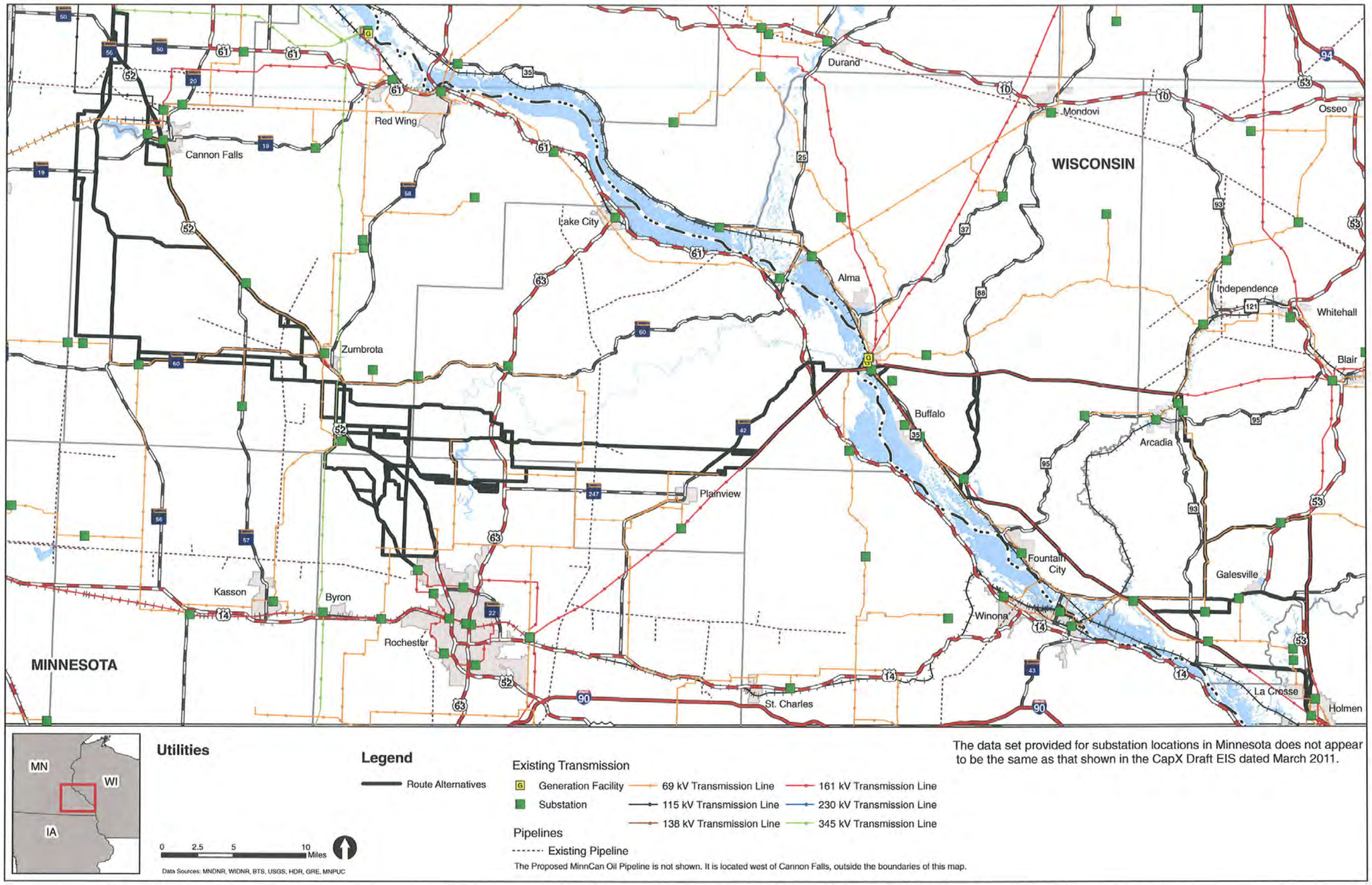

Figure 3-15: Major Roadways and Transmission Lines

The widened areas are shown in the detailed Minnesota route maps in Appendix E of this EIS (MDC 2011c, Appendix A) and include:

- Interchange at Dakota CR-47 near Hampton
- Potential railroad overpass approximately 0.3 mile north of the intersection of 295th Street and US 52
- Interchange at County 24 Boulevard and the industrial area south of Cannon Falls
- Interchange at County 1Boulevard
- Interchange at County 9 Boulevard
- Along US 52, approximately 0.7 mile north of the intersection of Dakota CR-86 and US 52 [Farmland and Natural Areas Program (FNAP) easements][147]
- Potential interchange or overpass at MN 57 and County Roads 7 and 50
- Neither the MnDOT nor the WisDOT currently have other major long-range construction plans for roadways within the Proposal area (WisDOT 2011b).

The Elk Run project in Olmsted County includes a new interchange on US-52 at Pine Island, the re-alignment of Olmsted County Road 12 and the elimination of 18 highway access points on US-52 between Pine Island and Oronoco. A schematic of the proposed project is shown in Figure 4-2. This project is under construction and scheduled to be finished in 2012 (MnDOT 2011a).[148] Several alternatives under consideration would be affected by this project (2P, 2P002, 2C3-001-2, 2C3-005-2, 2C3-006-2, 2C3-008-2, 2P-001, 2C3-002-2, 2C3-003-2, 2C3-004-2, and 2C3-007-2). If any of these routes are chosen, additional coordination with the MnDOT would be necessary to avoid conflicts.

Construction of the transmission line may result in occasional short-term traffic delays, especially at locations where the lines cross the road. At each location where a transmission line crosses a freeway or expressway, temporary traffic barriers will need to be installed to protect the area in the median where the transmission line work will

[147] The FNAP program was passed by Dakota County voters in 2002 and provides funding for protection of farmland and natural areas. Additional funding is provided by the USDA NRCS (Cooperative Conservation America n.d.)

[148] This project is shown as partially funded on the map used for Figure 4-1, which is dated 2009 and is available on MnDOT's website as of June 2011.

take place. This will likely require temporary lane closures in both directions on the highway. The impact on traffic operations associated with construction of the Proposal will vary among the route alternatives considered. Due to the greater complexities of high volume divided highways and the far greater traffic loads carried by Interregional Corridors such as Hwy 52, construction of routes that run along US 52, including the P route will have greater impacts on highway traffic than routes that run across or along lower volume roads.

The Federal Highway Administration allows location of transmission facilities in interstate and freeway ROW under state procedures if they do not adversely affect the safety, efficiency, and aesthetics of the highway, interfere with its present use or future expansion, or require access for future maintenance directly from the highway lanes or shoulder (PSC-WDNR 2011 p. 64).

3.8.2 Railroads

Portions of the route alternatives under consideration parallel existing railroad corridors and, in several areas, proposed route alternatives would require crossing railroad corridors. When a high voltage transmission line is located adjacent to a railroad, the tracks and signals may be subjected to electrical interference from electric and magnetic induction, conductive interference, and capacitive effects.

In Minnesota, initial planning is underway for a possible high speed passenger rail line between the Twin Cities and Rochester. Highway ROWs may serve as a corridor for future electrified high speed passenger rail service. New rail alignments would share similar concerns to those of freight railroads related to electromagnetic interference with signals and switches (MDC 2011c, p. 59).

3.8.3 Airports and Airplanes

Federal Aviation Administration (FAA) regulations require lighting and painting for towers in excess of 200 feet. None of the poles will be taller than 200 feet. The FAA has other height restrictions for structures near airports. The MRP and CPCN Applicants planned their routes to avoid airspace conflicts. A potential conflict with the Stanton Airport on Route 1A was noted during scoping; Route 1A-003 was developed to avoid this conflict. However, two of the alternatives proposed during the MN DEIS scoping,

Routes 1P-009 and 1B-005, may have a conflict with the Stanton Airport and may not be feasible. This is discussed in Section 2.5.1.1. Gliders using Stanton Airport may be impacted by routes near the airport.

A potentially active seaplane base is located at Lake Zumbro. Airspace around seaplane bases is not protected by the FAA or the MnDOT. FAA records show that the base was closed in 2007 and the landowner advised the Applicant that a plane last landed there in 2008. However, the landowner also stated that she considers the strip active and Applicants will work with the landowner(s) to minimize potential conflicts with the seaplane use. If applicable, impacts to the Lake Zumbro Seaplane Base can be avoided by choosing a route alternative that allows adequate distance between the transmission line and the seaplane base. Alternately, modified structures could be used to meet the maximum height limitations where the line is in close proximity to the seaplane base.

In Wisconsin, adjacent to the Q1-Highway 35 Route is the privately-owned Parkway Farm Strip in the town of Holland. The airstrip consists of a 2,500-foot north-south, grass-covered runway located near the intersection of Amsterdam Prairie Road and WI-35. The runway lies perpendicular and adjacent to the route. The proposed line would be double-circuited with the existing Dairyland Q1 161 kV line resulting in two sets of three conductors plus shield wires crossing the southern runway approach. The transmission structures would range in height from 130 and 195 feet. Conductors would attach to the transmission poles along the top 78 feet of the structure. At midpoint between the transmission structures, conductors at full sag might occupy the vertical airspace from approximately 34 to 112 feet above ground. There are required FAA clearances regarding obstructions to the navigable airspace of public airports. However, they do not apply to private airstrips. The PSC, in previous decisions, has considered a simplified safety trapezoidal area for private airstrips. The trapezoid has been 250 feet wide at the runway thresholds, extending outward 5,000 feet, with an outer width of 1,250 feet resulting in a 20:1 sloped area. The proposed transmission lines could be a safety hazard to the planes approaching and taking off from the Parkway Farm Strip airport (PSC-WDNR 2011 p. 125).

Take-off, landing, and route patterns for aerial crop spraying may need to be adjusted in the vicinity of the lines.

3.8.4 Emergency Medical Helicopters

Occasionally there is a need for immediate medical transport via helicopter from roadside locations due to accidents and illness. In these situations, rescue helicopters may need to land in the roadside environment. The MnDOT has indicated that an area with a minimum of a 90 foot diameter and two clear approaches separated by an arc of the least 90° is necessary for safe helicopter access to highways. While many helicopters operating in the roadside environment have cutters installed on the aircraft to cut power lines that they encounter, helicopter crashes can occur if power lines become entangled in the helicopter's rotor system or landing gear. (MDC 2011c, p. 58).

3.8.4.1 Impacts of the No Action Alternative

The no action alternative would result in no impacts to the environment at the Proposal area. The Proposal would not be constructed or operated, and therefore, there would be no impacts on transportation.

3.8.5 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

Implementation of the DOTs' Utility Accommodation Plans will minimize conflicts with roadway use and users. The MRP Applicants will be responsible for planning and coordination with the DOTs, the State Highway Patrols, and local highway and law enforcement authorities. Managing the traffic impacts of constructing the Proposal along an Interregional Corridor (i.e., US 52) will require substantial planning and by the MRP Applicants. Activities to be addressed may include: determining a work schedule based on anticipated traffic loads, developing and implementing media alerts and other communications plans, developing and implementing appropriate traffic control including barrier locations, fixed signs, and variable message boards, implementing temporary rolling roadblocks for lane closures, and ensuring that contingency plans are in place. The MRP Applicants will incur the cost of traffic control.

The Proposal alternatives incorporate avoidance of airspace impacts, except for the alternatives discussed in Section 3.8.2.1, which may not be feasible.

Due to the relatively small number of railroad crossings and the relatively short distance of the proposed routes that would parallel railroads, few impacts are anticipated. Potential electrical interference impacts can be modeled. If this modeling suggests potential impacts, the applicant would need to work with the railroad to design and install mitigating equipment. Because transmission lines often parallel conductive infrastructure (railroads, pipelines), mitigating strategies and equipment are available and feasible (MDC 2011c, p. 59).

3.9 HISTORIC/CULTURAL PROPERTIES

This section of the EIS identifies known cultural resources in the Proposal area. Cultural resources will continue to be identified as consultation under Section 106 of the National Historic Preservation Act proceeds.

There is no legal or generally accepted definition of "*cultural resources*" within the federal government. The term, however, is used throughout the federal government to refer to historic, aesthetic, and cultural aspects of the human environment. Under the National Environmental Policy Act (NEPA) the human environment includes the natural and the physical (e.g., buildings) environment, and the relationships of people to that environment. Accordingly, a thorough NEPA analysis should address the human (social and cultural) and natural aspects of the environment, and the relationships between them. In meeting its requirements as the lead agency for NEPA, RUS must consider the impact of its actions on all aspects of the human environment, including "*cultural resources.*"

Cultural resources include archeological sites, defined by the National Park Service as locations "*that contain the physical evidence of past human behavior that allows for its interpretation*;" buildings; structures; and traditional resources and use areas. Those cultural resources which qualify for listing in the National Register of Historic Places (NRHP) must meet one or more of the following criteria for evaluation:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and

objects that possess integrity of location, design, setting, materials, workmanship, feeling and association, and:

- That are associated with events that have made a significant contribution to the broad patterns of our history; or
- That are associated with the lives of persons significant in our past; or
- That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- That yielded, or may be likely to yield, information important in prehistory or history (NPS 1997).

The NRHP is a commemorative listing of those resources significant to the American past. Those cultural resources listed on or eligible for listing on the NRHP are designated “historic properties.” Under the National Historic Preservation Act (NHPA), as amended 2006, “historic property” means “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register, including artifacts, records, and material remains related to such a property or resource (16 U.S.C. 470w). Sites and regions on the National Register of Historic Places are shown in Figure 3-16.

In accordance with Section 106 of NHPA, 16 U.S.C. § 470f, RUS is required to take into account the effect of its undertakings on historic properties. The regulation, “Protection of Historic Properties” (36 CFR Part 800), implementing Section 106 establishes the process through which RUS and other federal agencies consider effects to historic properties in their decision making.

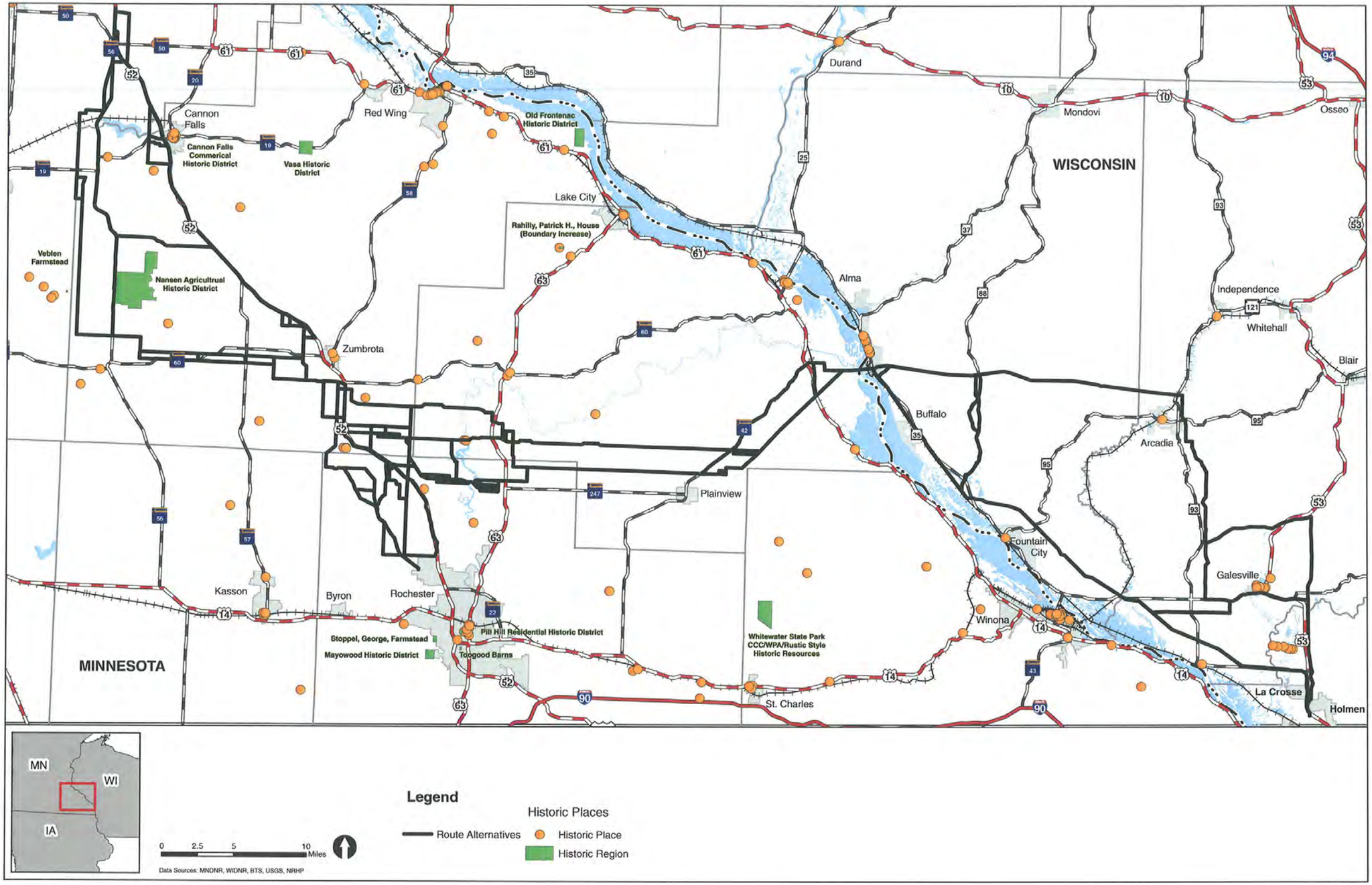

Figure 3-16: National Register of Historic Places

As the lead agency, RUS is coordinating compliance between the Section 106 procedures and the steps taken to meet NEPA requirements. As such, studies and analyses conducted to comply with NEPA, including this EIS, would be used and expanded as appropriate by RUS to meet the requirements of Section 106. Pursuant to 36 CFR § 800.2(d)(3), RUS has used its NEPA procedures to meet its requirements for public involvement under 36 CFR Part 800.

3.9.1 Affected Environment

3.9.1.1 Geographic Scope

Pursuant to 36 CFR § 800.16(d), the area of potential effects (APE) is defined as the area within which the Applicants' proposal has the potential to either directly or indirectly affect historic properties that may be present. Currently, the APE includes the 1,000-foot-wide route for each build alternative under consideration in this EIS in Minnesota, and the CPCN corridor in Wisconsin. However, the APE also must address visual effects. Given the height of the proposed structures and the requirement to maintain an alignment cleared of vegetation, this project could alter a historic property's integrity by diminishing its setting or feeling. Accordingly, the APE would be adjusted and refined as RUS learns more about the historic properties that might be present and the project's specific effects on them.

3.9.1.2 Study Area

The study area includes the entire geographic area evaluated in order to develop all of the alternatives proposed in the MCS and AES. As such it encompasses the APE, but is much broader.

3.9.1.3 Archeological Resources

As part of the MRP and CPCN permitting process, the Applicants consulted with the state historic preservation officers (SHPOs) and tribal historic preservation officers (THPOs) to identify potential archaeological resources. Field surveys were conducted, and a number of sites potentially within the corridors were identified. This information is not publicly available but was used in route siting, included with the permit applications and has been used in the route evaluation process (Tables 2-4 and 2-5).

3.9.1.4 Historic Structures

The Proposal would not have direct impacts on any structures or regions listed on the NRHP. Potential visual impacts to NRHP properties are discussed in Section 3.7.2.

The Applicants planned routes to avoid impacts to residences and other occupied structures to the extent practicable. Except for sites on or eligible for the NRHP, the avoidance of residences was done irrespective of the personal or local historic significance of the structure.

3.9.1.5 Tribal Consultation

RUS initiated tribal consultation through its scoping process, and the scoping process included their participation (Section 1.4.1). The Applicants coordinated with RUS to conduct tribal consultation regarding the proposed transmission facilities. In April 2010, RUS hosted a teleconference with tribes and others interested in participating as consulting parties to discuss the date, time and agenda for informational meetings planned for May 2010. The informational meetings took place on May 11 and 12, 2010, at the AmericInn Hotel in Wabasha, Minnesota and the Radisson Inn in La Crosse, Wisconsin. The meetings were followed by site visits.

Tribal representatives explicitly asked that specific areas of tribal importance be avoided including active tribal ceremonial sites, grave sites along the Mississippi River protected under Native American Graves Protection and Repatriation Act (NAGRPA), Native American cave and mound burial sites, vision quest sites, and architectural property, archeological sites, culturally sensitive sites, or traditional cultural properties significant to the Ho Chunk Nation. In addition, tribes requested to be included in the formal Section 106 process by being provided with cultural resource studies and archeological reports. Section 106 process and tribal consultation are ongoing.

3.9.1.6 Cemeteries

Cemeteries were avoided during route identification. In Minnesota, only one known cemetery, the Urland Church cemetery (within the 1000-foot route width of route alternative 1P-009), is located within the 1000-foot route width of any of the route alternatives (MDC 2011c, p. 86). In Wisconsin the Anchorage cemetery (WI-88 Option A Connector) and Rieck Graves site 9WI-88 Option A and Option B Connectors) may be

close to or within the ROW; these are discussed in Section 3.9.2.4 below. There are also some potential burial sites within Wisconsin corridors, also discussed in Section 3.9.2.4 below.

3.9.2 Environmental Consequences

3.9.2.1 Minnesota - Segment 1

No archaeological sites on the NRHP are located within one-half mile of any route alternative centerline in this segment. The seven NRHP sites shown in Table 2-4 for Route 1P are all historic structures located on 3rd, 4th and 6th Streets in Cannon Falls and include the Captain Charles Gellett House, Darwin E. Yale House, Third Street Bridge, Cannon Falls School, Yale Hardware Store, Ellsworth Hotel Livery Stable and Church of the Redeemer. The nearest of these structure is over 3,000 feet from the proposed centerline of the transmission line, which would likely be completely obscured by the trees and buildings in between. If some part of the line were visible, it would occupy less than 4 degrees in the field of view. There are distribution lines and other structures in the immediate vicinity of each of these historic structures. No impact to these historic structures is expected.

The Veblen Farmstead in Rice County near Nerstrand is the only NRHP-listed site within a mile of the 1A Routes and the 1A options. It is located over a half-mile from the centerline of the Route 1A. There are few trees in this area and it is possible that the line may be visible from the farmstead; however, it would occupy only a few degrees in the field of view. Also, the views east and northeast of the Veblen Farmstead are already impacted by two communication towers less than 1 mile away.

The NRHP Nansen Agricultural Historic District lies adjacent to MN-56 along much of its western boundary ((Figure 3-16). Route 1B-005 follows MN-56 through this area. The poles and transmission line would be a visual intrusion to the western parts of this NRHP site.

Archaeological sites in the vicinity of the proposed routes have not been evaluated for eligibility for the NRHP.

3.9.2.2 Minnesota – Segment 2

No NRHP registered archaeological sites are located within one-half mile of any route alternative's centerline in this segment. However, a lithic scatter site within one mile of some of the P route alternatives has been recommended to be eligible for listing on the NRHP. None of the other archaeological sites potentially located within the one-half mile of the route centerlines have been evaluated for eligibility for listing on the NRHP (MDC 2011c, p. 141).

The Jacob Bringghold House NRHP site in Pine Island would be approximately 3,000 feet from Route 2A; however, due to topography, vegetation and other structures, the line would likely not be visible from the NRHP site. The Pine Island City Hall and Fire Station NRHP site would be approximately 2,000 feet from Route 2C3-001-2; however, the transmission structures and lines would occupy only a few degrees in the field of view and would likely be obscured by trees and other structures.

3.9.2.3 Minnesota – Segment 3

Along most of the P route alternatives, seven archaeological sites have been documented within one mile of the route centerline; two of these sites are listed as single artifacts, two are listed as earth works and artifact scatter, one is listed as artifact scatter, and two are listed as lithic scatter. Of the lithic scatter sites, one has been determined as not eligible for listing on the NRHP. One site is listed as a lithic scatter that is recommended to be eligible for listing on the NRHP. Eligibility of the remaining sites has not been determined (MDC 2011c, p. 178).

Along most of the A route alternatives, eight archaeological sites have been documented within one mile of the route centerline. One of the sites was listed as a lithic scatter that has been determined as not eligible for listing on the NRHP. Eligibility of the remaining sites has not been determined (MDC 2011c, p. 178).

3.9.2.4 Wisconsin – Segment 4

Current NRHP Sites

There are no currently-listed NRHP sites within any corridors in Wisconsin. The only area where there are structures on the NRHP within a mile of a corridor is in the Galesville area, where the Arcadia Route and the Q1/Galesville Route coincide and

follow the WI-54 corridor just south of Galesville. The Bartlett Blacksmith Shop – Scandinavian Hotel, the John F. Cance House, and the John Bohrnstedt House in Galesville are all approximately 2,000 feet from the WI-54 route corridor. The Tollef Jensen House in Galesville is approximately 3,000 feet from the corridor. In addition, the Galesville downtown historic district NRHP site is within 2,000 feet of the WI-54 route corridor at its nearest distance and the Ridge Avenue historic district NRHP site is within approximately 3,000 feet. The Gale College NRHP historic district is within 1,000 feet of the WI-54 route corridor. Except for Gale College, the Proposal transmission structures and lines would occupy only a few degrees in the field of view and would likely be obscured by trees and other structures. The poles would occupy approximately 11 degrees in the field of view from Gale College, and would likely be obscured by the trees on the campus and between the campus and the corridor when the trees are leafed out. In winter the structures and lines would likely be visible from the campus.

Potential Archaeological Sites – Briggs Road Substation

The Mississippi Valley Archeological Center (MVAC) identified five archaeological sites potentially within or immediately adjacent to the proposed substation sites. Findings included campsites, a village, various artifacts, and grave sites. Only one of these is associated with the West Site substation, and it is outside the proposed substation footprint and transmission line corridors. According to the Wisconsin Historic Preservation Database (WHPD), no archaeological surveys have been conducted within the boundaries of the proposed Briggs Road West Substation site. The Wisconsin SHPO has not yet indicated whether additional surveys for the West Site are needed; however, none has been recommended by MVAC. There are four archaeological sites reported at the East Site. The first is actually located west of Briggs Road and beyond the site boundary. The second has been destroyed by Briggs Road realignment work. The third is a campsite for which MVAC does not recommend further investigation. The fourth, however, is an extensive, multi-component site for which the Wisconsin SHPO would likely recommend Phase 1 testing of areas along the archeological site's current boundaries and mitigation for any portion of the site that would be affected by construction. If the area falls under Section 106 and the East Site is approved by the

Commission, the Wisconsin SHPO would determine what mitigation was necessary (PSC-WDNR 2011 pp. 89-90).

Potential Archaeological Sites – Q1-Highway 35 Route

The Wisconsin Historical Society's (WHS) archeological sites database shows 13 known archeological sites that appear to be within or adjacent to the proposed ROW of the Q1-Highway 35 Route and could be affected by construction activities. All of the sites are of prehistoric age: nine campsites, two burial and effigy mound sites, one workshop, and one lithic scatter site. The mound sites are located along Segment 2B between Alma and Buffalo City and along Segment 8B, on the shore of the Black River. (Segment locations are shown on the environmental maps from the CPCN, included as Appendix G). They include numerous animal and conical mounds that have been recorded. WHS generally treats mound sites as burial sites subject to the Wisconsin Burial Sites Preservation Law, Wis. Stat. § 157.70, in addition to state and federal Historic Preservation Acts. Several segments are located near prehistoric campsites and workshop sites, particularly, particularly near the Mississippi, Trempealeau, and Black Rivers.

Potential Archaeological Sites – Original Q1 Route

In order to provide comparable information about the original Q1 path through the Black River bottoms, the CPCN Applicants provided archeological information related to Segments 5A, 5B, and 5C,. Two archeological sites were identified in the original Q1 ROW area along Segments 5A and 5B—a campsite/village site located in the existing Q1 ROW west of Tank Creek, and a group of approximately 17 burial mounds under the existing Q1 ROW near the Black River. Both sites are protected by the Wisconsin Burial Sites Preservation Law. To preserve the archeological integrity of these WHS-listed historic properties, the Applicants have stated that they would locate transmission structures outside of them in order to span them. Some sites appear small enough to be spanned with appropriate line design. It is likely, however, that all of these sites would require additional field investigations (PSC-WDNR 2011 p. 121). RUS, WHS and the PSC would require that the investigations be done by a qualified archeologist able to assess each site's location and boundaries and its current integrity.

Potential Archaeological Sites – Q1-Galesville Route

WHS's archeological sites database shows 15 known archeological sites that appear to be within or adjacent to the proposed ROW of the Q1-Galesville Route and could be affected by construction activities. Several sites include effigy mounds. One site consisting of three conical mounds is located in a farm field on Segment 2B between Alma and Buffalo City, a segment that is also part of the Q1-Highway 35 Route. Four groups of mounds are located in the vicinity of Galesville along STH 54/93 and USH 53, on route segments that are also part of the proposed Arcadia Route. All of the mound sites are considered by WHS to be subject to Wisconsin's Burial Sites Preservation Law. Other archeological resources along the route appear to be prehistoric campsites and work areas. Segments 2E, 2G, and 2I, which are also part of the Q1-Highway 35 Route, have several listed campsites and workshop sites containing lithic scatter. There is at least one other lithic scatter campsite in the area of Segment 18A and a work camp quarry site along Segment 18B, both also parts of the Arcadia Route.

To preserve the archeological integrity of these WHS-listed historic properties, the applicants have stated that they would locate transmission structures outside of them in order to span them. Some sites appear small enough to be spanned with appropriate line design. However, it is likely that these sites would require additional field investigations (PSC-WDNR 2011 pp. 157-158). RUS, WHS and the PSC would require that the investigations be done by a qualified archeologist able to assess each site's location and boundaries and its current integrity.

Potential Archaeological Sites – WI-88 Option A Connector

WHS's archeological sites database shows three known archeological sites that appear to be within or adjacent to the proposed ROW of the WI-88 Option A Connector. Whether within or adjacent to the proposed ROW, these archeological resources could be affected by construction activities.

It is likely that these sites would require additional field investigations. One site is the Anchorage Cemetery, located on Segment 88A. Another is the burial site Rieck Graves, also on Segment 88A, where it coincides with Segment 88F of Option B. The third archeological site is a historic Euro-American cabin/homestead on Segment 88A.

WHS and PSCW would require that the investigations be done by a qualified archeologist able to assess each site's location and boundaries and its current integrity. The cemetery and Rieck Graves would require compliance not only with the National and Wisconsin Historic Preservation Acts but also with the Wisconsin Burial Sites Preservation Law.

Potential Archaeological Sites – WI-88 Option B Connector

The archeological sites database shows two known archeological sites that appear to be within or adjacent to the proposed ROW of the WI-88 Option B Connector and could be affected by construction activities (PSC-WDNR 2011 p. 186).

It is likely that these sites would require additional field investigations. One site is a prehistoric campsite containing pottery fragments and lithic scatter, located on Segment 88G. The second is the Rieck Graves burial site on Segment 88F.

RUS, WHS and PSCW would require that the investigations be done by a qualified archeologist able to assess each site's location and boundaries and its current integrity. The Rieck Graves would require compliance not only with the National and Wisconsin Historic Preservation Acts but also with the Wisconsin Burial Sites Preservation Law.

Potential Archaeological Sites – Arcadia Route

WHS's archeological sites database shows 11 known prehistoric archeological sites within or adjacent to the proposed ROW of the Arcadia Route that could be affected by construction activities.

Several prehistoric effigy mounds are located along this route. Four groups of mounds are located in the vicinity of Galesville along WI-54/93 and US-53, on route segments that are also part of the proposed Q1-Galesville Route. WHS generally treats mounds as burials subject to the Wisconsin Burial Sites Preservation Law, Wis. Stat. § 157.70.

Other archeological resources along the route appear to be prehistoric campsites and work areas. Three along Segments 18A, B, and C are campsites, quarry sites, or lithic scatter (these would also be along the Q1-Galesville Route.) Segment 10C east of Arcadia has two prehistoric campsites listed. One of those is also a burial site. One

prehistoric era campsite is located on each of Segments 11B and 11G, south of Arcadia (PSC-WDNR p. 214).

To preserve the archeological integrity of these WHS-listed historic properties, the Applicants have stated that they would locate transmission structures outside of their boundaries in order to span them. Some sites appear small enough to be spanned with appropriate line design.

However, it is likely that these sites would require additional field investigations. RUS, WHS and PSCW would require that the investigations be done by a qualified archeologist able to assess each site's location and boundaries and its current integrity.

3.9.2.5 Impacts of the No Action Alternative

The no action alternative would result in no impacts to the environment at the Proposal area. The Proposal would not be constructed or operated, and therefore, there would be no impacts on cultural resources.

3.9.3 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

In some case, impacts could be avoided by selecting another route. For example, potential impacts to the NRHP Nansen Agricultural and Historic District could be avoided by selecting any other route besides Route 1B-005.

In some cases, impacts can be avoided by spanning the site and/or by minor adjustments in the line location. Avoidance of adverse effects to historic properties is preferred.

The reconnaissance level studies of the APE that have been conducted present information about previous archeological survey efforts and recorded archeological sites. The size of the corridors under evaluation in this EIS precluded more detailed analysis until the preferred alternative had been selected. Implementation of the subsequent studies needed to identify and evaluate historic properties in the ROW will be required under the terms of a Programmatic Agreement (PA) that will be developed to conclude review under Section 106. Because not all affected historic properties would be known prior to selection of the preferred alternative, the PA will establish

procedures to guide the identification and evaluation of historic properties, the assessment of adverse effects to them, and the development of appropriate mitigation for any adverse effects.

Avoidance and mitigation efforts will be on-going throughout the NEPA process. RUS will work with the Minnesota and Wisconsin SHPOs and the THPOs to identify sites requiring additional investigation and evaluation of significance under Section 106. Specific avoidance and mitigation plans will be developed, depending on the findings. Section 106 process and tribal consultation will continue throughout the process.

Mitigation measures that would be required by federal agencies as permitting conditions would be included in the Record of Decision (ROD) issued by each federal permitting agency.

3.10 PUBLIC HEALTH AND SAFETY

3.10.1 Affected Environment

This section discusses the following health and safety issues related to high-voltage transmission lines:

- Potential health effects of electric and magnetic fields (EMF)
- Potential impacts of EMF on implantable medical devices
- Electrical safety issues

Animal health is addressed in Section 3.11.2.2.

3.10.1.1 EMF

Flowing electricity creates electric and magnetic fields (EMF) that are all around us. Electric fields are measured in kV and magnetic fields are measured in gauss (G) or tesla (T). 1 T is equivalent to 10,000 G. Since most magnetic fields are only a fraction of a tesla or gauss, they are usually measured in milligauss (mG) or micotesla (uT) (NIEHS 2002). Electric fields are easily shielded by solid objects but magnetic fields are not. The calculated electric and magnetic fields from various configurations of the Proposal are shown in Table 3-8 and Table 3-9. Because the fields created are dependent upon the current flow, fields will vary from those shown in Tables 3-8 and 3-9. The values presented in Table 3-9 are projected system intact peak day loading in 2015 and 2025 and an anticipated average loading which was calculated as 80 percent

of the peak day loading. The estimated average 24-hour exposure for a typical person in the U.S. is less than about 2 mG; however, exposures vary widely (NIEHS 2002, pp. 30-31).

Table 3-8: Calculated electric fields (kV/m) for proposed transmission line designs (3.28 feet aboveground)

Structure Type	Distance to Proposed Centerline (ft) (Electric field in kV/m)										
	-300	-200	-100	-75	-50	0	50	75	100	200	300
Single-Pole, Davit Arm, 345/345 kV Double-Circuit with one 345 kV circuit in service	0.04	0.08	0.11	0.05	0.22	3.76	1.58	0.40	0.18	0.12	0.06
Single-Pole, Davit Arm, 345/345 kV Double-Circuit with both 345 kV circuit in service	0.02	0.05	0.15	0.42	1.41	2.48	1.41	0.42	0.15	0.05	0.02
Single-Pole, Davit Arm, 345/345 kV Double-Circuit with one 345 kV active and one operated at 161 kV	0.01	0.02	0.09	0.20	0.56	2.62	1.50	0.41	0.16	0.08	0.04
Single-Pole, Davit Arm, 345/345/69 kV Triple-Circuit with one 345 kV and 69KV Circuit in service	0.04	0.06	0.03	0.10	0.43	0.92	1.10	0.40	0.10	0.09	0.06
Single-Pole, Davit Arm, 345/345/69 kV Triple-Circuit with both 345 kV and 69KV circuits in service	0.00	0.01	0.01	0.22	0.41	0.55	0.98	0.39	0.13	0.05	0.03
Single-Pole Davit Arm 161 kV Single-Circuit	0.02	0.04	0.21	0.39	0.80	1.64	0.76	0.32	0.18	0.04	0.02
Single-Pole, Davit Arm, 345/345 kV Double-Circuit adjacent to Single-Pole Davit Arm 161 kV	0.04	0.08	1.00	2.88	2.87	1.97	1.52	1.40	.053	0.07	0.03
Single-Pole, Davit Arm, 345/161 kV Double-Circuit Adjacent to Single Pole Davit Arm 161 kV	0.07	0.13	1.00	3.16	3.53	1.00	1.56	1.38	0.54	0.09	0.04

Table 3-9: Calculated magnetic fields (mG) for proposed transmission line designs (3.28 feet aboveground)

Structure Type	Route Segment	Timeframe	Current (Amps)	Distance to Proposed Centerline in Feet (Magnetic field in mG)										
				-300	-200	-100	-75	-50	0	50	75	100	200	300
Single-Pole, Davit Arm, 345/345 kV Double-Circuit with **One** 345 kV Circuit in Service	Hampton to North Rochester Substation Segment	2015 Peak	140	0.38	0.79	2.35	3.41	5.24	13.58	9.64	5.88	3.77	1.04	0.46
		2015 Average	112	0.30	0.63	1.88	2.73	4.19	10.87	7.71	4.71	3.01	0.83	0.37
		2025 Peak	132	0.36	0.74	2.22	3.22	4.94	12.81	9.09	5.55	3.55	0.98	0.43
		2025 Average	106	0.29	0.60	1.78	2.58	3.97	10.29	7.30	4.45	2.85	0.79	0.35
Single-Pole, Davit Arm, 345/345 kV Double-Circuit with **Both** 345 kV Circuit in Service	Hampton to North Rochester Substation Segment	2015 Peak	140/140	0.10	0.31	1.76	3.22	6.34	15.92	6.42	3.27	1.80	0.31	0.10
		2015 Average	112/112	0.08	0.24	1.41	2.58	5.07	12.74	5.13	2.62	1.44	0.25	0.08
		2025 Peak	132/132	0.10	0.29	1.66	3.04	5.98	15.01	6.05	3.09	1.69	0.30	0.10
		2025 Average	106/106	0.08	0.23	1.33	2.44	4.80	12.06	4.86	2.48	1.36	0.24	0.08
Single-Pole, Davit Arm, 345/345 kV Double-Circuit with **One** 345 kV Circuit in Service	North Rochester Substation to Mississippi River Segment	2015 Peak	403	1.12	2.33	6.97	10.11	15.54	40.27	28.58	17.44	11.17	3.09	1.35
		2015 Average	322	0.87	1.81	5.41	7.85	12.06	31.24	22.17	13.53	8.67	2.40	1.05
		2025 Peak	415	1.12	2.33	6.97	10.11	15.54	40.27	28.58	17.44	11.17	3.09	1.35
		2025 Average	332	0.90	1.87	5.57	8.09	12.43	32.21	22.86	13.95	8.94	2.47	1.08
Single-Pole, Davit Arm, 345/345 kV Double-Circuit with **Both** 345 kV Circuit in Service	North Rochester Substation to Mississippi River Segment	2015 Peak	403/403	0.29	0.88	5.07	9.27	18.26	45.84	18.48	9.43	5.17	0.91	0.30
		2015 Average	322/322	0.23	0.70	4.05	7.41	14.59	36.63	14.76	7.53	4.13	0.72	0.24
		2025 Peak	415/415	0.30	0.91	5.22	9.55	18.80	47.21	19.03	9.71	5.32	0.93	0.31
		2025 Average	332/332	0.24	0.73	4.18	7.64	15.04	37.76	15.22	7.76	4.26	0.75	0.24
Single-Pole, Davit Arm, 345/345/69 kV Triple-Circuit with **One** 345 kV Circuit in Service	Areas within Hampton to North Rochester Substation Segment	2015 Peak	140/325	0.74	1.65	6.20	10.42	20.73	70.89	8.50	3.77	2.51	1.01	0.52
		2015 Average	112/260	0.59	1.32	4.96	8.33	16.58	56.71	6.80	3.02	2.01	0.81	0.41
		2025 Peak	132/328	0.73	1.62	6.14	10.36	20.71	71.85	5.89	3.92	2.54	0.99	0.50
		2025 Average	106/262	0.58	1.30	4.91	8.28	16.55	57.37	7.09	3.12	2.03	0.79	0.40
Single-Pole, Davit Arm, 345/345/69 kV Triple-Circuit with **Both** 345 kV Circuit in Service	Areas within Hampton to North Rochester Substation Segment	2015 Peak	140/140/325	0.47	1.00	3.51	6.16	14.19	68.88	11.45	5.18	3.00	0.93	0.46
		2015 Average	112/112/260	0.37	0.80	2.81	4.93	11.35	55.11	9.16	4.14	2.40	0.75	0.37
		2025 Peak	132/132/328	0.47	1.02	3.61	6.35	14.55	69.98	11.70	5.33	3.09	0.95	0.47
		2025 Average	106/106/262	0.38	0.82	2.88	5.06	11.61	55.87	9.34	4.25	2.47	0.76	0.37
Single Pole Davit Arm 161 kV Single-Circuit	North Rochester Substation to Northern Hills Substation Segment	2015 Peak	95	0.20	0.43	1.50	2.42	4.39	14.29	5.41	2.79	1.65	0.42	0.18
		2015 Average	76	0.16	0.34	1.20	1.94	3.51	11.43	4.33	2.23	1.32	0.33	0.14
		2025 Peak	96	0.20	0.43	1.52	2.45	4.43	14.44	5.47	2.82	1.66	0.42	0.18
		2025 Average	77	0.16	0.34	1.22	1.96	3.56	11.58	4.38	2.26	1.33	0.34	0.15
Single-Pole, Davit Arm, 345/345 kV Double-Circuit Adjacent to Single Pole Davit Arm 161 kV	Portions of the line that have a Parallel Alignment	2015 Peak	403/403/96	0.62	1.95	14.60	28.35	43.38	26.50	18.36	9.19	3.71	0.52	0.19
		2015 Average	322/322/77	0.50	1.56	11.67	22.65	34.65	21.19	14.72	7.38	2.98	0.42	0.16
		2025 Peak	415/415/96	0.63	2.00	15.04	29.22	44.71	27.15	18.41	9.12	3.66	0.51	0.19
		2025 Average	332/332/77	0.51	1.60	12.03	23.37	35.76	21.73	14.76	7.32	2.94	0.41	0.15
Single-Pole, Davit Arm, 345/161 kV Double-Circuit Adjacent to Single Pole Davit Arm 161 kV	Portions of the line that have a Parallel Alignment	2015 Peak	403/861/96	1.19	2.52	14.91	34.68	70.69	60.52	28.55	12.02	5.75	2.29	1.15
		2015 Average	322/689/77	0.96	2.02	11.93	27.74	56.56	48.45	22.88	9.64	4.60	1.83	0.92
		2025 Peak	415/889/96	1.24	2.62	15.41	35.82	73.00	62.39	29.07	12.27	5.97	2.38	1.19
		2025 Average	332/711/77	0.99	2.09	12.32	28.65	58.38	49.91	23.28	9.82	4.77	1.90	0.95

3.10.2 Environmental Consequences

3.10.2.1 Health Effects of EMF

The potential of health effects from EMF is a controversial scientific subject; however, the controversy is very narrow. There is some disagreement in the scientific community as to whether magnetic fields do or do not show a weak link to childhood leukemia based on pooled epidemiological studies. No other links to other diseases have been found [National Institute of Environmental Health Sciences (NIEHS) 1998, World Health Organization (WHO) 2007]. Epidemiological studies involve collecting large amounts of health data from a population, then statistically analyzing the data looking for patterns. Part of the difficulty with attempting this with childhood leukemia is that it is a rare disease, and even in a large study only a few people with the disease would be found, which makes it difficult to draw conclusions. Many studies were done from the 1970s to the 1990s and a few more have been done since then. The NIEHS (1998) and the National Academy of Sciences (NAS) (1997), looking at much the same data, although the NIEHS used studies completed after 1999 in addition to older studies, came to different conclusions regarding whether epidemiologic studies supported an association between childhood leukemia and magnetic fields when measured in residential settings versus the use of wire codes. The NAS reported in 1997 that "[a]n association between residential wiring configuration and childhood leukemia persists in multiple studies, although the causative factor responsible for that statistical association has not been identified" (NAS p. 2). The NAS found flawed methodology in the studies it reviewed (the magnetic fields were not measured; some assumptions were made that turned out to be incorrect) and concluded that "no evidence links contemporary measurements of magnetic fields to childhood leukemia" (NAS 1997, p. 2). The NIEHS reports that "assessments" completed after 1999 "support an association between childhood leukemia and exposure to power-frequency EMF" (NIEHS 2002, p. 3). Both the NIEHS and the NAS reached similar conclusions regarding laboratory tests. The NAS reports that "[t]here is no convincing evidence that exposure to 60-Hz electric and magnetic fields causes cancer in animals" (NAS 1997, p. 7). The NIEHS reports that 15 animal leukemia studies of exposure to power-frequency magnetic fields have been conducted and "the data provide no support for the reported epidemiology findings of leukemia

from EMF exposure (NIEHS 2002, p. 26). The NIEHS also reports the “interpretation of the epidemiological filings has been difficult due to the absence of supporting laboratory evidence or a scientific explanation linking EMF exposures with leukemia” (NIEHS 2002, p. 3). The WHO revisited the question in 2007, but new studies shed little light, and its conclusions were essentially the same as the NIEHS and the WHO International Agency for Research on Cancer (IARC) (2002). The IARC (2002) classified extremely low frequency magnetic fields, such as those from electricity as possibly carcinogenic to humans (Group 2B). Also in Group 2B are coffee and pickled vegetables (IARC 2011). In the American Cancer Society list of risk factors for childhood leukemia, “exposure to magnetic fields” in in a group called “Uncertain, unproven or controversial risk factors” that includes other items such as “mother’s age when child was born” and “infections early in life.” The site notes: “So far, most studies have not found strong links between any of these factors and childhood leukemia” (American Cancer Society 2011).

For more in-depth information on this topic, refer to the PSC overview of EMF, which is included as Appendix H.

3.10.2.2 Potential Impacts of EMF on Implantable Medical Devices

Two such devices, pacemakers and implantable cardioverter defibrillators (ICDs), have been associated with problems arising from interference caused by EMF. This is called electromagnetic interference or EMI. Manufacturers’ recommended threshold for modulated magnetic fields is 1 gauss which is 5 to 10 times greater than the magnetic field likely to be produced by a high-voltage transmission line. Research shows a wide range of responses for the threshold at which ICDs and pacemakers responded to an external EMI source. The results for each unit depended on the make and model of the device, the patient height, build, and physical orientation with respect to the electric field (PSC 2011d). Some of the devices that the American Heart Association reports may interfere with pacemakers are: anti-theft systems, metal detectors for security, cell phones, MP3 player headphones, magnetic resonance imagery and power-generating equipment. The American Heart Association recommends consulting with one’s physician about exposure to these devices (American Heart Association 2011). The Mayo Clinic identifies similar devices and recommends standing at least two feet away from high-voltage transformers. Furthermore, the Mayo Clinic recommends that people

with pacemakers who work around high voltage equipment ask their doctor to arrange a test to see if there is interference (Mayo Clinic 2010).

3.10.2.3 Induced and Stray Voltage

People or animals can receive a shock by touching a metal object located near a transmission line. The shock is similar to that received by touching a television after walking across a carpet. The magnitude and the strength of the charge will be related to the mass of the ungrounded metal object and its orientation to the transmission line. Induced current can be prevented or corrected by grounding metal objects near the transmission line. Grounding chains can be installed on tractors. Metal fences can be connected to a simple ground rod with an insulated lead and wire clamp. Electric fences with proper grounding should continue functioning properly even when subject to induced voltage (PSC 2011d, p. 19).

Stray voltage is a potential concern primarily for dairy cattle is discussed in Section 3.11.2.4.

3.10.2.4 Other Electrical Safety Issues

Safety Standards

Both Minnesota and Wisconsin have adopted the National Electrical Safety Code (with some changes in Wisconsin) [National Electrical Installation Standards (NEIS) 2011]. This code establishes design and operating standards, and sets minimum distances between wires, poles, the ground, and buildings. While the code represents the minimum standards for safety, the electric utility industry's construction standards are generally more stringent (PSC 2011d, p. 18).

Contact with Transmission Lines

The most significant risk of injury from any power line is the danger of electrical contact between an object on the ground and an energized conductor. Generally, there is less risk of contact with higher voltage lines as opposed to low-voltage lines due to the height of the conductors. When working near transmission lines, electrical contact can occur, even if direct physical contact is not made, because electricity can arc across an air gap. As a general precaution, no one should be on an object or in contact with an

object that is taller than 15 to 17 feet while under a high-voltage electric line. Individuals with specific concerns about whether it is safe to operate vehicles or farm equipment near transmission lines should contact their electric provider (PSC 2011d, p. 18).

Fallen Lines

Transmission lines are designed to automatically trip out-of-service (become de-energized) if they fall or contact trees. This is not necessarily true of distribution lines. However, transmission lines are not likely to fall unless hit by a tornado or a vehicle. (PSC 2011d p. 18).

Fiber Optic Cables

Utilities commonly include a fiber optic cable in the shield wire bundle to provide a communication path, and this feature is included in the Proposal. EPRI has reported that a potential safety issue exists when low-voltage power is brought from a distribution system to the vicinity of high-voltage power lines to operate the electronic equipment associated with the fiber optics cables. A fault or switching surge on the high-voltage line may induce very high voltages in the low-voltage supply system. In rare cases these induced high voltages have been transferred through the system into residences, leading to electrocution and fire (EPRI 1997, p. 2-27).

3.10.2.5 Impacts of the No Action Alternative

The no action alternative would result in no impacts to the environment at the Proposal area. The Proposal would not be constructed or operated, and therefore, there would be no direct impacts on public health and safety.

However, because the Proposal would not be constructed, the reliability of the transmission network would likely be impacted. The result may be brownouts, blackouts, and/or higher electricity rates for consumers. Reduced electrical system reliability can have impacts on public health and safety.

3.10.3 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

Avoidance of identified cultural resources is the preferred approach. If avoidance is not possible and construction is planned at an identified site, the SHPO may recommend

Phase I testing of the identified site by a fully qualified archeologist to verify location and determine whether evidence of the site remains. Some level of additional mitigation, such as recordation, may be determined for an identified and eligible site prior to construction. Previously undiscovered sites uncovered during construction would likely follow a similar course of Phase I examination with appropriate mitigation determined in consultation with all parties. Pole locations can be field adjusted if need.

3.10.4 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

Routes were identified to minimize proximity to residences, and no residences are allowed within 75 feet of the 345 kV line.

3.11 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

The socioeconomic issues that have been identified through the scoping and EIS development process include the following:

- Impacts on property values (economic)
- Impacts to tourism, including agrotourism
- Impacts on qualifications for loans through the Federal Housing Administration (FHA)
- Interference with communication equipment
- Impacts to windbreaks
- Impacts to agricultural practices and farm animals (economic)

Related topics are discussed in other sections: land use planning impacts, Section 3.6.2.1; public health and safety, Section 3.10.2; and visual impacts, Section 3.7.

3.11.1 Affected Environment

These impacts would occur only very close to the transmission lines, and are relevant only to individual homeowners, businesses and farmers, regardless of what the surrounding social setting is.

3.11.1.1 Agriculture

Farms with center-pivot irrigation systems and organic farms are shown in Figure 3-17. Center-pivot irrigation is employed only in the sandy soils at the far north end of the Proposal area, and in the limited farming areas along the Mississippi bottomland. Specific locations of dairy farms were not identified; however, issues were raised regarding dairy farms.

Center-pivot irrigation is employed only in the sandy soils at the far north end of the Proposal area, and in the limited farming areas along the Mississippi bottomland. Specific locations of dairy farms were not identified; however, issues were raised regarding dairy farms.

Organic farms are scattered throughout the area.

3.11.2 Environmental Consequences

3.11.2.1 Property Values, Housing Loans and Tourism

Property Values

A concern of many potentially-affected landowners lies with the perceived effect of transmission lines on their property value. The PSC (2011d) has prepared the following summary of Electric Power Research Institute (EPRI)'s 2003 assessment of previous investigations of the researched relationship between transmission facilities and property values (plus two additional studies PSC added):

- The potential reduction in sale price for single-family homes in the U.S. may range from 0 to 14 percent. For states within the Midwest (Minnesota, Wisconsin, and the Upper Peninsula of Michigan), the average decrease appears to be between 4 and 7 percent. EPRI reported a potential overall decrease of 0 to 6.3 percent.
- Higher-end properties are more likely to experience a reduction in selling price than lower-end properties.
- Adverse effects on the sale price of smaller properties could be greater than effects on the sale price of larger properties.

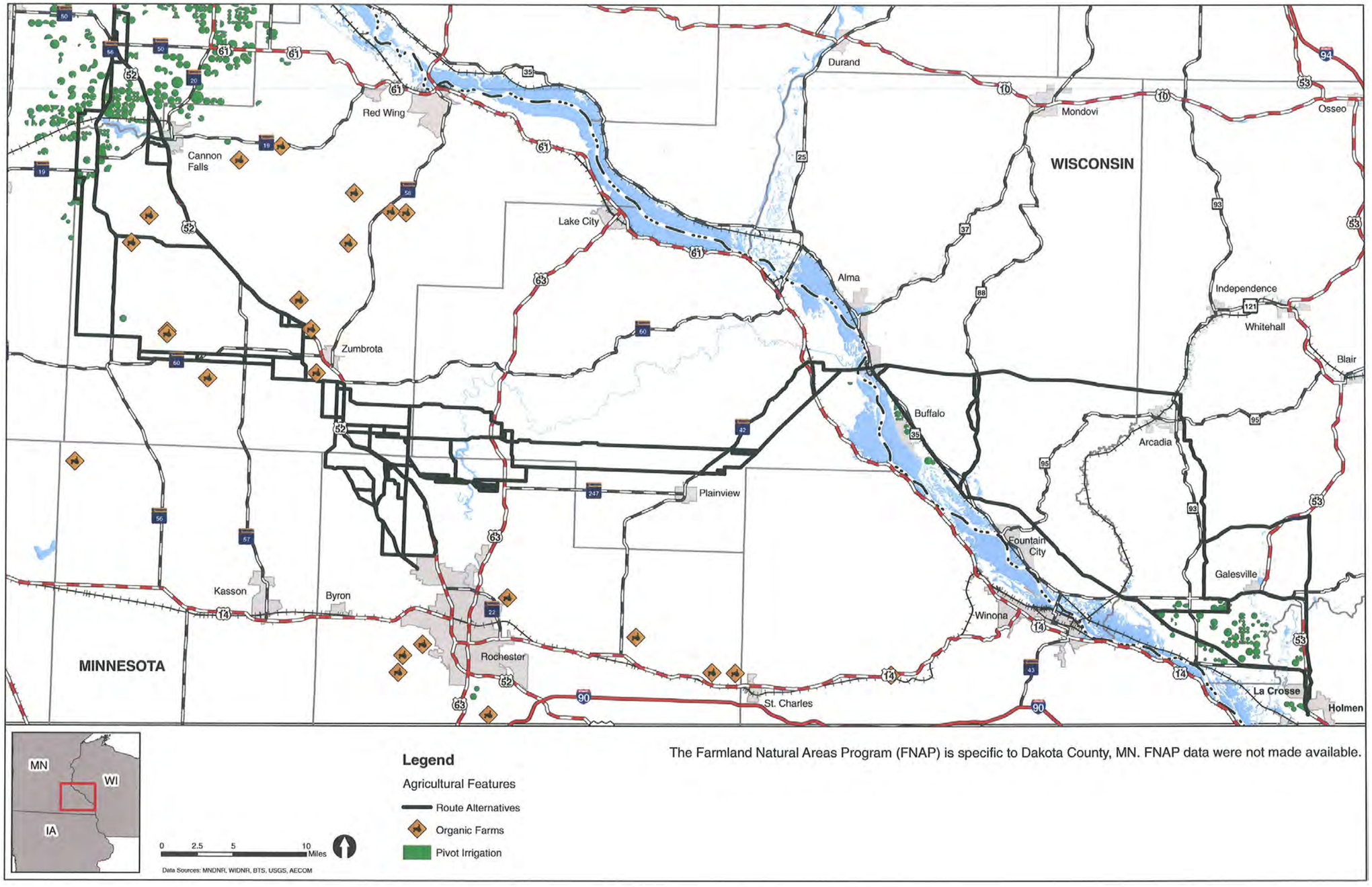

Figure 3-17: Center Pivot Irrigation and Organic Farms

- Amenities such as proximity to schools or jobs, lot size, square footage of a house, and neighborhood characteristics tend to have a much greater effect on sale price than the presence of a power line.
- The degree of opposition to an upgrade project may affect the size and duration of the sales-price effects. Furthermore, adverse effects on price and value appear to be greatest immediately after a new transmission line is built and appear to diminish over time and generations of property owners.
- Setback distance, ROW landscaping, shielding of visual and aural effects, and integration of the ROW into the neighborhood can significantly reduce or eliminate the impact of transmission structures on sales price.
- Although, appreciation of property does not appear to be affected, proximity to a transmission line can sometimes result in increased selling time.
- The value of agricultural property is likely to decrease if the power line structures are placed in an area that inhibits farm operations (PSC 2011d).

RUS' review of previous studies is generally consistent with the EPRI results:

- A statistical sales analysis concluded that "proximity to a power line is associated with diminished selling prices. Both models, however, show that this impact (i.e., reduced selling prices with greater proximity) is diminished through time[,] perhaps as the growth of trees obscures the view of the electric transmission lines… The negative impact of power lines is large in close proximity but declines as distance increases" (Colwell, 1990).
- A report done by a real estate appraiser concluded that "no relationship was established between sales price and the proximate distances to a power line… the fears expressed by proximate owners are not substantiated by acreage buyers in the market place… [o]nly parcel size is shown to have a high correlation with price" (Rigdon, 1991).
- An article stressing that "being adjacent to the easement will not necessarily cause a house to depreciate. It may even increase its value in similar proportions… where proximity advantages exceed drawbacks… As for negative

visual impacts, where applicable, they tend to decrease rapidly with distance, and are no more significant beyond 150m" (Des Rosiers, 2002).

- A 1996 study concluded that "other factors such as location of the property, type, and condition of improvements, and the level of real estate activity are far more important than the presence of transmission lines in determining the value of residential property" (Cowger, Bottermiller, and Cahill, 1996), as well as a follow-up that confirmed these results, with a warning against making generalizations based on them, noting that "[u]nderstanding the effects of HTVLs on home prices and appreciation rates is a dynamic process. It is affected by changing public perceptions and different on-site factors" (Wolverton and Bottemiller, 2003).
- A different report claimed that encumbrance was the issue, not visibility or proximity, concluding that "there is no evidence of systematic effects of either proximity or visibility of 345-kV transmission lines on residential real estate values. Encumbrance of the transmission line easement on adjoining properties does appear to have a consistent negative effect on value" (Chalmers and Voorvaart, 2009).

Loan Qualifications

The FHA, an agency within the U.S. Department of Housing and Urban Development (HUD), provides mortgage insurance on loans made by FHA-approved lenders throughout the U.S. FHA-approved loans must meet certain HUD-established requirements. One requirement is related to homes located with the "fall distance" of a transmission line pole as described in Section 2-2(J) of the HUD Handbook 4150.2 (HUD 1999). However, HUD has clarified that this requirement is applicable only to homes located within the easement of the transmission line and "if a living unit is located outside the easement then the property is eligible for FHA financing" (HUD 2010 p. 19). Because no living units would be located within the easement, this restriction is not applicable to the Proposal. Similarly, the Veteran's Administration does not allow financing for homes located within or partially within high voltage transmission line easements (US Department of Veterans Affairs 2003, p. 10-12 and 2001, p. 12-13).

Tourism, Including Agrotourism

Negative visual impacts from the Proposal could potentially result in a reduction in the number of visitors who come to the Proposal area for its scenic qualities, however, no data was found to suggest that this impact is likely to occur. In almost all areas where the Proposal may be constructed, there are other infrastructure and structural intrusions. The WI-MRPC believes that using the Q1 route in Wisconsin would result in negative impacts to the scenic route that would result in fewer visitors to the area (PSC-WDNR 2011 p. 169). See Section 3.7 for a discussion of potential visual impacts to the WI-MRPC. No information is available to assess this potential impact.

Approximately 2.5% of farms nationwide offer farm-based recreation, or agrotourism as a supplemental income activity (Brown and Reeder 2007 p. 6). Based on a survey conducted in 2000, farm recreation participants live fairly close to the farms they visit, with an average round trip distance of approximately 80 miles. The most popular activities were petting farm animals (67% participating), taking hay rides and/or exploring corn mazes (24%), going horseback riding (15%) and milking cows (10%) (Brown and Reeder 2007 p. 8). Other activities include pick-your-own operations, Christmas tree sales, harvest festivals, hunting and fishing (Brown and Reeder 2007). Participants in agrotourism indicate that scenery is important, stressing "an interest in seeing less residential development and nonfarm businesses on the way to the farm. Sceneries with woodlands, orchards, and grazing animals were of greatest interest" (Brown and Reeder 2007 p. 9). While the intrusion of transmission lines could potentially adversely affect agrotourism, no information is available to assess this potential impact.

3.11.2.2 Interference with Communication Equipment

Corona (discussed in Section 3.3.2.1) has the potential to cause electromagnetic interference (EMI) through the induced currents it creates; it is also possible that a signal can be scattered by the conductors (Silva and Olsen 2002 p. 939). Corona is more common in foul weather and at high altitudes (Silva and Olsen 2002 p. 939).

Radio and Television Interference

Corona from transmission line conductors can generate electromagnetic "noise" at the same frequencies that radio and television signals are transmitted. However, this noise usually does not interfere with normal television and radio reception. In some cases, interference is possible at a location close to the ROW due to weak broadcast signals or poor receiving equipment. If interference occurs because of the transmission line, the electric utility is required to remedy problems so that reception is restored to its original quality (PSC 2011d, p. 17).

Global Positioning System (GPS) Interference

The GPS is a satellite-based radio navigation system. The GPS radio signal sent from multiple GPS satellites must have sufficient strength to be detected above background noise by the receiver on the ground. In a study specifically designed to assess whether high-voltage power lines may interfere with GPS functioning, and that included both modeling and field studies in foul weather, researchers concluded such interference is unlikely (Silva and Olsen 2002 pp. 943-944). Based on a model followed by field testing, the researchers concluded that signal scattering by conductors is unlikely to be a problem, particularly considering that the GPS receiver relies on signals from several satellites. Regarding corona impacts, they found that "a theoretical evaluation of transmission line corona noise at the GPS carrier frequency did not indicate that corona noise could affect GPS receiver performance" and "measurements in four weather confirm this conclusion (Silva and Olsen 2002 p. 944). The researchers noted that GPS receivers may experience problems when a GPS satellite exhibits operational anomalies; while these are rare, GPS users should be aware of them "because the resulting loss of signal lock could erroneously be attributed to any nearby power lines" (Silva and Olsen 2002 p. 944).

Cellular Telephone and Wifi

Cellular service and Wifi would not be impacted by the Proposal, because cellular signals are transmitted in all directions and would not be blocked by the Proposal.

3.11.2.3 Impacts to Tree Groves and Windbreaks

Trees may be important for privacy, shade and wind protection. In areas where soil is subject to wind erosion, windbreaks can help reduce soil erosion. Removal of trees used for these purposes results in adverse impacts. In identifying the route alternatives the MRP/CPCN Applicants have endeavored to minimize removal of trees in general, and particularly windbreaks and other tree stands that provide privacy and shade. There are, however, some locations where routes share corridors with roadways and where installation of the line would require removal of trees along the existing ROW. In some cases this may result in a reduction of the tree screen provided to residences near the roadway.

3.11.2.4 Agriculture

Dairy Cattle and EMF

Concerns have been raised as to the potential impacts of EMF on the milk yield and reproduction potential of dairy cattle. A series of experiments were done by McGill University researchers between 1990 and 2002 that consisted of the placement of cattle in “EMF exposure chambers” and monitoring their conditions. According to the researchers, the chamber was designed to replicate conditions if a cow stood continuously under a 735-kV ac transmission line (2,000 amperes) resulting in a magnetic field of 300 mG and an electric field of 10kV/m. Overall, the design of these experiments were similar:

1) Assemble a group of cows from the research herd;
2) Randomly divide the cows into two separate groups;
3) Expose one group of cows to continuous conditions of 10 kV/m and 300mG for a period of time (one month in pregnant cows and one estrous cycle in non-pregnant cows) (ON), turn off the exposure for the same amount of time (OFF), and then turn it back on again for the same period of time (ON);
4) Expose the second group of cows, but in the reverse pattern: OFF-ON-OFF.

The design of two of the experiments (Burchard et al. 2004; Burchard et al. 2007) was similar, except that the groups of cows were only exposed to 10kV/m of electric field OR 300 mG of magnetic field, for similar periods of time and in the same pattern (Exponent 2008).

Milk Yield. RUS reviewed the findings of these studies, and they appear to report inconsistent results in studying milk yield: an increase in both fat-corrected milk yield and milk fat in pregnant cattle (Burchard et al. 1996 as reported by Exponent 2008); that, testing pregnant cattle, “the yield of milk or its components was not affected by EMF exposure, but milk yield was significantly higher for the exposed animals during wk 4”(Rodriguez et al. 2002); and an average decrease of 4.97% in milk yield, 13.78% in fat-corrected milk yield, and 16.39% in milk fat of fertile cattle (Burchard et al. 2003). Thus, there are no consistent associations between EMF exposure and either milk yield or milk composition.

Reproduction Potential. The other concern lies with the reproduction potential of dairy cattle in similar situations. The same experiments monitored relevant factors, including progesterone, melatonin, and prolactin levels, with more similar results: an increase in progesterone levels in pregnant cattle (Burchard et al. 1996); no significant change in progesterone levels but an increase in estrous cycle duration (Burchard et al. 1998); an increase in the duration of the estrous cycle (Rodriguez et al. 2003); no significant change in progesterone but an increase in melatonin in pregnant cattle, with the caveat that, “[d]ue to the inconsistency of the MLT [melatonin] response in the different replicates, caution should be exercised in the interpretation of this phenomenon” (Burchard et al. 2004); and no significant change in the progesterone levels of pregnant cattle (Burchard et al. 2007). For the most part, these results would indicate that there is little to no effect on progesterone levels from EMF; there also does not appear to be an effect from electric fields or magnetic fields separately. The increase in estrous cycle length can be explained by the fact that “[e]strous cycle length varies considerably in cows, and the investigators concluded that the reported variation of two to three days was normal and would not adversely affect reproductive function. Therefore, overall, no significant reproductive effects were reported” (Exponent 2008).

Stray Voltage

Stray voltage and its impacts on livestock and other confined animals have been studied in detail by state and federal agencies, universities, electric utilities, and numerous scientists since the late 1970s. The PSC has opened investigations,

established measurement protocol and compiled a database to track investigation, all to develop successful strategies for minimizing stray voltage in farm operations. The information in this section comes directly from the Public Service Commission of Wisconsin (PSC 2011d).

Electrical systems, including farm systems and utility distribution systems, are grounded to the earth to ensure safety and reliability, as required by the National Electrical Safety Code and the National Electrical Code. Because of this, some current flows through the earth at each point where the electrical system is grounded and a small voltage develops. This voltage is called neutral-to-earth voltage (NEV). When NEV is measured between two objects that are simultaneously contacted by an animal, a current will flow through the animal and it is considered stray voltage. Animals may then receive a mild electrical shock that can cause a behavioral response. At low voltages, an animal may flinch with no other noticeable effect. At higher levels, avoidance or other negative behaviors may result. Stray voltage may not be noticeable to humans. Low levels of AC voltage on the grounded conductors of a farm wiring system are a normal and unavoidable consequence of operating electrical farm equipment. Thus, some levels of stray voltage will always be found on a farm. For example, a dairy cow may feel a small electric shock when it makes contact with an energized water trough. The concern lies with stray voltage that occurs at a level that negatively affects an animal's behavior, health, and, more specifically, milk production. Stray voltage can be caused by a combination of on-farm and off-farm causes. One off-farm contributor to stray voltage is the operation of transmission lines in close proximity and parallel to a distribution line. As a means to minimize new transmission line impacts, new lines are often co-located near a distribution ROW or the distribution line is underbuilt on the new transmission poles. This configuration can contribute to stray voltage issues.

Center-Pivot Irrigation Systems – Farm Terraces

The Applicants will endeavor to avoid interference with center-pivot irrigation system and constrictions caused to equipment operation. If these cannot be avoided, the owners will be compensated.

Other Agricultural Impacts

The placement of transmission structures can cause the following agricultural impacts:

- Create problems for turning field machinery and maintaining efficient fieldwork patterns
- Create opportunities for weed encroachment
- Compact soils and damage drain tiles
- Result in safety hazards due to pole and guy wire placement
- Hinder or prevent aerial activities by planes or helicopters
- Interfere with moving irrigation equipment
- Hinder future consolidation of farm fields or subdividing land for residential development

3.11.2.5 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* requires that federal agencies consider "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." RUS assessed all macro-corridors with the USEPA's EJView, formerly known as the Environmental Justice Geographic Assessment Tool to determine whether there are low income or minority populations within the macro-corridor area. All areas assessed resulted in income levels at or above the state-wide average and percent minority population at or below the state-wide average (USEPA 2010).

3.11.2.6 Impacts of the No Action Alternative

The no action alternative would result in no impacts to the environment at the Proposal area. The Proposal would not be constructed or operated, and therefore, there would be no direct socioeconomic impacts.

However, because the Proposal would not be constructed, the reliability of the transmission network would likely be impacted. The result may be brownouts, blackouts, and/or higher electricity rates for consumers. Reduced electrical system reliability can have impacts on socioeconomics and environmental justice.

3.11.3 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

3.11.3.1 General Measures

Construction debris will be removed from private property and disposed off-site.

If a temporary road is to be removed, the land upon which the road is constructed will be returned to its previous use and restored to equivalent condition prior to construction.

The easement payment is considered compensation for property value impacts. Many owners also have the option to sell their entire property to the utility, under state law.

3.11.3.2 Measures Specific to Agricultural Land

Under Minnesota law, it is the State's policy to guide the "orderly construction and development of energy generation and transmission systems" and "preserve agricultural land to the greatest possible extent".[149] Impacts to agricultural land have been minimized by placing the routes in existing corridors to the extent practical, by following section lines when crossing agricultural fields, and by single pole construction.

The Minnesota Route Permit Applicants (MRP Applicants) have developed an agricultural impact mitigation plan (Ag Mitigation Plan) for the Proposal, which is included in this EIS as Appendix I. The Ag Mitigation Plan applies to Agricultural Land, which it defines as "land that is actively managed for cropland, hay land or pasture and land in government set-aside programs." The Ag Mitigation Plan includes specific measures for organic Agricultural Land, where organic is defined by the National Organic Program Rules.[150] While the Ag Mitigation Plan was developed for Minnesota, RUS assumes that the mitigation measures will also be implemented in Wisconsin, as applicable.

Mitigation measures described in the Ag Mitigation Plan that are applicable to socioeconomics are summarized below. Terms are used as defined in the Ag Mitigation Plan (Appendix I).

- The MRP Applicants will work with individual landowners to address pole placement.

[149] Minn. Stat. 17.80
[150] 7 CFR 205.100, 205.101, and 205.202

- Any excess soil and rock will be removed from the site unless requested otherwise by the Landowner.
- The MRP Applicants will consult with the Landowner on drain tile locations and attempt to probe to locate drain tiles. Damages to drain tiles will be repaired by the MRP Applicants as described in detail in the Ag Mitigation Plan.
- Compaction and rutting will be remediated as described in the Ag Mitigation Plan.
- Terraces and grassed waterways damaged by construction or maintenance activities will be restored to the condition they were in prior to the damage.
- Compensation for damages to Agricultural Land will be made as described in the Ag Mitigation Plan.
- The MRP Applicants will employ a qualified Agricultural Monitor to audit compliance with the Ag Mitigation Plan, and a Utilities Inspector who will verify compliance with the Ag Mitigation Plan.
- At substation facilities, the MRP Applicants will work with adjacent Landowners, if requested, to prevent spread of weeds from the substation area to adjacent Agricultural Land.
- The MRP Applicants will work with landowners to coordinate down time (and compensation, if appropriate) for operational (or soon to be operational) irrigation equipment that will be affected by construction and/or maintenance activities.
- Temporary roads will not impede drainage and will be constructed to mitigate soil erosion on or near the temporary roads.
- The MRP Applicants will employ additional measures on or near organic Agricultural Land as described in the Ag Mitigation Plan, to ensure consistency with the requirements of the National Organic Program.

Additional mitigation may include the following:

- Implementing measures that are currently being used by the farm owner or operator to prevent farm diseases related to animal health or soil contamination.
- Use of barriers between construction and maintenance equipment and agricultural land such as construction matting or ice roads.
- Working with landowners to temporarily change farming practices, such as moving animals to another pasture or changing manure application schedule.
- To minimize the likelihood of stray voltage occurrences from closely space and parallel transmission and distribution lines, utilities sometimes propose to relocate the paralleling distribution lines further away from the transmission line and/or bury the distribution line underground. Additionally, the PSC may require the utility to conduct pre-construction and post-construction testing of potentially impacted farms and lines (PSC 2011d).