7.1 Cumulative Impacts Analysis

In addition to analyzing the direct and indirect impacts of the alternatives—which include the proposed Project routes and variations presented in Chapter 5 and Chapter 6—the federal environmental review process requires consideration of the cumulative environmental impacts of multiple actions within an area. Cumulative impacts result from the "incremental impact of the [current] action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 Code of Federal Regulations (CFR) 1508.7).

Similarly, Minnesota's environmental review rules require the evaluation of "cumulative potential effects" which is defined as "the effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects" (Minnesota Rules, part 4410.0200, subpart 11a).

The cumulative impacts analysis, as provided in Section 7.2 and Section 7.3, consists of two parts: identification of other actions that are considered along with the proposed Project in analyzing cumulative impacts, and a description (quantitative or qualitative) of those potential cumulative impacts.

7.2 Other Actions Considered for Potential Cumulative Impacts

The potential for cumulative impacts depends, in part, on temporal factors within the environment. The temporal boundaries for cumulative impacts include past actions, ongoing actions, and reasonably foreseeable future actions that cover the construction period of the proposed Project (beginning in fall 2016) and the beginning of operations (summer 2020). The temporal period would also carry through the life of the proposed Project for operational impacts, such as aesthetic or electric and magnetic fields (EMF) effects. Accordingly, this section identifies past, present, and reasonably foreseeable future actions considered in the cumulative impacts analysis.

7.2.1 Past Actions

Past actions are those actions and their associated impacts that occurred within or influenced the geographic region of influence (ROI) of each resource and have shaped the current affected environment of the proposed Project area. For the purposes of this Environmental Impact Statement (EIS), actions that have occurred in the past and their associated impacts are now part of the existing environment and are included in the affected environment described in Chapter 5.

7.2.2 Present and Reasonably Foreseeable Future Actions

This section describes reasonably foreseeable projects that are (1) under construction, have permits, or have submitted permit applications, and (2) have the potential to collectively impact resources within the proposed Project's ROI for the various resources evaluated in Chapter 5 and Chapter 6. The types of projects considered include roadways, railroad lines, industrial facilities, and energy projects such as power plants, transmission lines, and pipelines.

The Minnesota Department of Transportation (MnDOT) Statewide Transportation Improvement Program (STIP) and current amendments and modifications to the STIP identify various transportation projects in the vicinity of the proposed Project for the period of 2015-2018 (MnDOT 2014, reference (191)). Review of the planned projects for MnDOT Districts 1B and District 2A,[83] which include the proposed Project area, indicates that the planned transportation projects generally consist of routine maintenance activities such as roadway re-surfacing, asphalt surface treatment, bridge repair, asphalt surface treatments, concrete paving, railroad crossings, signage, and pedestrian/bike trail improvements. Based on the STIP, other than the routine maintenance activities, there are no roadway projects presently planned or reasonably foreseeable within the vicinity of the proposed Project, including the areas adjacent to the Applicant's proposed international border crossing and alternative international border crossings.

The Minnesota Department of Commerce (MN DOC) project database was also reviewed to identify any power plant, transmission line, pipeline, or wind projects currently open or permitted in the vicinity of the proposed Project, as these would also be

83 Map available at http://www.dot.state.mn.us/information/docs/district-map-with-sub-areas.pdf

reasonably foreseeable projects.[84] According to this review, one power plant with an associated transmission line and natural gas pipeline (Excelsior Energy's Mesaba Energy project) and one 230 kilovolt (kV) transmission line (Minnesota Power's Nashwauk Project) have been issued permits since 2010 by the Minnesota Public Utilities Commission (MN PUC) but have not yet been constructed. In addition, as part of the route permit process for the proposed Enbridge Sandpiper oil pipeline project, the MN PUC has included one route for consideration that would cross the 200-foot right-of-way (ROW) of this proposed Project (from west to east).[85] The proposed Enbridge Line 3 project, another oil pipeline, would follow the same route as the proposed Enbridge Sandpiper project from the terminal in Clearbrook, Minnesota to the terminal in Superior, Wisconsin terminal.

In summary, portions of the permitted routes for the Mesaba Energy and Nashwauk transmission line projects are within the Applicant's proposed routes. One of the proposed Enbridge Sandpiper routes and the Enbridge Line 3 route, under consideration by the MN PUC, would cross the alternatives for the proposed Project. Therefore, since these transmission line and pipeline projects are reasonably foreseeable projects that could occur in the vicinity of the proposed Project, they are described below.

7.2.2.1 Excelsior Energy Mesaba Energy Project

On March 12, 2010, the MN PUC issued a large electric power generating plant site permit to Excelsior Energy to construct the Mesaba Energy project in Itasca County (Map 7-1). The Mesaba Energy project was originally proposed as a 1,200 megawatt (MW) (net) coal-feedstock integrated gasification combined cycle power plant. In addition to the site permit, the MN PUC also issued a pipeline permit and a Route Permit for a 345 kV transmission line to connect the proposed power plant into the existing Blackberry Substation.[86] Construction has not started on the power plant, the natural gas pipeline, or the transmission line.

On May 31, 2012, the MN PUC received a letter from Excelsior Energy stating that it intends to develop only the combined-cycle power block portion of the project, eliminating the syngas production portions (i.e., gasification island, air separation unit, coal/pet-coke feedstock handling and storage, syngas treating unit, sulfur recovery and tail gas recycle units, etc.) of the project and operating the facility as a natural gas-fueled combined-cycle.[87] Excelsior Energy also indicated that it plans to construct the coal gasification if and when it becomes feasible to do so from economic and regulatory standpoints (Excelsior Energy 2012, reference (192). Minnesota Statutes, section 216B.1694, subdivision 3, states that the site and route permits and water appropriation approvals for an innovative energy project must also be deemed valid for a power plant meeting the requirements of paragraph (a) and shall remain valid until the earlier of (i) four years from the date the final required state or federal preconstruction permit is issued or (ii) June 30, 2019.

As shown in Map 7-1, the permitted route for Excelsior Energy's approximately 10-mile long, 345 kV transmission line would be located within the Proposed Blue Route and Proposed Orange Route for about 1.2 miles in the Balsam Variation Area and would be within the entire length (approximately 5.5 miles) of the Proposed Blue Route in the Blackberry Variation Area. The building within the plant site would be located approximately 300 feet from the anticipated alignment of the Proposed Blue/Orange Route in the Balsam Variation Area (Map 7-1).

7.2.2.2 Nashwauk Public Utilities Commission 230 kV Transmission Line

Under an agreement with the Nashwauk Public Utilities Commission, Minnesota Power previously constructed three of four 230 kV transmission lines and two 230 kV substations to supply electric power to an Essar Steel Minnesota project. A fourth transmission line has been permitted by the MN PUC but has not yet been constructed. This potential fourth transmission line would begin at the existing Minnesota Power 230 kV Blackberry Substation (Township 55 North, Range 23 West, Section 19) and continue northeast and parallel two existing Minnesota Power 115 kV transmission lines (the 63 Line and the 62 Line), terminating at the Essar Steel Minnesota project (Map 7-1).

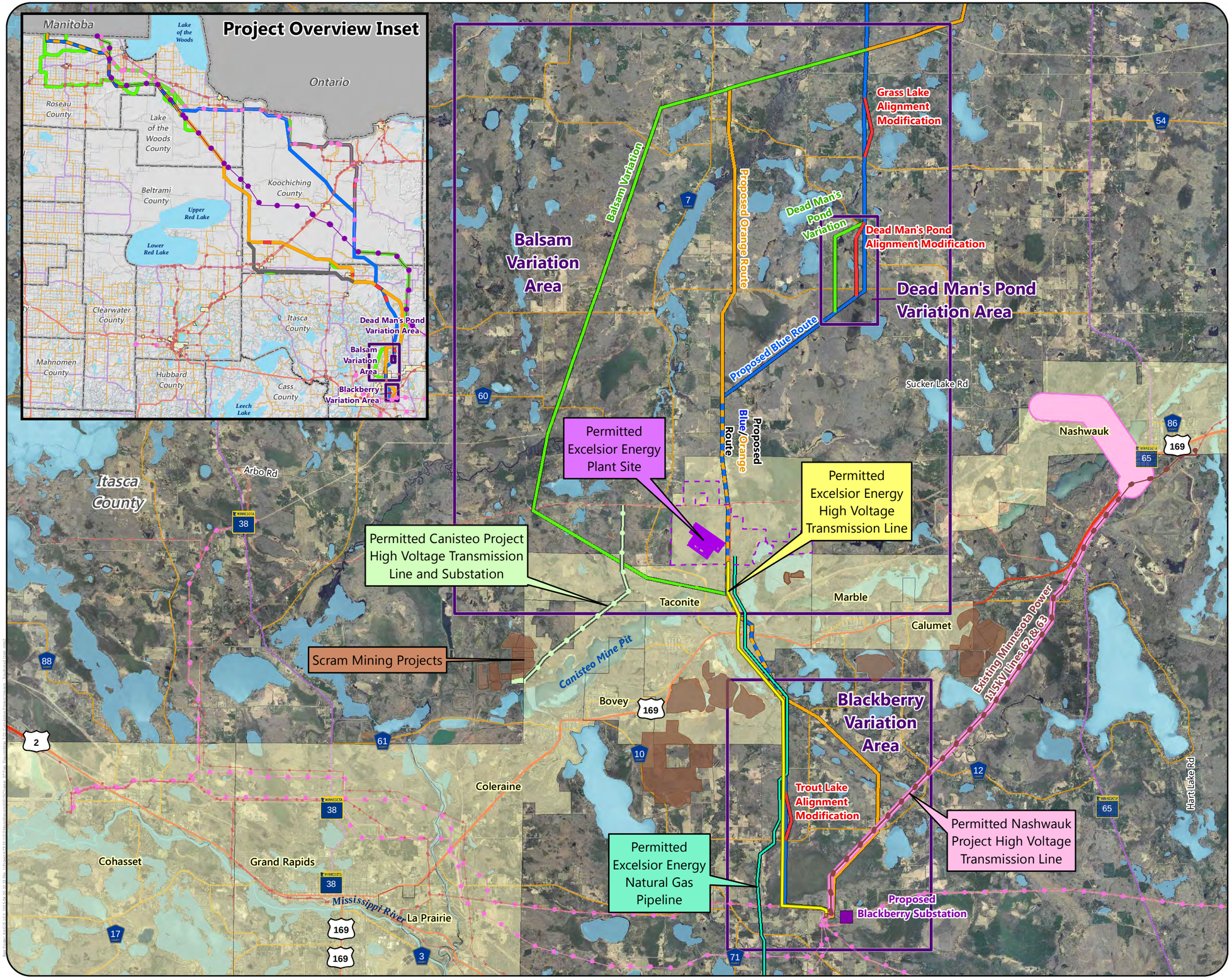
According to the MN PUC route permit (MPUC 2010, reference (193)), if this proposed fourth transmission line to the Essar Steel Minnesota project is built, the existing 62 line, located west of the 63 Line, would be dismantled (Map 7-1). The potential fourth 230 kV transmission line would then be constructed

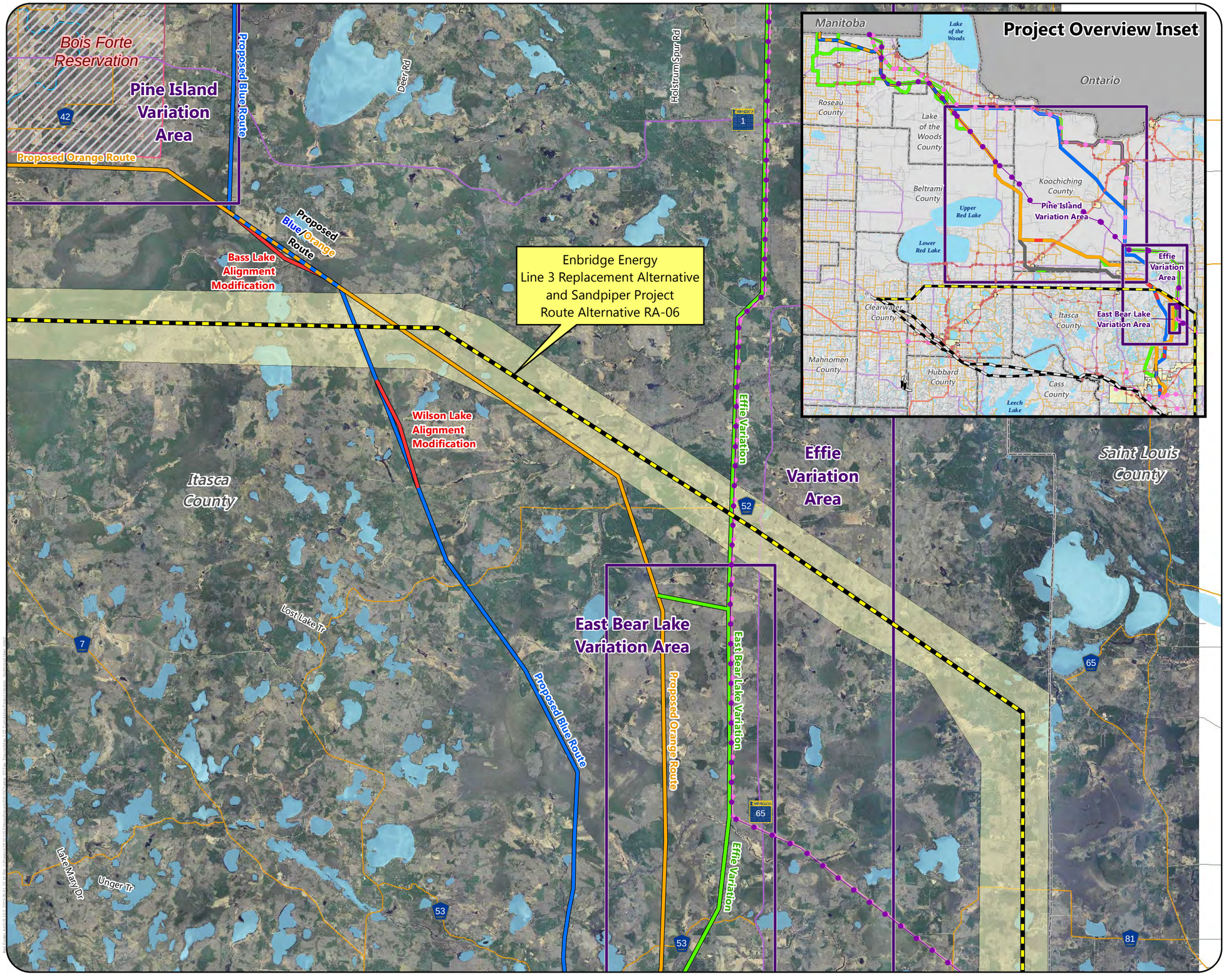
84 Available at: http://mn.gov/commerce/energyfacilities/Docket.html Reviewed on March 25, 2015 for open projects permitted since January 1, 2010

85 Available at: http://mn.gov/commerce/energyfacilities/Docket.html?Id=33599#edocketFiles

86 Available at: http://mn.gov/commerce/energyfacilities/documents/16573/Combined%20Order%20and%20Permits%20(signed).pdf

87 Available at: http://mn.gov/commerce/energyfacilities/documents/16573/Excelsior%20Request%20on%20Natural%20Gas%20Conversion%20(5-31-12).pdf


Project Overview Inset
Manitoba
Ontario
Lake of the Woods
Roseau County
Lake of the Woods County
Beltrami County
Koochiching County
Upper Red Lake
Lower Red Lake
Clearwater County
Itasca County
Mahnomen County
Hubbard County
Cass County
Leech Lake
Dead Man's Pond Variation Area
Balsam Variation Area
Blackberry Variation Area
Balsam Variation Area
Balsam Variation
Proposed Orange Route
Grass Lake Alignment Modification
Dead Man's Pond Variation
Dead Man's Pond Alignment Modification
Dead Man's Pond Variation Area
Proposed Blue Route
Proposed Blue/Orange Route
Sucker Lake Rd
Permitted Excelsior Energy Plant Site
Permitted Excelsior Energy High Voltage Transmission Line
Permitted Canisteo Project High Voltage Transmission Line and Substation
Scram Mining Projects
Taconite
Marble
Calumet
Nashwauk
Canisteo Mine Pit
Bovey
Coleraine
Cohasset
Grand Rapids
Mississippi River
La Prairie
Itasca County
Arbo Rd
Blackberry Variation Area
Trout Lake Alignment Modification
Permitted Excelsior Energy Natural Gas Pipeline
Permitted Nashwauk Project High Voltage Transmission Line
Existing Minnesota Power 115kV Lines 62 & 63
Proposed Blackberry Substation
Hart Lake Rd
Proposed Blackberry Substation Location
Proposed Routes
Blue/Orange Route
Blue Route
Orange Route
Alternatives
Route Variation
Alignment Modification
Existing Transmission Lines
69 or 115 kV
230 kV
Municipal Boundary
Variation Area
Scram Mining Projects
Excelsior Energy Project
Permitted High Voltage Transmission Line
Permitted Natural Gas Pipeline
Permitted Plant Site
Optioned Property
Nashwauk Project
Permitted High Voltage Transmission Line
Canisteo Project
High Voltage Transmission Line
Substation Area
Note:
The Applicant will be issued a Route Permit with a specific route width. The proposed route widths are shown in Appendix S.
Miles
2 0 2
Map 7-1
CUMULATIVE PROJECT IMPACTS - SOUTH
Great Northern Transmission Line
Draft Environmental Impact Statement
U.S. DEPARTMENT OF ENERGY
MINNESOTA DEPARTMENT OF COMMERCE



Proposed Routes
- Blue/Orange Route
- Blue Route
- Orange Route

Alternatives
- Route Variation
- Alignment Modification

Existing Transmission Lines
- 230 kV
- 500 kV
- Indian Reservation Land
- Variation Area

Enbridge Projects
- Line 3 Replacement / Sandpiper RA-06 Alignment
- Other Alignment
- Approximate RA-06 Route Width

Note:
The Applicant will be issued a Route Permit with a specific route width. The proposed route widths are shown in Appendix S.

Miles
2 0 2

Map 7-2

CUMULATIVE PROJECT IMPACTS - NORTH
Great Northern Transmission Line
Draft Environmental Impact Statement

within the former 62 Line ROW and would not result in the creation of a new ROW.

The portion of the permitted route for this potential fourth 230 kV transmission line that would parallel the Proposed Orange Route would be two miles in length, and located within the area between the existing Blackberry Substation and near the north end of Little Sand Lake (Map 7-1).

7.2.2.3 Proposed Oil Pipeline Projects

The MN PUC has included numerous potential routes for the proposed Enbridge Sandpiper pipeline project for detailed study as part of the Route Permit process for that project (Minnesota Department of Commerce, reference (194)). One of these route (RA-06) crosses the Proposed Blue Route, Proposed Orange Route, and the Effie Variation in the Effie Variation Area (Map 7-2). As proposed, the Enbridge Line 3 project would also follow the same route as the proposed Enbridge Sandpiper project from the Clearbrook terminal to the Superior terminal; crossing the proposed Project in the same locations as the Enbridge Sandpiper pipeline project. Both of these pipelines would be located underground.

7.2.2.4 Scram Mining

There are also areas where iron ore is currently mined or permits have been issued for new mines in which the ore is extracted from previously developed stockpiles, basins, underground workings, or open pits. The currently active areas of so-called "scram" mining are located near the west side of the Canisteo Pit, approximately four to six miles west of the proposed routes and variations (Map 7-1). The Balsam Variation, which is in the Balsam Variation Area, would cross the permitted Canisteo 115 kV transmission line recently constructed specifically to serve one of these scram mining facilities. The anticipated alignment for all other proposed routes and variations are located more than 2,000 feet from existing or proposed scram mining facilities in the area.

7.3 Cumulative Impacts

In addition to temporal factors, the potential for cumulative impacts also depends on spatial factors within the environment, which can vary for the resources evaluated in this EIS. For example, the geographic area of consideration for cumulative impacts could be limited to the discrete area of disturbance for vegetation resources but also include all vantage points for visual resources. The geographic ROI for cumulative impacts includes the areas in which the proposed Project and reasonably foreseeable future actions—which are identified in Section 7.2.2—directly and indirectly impact resources, and corresponds to the ROIs described in Chapter 5 and Chapter 6.

Cumulative impacts analysis must be conducted within the context of the resources evaluated in this EIS. The magnitude and context of the effect on a resource depends on whether the cumulative effects exceed the capacity of a resource to sustain itself and remain productive (CEQ 1997, reference (195)). If cumulative impacts are expected to exceed these thresholds, they would be considered significant.

The international border crossing alternatives discussed in Section 5.2, Section 5.3, and Section 6.2.1 do not have any reasonably foreseeable future projects located within their ROI that are expected to result in any cumulative impacts.

7.3.1 Human Settlement

This section describes potential cumulative impacts to human settlement resources discussed in Chapter 5 and Chapter 6.

7.3.1.1 Aesthetics

As discussed in Section 5.3.1.1, construction of the proposed Project would result in visual impacts. Short-term aesthetic impacts during construction would be temporary and are expected to be restored to pre-existing conditions upon completion of construction. If any of the reasonably foreseeable projects are constructed at the same time as the proposed Project, these temporary effects would be exacerbated during concurrent construction phases but their short-term nature would mean these adverse impacts are not expected to be significant.

The ROI for long-term impacts on aesthetics is 1,500 feet on either side of the anticipated alignment of the proposed routes and variations and within 1,500 feet from the footprint of the proposed Blackberry 500 kV Substation, 500 kV series compensation station, regeneration stations, permanent and temporary access roads, temporary laydown areas, temporary stringing areas, and temporary fly-in sites. The 1,500 foot ROI for aesthetic resources was identified because the proposed Project is most likely to be visible within this near-foreground distance zone and views of the proposed Project from aesthetic resources within this distance zone have the greatest potential to result in visual impacts for sensitive viewers.

Although many of the aesthetic impacts of the proposed Project would be short-term during construction, the presence of transmission

structures in the landscape and clearing the ROW of trees would result in a long-term change in local aesthetics. In addition, utilities paralleling existing corridors can cumulatively create wide, long areas of visual disturbance. The reasonably foreseeable future transmission line projects listed in 7.2.2 are all in the Balsam and Blackberry variation areas where there are more population centers, infrastructure, and mining activity. The Sandpiper Pipeline RA-06 route, if selected, and the Enbridge Line 3 project would intersect the Proposed Blue/Orange Route, but would be located underground and would cross the 200-foot ROW for the proposed Project. The potential cumulative aesthetic impacts in this area are not expected to be significant because they would only involve paralleling transmission lines for approximately nine miles, and this infrastructure would not be incompatible with existing conditions.

7.3.1.2 Land Use Compatibility

The ROI for land use includes land within 1,500 feet on either side of the anticipated alignment of the proposed routes and variations and within 1,500 feet of the footprint of the proposed Blackberry 500 kV Substation, 500 kV series compensation station, regeneration stations, permanent and temporary access roads, temporary laydown areas, temporary stringing areas, and temporary fly-in sites. This ROI includes the 200-foot ROW and adjacent lands that would be impacted by construction and operation of the proposed Project.

All of the reasonably foreseeable future projects would be required to be developed in compliance with local zoning, floodplain ordinances, and land management plans. As such, considered together, these reasonably foreseeable future projects would be expected to be consistent with planned land uses and no cumulative impacts on land-use compatibility would be expected. The Applicant will need to consult with applicable land management agencies and entities to ensure this compatibility.

7.3.1.3 Cultural Values

The ROI for impacts to cultural values includes the counties crossed by each of the proposed routes and variations. The proposed Project is not expected to have the potential to impact cultural values outside these areas. The cumulative impacts of the reasonably foreseeable future projects listed in Section 7.2.2 all occur in the general region of the Iron Range, which over the last century has been characterized by communities that developed as a result of the iron and taconite mining industry on the Mesabi Iron Range. The potential impacts from the reasonably foreseeable future projects on these values are not expected to be measurable. Impacts on cultural values in the West, Central, and East Sections due to past projects and the proposed Project are described in Section 5.3.1.

7.3.1.4 Displacement

The ROI for displacement is the 200-foot ROW of the proposed routes and variations since structures within the ROW would need to be removed for construction and operation of the proposed Project. The reasonably foreseeable future transmission line projects would run parallel in the Balsam and Blackberry variation areas. There are no residences in the Proposed Blue Route ROW or the Proposed Orange Route ROW in both the Balsam Variation Area and the Blackberry Variation Area. There are also no residences in the ROW of the Balsam Variation within the Balsam Variation Area. In these locations, all residences are more than 210 feet from any proposed ROW. Because none of the reasonably foreseeable future projects listed in 7.2.2 have residences within any of the potential ROWs, no displacement is anticipated from the proposed Project.

7.3.1.5 Noise

The ROI for noise includes receptors within a 1,500-foot on either side of the anticipated alignment of the proposed routes and variations , new Blackberry 500 kV Substation site, the 500 kV series compensation station, regeneration stations, permanent and temporary access roads, temporary laydown areas, temporary stringing areas, and temporary fly-in sites. Since construction areas and access roads may be located anywhere within or outside of the ROW and not necessarily only at the proposed centerline, a conservative radius of 1,500 feet from the proposed Project noise sources has been selected to assess the potential impacts of noise from the project on existing sensitive receptors. The attenuation of noise with distance results in a decrease in noise with distance. Typically, a radius of 1,325 to 1,500 feet is used while evaluating potential community noise impacts (Section 5.2.1.2). If all of reasonably foreseeable future projects were constructed at the same time, there would be an expected short-term increase in noise disturbance.

7.3.1.6 Air Quality, Greenhouse Gas Emissions, and Climate Change

The ROI for air quality includes the counties of Roseau, Lake of the Woods, Beltrami, Koochiching, and Itasca because compliance with the national and state air quality standards in the State of Minnesota is assessed at the county level. United States (U.S.)

Environmental Protection Agency (EPA) designates all of the counties in the ROI to be in attainment or unclassifiable (to be considered in attainment) for all National Ambient Air Quality Standards (NAAQS) (EPA 2015, reference (2)).

As discussed in Section 5.2.1.3, the construction activities for the proposed Project would generate criteria pollutant emissions; these emissions would be localized to the area of the proposed Project and occur in the short-term time frame of construction. Each of the reasonably foreseeable projects listed in Section 7.2.2 would also involve construction activities with associated short-term emissions. If the large electric power generating plant for the Mesaba Energy project were built, it would result in long-term emissions from operations. None of the reasonably foreseeable future projects individually[88] or cumulatively are expected to contribute to significant air emission impacts because the projects would be in attainment for all NAAQS.

7.3.1.7 Property Values

The ROI for property values is 1,500 feet on either side of the anticipated alignment of the proposed routes and variations and within 1,500 feet the permanent footprint of the other elements of the proposed Project including the proposed Blackberry 500 kV Substation, 500 kV series compensation station, regeneration stations and permanent access roads). This is the same ROI used in the analysis of the factors (Aesthetics, EMFs, and Agriculture) that can influence property value impacts. The Sandpiper pipeline RA-06 route, if selected, and the Enbridge Line 3 project would intersect the alternatives for this proposed Project, but only underground and for the short distance needed to cross the 200-foot ROW. The Excelsior Energy and Nashwauk transmission line projects would both parallel existing transmission line corridors. Therefore, the impact of either of these two reasonably foreseeable future projects on property values in the ROI would be minimal because there is already an existing transmission lines in both of the proposed corridors.

7.3.1.8 Electronic Interference

The ROI for electronic interference is 1,500 feet on either side of the anticipated alignment of the proposed routes and variations. This ROI was selected because it incorporates direct impacts that could result if communication towers are near the transmission line and could be impacted by the transmission line structures and corona effects as described in Section 5.2.1.5.

The reasonably foreseeable future projects listed in Section 7.2.2 could result in paralleling corridors for several electric transmission lines and two pipelines. The only cumulative impact these projects could produce would be line-of-sight interference with communications. Should this occur, it could be remedied during final design by moving the receiving antenna or other communication device or positioning the transmission line structure so it does not cause line-of-sight interference.

7.3.1.9 Transportation and Public Services

The reasonably foreseeable future projects listed in Section 7.2.2 would not be expected to impact transportation or public services. There would be increased construction vehicle traffic if all reasonably foreseeable future projects were constructed at the same time, but this impact would result in short-term, adverse traffic impacts. The MN PUC Route Permit would require the Applicant to comply with MDOT and all applicable road authorities' management standards and policies during construction. For example, the Route Permit would direct the Applicant to provide written notice of construction to MnDOT and applicable city, township, and county road authorities to coordinate local traffic concerns. The Applicant has also committed to implement traffic control measures in accordance with the MnDOT Manual on Uniform Traffic Control Devices. (MnDOT 2014, reference (196)).

7.3.1.10 Environmental Justice

The ROI for environmental justice comprises all the census tracts intersected by the 200-foot ROWs of the proposed routes and variations. Potential cumulative impacts on environmental justice could occur due to the proximity of the reasonably foreseeable future projects to low-income and minority populations, which could result in disproportionately high and adverse human health or environmental effects on those populations. If low-income and minority populations live near the projects, then construction and operation of the proposed Project and reasonably foreseeable future projects could subject those populations to disproportionate affects due to adverse impacts to air quality, socioeconomics, transportation, and public service, EMFs, implantable medical devices, stray voltage, induced voltage, and subsistence. However, since there is a low percentage of minority and low-income populations in the project area (Section 5.2.1.7), these populations would not be disproportionately affected by the proposed Project, variations, or the reasonably foreseeable projects).

88 The Mesaba Energy project is now expected to be a combined-cycle natural gas plant.

7.3.1.11 Socioeconomics

The ROI for socioeconomic impacts includes the counties intersected by the proposed routes and variations. From north to south, the ROI includes the counties of Roseau, Lake of the Woods, Beltrami, Koochiching, and Itasca as the majority of potential socioeconomic effects from the proposed Project would occur in theses counties.

If all the reasonably foreseeable future projects listed in Section 7.2.2 were constructed at the same time, there would be a cumulative socioeconomic benefit, primarily in the form of short-term construction employment and long-term revenue from taxes. A complete analysis of socioeconomics for the proposed Project can be found in Section 5.2.1.8. During construction, an average of 120 construction workers would be employed annually during the five year construction period from 2016 through 2020. In the peak year of construction, the proposed Project would directly employ approximately 213 workers (University of Minnesota-Duluth 2013, reference (36)) Along with these construction jobs, tax revenues, gross output, and value-added spending (reported in 2013 dollars) would occur from development and construction of the proposed Project. During the five-year construction phase, the proposed Project would generate approximately $26.5 million dollars in state and local taxes through compensation, business, household, and corporation taxes. Combined with taxes paid at the state and local level during the development (pre-construction) phase, the total state and local taxes would be approximately $28 million (University of Minnesota-Duluth 2013, reference (36)).

The Mesaba Energy project, if constructed, would also contribute to significant increases in construction jobs for Itasca County and the entire Arrowhead Region. The EIS for the Mesaba Energy project predicted that during the peak construction year, approximately 1,600 direct construction jobs would be created in the region, including those jobs which provide goods and services for the project. Another 955 new jobs in numerous industries were estimated to be induced by the Mesaba Energy project through increased consumer spending. No estimates of construction or operation phase jobs for a natural gas combined cycle facility (without coal gasification) are currently available for the Mesaba Energy project. The Enbridge Sandpiper pipeline project and the Enbridge Line 3 project would also create new employment during construction in the area, and could contribute to a temporary housing shortage in the area all these projects were to be constructed at the same time. Because Grand Rapids is within commuting distance of the construction area of these reasonably foreseeable future projects, any housing shortage would not be expected to be significant.

Along with the cumulative socioeconomic impacts from the Mesaba Energy project and the pipeline projects, there are socioeconomic implications of the proposed Project's potential effect on the regional electric grid. The Midcontinent Independent System Operators (MISO) published a study, the MISO Manitoba Hydro Wind Synergy Study, which analyzed a new 500 kV interconnection with Manitoba. (Table 5.7 of MISO 2013, reference (197)). The study concluded that such a connection would provide "significant benefits" to the entire MISO footprint, including substantial reductions in wind curtailments and better utilization of both wind and hydro resources, meaning increased efficiency of the energy supply system as a whole. Over a 20-year timeframe, these benefits were valued at approximately $1.6 billion in 2012 dollars for the northern MISO region.

7.3.1.12 Recreation and Tourism

The ROI for impacts to recreation includes county, state, and federal parks and forests, state SNAs, state trails, scenic byways, and snowmobile and water trails that are located within 1,500 feet on either side of the anticipated alignment of the proposed routes and variations and within 1,500 feet of the footprint of the other elements of the proposed Project including the proposed Blackberry 500 kV Substation, 500 kV series compensation station, regeneration stations, permanent and temporary access roads, temporary laydown areas, temporary stringing areas, and temporary fly-in sites. This ROI was identified because recreation features within these areas are most likely to experience direct or indirect impacts from the proposed Project.

If all the reasonably foreseeable future projects listed in Section 7.2.2 were constructed there could be cumulative long-term indirect visual impacts, primarily to recreational boaters at lakes in Itasca County, who could see additional transmission line structures where they could be located in parallel corridors in the vicinity of South Twin Lakes and Loon Lakes in the Blackberry Variation Area, as well as in the vicinity of O'Reilly Lake in the Balsam Variation Area. This impact is not expected to have a measureable effect on recreation and tourism, however, because the additional infrastructure would be constructed parallel to the same corridor as a section of the proposed Project. A second transmission line paralleling the same corridor as the proposed Project would have only a small

incremental impact on the view from these recreation areas.

7.3.2 Public Health and Safety

This section describes potential cumulative impacts to public health and safety resources discussed in Chapter 5 and Chapter 6.

7.3.2.1 Electric and Magnetic Fields

The ROI for EMF includes a 600-foot buffer (300 feet on either side of the anticipated alignment) along the proposed routes and variations within the West, Central, East sections, as well as the proposed Blackberry 500 kV Substation, 500 kV Compensation Station, and regeneration stations. When the proposed transmission line routes are collocated with existing transmission lines, the ROI has been expanded to a buffer of 800 feet wide (400 feet from the proposed transmission line centerline). The ROI was determined based on standard methodologies for EMF measuring and modeling that account for standard attenuation distances for these fields.

If all reasonably foreseeable future projects listed in Section 7.2.2 were constructed, it would result in paralleling of multiple electric transmission lines and an increase in electric and magnetic fields. The cumulative effects from this paralleling would be similar to the levels listed in Section 5.2.2.1 which would be below state standards for electric fields and other state and international standards on magnetic fields, therefore, potential cumulative impacts from EMFs on public health are not expected to be significant.

7.3.2.2 Implantable Medical Devices

As discussed above on EMFs, cumulative impacts from all reasonably foreseeable future projects listed in Section 7.2.2 would result in an increase in electric fields, but this cumulative increase would result in levels below state standards and is not expected to affect implantable medical devices.

7.3.2.3 Stray Voltage

The ROI for this analysis of stray voltage includes the 200-foot ROW for the proposed routes and variations within the West, Central, East sections, as well as the proposed Blackberry 500 kV Substation, 500 kV Compensation Station, and regeneration stations. Similar to implantable medical devices, the cumulative impacts from all projects listed in Section 7.2.2 combined with the proposed Project would not be expected to have any measurable impacts from stray voltage, even on agricultural operations.

7.3.2.4 Induced Voltage

The ROI for induced voltage includes the 200-foot ROW for the proposed routes and variations within the West, Central, East sections, as well as the proposed Blackberry 500 kV Substation, 500 kV Compensation Station, and regeneration stations. As with stray voltage, the cumulative result of all projects listed in Section 7.2.2 in combination with the proposed Project would not be expected to result in measureable increases in induced voltage. The combination of transmission lines located in parallel corridors would increase the potential for minor shocks to occur to individuals touching an ungrounded object, such as machinery, while standing directly underneath one of these lines. Adherence to best management practices (BMPs) and safety measures would avoid this impact.

7.3.2.5 Intentional Destructive Acts

The ROI for intentional destructive acts includes the 200-foot ROW for the proposed routes and variations within the West, Central, East sections, as well as the proposed Blackberry 500 kV Substation, 500 kV compensation station, and regeneration stations. If the Mesaba Energy project, the Nashwauk transmission line from the Blackberry to Nashwauk, or both were constructed, they would all connect into the existing Blackberry Substation.

7.3.2.6 Environmental Contamination

The ROI for environmental contamination includes environmental contamination sites within 2,000 feet (1000-feet on either side) of the anticipated alignment of the proposed routes and variations and proposed Blackberry 500 kV Substation, 500 kV Compensation Station, and regeneration stations. Construction and maintenance of any transmission line involves the use of hazardous materials and the generation of waste. If handled improperly, the public and/or the surrounding environment could be adversely affected. For all the proposed routes and variations, soil would be disturbed and, as a result, any existing contaminated soil or groundwater could be mobilized. In this case, a 2,000-foot radius was used to be conservative and to gain a comprehensive view of the potential for contamination near the proposed routes and variations. While the construction of all reasonably foreseeable future projects would increase the potential for environmental contamination through spills or excavation of contaminated sites, the adherence to BMPs would avoid these impacts.

7.3.2.7 Worker Health and Safety Considerations

While construction activity of all reasonably foreseeable future projects would increase the potential for health and safety concerns, compliance with Occupational Safety and Health Administration (OSHA) requirements would help to avoid or minimize these impacts.

7.3.3 Land-Based Economies

This section describes potential cumulative impacts from the constructions of all reasonably foreseeable future projects to land-based economic resources discussed in Chapter 6, specifically agriculture, forestry, and mining and mineral resources.

7.3.3.1 Agriculture

The ROI for agriculture includes the 200-foot ROW of the proposed routes and variations and the footprint of the other elements of the proposed Project including permanent access roads and the proposed Blackberry 500 kV Substation, 500 kV series compensation station, and regeneration stations.

As discussed in Section 5.3.2.1, construction of the proposed Project could result in impacts to agricultural operations and practices. The proposed Project, in combination with reasonably foreseeable future projects could cause cumulative impacts to agriculture as operations and practices which may need to be altered (e.g., row cropping around individual transmission structures) in certain areas to avoid conflicts with utilities. These cumulative impacts to agriculture would only occur in the Balsam and Blackberry variation areas, and since farmland is not common in these variation areas, adverse cumulative impacts are expected to be minimal.

7.3.3.2 Forestry

The ROI for forestry includes the 200-foot ROW of the proposed routes and variations and the footprint of the proposed Blackberry 500 kV Substation, 500 kV series compensation station, regeneration stations, permanent and temporary access roads, temporary laydown areas, temporary stringing areas, and temporary fly-in sites.

The proposed Project, in addition to the reasonably foreseeable future projects listed in 7.2.2, could collectively result in adverse, localized cumulative impacts to forestry and timber operations by removing the lands in ROWs from active timber production or forestry activity. The cumulative impacts associated with the reasonably foreseeable future projects listed in Section 7.2.2, would be limited to the southern portion of the Balsam Variation Area and the Blackberry Variation Area, where forested land is dominant, so the cumulative impacts from these projects are likely to be a small percentage of the forested area. Therefore, cumulative impacts to forestry and timber operations are expected to be minimal.

7.3.3.3 Mining and Mineral Resources

The ROI for mining and mineral resources includes the 200-foot ROW of the proposed routes and variations, permanent and temporary access roads, and the footprint of the proposed Blackberry 500 kV Substation, 500 kV series compensation station, regeneration stations, temporary laydown areas, temporary stringing areas, and temporary fly-in sites.

Potential cumulative impacts on mining and mineral resources could occur if multiple projects that interfere with access to mineable resources or the ability to remove mineral resources are constructed in close proximity to or at the same time as one another. If there is a conflict between transmission lines and mineral rights, the transmission lines may have to be relocated to access the underground minerals.

The Proposed Blue Route, and the transmission line and pipeline routes for the Mesaba Energy project all cross one area of known mineral resources in the north portion of the Blackberry Variation Area. Route RA-06 for the Enbridge Sandpiper pipeline project and the Enbridge Line 3 project also would cross through areas with known mineral resources. If the Mesaba Energy project, the Enbridge Sandpiper pipeline project, and the Enbridge Line 3 project were eventually constructed in this area, portions of one or all of these projects may need to be relocated in the future in order to protect access to mineral resources.

7.3.4 Archaeology and Historic Resources

As discussed in Section 5.3.3.2, transmission line construction can result in damage, destruction, or alteration of historic buildings and buried archaeological resources. A Programmatic Agreement (PA) is under development by Department of Energy (DOE), Tribes, Minnesota State Historical and Preservation Office (SHPO), Advisory Council on Historic Preservation (ACHP), the Applicant, and other consulting parties to avoid and minimize impacts to cultural resources.

Adverse cumulative effects on cultural resources may occur if ground disturbance associated with the

proposed Project and other present and reasonably foreseeable projects directly destroy or damage archaeological resources, disturb the context of archaeological resources, or affect an NRHP-eligible architectural resource.

The ROI for cumulative effects assessment to archaeological resources includes the 200-foot ROW of the proposed routes and variations and the permanent and temporary access roads as well as the footprint of the proposed Blackberry 500 kV Substation, 500 kV series compensation station, regeneration stations, temporary laydown areas, temporary stringing areas, and temporary fly-in sites. For architectural resources, the ROI (which is the same as the Area of Potential Effect (APE)) includes the 200-feet ROW width plus the distance of a one-mile radius from the anticipated alignment of the proposed routes and variations. The additional one-mile ROI for architectural resources serves to address the potential adverse effects the proposed Project could have upon historic viewsheds, adjacent historic architectural resources, and cultural landscapes because visual intrusions can have a direct effect on the context and setting of historic architectural properties.

If the proposed Project parallels other transmission line corridors and is within the viewshed of historic architectural or built resources in the indirect APE, as defined in Section 5.3.3.1, it could have indirect, cumulative adverse visual effects on those structures if these historic architectural or built resources are determined NRHP-eligible and if setting is determined to be a character defining feature that contributes to the significance of the resource. One area where this could happen is along the Proposed Blue Route and Proposed Orange Route in the Balsam Variation Area where the proposed Project would parallel the transmission line associated with the proposed Excelsior Energy Mesaba Energy power plant. Specifically, these projects would be located in the municipality of Taconite where several historic architectural sites that have either not been evaluated or were recommended potentially NRHP eligible, recommended NRHP eligible, or considered NRHP eligible are located (Map 6-62). It is currently unknown whether the setting of any of these historic architectural sites contributes to the significance of the resource and therefore whether it would be an adverse effect to the resource. The Enbridge Sandpiper pipeline RA-06 route, if selected, and the Enbridge Line 3 project would intersect the alternatives for this proposed Project, but would be underground and would cross the route of the proposed Project for only the 200-foot ROW and would therefore not visually impact historic resources.

Indirect, long-term, adverse visual effects on these architectural resources within the indirect APE are likely to occur wherever the transmission structures associated with the reasonably foreseeable future projects are visibly prominent and appear inconsistent with the existing setting of the architectural resources or within views to and from the architectural resources. However, since this is a developed area, none of the reasonably foreseeable future projects are expected to be inconsistent with existing settings or views surrounding architectural resources. As such, these impacts would not be expected to be significant.

7.3.5 Natural Resources

This section describes potential cumulative impacts to natural resources discussed in Chapter 6 specifically water, vegetation, and wildlife resources. The ROI for impacts to water resources, vegetation, and general wildlife (not threatened or endangered species) is the 200-foot ROW of the proposed routes and variations, permanent and temporary access roads, and the footprint of the proposed Blackberry 500 kV Substation, 500 kV series compensation station, regeneration stations, temporary laydown areas, temporary stringing areas, and temporary fly-in sites. This ROI was selected based on the expectation that, given the construction activities proposed and associated Applicant measures to avoid, minimize, and mitigate potential impacts, any impacts to water resources would likely occur within this area.

7.3.5.1 Water Resources

The proposed Project, in addition to the reasonably foreseeable future projects listed in Section 7.2.2, would collectively result in adverse, regional cumulative impacts to wetlands. Linear projects, such as transmission lines and pipelines, require removal of woody vegetation from the project ROWs for construction and operation. Should woody vegetation be removed from forested and/or shrub wetlands, it would convert the wetland to a different vegetation community and wetland type.

When considered collectively, the proposed Project in combination with present and reasonably foreseeable projects would be expected to cumulatively result in a conversion of wetland vegetation community and wetland type; however, these impacts are not anticipated to be significant due to the amount of surrounding shrub and forested wetlands in the region.

Total wetland acreage within the region was calculated within eight-digit hydrologic unit code watersheds that overlap the proposed Project and any of the reasonably foreseeable projects. Watersheds used in this analysis include Little Fork, Prairie-Willow, Red Lakes, Big Fork, Rapid, Two Rivers, Lower Rainy, Roseau, and Lake of the Woods and were limited to portions of the watersheds within the United States to match the extents of available NWI data. Based on NWI data, there are approximately 4,609,000 acres of wetland in the region; of this, approximately 3,384,000 million (73.4 percent) are forested or shrub wetland.

Potential cumulative wetland impacts were determined based on conversion of forested or shrub wetland to herbaceous wetland types within a 200-foot ROW for all reasonably foreseeable future linear projects or within the project footprint for non-linear projects. The proposed Project, in combination with all reasonably foreseeable future projects, would result in the conversion of 0.12 percent of NWI-determined forested or shrub wetland in the region to an herbaceous wetland type. This quantity of potential wetland conversion is not expected to be significant in the context of the region.

The long-term impacts associated with vegetation removal and subsequent vegetation maintenance of the ROWs of all reasonably foreseeable future projects could result in adverse cumulative impacts to wetland hydrology, vegetation composition, and wetland function; however, these impacts are not expected to be significant due to the amount of surrounding shrub and forested wetlands in the region. The Applicant for the proposed Project and other reasonably foreseeable future project proponents would likely need to mitigate wetland impacts as part of permit negotiations with USACE for their individual project (40 CFR 332.3).

7.3.5.2 Vegetation

Potential cumulative impacts on vegetation resources could occur if multiple projects are constructed in close proximity of one another. The clearing of vegetation and conversion from forested to open habitats could impede native vegetation by increasing potential for spread of invasive species and noxious weeds and could also increase the effects of light penetration, wind, and humidity that is more prominent on edges between different habitat types. Projects may also permanently remove vegetation to place structures, permanent access roads, etc. Clearing of low-growing vegetation during construction is not anticipated to result in a significant cumulative impact as it would be expected that disturbed areas would be reseeded upon completion of construction. However, permanent removal of trees and shrubs along project ROWs could result in significant cumulative effects if these projects are constructed in close proximity to one another and do not minimize impacts through paralleling existing corridors.

7.3.5.3 Wildlife

Cumulative impacts for wildlife resources would be different from construction and operation activities of the transmission line. During construction of the proposed Project, wildlife could be affected by actual vegetation clearing or ground disturbance within the proposed Project footprints, as well as through the alteration of habitats following construction, as discussed in Section 5.3.4.3.

The proposed Project could result in cumulative impacts to wildlife resources when considered together with the other projects listed in 7.2.2 if those projects are constructed concurrently in close proximity. Specifically, the clearing of vegetation and disturbance of wildlife habitats could physically harm or displace wildlife species. In addition, impacts such as disturbance related to construction noise could occur. For non-listed wildlife species, these impacts would not be expected to be significant because these species do not suffer from population level declines.

Even if not constructed concurrently, these reasonably foreseeable future projects could further alter the amount and quality of habitat available to wildlife in the vicinity of the proposed Project due to tree clearing for ROWs for transmission lines and a pipeline and the facility footprint for the Mesaba Energy power plant. These reasonably foreseeable future projects are in parallel corridors for approximately nine miles with the Proposed Project; so while these impacts would be long-term, their localized nature and the availability of abundant forested habitat in the vicinity mean that these impacts would not be expected to be significant.

Operations of the reasonably foreseeable future transmission line projects in 7.2.2 could have a greater cumulative impact on avian species through collisions and electrocutions, as discussed in Section 5.3.4.3. These cumulative impacts are not expected to be significant, though, due to the isolated nature of these impacts and the Applicant proposed measures to reduce impacts to avian species from transmission lines, which are summarized in Chapter 2.

7.3.6 Rare and Unique Natural Resources

This section describes potential cumulative impacts to rare and unique natural resources discussed in Chapter 6, specifically rare species and rare communities. The ROI for rare and unique natural resources varies by species. The ROI for federally-listed species under the Endangered Species Act (ESA) includes the county for which each species is listed. Because no formal surveys for state-listed species have been conducted for the proposed Project, the ROI for state-listed species includes a one-mile buffer on either side of the anticipated alignment for the proposed routes and variations in order to obtain a broad view of species that may be present across the project. The ROI for rare plant communities includes the 200-foot ROW of the proposed transmission line and the permanent and temporary access roads in addition to the footprint of the other elements of the proposed Project: the Blackberry 500 kV Substation, 500 kV series compensation station, regeneration stations, temporary laydown areas, temporary stringing areas, and temporary fly-in sites. These ROIs were selected based on the expectation that the majority of rare and unique natural resource impacts would likely occur due to construction and on-going transmission line operation within these areas.

7.3.6.1 Rare Species

Potential cumulative impacts to rare wildlife species could occur during construction of multiple projects that are constructed concurrently in close proximity and are similar to those described for non-listed species in Section 7.3.5.3. If cumulative effects associated with construction or operation of the proposed Project could occur to federally- or state-listed species, then the potential for cumulative adverse effects could be significant.

The proposed Project, when considered with any other reasonably foreseeable future project that may involve tree removal, could contribute to cumulative impacts to the northern long-eared bat, which relies on forested habitat for roosting. If trees are cleared during the roosting period or if trees are cleared within close proximity to one another, cumulative impacts to the northern long-eared bat and its roosting habitat could be significant. A Biological Assessment is being prepared and consultation with the U.S. Fish and Wildlife Service (USFWS) is ongoing. Avoidance, minimization, and mitigation measures for federally-listed species will need to be coordinated with the USFWS in compliance with the ESA.

If rare species are located in disturbed areas of projects constructed in close proximity of one another, the cumulative impacts could be detrimental to individual rare communities; however, field surveys would be required to confirm the presence of rare species in the respective project areas prior to construction. If species are found, the Applicant would coordinate with USFWS or Minnesota Department of Natural Resources (MnDNR) regarding avoidance or mitigation. Some rare species frequently colonize disturbed areas and could benefit from new habitat created as a result of ground disturbance from multiple projects (see Section 5.3.5.2 for additional information).

7.3.6.2 Rare Communities

Potential cumulative impacts on rare communities could occur if multiple projects are constructed in close proximity of one another and are similar to those described for vegetation in Section 7.3.5.2. Permanent loss of forest would lead to fragmentation by reducing intact blocks of forest vegetation. Removal of vegetation and conversion to open habitats would increase the potential for spread of invasive species and would alter the structure and function of rare communities, potentially making them less suitable for the rare species that would typically inhabit them. Cumulative impacts to rare communities could be significant if projects are constructed in close proximity to one another and disturbance is not minimized by paralleling existing corridors.

7.4 Adverse Impacts that Cannot be Avoided

Adverse impacts would be minimized with implementation of the Applicant-proposed measures described in Section 2.13. Where feasible, this EIS suggests additional measures (mitigation) would be incorporated into the planning, design and construction of the proposed Project to substantially eliminate the adverse impacts where possible. For some impacts, adverse impacts can be reduced but not eliminated and are therefore determined to be unavoidable. Most unavoidable adverse impacts would occur during the construction phase of the proposed Project and would be temporary.

A review of impacts and possible mitigation measures is located in Chapter 5 in this EIS; the unavoidable adverse effects caused by the proposed Project that would remain after applying mitigation measures are discussed in Chapter 6.

Unavoidable adverse effects related to the proposed Project construction would last only as long as

the construction period, and would include the following:

- Soil compaction, erosion, and vegetation degradation;
- Disturbance to and displacement of some species of wildlife;
- Disturbance to nearby residents;
- Traffic delays in some areas; and
- Minor air quality impacts due to fugitive dust.

Unavoidable adverse effects related to the proposed Project that would last at least as long as the life of the proposed Project would include the following:

- The addition to the visual landscape of transmission structures and lines;
- Habitat type changes and fragmentation;
- Adverse impacts to wildlife and wildlife habitat due to project-related changes to wetland type (palustrine forested (PFO) and palustrine shrub (PSS) to palustrine emergent (PEM)) and the removal of other vegetation; and
- Direct adverse impacts to wildlife as a result of avian collisions.

EMFs from the proposed Project are also unavoidable. Further details of these impacts are discussed in Section 5.2.2.1.

7.5 Relationship between Short-term uses of the Environment and the Maintenance and Enhancement of Long-term Productivity

Short-term uses of the biophysical components of the human environment include impacts, usually related to construction activities, which occur over a period of less than five years. Long-term uses of the human environment include those impacts that occur over a period of more than five years, including permanent resource losses.

Chapter 5 identifies potential short-term, adverse impacts on the natural environment as a result of construction activities. These adverse impacts include increases in surface water turbidity; disturbance and re-suspension of sediments in surface waters; vegetation clearing; localized habitat degradation; soil disturbance and increased potential for erosion; stormwater runoff into surface water; and increased traffic, air emissions, and noise. Long-term adverse impacts of the proposed Project include wetland vegetation community and wetland type conversion through clearing of woody vegetation in the project ROW.

The proposed Project would be expected to enable long-term productivity by importing energy generated in Canada to the U.S. power grid, thus applying downward pressure on electricity prices and replacing more emissive fossil-fueled sources of energy with hydroelectric sources.

7.6 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable commitments of resources refer to impacts on or losses of resources that cannot be reversed or recovered, even after an activity has ended. Irreversible commitment applies primarily to nonrenewable resources, such as minerals or cultural resources, and to those resources that are renewable only over long time spans, such as soil productivity. Irretrievable commitment applies to the loss of production, harvest, or natural resources. This section discusses irreversible and irretrievable commitments of resources as a result of implementing the proposed Project; these impacts are permanent.

7.6.1 Rare Species

Activities involving heavy machinery, which could include construction, maintenance, or emergency repairs, in the proposed Project ROW could result in the direct mortality of individual listed species. Most mobile species would be expected to avoid areas undergoing active ground disturbance. The loss of an individual of a protected species would be adverse, but is not expected to have irreversible or irretrievable impacts on the species as a whole. A draft Biological Assessment is being prepared in order to determine the impacts of the proposed Project on federally-listed species, and DOE and USFWS consultation under Section 7 of the ESA is on-going (Appendix Q).

7.6.2 Wetland Type Conversion

The proposed Project would permanently clear woody vegetation from forested and shrub wetlands, allowing for only short-stature vegetation to regrow. Though removing woody vegetation within a forested or shrub wetland would not reduce overall wetland acreage, it would convert the forested or shrub wetland area to a different vegetation community and wetland type. This would be considered an irretrievable and irreversible impact

because the area would be continuously managed in an emergent, herbaceous state for the life of the project. This change could significantly shift the vegetation composition and hydrologic function and result in a measureable decrease in water uptake by vegetation. This decrease could have an associated influence on the suitability of wildlife habitat for certain species as well as wetland function.

7.6.3 Materials

Material resources irretrievably used to construct the proposed Project could include copper, lead, steel, concrete, bitumen, and other materials. These materials are not in such short supply that implementation of the proposed Project would limit other unrelated construction activities and their use would not be significant.

7.6.4 Energy

Energy resource used to construct the proposed Project would be irretrievably lost. During construction, gasoline and diesel fuel would be used for the operation of vehicles and heavy equipment. Intermittent inspection and emergency repair activities would also require gasoline and diesel fuel. Overall, consumption of energy resources would not place a significant demand on their availability in the region. Therefore, limited impacts are anticipated from the consumption of energy.

7.6.5 Landfill Space

The disposal of any excavated soils or other construction materials in a landfill would be an irretrievable, adverse impact. There are several landfills and construction and demolition processing facilities that could manage waste generated by construction of the proposed Project. However, any waste generated by the proposed Project that is disposed of in a landfill would be considered an irretrievable loss of that landfill space.

7.6.6 Human Resources

The use of human resources for construction is considered an irretrievable loss only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources represents employment opportunities and is considered beneficial.

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Chapter 8 provides the list of individuals who filled primary roles in the preparation of this EIS.

8.1 Federal and State Agencies

Julie Smith of the Department of Energy Office of Electricity Delivery and Energy Reliability (DOE) and Bill Storm of the Minnesota Department of Commerce – Energy Environmental Review and Analysis (DOC-ERRA) directed the preparation of the EIS. DOE invited other federal agencies to participate in the preparation of this EIS to ensure that it satisfies those agencies' environmental requirements and to engage their specialized expertise. The federal cooperating agencies include the St. Paul District of the USACE, Region 5 of the EPA, and the Twin Cities Ecological Field Office (Region 3) of USFWS. DOE has also invited the Red Lake Band and Bois Forte Band of Chippewa Indians to act as cooperating agencies on the EIS. Table 8 1 lists the federal agency, state agency, and cooperating agencies.

Table 8-1 List of Preparers - Federal and State Organization

Name	Organization
Lead Agencies	
Julie Smith, Ph.D.	DOE Office of Electricity Delivery and Energy Reliability, Washington, DC
Bill Storm	Department of Commerce – Energy Environmental Review, St. Paul, MN
Cooperating Agencies	
Margaret Rheude	U.S. Fish and Wildlife Service
William Baer	U.S. Army Corps of Engineers, Bemidji Regulatory Field Office
Virginia Laszewski	U.S. Environmental Protection Agency Region 5

8.2 EIS Preparation Team

The EIS Preparation Team was led by the EIS contractor Barr Engineering Co. with support from Ecology and Environment Inc. (E & E) and Azar Law LLC. This team provided primary support and assistance to DOE and DOC-ERRA. Primary members of this team included John Wachtler (Barr), Cheryl Feigum (Barr), Dan Belin (E & E), Courtney Dohoney (E & E), and Lauren Azar (Azar Law LLC). In addition, a range of resource specialists, NEPA specialists, and technical writers were also part of the team. Table 8-2 lists each individual and their organization, education and experience, and responsibilities.

8.3 Responsibilities

DOE and DOC-ERRA provided direction to Barr and E & E which were responsible for developing analytical methodology and assessing the potential impacts of the alternatives, coordinating the work tasks, performing the impact analyses, and producing the document. DOE and DOC-ERRA were responsible for the scope, content, and organization of the EIS, data quality, and issue resolution and direction.

DOE and DOC-ERRA independently evaluated all supporting information and documentation prepared by the Barr and E & E project teams. Further, DOE and DOC-ERRA retained the responsibility for determining the appropriateness and adequacy of incorporating any data, analyses, and results of other work performed by Barr and E & E in the EIS. Barr and E & E were responsible for integrating this work into the EIS.

As required by Federal Regulations (40 CFR 1506.5(c)), Barr, E & E, and Azar Law LLC signed a NEPA Disclosure Statement in relation to the work they performed on this EIS. These signed statements are provided in Appendix T of this EIS.

Table 8-2 List of Preparers - EIS Preparation Team

Name, Organization	Education and Experience	Responsibility
Cheryl Feigum, PhD Vice President Barr Engineering Co.	Ph.D. Soil Science M.S. Zoology B.A. Biology Years of Experience: 15	Barr Project Manager
John Wachtler, Vice President Barr Engineering Co.	J.D. M.S. Civil and Environmental Engineering, B.S. Biology Years of Experience: 30	Barr Principal in Charge, Corridor Sharing, Electrical System Reliability
Louise Segroves Barr Engineering Co.	M.S. Geosciences B.A. Geology/Economics Years of Experience: 7	Barr Deputy Project Manager, Land-based Economies, Cultural Values, Relative Merits
Mike Strong Barr Engineering Co.	B.A. Environmental Studies Years of Experience: 9	GIS Management
Jessica Butler Barr Engineering Co.	M.S. Soil Science B.S. Resource Conservation Years of Experience: 11	Vegetation, Wildlife, Rare Natural Communities, Land-Based Economies
Shanna Braun Barr Engineering Co.	B.S. Natural Resources Management Years of Experience: 10	Water Resources, Cumulative Effects
Daniel Jones Barr Engineering Co.	M.S. Biology – Ecology and Evolution B.S. Botany and Plant Pathology Years of Experience: 24	Vegetation, Wildlife
Sarah Olson Barr Engineering Co.	B.S. Environmental Science Years of Experience: 4	Data Management
Kathy Brown Barr Engineering Co.	M.L.S. Library and Information Science B.S. Business Administration Years of Experience:4	Administrative Record
Lauren Azar Azar Law LLC	J.D., M.S. Philosophy, B.S. Water Resources Management, B.A. Philosophy Years of Experience: 21	NEPA Advisor
Rick Holton Rick Holton | Writing for Results	Ph.D. English, M.A. English, A.B. English Years of Experience: 25	Summary
Dan Belin, *AICP* E & E	M.S. Forestry, B.A. History/Environmental Studies Years of Experience: 19	E & E Project Director
Courtney Dohoney E & E	M.E.M. Environmental Management B.S. Environmental Studies Years of Experience: 9	E & E Project Manager
Katie Day E & E	M.S. Biology B.S. Biology and Environmental Studies Years of Experience: 9	E & E Deputy Project Manager
George Welsh E & E	M.S. Forest Resources, B.S. Forest Resource Management Years of Experience: 42	E & E Principal Reviewer
Natasha Snyder E & E	M.A. Anthropology B.A. Anthropology/Environmental Science A.A. Liberal Arts Years of Experience: 30	Cultural Resources
Carl Sadowski, *AICP* E & E	M.U.P. Urban Planning B.A. Environmental Design Years of Experience: 6	Transportation and Traffic

Name, Organization	Education and Experience	Responsibility
Laurie Kutina, CEM, REM E & E	M.B.A. Business Administration, M.A. Architecture, B.A. Physics Years of Experience: 22	Air Quality and Greenhouse Gas
Joe Donaldson E & E	M.L.A. Landscape Architecture , B.A. Architecture Years of Experience: 37	Aesthetics
Kathleen Welder E & E	M.S. Environmental Science, B.A. Urban Studies Years of Experience: 13	Environmental Justice and Socioeconomics
Silvia Yanez E & E	M.S. Development and Environment Diploma (M.S. Equivalent) Environmental Management Diploma (B.S. Equivalent) Chemical Engineering Years of Experience: 13	Noise, Human Health and Safety

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9.0 References

1. Minnesota Power. Application for Presidential Permit and Route Permit. Great Northern Transmission Line. [Online] 2014. http://www.greatnortherneis.org/Home/documents.

2. U.S. Environmental Protection Agency. Minnesota Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. Green Book. [Online] January 30, 2015. [Cited: February 4, 2015.] http://www.epa.gov/oar/oaqps/greenbk/anayo_mn.html.

3. Weber, William V. and Jensen, Glenn A. A Study of High Voltage Power Line Easements and their Effect on Farm Land Values in West Central Minnesota. Luverne, Minnesota: Jensen Management Service. 1978.

4. Jensen, Glenn A. and Weber, William V. High Voltage Transmission Lines and their Effect on Farm Land Value in West Central Minnesota. Luverne, Minnesota: Jensen Management Service, Inc. 1982.

5. Jackson, Thomas O. and Pitts, Jennifer. The Effects of Electric Transmission Lines on Property Values: A Literature Review. Journal of Real Estate Literature. 2010, Vol. 18, 2, pp. 239-259.

6. Scholten, A., Joosten, S. and Silny, J. Unipolar cardiac pacemakers in electromagnetic fields of high voltage overhead lines. Journal of Medical Engineering & Technology. Jul-Aug 2005, Vol. 29, 4, pp. 170-175.

7. Electric Power Research Institute. Electromagnetic Interference with Implanted Medical Devices. 2004.

8. Minnesota Power. Response to Information Request regarding Project Development in Western Region. March 9, 2015.

9. —. cost comparison - Minnesota Power Response to Request for Information from DOE. April 1, 2015.

10. Minnesota Pollution Control Agency. A Guide to Noise Control In Minnesota: Acoustical Properties, Measurement, Analysis and Regulation. 2008.

11. Federal Highway Administration (FHWA). FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

12. Power Engineer. Great Northern Transmission Line Project – EMF and Corona Effects Calculations Memorandum. August 8, 2013.

13. —. Great Northern Transmission Line Project – EMF and Corona Effects Calculations with Adjacent Lines Memorandum. January 27, 2014.

14. McDonald, John D. (editor). Electric Power Substations Engineering. 2nd. s.l. : CRC Press, 2007.

15. National Electrical Manufacturers Association (NEMA). Transformers, Regulators and Reactors NEMA Standards Publication TR-1-1993 (R2000). Rosslyn, VA : s.n., 2000.

16. U.S. Environmental Protection Agency. Air Quality. U.S. Environmental Protection Agency Air Quality Planning and Standards. [Online] [Cited: April 16, 2015.] http://www.epa.gov/airquality/cleanair.html.

17. —. National Ambient Air Quality Standards (NAAQS). U.S. Environmental Protection Agency - Air and Radiation. [Online] October 21, 2014. [Cited: January 15, 2015.] http://www.epa.gov/air/criteria.html.

18. —. Overview of Greenhouse Gases. U.S. Environmental Protection Agency - Climate Change. [Online] May 7, 2015. [Cited: May 7, 2015.] http://www.epa.gov/climatechange/ghgemissions/gases/fgases.html.

19. U.S. Council on Environmental Quality. Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts. the White House. [Online] [Cited: March 15, 2015.] https://www.whitehouse.gov/sites/default/files/docs/nepa_revised_draft_ghg_guidance_searchable.pdf.

20. U.S. Environmental Protection Agency. Climate Change Impacts and Adapting to Change. Climate Change. [Online] [Cited: April 16, 2015.] http://epa.gov/climatechange/impacts-adaptation/index.html.

21. —. FACT SHEET: Clean Power Plan State Roles. Carbon Pollution Standards. [Online] 2015. [Cited: February 5, 2015.] http://www2.epa.gov/carbon-pollution-standards/fact-sheet-clean-power-plan-state-roles.

22. Minnesota Power. Energy Forward Strategy. Energy Forward. [Online] 2015. [Cited: April 16, 2015.] http://www.mnpower.com/Environment/EnergyForward.

23. U.S. Environmental Protection Agency. Visibility in our Nation's Parks and Wilderness Areas. Visibility. [Online] May 31, 2012. [Cited: February 5, 2015.] http://www.epa.gov/airquality/visibility/monitor.html.

24. —. Air Quality Index Report for Minnesota by County, 2013 and 2014. Air Data. [Online] [Cited: March 4, 2015.] http://www.epa.gov/airdata/.

25. Smith, James E., et al. Methods for Calculating Forest Ecosystem and Harvested Carbon with Standard Estimates for Forest Types of the United States. United States Department of Agriculture -Forest Service – Northeastern Research Station. General Technical Report NE-343. 2006.

26. Minnesota Power. 2013 Resource Plan for Minnesota Power. Docket No. E015/RP-13-53. [Online] March 1, 2013. [Cited: April 16, 2015.] http://www.mnpower.com/Environment/ResourePlan.

27. U.S. Environmental Protection Agency. Emissions of Fluorinated Gases. U.S. Environmental Protection Agency - Climate Change - Overview of Greenhouse Gases. [Online] 2015. [Cited: April 16, 2015.] http://www.epa.gov/climatechange/ghgemissions/gases/fgases.html.

28. U.S. Environmental Protectin Agency. SF6 Emission Reduction Partnership for Electric Power Systems. U.S. Environmental Protectin Agency. [Online] May 18, 2015. [Cited: April 16, 2015.] http://www.epa.gov/highgwp/electricpower-sf6/index.html.

29. Minnesota Department of Health. Minnesota Climate Change Vulnerability Assessment. Minnesota Department of Health - Climate and Health. [Online] October 2014. http://www.health.state.mn.us/divs/climatechange/docs/mnclimvulnreport.pdf.

30. Minnesota Pollution Control Agency, Interagency Climate Adaption Team. Adapting to Climate Change in Minnesota. Minnesota Pollution Control Agency. [Online] 2013. http://www.pca.state.mn.us/index.php/view-document.html?gid=15414.

31. Public Service Commission of Wisconsin. Arrowhead-Weston Electric Transmission Line Project: Final Environmental Impact Statement Volume I, Docket 05-CE-113. October 2000.

32. Arora and Mosch. High Voltage and Electrical Insulation Engineering. John Wiley and Sons. Hoboken, NJ. 2011. p. 165.

33. Bonneville Power Administration. Big Eddy-Knight Transmission Project Final Environmental Impact Statement. July 2011.

34. Minnesota Department of Transportation. Traffic Forecasting & Analysis, Traffic Volume (AADT/HCAADT). Minnesota Department of Transportation. [Online] 2014. [Cited: March 3, 2015.] http://www.dot.state.mn.us/traffic/data/data-products.html#volume.

35. —. Minnesota Freight Railroad Map. Minnesota Department of Transportation. [Online] January 2015. [Cited: March 4, 2015.] http://www.dot.state.mn.us/ofrw/maps/MNRailMap.pdf.

36. University of Minnesota, Duluth, Bureau of Business and Economic Research; Labovitz School of Business and Economics. Minnesota Power/Manitoba Hydro Great Northern Transmission Line Economic Impact on Northern Minnesota. July 2013.

37. Minnesota Department of Tranportation. Utility Accommodation on Highway Right of Way. Minnesota Department of Tranportation. [Online] 2015. [Cited: March 3, 2015.] http://www.dot.state.mn.us/policy/operations/op002.html.

38. U.S. Government Publishing Office. Title 14: Aeronautics and Space, Part 77-Safe, Efficient Use, and Preservation of the Navigable Airspace, Subpart B-Notice Requirements. Electronic Code of Federal Regulations (e-CFR). [Online] May 14, 2015. http://www.ecfr.gov/cgi-bin/text-idx?SID=c957224f6e2b4fb1f2fc236f5da09558&node=pt14.2.77&rgn=div5.

39. Federal Aviation Administration. Data Dictionaries: Facilities, Runways. County: Roseau, Lake of the Woods, Koochiching, Beltrami, Itasca. Airport Data & Contact Information. [Online] April 30, 2015. [Cited: March 6, 2015.] https://www.faa.gov/airports/airport_safety/airportdata_5010/.

40. Minnesota Department of Natural Resources. Wildfire Information. Division of Forestry. [Online] [Cited: March 2, 2015.] http://www.dnr.state.mn.us/forestry/fire/index.html.

41. U.S. Environmental Protection Agency. Final Guidance For Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses. U.S. Environmental Protection Agency. [Online] April 1998. [Cited: February 27, 2015.] http://www.epa.gov/environmentaljustice/resources/policy/ej_guidance_nepa_epa0498.pdf.

42. U.S. Census Bureau. 2012 American Community Survey. American Fact Finder - DP05: ACS Demographic and Housing Estimates. [Online] 2012. [Cited: May 14, 2015.] http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF.

43. —. 2008-2012 American Community Survey 5-year Estimates. Geography includes Minnesota, and selected Minnesota Counties, and selected Minnesota census tracts. American Fact Finder - DP05: ACS Demographic and Housing Estimates. [Online] 2012. [Cited: February 20, 2015.] http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk.

44. —. 2012 American Community Survey 1-Year Estimates. American Fact Finder - DP05: ACS Demographic and Housing Estimates. [Online] 2012. [Cited: May 14, 2015.] http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk.

45. Council on Environmental Quality, Executive Office of the President. Environmental Justice, Guidance Under the Natinoal Environmental Policy Act. U.S. Environmental Protection Agency. [Online] December 10, 1997. [Cited: February 27, 2015.] http://www.epa.gov/compliance/ej/resources/policy/ej_guidance_nepa_ceq1297.pdf.

46. U.S. Census Bureau. 2009-2013 American Community Survey 5-year Estimates. Geography includes Minnesota, Beltrami County, and the following reservations: Boise Forte, Fond du Lac, Grand Portage, Leech Lake, Mill Lacs, Red Lake, and White Earth. American Fact Finder - DP03: ACS Demographic Housing Estimates. [Online] 2013.

47. Minnesota Department of Natural Resources. 2014 Minnesota Hunting & Trapping Regulations Handbook. [Online] 2014. [Cited: May 13, 2015.] http://files.dnr.state.mn.us/rlp/regulations/hunting/2014/full_regs.pdf.

48. Red Lake Department of Natural Resources. Red Lake Fisheries Program. Red Lake Department of Natural Resources. [Online] 2015. [Cited: May 14, 2015.] http://www.redlakednr.org/Fisheries.html.

49. Minnesota Department of Natural Resources. Wild Rice Management. Minnesota Department of Natural Resources. [Online] 2015. [Cited: May 13, 2015.] http://www.dnr.state.mn.us/wildlife/shallowlakes/wildrice.html.

50. —. Natural Wild Rice in Minnesota: A Wild Rice Study document submitted to the Minnesota Legislature. Minnesota Department of Natural Resources. [Online] February 15, 2008. [Cited: May 13, 2015.] http://files.dnr.state.mn.us/fish_wildlife/wildlife/shallowlakes/natural-wild-rice-in-minnesota.pdf.

51. U.S. Census Bureau. GCT-PH1: Population, Housing Units, Area, and Density: 2010-County--County Subdivision and Place, 2010 Census Summary File 1. U.S. Census Bureau. [Online] 2010. [Cited: March 11, 2015.] http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk.

52. —. GCT-PH1: Population, Housing Units, Area, and Density: 2010-State – Place. 2010 Census Summary File 1. s.l. : U.S. Census Bureau, 2010.

53. —. 2008-2012 American Community Survey 5-Year Estimates. Geography includes Bemidjii Grand Rapids, and International Falls, Minnesota. American Fact Finder - DP05: ACS Demographic and Housing Estimates. [Online] 2012. [Cited: February 20, 2015.] http://factfinder.census.gov/bkmk/table/1.0/en/ACS/12_5YR/DP05/1600000US2705068|1600000US2725118|1600000US2731040.

54. —. 2010 Census Summary File 1. American FactFinder - DP-1: Profile of General Population and Housing Characteristics: 2010. [Online] 2010. [Cited: February 21, 2015.] http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk.

55. Minnesota State Demographic Center. Projections. Minnesota State Demographic Center - Our Projections. [Online] 2014. [Cited: February 21, 2015.] http://mn.gov/admin/demography/data-by-topic/population-data/our-projections/.

56. Minnesota Department of Employment and Economic Development. Minnesota Unemployment Statistics LAUS (Local Area Unemployment Statistics) Data. Minnesota Department of Employment and Economic Development. [Online] 2014. [Cited: February 21, 2015.] https://apps.deed.state.mn.us/lmi/laus/Default.aspx.

57. Minnesota Revenue Department. Preliminary 2014 Property Tax Levies. Minnesota Revenue Department - Property Tax. [Online] 2014. [Cited: February 22, 2015.] http://www.revenue.state.mn.us/propertytax/Pages/ptlevies_14p.aspx.

58. Association of Minnesota Counties. County Government Revenue. Association of Minnesota Counties. [Online] September 2010. [Cited: February 22, 2015.] http://www.mncounties.org/Publications/FYIs/PDF/County_Revenues10.pdf.

59. Minnesota Revenue Department. Corporate Francise Tax. Minnesota Revenue Department - 2015 Legislative Resources. [Online] 2015. [Cited: February 22, 2015.] http://www.revenue.state.mn.us/legislativeupdate/Documents/Corporate_Tax.pdf.

60. Explore Minnesota. All Places to Stay. Explore Minnesota - Places to Stay. [Online] 2015. [Cited: February 21, 2015.] http://www.exploreminnesota.com/places-to-stay/all-places-to-stay/?keywords=&pageIndex=0&radius=0&mapTab=false&sortOrder=asc&sort=randomdaily&locationid=&region_id=&attrFieldsAtLeast=&attrFieldsAtMost=&startDate=false&class_id=1&lat=&lon=&city=&pageSize=2.

61. Red Lake Nation. Red Lake Nation Foods Incorporated. Red Lake Nation Foods. [Online] 2015. [Cited: May 11, 2015.] http://redlakenationfoods.com/index.cfm/home.

62. Red Lake Fishery. Red Lake Nation Fishery. Red Lake Fishery. [Online] 2015. [Cited: May 11, 2015.] http://www.redlakewalleye.com/.

63. Red Lake Nation. Red Lake Band of Chippewa Indians. Red Lake Nation - Red Lake, Minnesota. [Online] 2015. [Cited: May 11, 2015.] http://www.redlakenation.org/.

64. Minnesota Department of Natural Resources. State Forests, Rules. Minnesota Department of Natural Resources - State forests. [Online] 2015. [Cited: May 6, 2015.] http://www.dnr.state.mn.us/state_forests/rules.html.

65. —. State Parks, Rules. Minnesota Department of Natural Resources - Minnesota State Parks. [Online] 2015. [Cited: March 6, 2015.] http://www.dnr.state.mn.us/state_parks/rules.html.

66. Bonneville Power Administration. Living and Working Safely Around High-Voltage Power Lines. Bonneville Power Administration. [Online] 2007. [Cited: February 19, 2015.] http://www.bpa.gov/news/pubs/GeneralPublications/lusi-Living-and-working-safely-around-high-voltage-power-lines.pdf.

67. Great River Energy. Safety Around Power Lines. Great River Energy. [Online] [Cited: February 19, 2015.] http://www.greatriverenergy.com/deliveringelectricity/safety/safetyaroundpowerlines.pdf.

68. National Cancer Institute. Magnetic Field Exposure and Cancer. National Cancer Institute at the National Institue of Health. [Online] November 3, 2014. http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/magnetic-fields-fact-sheet.

69. National Institute of Environmental Health Sciences. EMF Electric and Magnetic Fields Associated with the Use of Electric Power - Questions & Answers. [Online] June 2002. http://www.niehs.nih.gov/health/assets/docs_p_z/results_of_emf_research_emf_questions_answers_booklet.pdf..

70. Lee, Jack M. Electrical and Biological Effects of Transmission Lines: A Review. Prepared for Bonneville Power Adminsitration. Portland, OR : s.n., 2006.

71. International Commission on Non-ionizing Radiation Protection. Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz – 100 kHz). Health Physics. 2010, Vol. 99, 6, pp. 818-836.

72. Public Service Commission of Wisconsin. Environmental Impacts of Transmission Lines. [Online] July 2013. http://psc.wi.gov/thelibrary/publications/electric/electric10.pdf.

73. Reinemann, Douglas J. Literature Review and Synthesis of Research Findings on the Impact of Stray Voltage on Farm Operations. Ontario Energy Board. [Online] March 2008, 31. http://www.ontarioenergyboard.ca/oeb/_Documents/EB-2007-0709/report_Reinemann_20080530.pdf.

74. Wisconsin Public Service Corporation. Answers to your Stray Voltage Questions: Backed By Research. Wisconsin Public Service - Your Business - Your Farm - Stray Voltage. [Online] 2011. http://www.wisconsinpublicservice.com/business/pdf/farm_voltage.pdf.

75. North American Electric Reliability Corporation. State of Reliability 2013. [Online] May 2013. http://www.nerc.com/pa/rapa/pa/performance%20analysis%20dl/2013_sor_may%2015.pdf.

76. Kemp, John. Protecting the power grid from sabatage and terrorism: Kemp. Reuters. [Online] February 17, 2015. [Cited: February 19, 2015.] http://www.reuters.com/article/2014/02/17/electricity-sabotage-terrorism-idUSL6N0LM1ZG20140217.

77. Blinder, Alan. Power Grid is Attacked in Arkansas. The New York Times. [Online] October 8, 2013. [Cited: February 13, 2015.] http://www.nytimes.com/2013/10/09/us/power-grid-is-attacked-in-arkansas.html?_r=1.

78. Energy Sector Control Systems Working Group. Roadmap to Achieve Energy Delivery Systems Cybersecurity. Energy.gov. [Online] September 2011. [Cited: February 13, 2015.] http://energy.gov/sites/prod/files/Energy%20Delivery%20Systems%20Cybersecurity%20Roadmap_finalweb.pdf.

79. National Insurance Crime Bureau, Nation Equipment Register. 2012 Equipment Theft Report. NER - Annual Theft Report. [Online] 2012. [Cited: February 13, 2015.] https://www.nicb.org/File%20Library/Public%20Affairs/2012-NICB-HEreport.pdf.

80. LoJack Corporation. Heavy Construction Equipment and Theft: The 2011 LoJack Corporation Study on Heavy Construction Equipment Theft. For Construction Pros. [Online] September 18, 2012. http://media.cygnus.com/files/cygnus/document/FCP/2012/SEP/lojack-2011-theft-study-final_10781172.pdf.

81. Minnesota Pollution Control Agency. What's In My Neighborhood Database. Data - WMN: What's in My Neighborhood. [Online] 2015. [Cited: February 24, 2015.] http://www.pca.state.mn.us/index.php/data/wimn-whats-in-my-neighborhood/whats-in-my-neighborhood.html.

82. U.S. Department of Labor. Work-related Fatalities, Injuries, and Illnesses - Construction. Bureau of Labor Statistics - Industries at a Glance - Construction: NAICS 23. [Online] 2014. [Cited: January 9, 2015.] http://www.bls.gov/iag/tgs/iag23.htm#fatalities_injuries_and_illnesses.

83. —. Work-related Fatalities, Injuries, and Illnesses - Utilities. Bureau of Labor Statistics - Industries at a Glance - Utilities: NAICS 22. [Online] 2014. [Cited: January 09, 2015.] http://www.bls.gov/iag/tgs/iag22.htm#fatalities_injuries_and_illnesses.

84. —. Table A-1. Fatal occupational injuries by industry and event or exposure, all United States, 2013. Bureau of Labor Statistics - Injuries, Illnesses, and Fatalities . [Online] 2014. [Cited: January 11, 2015.] http://www.bls.gov/iif/oshwc/cfoi/cftb0277.pdf.

85. —. Table 1. Incidence rates of nonfatal occupational injuries and illnesses by industry and case types, 2013. Bureau of Labor Statistics - Injuries, Illnesses, and Fatalities. [Online] 2014. [Cited: Janurary 11, 2015.] http://www.bls.gov/iif/oshwc/osh/os/ostb3958.pdf.

86. General Electric Industrial Solutions - Cameron G. Clark: GE Specification Engineer. The Basics of Arc Flash. GE Industrial Solutions. [Online] https://www.geindustrial.com/sites/geis/files/gallery/The-Basics-of-Arc-Flash-Article_GE_Industrial_Solutions_0.pdf.

87. U.S. Army Corps of Engineers. Visual Impact Assessment Procedure for US Army Corps of Engineers. Instruction Report EL-88-1, prepared by State University of New York, Syracuse, for US Army Engineer Waterways Experiment Station, Vicksburg, Miss. Syracuse, New York : State University of New York, College of Environmental Science and Forestry, March 1988.

88. U.S. Department of Transportation Federal Highway Administration Office of Environmental Policy. Visual Impact Assessment for Highway Projects. Publication No. FHWA-HI-88-054. California Department of Transportation - Standard Environmental Reference. [Online] Publication No. FHWA-HI-88-054, 1981. Office of Environmental Policy. http://www.dot.ca.gov/ser/downloads/visual/FHWAVisualImpactAssmt.pdf.

89. U.S. Forest Service U.S Department of Agriculture. National Forest Landscape Management Volume 2, Chapter 1: The Visual Management System: Agriculture Handbook Number 462. [Online] April 1974. [Cited: September 5, 2013.] http://pbadupws.nrc.gov/docs/ML1224/ML12241A372.pdf.

90. U.S. Forest Service; U.S. Department of Agriculture. Landscape Aesthetics: A Handbook for Scenery Management. Agriculture Handbook Number 701. U.S. Forest Service - Continental Divide National Scenic Trail. [Online] December 1995. [Cited: September 5, 2013.] www.fs.fed.us/cdt/carrying_capacity/landscape_aesthetics_handbook_701_no_append.pdf.

91. Bureau of Land Management. Visual Resource Contrast Rating - Bureau of Land Management Handbook 8431-1. U.S. Department of the Interior Bureau of Land Management. [Online] January 17, 1986. [Cited: January 7, 2013.] Washington, D.C.. http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.79462.File.dat/8431.pdf.

92. Minnesota Department of Natural Resources. Ecological Classification System. Minnesota Department of Natural Resources - Nature. [Online] 2015. [Cited: February 20, 2015.] http://www.dnr.state.mn.us/ecs/index.html.

93. Wind Turbine Visibility and Visual Impact Threshold Distances in Western Landscapes. Sullivan, Robert G., et al. Portland, OR : s.n., 2012. National Association of Environmental Professionals 37th Annual Conference.

94. Minnesota Department of Natural Resources; U.S. Fish and Wildlife Service. Beltrami Island Land Utilization Project Comprehensive Conservation Management Plan. U.S. Fish & Wildlife Service Division of Conservation Planning - Completed Planning Projects. [Online] 2013. [Cited: May 13, 2015.] http://files.dnr.state.mn.us/input/mgmtplans/beltrami_island/final-lup-ccmp.pdf.

95. Minnesota Department of Natural Resources. School Trust Lands. Minnesota Department of Natural Resources - About the DNR - School Lands. [Online] 2015. [Cited: March 11, 2015.] http://www.dnr.state.mn.us/aboutdnr/school_lands/index.html.

96. Roseau County. Roseau County Floodplain Management Ordinance. Ordinance No. 29. Roseau County Minnesota - County Ordinances. [Online] November 20, 2001. [Cited: February 18, 2015.] http://www.co.roseau.mn.us/ordinances/Ordinance%20No.%2029%20-%20Flood%20Plain%20Management%20Ordinance.pdf.

97. Headwaters Regional Development Commission. Lake of the Woods County Comprehensive Land Use Plan. Lake of the Woods County - Land & Water Planning. [Online] March 28, 2000. [Cited: February 12, 2015.] http://www.co.lake-of-the-woods.mn.us/PDF/Plans/Comp%20Land%20Use%20Plan.pdf.

98. Lake of the Woods County. Lake of the Woods County Zoning Ordinance. Lake of the Woods County - Land & Water Planning. [Online] October 3, 2011. [Cited: February 12, 2015.] http://www.co.lake-of-the-woods.mn.us/PDF/Ordinances/October_3_2011_Zoning_Ordinance.pdf.

99. Minnesota Department of Natural Resources. Forest Action Plans. National Association of State Foresters. [Online] June 2010. [Cited: May 13, 2015.] http://www.forestactionplans.org/states/minnesota.

100. Chinni, Dante and Gimpel Ph.D., James. Our Patchwork Nation: The Surprising Truth About the "Real" America. New York : Penguin Group (USA) Inc., 2011.

101. Woodard, Colin. American Nations: A History of the Eleven Rival Regional Cultures of North America. New York : Penguin Publishing Group, 2012.

102. U.S. Department of Energy Office of Electricity Delivery and Energy Reliability and Minnesota Department of Commerce Energy Environmental Review and Analysis. Scoping Summary Report, Great Northern Transmission Line Environmental Impact Statement. November 2014.

103. Mayer, M. L. The Red Lake Ojibwe. [book auth.] Herbert Edgar Wright, Barbara Coffin and Norman E. Aaseng. The Patterned Peatlands of Minnesota. Minneapolis : University of Minnesota Press, 1992.

104. Minnesota Department of Agriculture; U.S. Department of Agriculture. 2012 Minnesota Agricultural Statistics. 2012.

105. Ye, Su. Minnesota Agriculture Profile. Minnesota Department of Agriculture. [Online] 2014. https://www.mda.state.mn.us/en/~/media/Files/agprofile.ashx.

106. U.S. Department of Agriculture. 2012 Census of Agriculture County Profiles. [Online] 2012. [Cited: February 25, 2015.] http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/Minnesota/st27_2_001_001.pdf.

107. Minnesota Department of Natural Resources; Labovitz School of Business and Economics, University of Minnesota Duluth. Economic Contribution of Minnesota's Forest Products Industry – 2011 edition. [Online] April 2011. [Cited: May 15, 2015.] http://files.dnr.state.mn.us/forestry/um/economiccontributionMNforestproductsindustry2011.pdf.

108. Tuck, Brigid University of Minnesota | Extension. Economic Composition of Northwest Minnesota: Industries and Performance. University of Minnesota | Extension - Understanding Economic Change. [Online] September 2014. [Cited: May 15, 2015.] http://www.extension.umn.edu/community/economic-impact-analysis/reports/docs/2014-Northwest-MN.pdf.

109. —. Economic Composition of the Headwaters Region of Minnesota: Industries and Performance. University of Minnesota | Extension - Understanding Economic Change. [Online] November 2014. [Cited: May 15, 2015.] http://www.extension.umn.edu/community/economic-impact-analysis/reports/docs/2014-headwaters-MN.pdf.

110. Minnesota Department of Natural Resources. Letter to Bill Storm. In the Matter of the Application of Minnesota Power for a Route Permit for the Great Northern Transmission Line Public Utilities Commission. Docket Number E-015/TL14-21, Minnesota Department of Natural Resources EBDB Number: 20130195. August 15, 2014.

111. Advisory Council on Historic Preservation. 360 CFR Part 800 -- Protection of Historic Properties (incorporating amendments effective August 5, 2004). Advisory Council on Historic Preservation. [Online] [Cited: May 19, 2015.] http://www.achp.gov/regs-rev04.pdf.

112. National Park Service Cultural Resources U.S. Department of the Interior. How to Apply the National Register Criteria for Evaluation - National Register Bulletin. National Park Service National Register of Historic Places Program: Publications. [Online] [Cited: May 19, 2015.] http://www.nps.gov/nr/publications/bulletins/pdfs/nrb15.pdf.

113. Executive Order No. 13175. Consultation and Coordination with Indian Tribal Governments. 65 Federal Regulation 67249. November 6, 2000. p. 2806.

114. U.S. Department of Energy. American Indian and Alaska Native Tribal Government Policy. 2009.

115. Gibbon, Guy E, Johnson, Craig M and Hobbs, Elizabeth. Minnesota's Environmental and Native American Culture History in Predictive Model of Precontact Archaeological Site Location of the State of Minnesota. Minnesota Department of Transportation. [Online] 2002. St. Paul, Minnesota. http://www.dot.state.mn.us/mnmodel/P3FinalReport/chapter3.html.

116. Dobbs, C A. Historic Context Outlines: The Contact Period Contexts (ca 1630 A.D.-1820 A.D.) In Minnesota History Sites and Structures: A Comparative Planning Series. s.l., St. Paul, Minnesota : Institute of Minnesota Archaeological Reports of Investigations, 1990. Vol. 30. On file at the State Historic Preservation Office.

117. U.S. Geological Survey. Groundwater use in the United States. U.S. Water Science School. [Online] http://water.usgs.gov/edu/wugw.html.

118. Minnesota Pollution Control Agency. MPCA Impaired Lakes (2014 Draft data). Water - Water Types and Programs - Impaired Waters and TMDLs - Minnesota's Impaired Waters List. [Online] 2014. http://www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/impaired-waters-list.html.

119. —. MPCA Impaired Streams (2014 Draft data). Water - Water Types and Programs - Impaired Waters and TMDLs - Minnesota's Impaired Waters List. [Online] 2014. http://www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/impaired-waters-list.html.

120. U.S. Environmental Protection Agency. Wetlands - Wetland Types. U.S. Environmental Protection Agency - Water: Wetlands. [Online] 2013. http://water.epa.gov/type/wetlands/types_index.cfm.

121. Cowardin, L.M., V. Carter, F.C. Golet, R.T. LaRoe. Classification of Wetlands and Deepwater Habitats of the United States. s.l. : U.S. Fish and Wildlife Service, 1979. p. 103. FWS/OBS079/31.

122. Minnesota Department of Agriculture. Minnesota Noxious Weeks. Minnesota Department of Agriculture - Plants, Pests & Pest Control - Pest Management - Noxious & Invasive Week Program. [Online] http://www.mda.state.mn.us/plants/pestmanagement/weedcontrol/noxiouslist.aspx.

123. Minnesota Power. Response to Requests for Information from DOE - Preliminary Design Changes/Additional Information. December 1, 2014.

124. —. Preliminary Design Changes/Additional Information. December 1, 2014.

125. Minnesota Department of Natural Resources, Division of Ecological Services. Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife Conservation Strategy. 2006.

126. Minnesota Department of Natural Resources. Subsection Forest Resources Management Plan (SFRMP) - Special Management Area Plan: Great Gray Owl Management Area. 2006b.

127. U.S. Fish and Wildlife Service. Endangered Species Program. [Online] 2015. http://www.fws.gov/midwest/endangered/lists/minnesot-cty.html.

128. —. Wolf Fact Sheets. U. S. Fish & Wildlife Service Wolf - Western Great Lakes. [Online]

129. —. Canada Lynx. Endangered Species Program. [Online] 2013. http://www.fws.gov/mountain-prairie/species/mammals/lynx/.

130. —. Piping Plover Fact Sheet. Endangered Species. [Online] 2001. http://www.fws.gov/midwest/endangered/pipingplover/pipingpl.html.

131. —. Northern Long-Eared Bat. Endangered Species. [Online] 2015. http://www.fws.gov/midwest/endangered/mammals/nleb/nlebFactSheet.html.

132. Minnesota Department of Natural Resources. Natural Heritage Information System Database. Copyright 2014. State of Minnesota, Department of Natural Resources. Access by Barr Engineering under License Agreement LA-674. [Online]

133. —. High Conservation Value Forests (HCVFs) Fact Sheet. [Online] May 2015. http://files.dnr.state.mn.us/forestry/certification/hcvf-factsheet.pdf.

134. —. Personal Communication to Barr Engineering Co. (email). December 10, 2014.

135. Minnesota Power. Application for a Certificate of Need: Great Northern Transmission Line. MPUC Docket No. E-015/CN-12-1163. October 21, 2013.

136. Beltrami County. Beltrami Counry Shoreland Management Ordinance. County Ordinance. [Online] 2006. [Cited: February 19, 2015.] http://www.co.beltrami.mn.us/Government/Ordinances/Ordinances.html.

137. Koochiching County. Koochiching County Development Ordinance. [Online] 2008. [Cited: February 19, 2015.] http://www.co.koochiching.mn.us/dept/esd/Kooch%20dev%20ords%20clean%20copy.pdf.

138. Itasca County. Zoning Ordinance, Itasca County, Minnesota. Itasca County Environmental Services. [Online] 2012. [Cited: February 12, 2015.] https://www.co.itasca.mn.us/Home/Departments/Environmental%20Services/Documents/2012.04.15%20Zoning%20Ordinance.pdf.

139. Bradoff, K L. Ditching tof Red Lake Peatland During the Homestead Era. [book auth.] Patterned Peatlands of Minnesota. [ed.] H E Wright Jr. and N E Aaseng. Wright, Herbert Edgar; Coffin, Barbara; Aaseng, Norman E. Minneapolis : University of Minesota Press, 1992, pp. 263-284.

140. Minnesota Department of Natural Resources. Big Bog State Recreation Area. Minnesota Department of Natural Resources - Destinations - State Parks. [Online] 2015. [Cited: March 6, 2015.] http://www.dnr.state.mn.us/state_parks/big_bog/index.html.

141. Tuck, Brigid University of Minnesota | Extension. Economic Composition of Northeast Minnesota: Industries and Performance. University of Minnesota | Extension - Understanding Economic Change. [Online] November 2014. [Cited: May 15, 2015.] http://www.extension.umn.edu/community/economic-impact-analysis/reports/docs/2014-Northeast-MN.pdf.

142. Dobbs, C. A. Outline of Historic Contexts for the Prehistoric Period (ca. 12,000-A.D. 1700). Minnesota History in Sites and Structures: A Comprehensive Planning Series. St. Paul : Institute for Minnesota Archaeology Reports of Investigations, 1989. Vol. 56.

143. Arrowhead Regional Development Commission (ARDC). Taconite Comprehensive Plan. ARDC's Regional Planning Division. [Online] 2007. [Cited: March 6, 2015.] http://www.arrowheadplanning.org/Default.asp?PageID=1169.

144. Minnesota Power. Proposed Transmission Line Alignment. Shapefiles received via HDR Sharepoint (GNTL.zip). October 14, 2014.

145. Minnesota Department of Commerce. High Voltage Transmission Lines. Shapefile from Nancy Rader, Minnesota Department of Commerce to Barr Engineering Co. May 30, 2014.

146. Minnesota Power. Residences. Shapefiles received via HDR Sharepoint (Data.zip). August 14, 2014.

147. State Historic Preservation Society - Minnesota Historical Society. Historic Sites. SHPO - Survey and Inventory - Statewide Inventories. [Online] http://www.mnhs.org/shpo/survey/inventories.php.

148. Minnesota Department of Natural Resources. State Forests. The DNR Data Deli. [Online] 2003. http://deli.dnr.state.mn.us.

149. Minnesota Department of Transportation. Scenic Byways - 2013-2014 Official Highway Map - Minnesota. State Highway Map. [Online] 2013. http://www.dot.state.mn.us/statemap/2013/mapfront.pdf.

150. Minnesota Department of Natural Resources. Snowmobile Trails. The DNR Data Deli. [Online] 2010. http://deli.dnr.state.mn.us.

151. U.S. Geological Survey. GAP Land Cover. U.S. Geological Survey - National Gap Analysis Program (GAP) | Land Cover Data Portal. [Online] 2001. [Cited: August 20, 2014.] http://gapanalysis.usgs.gov/gaplandcover/data/download/.

152. Minnesota Department of Natural Resources. State Administered Lands. [Online] 2014. ftp://ftp.dnr.state.mn.us/pub/gisftp/shwatson/state_lands/.

153. Itasca County, MN. County/Local Parks. Itasca County - Departments - Park System - Itasca County Land Department Park System. [Online] 2014. [Cited: August 20, 2014.] http://www.co.itasca.mn.us/home/departments/park%20system/pages/county-parks.aspx.

154. U.S. Department of Agriculture. Farmland. U.S. Department of Agriculture - Natural Resources Conservation Service - Web Soil Survey. [Online] 2014. [Cited: August 20, 2014.] http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

155. State Historic Preservation Society - Minnesota Historical Society. Archaeological Sites. SHPO - Survey and Inventory - Statewide Inventories. [Online] http://www.mnhs.org/shpo/survey/inventories.php.

156. Minnesota State Historic Preservation Office. SHPO Manual for Archaeological Projects in Minnesota. Survey and Inventory. [Online] July 2005. http://www.mnhs.org/shpo/survey/archsurvey.pdf.

157. U.S. Fish and Wildlife Service. Statewide National Wetland Inventory. National Wetlands Inventory. [Online] 1997. http://www.fws.gov/wetlands/Data/State-Downloads.html.

158. U.S. Geological Survey. NHD Waterbodies. http://nhd.usgs.gov/data.html. [Online] 2014. http://nhd.usgs.gov/data.html.

159. —. NHD Flowlines. Hydrography. [Online] 2014. http://nhd.usgs.gov/data.html.

160. Minnesota Department of Natural Resources. Public Water Inventory Streams. [Online] 2008. http://deli.dnr.state.mn.us.

161. —. Public Waters Inventory – Basin Delineations. GIS shapefile. The DNR Data Deli. [Online] July 31, 2008. http://deli.dnr.state.mn.us/metadata.html?id=L390006600201.

162. —. Public Water Inventory Wetlands. The DNR Data Deli. [Online] 2008. http://deli.dnr.state.mn.us.

163. Minnesota Power. FEMA Floodplain / Flood Hazard Areas. Minnesota Power as published by FEMA on https://msc.fema.gov/portal. 2014.

164. U.S. Fish and Wildlife Service/Partner's in Flight. Grassland Bird Conservation Areas. Shapefile from Dan Hertel, U.S. Fish and Wildlife Service to Barr Engineering Co. October 14, 2014.

165. Minnesota Department of Natural Resources. Wildlife Management Areas. The DNR Data Deli. [Online] 2006. http://deli.dnr.state.mn.us.

166. —. Gray Owl Management Area. Email from Jamie Shrenzel, Minnesota Department of Natural Resources to Barr Engineering Co. November 4, 2014.

167. —. Preliminary MBS Sites of Biodiversity Significance. Shapefiles from Lisa Joyal, Minnesota Department of Natural Resources to Barr Engineering Co. 2014-2015.

168. —. High conservation value forests (HCVF). Forestry - Certification. [Online] 2014. [Cited: December 18, 2014.] http://www.dnr.state.mn.us/forestry/certification/hcvf.html.

169. —. Preliminary MBS Native Plant Communities. Email from Lisa Joyal, Minnesota Department of Natural Resources to Barr Engineering Co. December 17 2014.

170. U.S. Department of Agriculture. FSA Aerial Imagery. U.S. Department of Agriculture - Natural Resources Conservation Service - Geospatial Data Gateway. [Online] 2013. [Cited: August 20, 2014.] http://datagateway.nrcs.usda.gov.

171. Minnesota Department of Transportation. Streets and Highways. Geographic Data, Mapping & Analysis - GIS Data Products. [Online] October 1, 2010. http://www.dot.state.mn.us/maps/gdma/gis-data.html.

172. Minnesota Department of Natural Resources. Trails. The DNR Data Deli. [Online] 2010. http://deli.dnr.state.mn.us.

173. —. PLSS Line. The DNR Data Deli. [Online] 2009. http://deli.dnr.state.mn.us.

174. —. NW 50cm Aerial Imagery - Minnesota Geospatial Image Service: Data Layers. Minnesota Geospatial Information Office. [Online] 2014. [Cited: August 20, 2014.] http://www.mngeo.state.mn.us/chouse/wms/wms_image_server_layers.html.

175. —. NW 50cm Aerial Imagery - Minnesota Geospatial Image Service: Data Layers. Minnesota Geospatial Information Office. [Online] 2013. [Cited: August 20, 2014.] http://www.mngeo.state.mn.us/chouse/wms/wms_image_server_layers.html.

176. —. North 1ft Aerial Imagery - Minnesota Geospatial Image Service: Data Layers. Minnesota Geospatial Information Office. [Online] 2013. [Cited: August 20, 2014.] http://www.mngeo.state.mn.us/chouse/wms/wms_image_server_layers.html.

177. —. Ncentral border Aerial Imagery - Minnesota Geospatial Image Service: Data Layers. Minnesota Geospatial Information Office. [Online] 2009. [Cited: August 20, 2014.] http://www.mngeo.state.mn.us/chouse/wms/wms_image_server_layers.html.

178. U.S. Fish and Wildlife Service. USFWS Interests. U.S. Fish and Wildlife Service Geospatial Services. [Online] 2014. [Cited: October 10, 2014.] http://www.fws.gov/gis/data/CadastralDB/index.htm.

179. Minnesota Department of Natural Resources. State Mineral Leases. [Online] 2014. http://files.dnr.state.mn.us/lands_minerals/min_data/mn_state_minerals_leases_all_oct01_2014.zip.

180. —. Shallow Lakes. The DNR Data Deli. [Online] 2010. http://deli.dnr.state.mn.us.

181. National Audubon Society. Important Bird Areas. Audubon. [Online] 2014. [Cited: December 5, 2014.] http://web4.audubon.org/bird/iba/IBADataRequest.html.

182. Minnesota Department of Natural Resources. Trails. The DNR Data Deli. [Online] 2003. http://deli.dnr.state.mn.us.

183. —. Water Trails. The DNR Data Deli. [Online] 2010. http://deli.dnr.state.mn.us.

184. —. State Conservation Easements. The DNR Data Deli. [Online] 2010. http://deli.dnr.state.mn.us.

185. —. Ecologically Important Lowland Conifers. Shapefiles from Jamie Shrenzel, Minnesota Department of Natural Resources to Barr Engineering Co. November 4, 2014.

186. Minnesota Power. cost comparison - Effie and Pine Island - Minnesota Power Response to Request for Information from DOE. April 7, 2015.

187. Minnesota Department of Natural Resources. Scientific and Natural Areas. The DNR Data Deli. [Online] 2003. http://deli.dnr.state.mn.us.

188. Minnesota Department of Transportation. Aggregate Sources - Gravel Pit and Rock Quarry Aggregate Source Information. [Online] 2015.

189. Minnesota Department of Natural Resources. National Forest. The DNR Data Deli. [Online] 2008. http://deli.dnr.state.mn.us.

190. —. Water Access Points. The DNR Data Deli. [Online] 2003. http://deli.dnr.state.mn.us.

191. Minnesota Department of Transportation. 2015-2018 State Transportation Improvement Program (STIP). Planning & Programming. [Online] 2014. http://www.dot.state.mn.us/planning/program/pdf/stip/2015-2018%20STIP%20FINAL.pdf.

192. Excelsior Energy. Letter to Minnesota Public Utilities Commission In the Matter of a Joint LEPGP Site Permit, HVTL Route Permit and Pipeline (Partial Exemption) Route Permit Application for the Mesaba Energy Project. Minnesota Department of Commerce.energy - Topics - Energy Projects & Rates - Energy Facility Permitting. [Online] June 26, 2012. http://mn.gov/commerce/energyfacilities/documents/16573/Excelsior%20Reply%20Comments%20NG%20Conversion%20(6-26-12).pdf.

193. Minnesota Public Utilities Commission. In the Mailer of the Application for a HVTL Route Permit for the Essar Steel Transmission Project. Minnesota Department of Commerce.energy - Topics - Energy Projects & Rates - Energy Facility Permitting. [Online] August 2, 2010. http://mn.gov/commerce/energyfacilities/documents/24526/Order%20-%20Final%20Decision.pdf.

194. Minnesota Department of Commerce. Comments and Recommendations DOC EERA Comments and Recommendations on proposed system and route alternatives for the Sandpiper Pipeline Project in Minnesota. Minnesota Department of commerce.energy - Topics - Energy Projects & Rates - Energy Facility Permitting. [Online] 2012. http://mn.gov/commerce/energyfacilities//resource.html?Id=33938.

195. Council on Environmental Quality - Executive Office of the President. Considering Cumulative Effects under the National Environmental Policy Act. January 1997.

196. Minnesota Department of Transportation. Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD). Minnesota Department of Transportation. [Online] 2014. http://www.dot.state.mn.us/trafficeng/publ/mutcd/.

197. Bakke, Jordan, Zhou, Zheng and Mudgal, Sumeet. Manitoba Hydro Wind Synergy Study - Final Report. [Online] https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/Planning%20Materials/Manitoba%20Hydro%20Wind%20Synergy%20TRG/Manitoba%20Hydro%20Wind%20Synergy%20Study%20Final%20Report.pdf.

10.0 Acronyms

AC	alternating current
ACHP	Advisory Council on Historic Preservation
ACSR	aluminum conductor steel reinforced
AIMP	Agriculture Impact Mitigation Plan
ALJ	Administrative Law Judge
APE	Area of Potential Effect
APLIC	Avian Powerline Interaction Committee
AQI	Air Quality Index
ASCE	American Society of Civil Engineers
BMP	best management practice
BWSR	Minnesota Board of Water and Soil Resources
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH4	methane
CO	carbon monoxide
CO2	carbon dioxide
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
DOC-EERA	Department of Commerce – Energy Environmental Review and Analysis
DOE	Department of Energy
ECS	Ecological Classification System
EIS	Environmental Impact Statement
EMF	electric and magnetic fields
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
EQB	Environmental Quarterly Bulletin
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FPPA	Farmland Protection Policy Act
F	Fahrenheit
FR	Federal Register
G	Gauss
GAP	Gap Analysis Program
GHGs	Greenhouse gases
GNTL	Great Northern Transmission Line
GPS	Global Positioning System
HASP	Health and Safety Plan
Hz	hertz kV
ICDs	implantable cardioverter defibrillators
Kcmil	thousand circular mil
kV	Kilovolt
kV/m	kilovolts per meter
Leq	equivalent continuous noise level
LGUs	Local Units of Government
MBS	Minnesota Biological Survey
MBTA	Migratory Bird Treaty Act
MCWS	Manitoba Conservation and Water Stewardship
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
mG	milliGauss
MHz	megahertz
MISO	Midcontinent Independent System Operator
MnDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MN PUC	Minnesota Public Utilities Commission
MPH	miles per hour
MPCA	Minnesota Pollution Control Agency

MW	megawatt
NAAQS	National Ambient Air Quality Standards
NEB	National Energy Board
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act
NERC	North American Electrical Reliability Corporation
NESC	National Electric Safety Code
NHIS	Natural Heritage Information System
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NLCS	National Landscape Conservation System
NO2	nitrogen dioxide
NOX	nitrous oxide
NOA	Notice of Availability
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NOI	Notice of Intent
NWI	National Wetland Inventory
O3	ozone
OE	Office of Electricity Delivery and Energy Reliability
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
Pb	lead
PCBs	polychlorinated biphenyl
PEM	palustrine emergent wetland
PFO	palustrine forested wetland
PLSS	public land survey sections
PM	particulate matter
PPA	power purchase agreement
PPSA	Power Plant Siting Act
PSS	palustrine shrub wetland
PUB	palustrine unconsolidated bottom pond
PWI	Public Water Inventory
ROC	region of comparison
ROI	region of influence
ROW	right of way
RPS	Renewable Portfolio Standard
RTK	real-time kinematic
SA	State Assessment
SF6	Sulfur Hexafluoride
SGCN	species of greatest conservation need
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO2	Sulfur dioxide
SNA	Scientific and Natural Area
SPCC	Spill Prevention, Control, and Countermeasures
SSPP	Strategic Sustainability Performance Plan
SSURGO	Soil Survey Geographic Database
STIP	Statewide Transportation Improvement Program
SWPPP	Stormwater Pollution Prevention Plan
TCL	traditional cultural landscape
TCP	traditional cultural property
TMDL	total maximum daily loads
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USDA	United States Department of Agriculture
USFS	United States Forest Service

USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WCA	Wetland Conservation Act
WMA	Wildlife Management Area
WPA	Watershed Protection Area

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