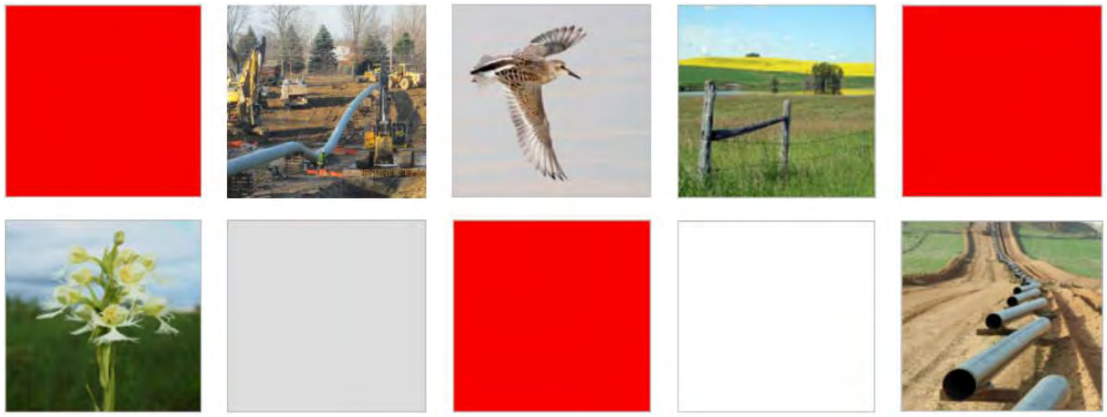

Enbridge Energy, Limited Partnership
Line 3 Replacement Project

Simonson CN & PPL Direct - Schedule 7

Enbridge Alternatives Analysis

Minnesota Public Utilities Commission
Docket Nos. PL-9/CN-14-916 and PL-9/PPL-15-137
OAH Docket Nos. 65-2500-32764 and 65-2500-33377

January 2017

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Table of Contents

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Introduction to the Analysis

Overview

The purpose of this Alternatives Analysis is to provide information useful to the Minnesota Public Utilities Commission (the "Commission") when considering the certificate of need and route permit criteria set out in Minnesota Rule Chapters 7853 and 7852 for the Line 3 Replacement Project ("Project").

The Enbridge Energy, Limited Partnership ("Enbridge") Preferred Route ("Preferred Route") is the same route that the Commission accepted for study as "Line 3 Applicant's Proposed Route" or "APR" in the December 2016 Final Scoping Decision Document ("FSDD"). The Preferred Route reflects the over 50 centerline adjustments and 23 route alternatives that Enbridge has incorporated to further avoid and minimize potential impacts from the Project. Schedule 5 to Paul Eberth's Direct Testimony summarizes these changes.

Enbridge provided detailed information regarding the potential impacts of the Preferred Route and mitigation strategies in the Certificate of Need and Route Permit Applications filed on April 24, 2015 and in the Environmental Assessment Worksheet ("EAW") published by the DOC-EERA on April 12, 2016. Numerous Enbridge witnesses are providing additional information or clarifications to the Applications in their testimonies based on information that has become available since Enbridge filed the Applications in April 2015 and since the EAW was published. Enbridge has presented updates to the Route Permit Application and Appendices using the same format as the EAW published in April 2016 for ease of reference. Potential impacts and mitigation related to Enbridge's Preferred Route are reflected in the January 2017 EAW included as Schedule 2 to Mr. Paul Eberth's testimony. Information from additional field surveys completed by Enbridge in 2016 is included in this January 2017 EAW and is described in Ms. Britta Bergland's Direct Testimony.

Enbridge's consideration of the System Alternative ("SA"), Route Alternatives ("RAs"), and Route Segment Alternatives ("RSAs") accepted for evaluation in the Environmental Impact Statement ("EIS") and public hearings is intended to inform the contested case record and supplement the EIS by informing the Commission and the general public about the routing constraints and the human and environmental features of each alternative as compared to the corresponding segment of the Preferred Route.

Analysis Methodology

Enbridge conducted a detailed quantitative analysis of human and environmental features crossed by the centerlines of the SA, RAs, and RSAs that have been approved by the Commission for study in the EIS (see figures on pages 3, 4, and 5). In addition, Enbridge conducted an analysis of a 750-foot-wide route width centered over each SA, RA, and RSA because Enbridge has requested that the Commission issue Enbridge a 750-foot-wide route for the Project.

Enbridge developed its list of human and environmental datasets to address the Commission's certificate of need and route permit criteria contained in Minnesota Rule Chapters 7853 and 7852. Enbridge then grouped the human and environmental datasets into categories that are responsive to the rule criteria. A complete list of the human and environmental datasets used by Enbridge in its analysis is presented in the Human and Environmental Resource Summary Table in Appendix A.

In most cases, Enbridge accessed Geographic Information System ("GIS") datasets via download from public agency-sponsored websites. In some instances, Enbridge also conducted further research at an agency office or by formally requesting information from a resource agency. Where Enbridge (or its consultants) entered into license agreements that protect the data from public distribution (for example, in the case of sensitive species locational information), Enbridge presented the data at such a level as to inform the overall conclusions in the document and not disclose any protected information.

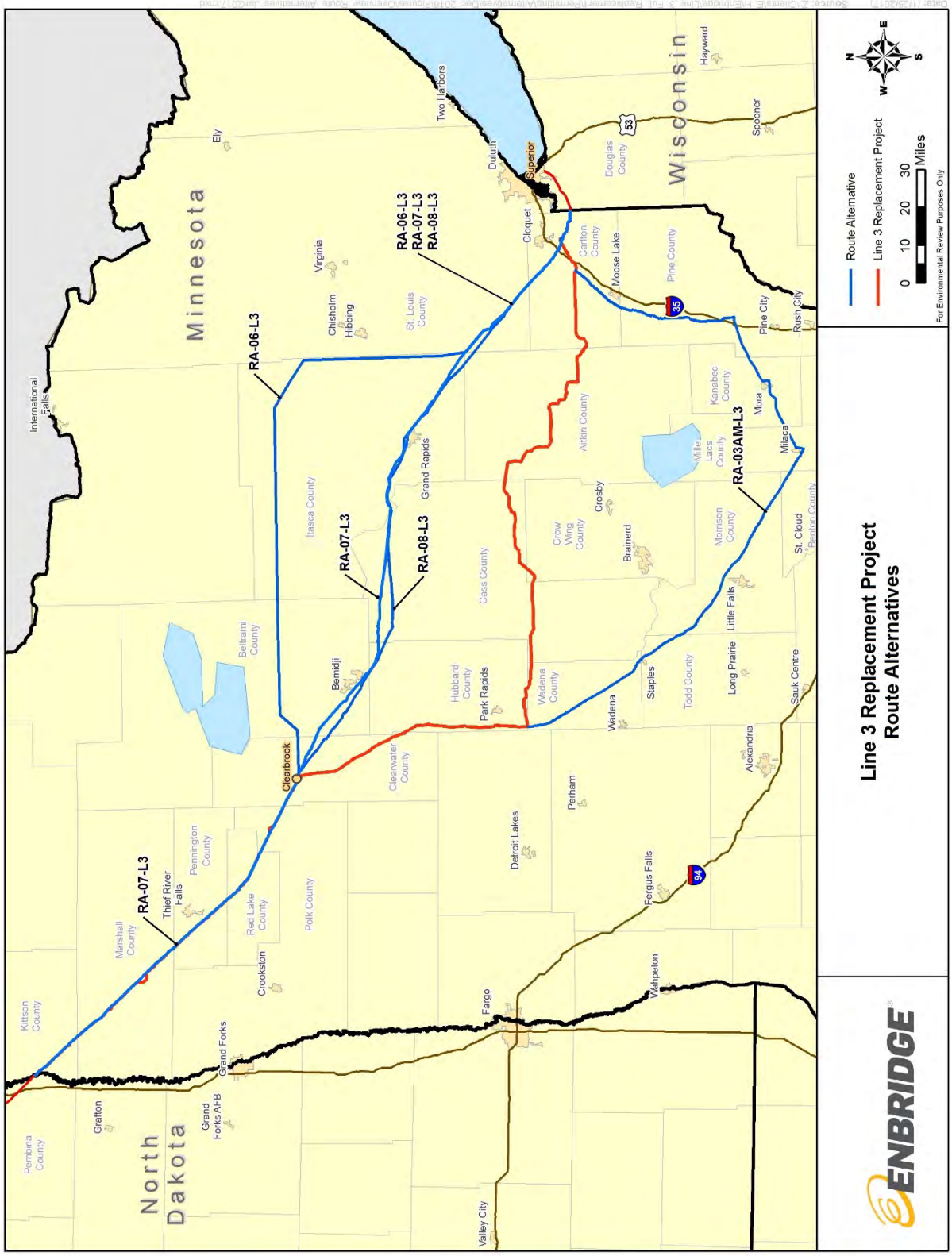
Once the aforementioned GIS datasets were obtained, Enbridge used GIS software (ArcGIS) to spatially intersect the centerlines and 750-foot-wide route widths with the GIS datasets. Attributes within the public GIS dataset tables contain information about the features within the GIS data. For example, a shapefile downloaded from the National Wetlands Inventory ("NWI") contains attributes that describe each wetland's type and wetland code. Metadata within the GIS datasets explains in more detail what each attribute in the table represents. Enbridge quantified the number or miles of each feature that would be crossed by the routes or contained within a 750-foot-wide route width by intersecting the datasets with the centerline or route width.

Enbridge's analysis for each SA, RA, and RSA provides additional context for the quantitative information presented in the Human and Environmental Resources Summary Table. Each SA, RA, and RSA analysis contains a chart which visually compares a subset of the resources Enbridge analyzed as part of this effort; these were chosen to represent a cross-section of the human and environmental resources often considered in pipeline routing.

The updated Project information filed in the January 2017 EAW attached as Schedule 2 to Mr. Paul Eberth's testimony, as noted above, presents actual impacts along the Preferred Route based on field survey results. Enbridge relies on field data to permit the Project and to identify Project impacts when possible. However, Enbridge utilized desktop data when conducting this comparative analysis of the SA, RAs, and RSAs against the corresponding Preferred Route segment.

Importantly, Enbridge's experience routing and constructing pipeline projects adds valuable information that the Commission should consider in analyzing the Preferred Route and the alternatives. This information, as contained within this analysis, extends beyond what can be learned in quantitative and qualitative desktop analyses and discussions of potential human and environmental impacts and provides greater context as to the nature and extent of potential impacts of pipeline construction.


Line 3 Replacement Project
System Alternative
ENBRIDGE
SA-04-L3
Line 3 Replacement Project
0 25 50 75 Miles
For Environmental Review Purposes Only
N
E
S
W
Minnesota
North Dakota
South Dakota
Iowa
Wisconsin
Illinois
Superior
Clearbrook
Minneapolis-Saint Paul Metro Area
Chicago Metro Area


Line 3 Replacement Project
Route Alternatives
ENBRIDGE
Route Alternative
Line 3 Replacement Project
0 10 20 30 Miles
For Environmental Review Purposes Only
N
E
S
W
Minnesota
North Dakota
Wisconsin
RA-06-L3
RA-07-L3
RA-08-L3
RA-03AM-L3
Clearbrook
Bemidji
Park Rapids
Grand Rapids
Fergus Falls
Detroit Lakes
Perham
Wadena
Staples
Brainerd
Little Falls
Long Prairie
Sauk Centre
St. Cloud
Alexandria
Milaca
Mora
Pine City
Rush City
Moose Lake
Cloquet
Superior
Duluth
Two Harbors
Ely
International Falls
Virginia
Chisholm
Hibbing
Itasca County
Cass County
Hubbard County
Wadena County
Crow Wing County
Morrison County
Benton County
Aitkin County
Kanabec County
Mille Lacs County
Carlton County
Pine County
St. Louis County
Douglas County
Hayward
Spooner
Beltrami County
Clearwater County
Polk County
Red Lake County
Pennington County
Marshall County
Kittson County
Pembina County
Grafton
Grand Forks
Grand Forks AFB
Crookston
Thief River Falls
Fargo
Wahpeton
Valley City
Todd County


Line 3 Replacement Project
Route Segment Alternatives
ENBRIDGE
Route Segment Alternative
Line 3 Replacement Project
0
10
20
Miles
For Environmental Review Purposes Only
N
E
S
W
Minnesota
Wisconsin
Clearbrook
Superior
Duluth
Douglas County
Cloquet
Carlton County
Pine County
Moose Lake
Virginia
St. Louis County
Chisholm
Hibbing
Itasca County
Grand Rapids
Aitkin County
Crosby
Crow Wing County
Cass County
Brainerd
Staples
Wadena
Wadena County
Otter Tail County
Becker County
Park Rapids
Hubbard County
Bemidji
Beltrami County
Cleanwater County
RSA-05-L3
RSA-10-L3
RSA-15-L3
RSA-21-L3
RSA-22-L3
RSA-Blandin-L3
RSA-23-L3
RSA-White
Elk Lake-L3
RSA-27-L3
RSA-28-L3
RSA-33-L3
RSA-31-L3
RSA-35-L3
RSA-34-L3
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RSA-53
RSA-22-L3
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RSA-52-L3

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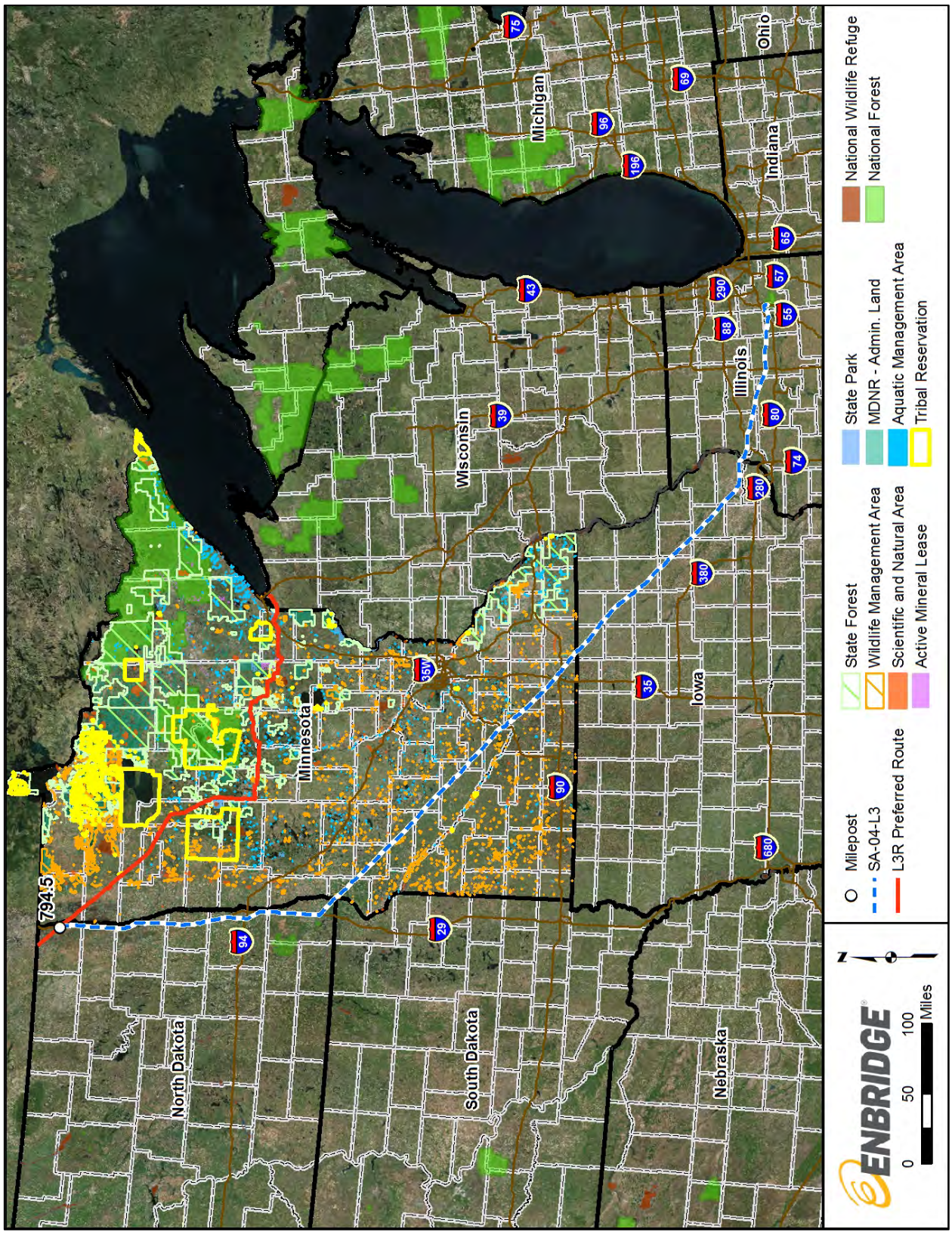
SA-04-L3


794.5
North Dakota
South Dakota
Nebraska
Minnesota
Iowa
Wisconsin
Illinois
Michigan
Indiana
Ohio
Milepost
SA-04-L3
L3R Preferred Route
State Forest
Wildlife Management Area
Scientific and Natural Area
Active Mineral Lease
State Park
MDNR - Admin. Land
Aquatic Management Area
Tribal Reservation
National Wildlife Refuge
National Forest
ENBRIDGE
0
50
100
Miles

Purpose

System Alternative SA-04-L3 was initially proposed by Friends of the Headwaters as part of the Sandpiper Pipeline Project to avoid crossing north central Minnesota. SA-04-L3 was modified by DOC-EERA in the FSDD to connect to Enbridge's existing Line 3 pipeline by including a link to Line 3 near the North Dakota/Minnesota border.

Description

SA-04-L3 begins in northeastern North Dakota, just west of the Minnesota-North Dakota border near approximate milepost ("MP") 794.5. It travels south through North Dakota along the Red River before joining the Alliance Pipeline right-of-way in eastern North Dakota. It then proceeds generally southeast through South Dakota, Minnesota, Iowa, and Illinois to its termination point in Joliet, Illinois.

	The Preferred Route Segment	SA-04-L3
Collocated Length (mi.)	299.6	599.4[1]
Greenfield Length (mi.)	60.6	162.4
Total (mi.)	360.2	761.8

A comparison of the human and environmental characteristics of SA-04-L3 and the corresponding Preferred Route is presented in Appendix A.

Enbridge Recommendation

Enbridge does not recommend that SA-04-L3 be approved for the following reasons:

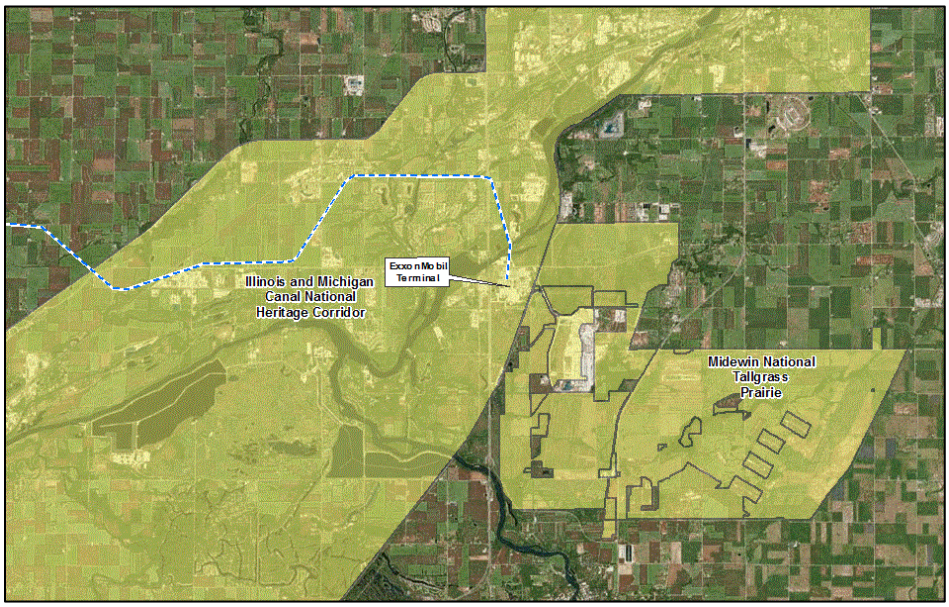
- **Does Not Meet Project Purpose and Need.**
  - **SA-04-L3 is not a Replacement of Existing Line 3**. SA-04-L3 does not meet the Project's stated purpose and need. It cannot serve as a replacement to the existing Line 3 because it does not connect to existing Enbridge pipelines or facilities at Clearbrook, Minnesota or Superior, Wisconsin.
  - **Regulatory Feasibility.** Approval of SA-04-L3 in Minnesota does not factor in regulatory processes in neighboring states (North Dakota, South Dakota, Illinois, and Iowa). These potentially lengthy permitting processes in North Dakota, Illinois and Iowa are not required for the Project and may not provide a connection to an approved pipeline outside of the state of Minnesota in the same location.
- **Increased Human and Environmental Impacts.**
  - **Significantly Greater Total Construction Disturbance.** Because SA-04-L3 is approximately 400 miles longer than the Preferred Route, it would result in a significant increase in total acres disturbed and total environmental and human resources impacted during construction of the Project.
  - **Impacts a New Group of Landowners.** Enbridge has obtained easements for the Preferred Route for 94% of private landowners. SA-04-L3 would impact an entirely new group of landowners.

[1] Based on the narrative in the Final Scoping Decision Document Enbridge has assumed 100 percent collocation with the Alliance pipeline in Minnesota and Iowa. However, there are significant differences in the digital data between SA-04-L3 and the Alliance pipeline ROW as it enters Illinois, resulting in greenfield areas through Illinois.

- **Increased Impacts to Residential Areas.**
  - *Mankato, Minnesota* - SA-04-L3 would encounter multiple residences and small businesses north of Mankato, which would create construction concerns and would likely result in multiple residential impacts.
  - *Channahon, Illinois* - A large residential subdivision exists near the end-point of SA-04-L3 in Channahon. Construction through this area would impact a large number of homeowners, requiring their relocation, and a number of homes may need to be demolished in order to accommodate the new pipeline. Just prior to its end, SA-04-L3 would encounter the Des Plaines River in a location surrounded by commercial and residential communities.
- **Significantly Greater Impacts to Cities.** SA-04-L3 would cross 18 cities which are not crossed by the Preferred Route. Major cities with over 10,000 persons crossed by SA-04-L3 include Fargo, West Fargo, and Grand Forks, North Dakota; Mankato, Minnesota; Clinton, Iowa; and Chanhannon and Minooka, Illinois. Other cities include Blomkest, Minnesota; White Rock, South Dakota; Horace, Manvel, Hillsboro, Gardner, and Argusville, North Dakota; and Little Cedar, Center Junction, Grand Mound, and Camanche, Iowa. The 750-foot-wide route width over SA-04-L3 would contain three additional cities: Lyle and Eagle Lake, Minnesota and La Moille, Illinois. In contrast, the only major city over 10,000 persons crossed by the Preferred Route is Superior, Wisconsin. The remaining four cities crossed by the Preferred Route are under 500 persons (Trail, Plummer, Oklee, and Mahtowa, Minnesota).
- **Significantly Greater Impacts to Homes.** There are 1,147 more houses within the 750-foot-wide route width over SA-04-L3 as compared to the Preferred Route. Due to the developed nature of the SA, it would also impact more structures, center pivot irrigation systems, airports, schools, churches, cemeteries, wind turbines, roads, railroads, and communication towers than the Preferred Route.
- **Requires Construction of New Terminal and Pump Stations.** SA-04-L3 would require the construction of a new crude oil storage terminal at the termination of SA-04-L3 in Joliet, Illinois, which is located approximately 40 miles south of Chicago. This terminal would require approximately seven new storage tanks and associated electrical and mechanical facilities such as substations and pumping units. The new terminal would result in approximately 55 acres of permanent disturbance. Enbridge also would need to construct eight additional pump stations to operate the approximately 400 additional miles of pipeline required for this SA.
  - **Increased Power Usage and Greenhouse Gas Emissions.** The addition of seven crude oil storage tanks would significantly increase the amount of volatile organic compounds ("VOCs"), greenhouse gases ("GHGs"), criteria pollutants, and hazardous air pollutants ("HAPs") emitted during operations. The eight additional pump stations would require more power, and their operation would generate more indirect emissions, such as GHGs, Sulfur Dioxide ("SO_2") and nitrogen oxides ("NO_x"), as compared to the Preferred Route. This SA would result in the consumption of 1,703 gigawatt hours per year ("GWh/yr") to power the pump stations, approximately two times greater as compared to the Preferred Route. SA-04-L3 would also increase emissions of carbon dioxide equivalent (CO_{2e}), SO_2, and NO_x by 90 percent as compared to the Preferred Route.
  - **Greater Permanent Impacts**. As noted above, the additional terminal facility would require civil work that would permanently impact approximately 55 acres

of land. Enbridge cannot provide impacts associated with the terminal beyond construction and operations emissions (see bullet point above regarding GHG emissions) because the terminal has not been sited; indeed, Enbridge notes that there could be great difficulty siting this terminal (see discussion below).

- **Difficulty in Siting the Required Terminal.** SA-04-L3 terminates at Exxon Mobil's existing facility in Joliet, Illinois (see image below). The area surrounding the Exxon Mobil terminal is extremely congested and contains the Midewin National Tallgrass Prairie, the U.S. National Parks Service ("NPS") Illinois and Michigan Canal Natural Heritage Corridor, and several industrial facilities. The Midewin National Tallgrass Prairie is the first national tallgrass prairie in the U.S., the largest open space in the Chicago area, and the largest tallgrass prairie east of the Mississippi River (Nature Conservancy, 2017).



- **Parallels the Red River through North Dakota.** SA-04-L3 is located within 5 miles or less of the Red River for approximately 102 miles and would cross 119 waterbodies that are tributaries to the Red River.
- **Increased Impacts to Waterbodies.** SA-04-L3 would cross 512 more waterbodies than the Preferred Route; of these, it would cross 106 more perennial streams, 339 more intermittent streams, and 67 more canals/ditches. SA-04-L3 also would cross 2 more commercially navigable waterways and would result in 33 more major river crossings.
- **Impacts to the U.S. Army Corps of Engineers Mississippi River Pools 11-22 Recreation Area.** SA-04-L3 would cross the Mississippi River where it is part of the U.S. Army Corps of Engineers ("USACE") Mississippi River Pools 11-22 Recreation Area. This area includes 15 campgrounds along the shoreline of the Mississippi River. Recreational activities in this area include boating, interpretive programs, hiking trails, fishing and eagle watching in winter months among others (Recreation.gov, 2014).
- **Impacts to U.S. Fish and Wildlife Service Upper Mississippi River National Wildlife and Fish Refuge.** SA-04-L3 would cross the portion of the Mississippi River that is included in the U.S. Fish and Wildlife Service ("USFWS") Upper Mississippi River National Wildlife and Fish Refuge. According to the USFWS, the Upper Mississippi River National Wildlife

and Fish Refuge is located in four states: Minnesota, Wisconsin, Iowa, and Illinois. The refuge encompasses one of the largest blocks of floodplain habitat in the lower 48 states (USFWS, 2016). The refuge is designated as a Wetland of International Importance and a Globally Important Bird Area ("IBA"), which is the highest priority given in the IBA program implemented by Audubon and BirdLife International (Audubon, 2017). A Wetland of International Importance is a designation associated with the Ramsar Convention, a global intergovernmental treaty which promotes the conservation and wise use of wetlands (Ramsar, 2017). Wetlands on the Ramsar list are designated for their high value to the country and the world, and are officially designated by the National Administrative Authority.

- **Impacts to USFWS Waterfowl Production Areas.** SA-04-L3 would cross four USFWS Waterfowl Production Areas in North Dakota and Minnesota. Waterfowl Production Areas provide habitat for a vast variety of waterfowl, shorebirds, grassland birds, plants, insects, and wildlife.
- **Impacts to the NPS Illinois and Michigan Canal Natural Heritage Corridor.** SA-04-L3 would cross the NPS Illinois and Michigan Canal Natural Heritage Corridor at its termination in Joliet, Illinois. According to the NPS, such Natural Heritage Areas are "places where historic, cultural and natural resources combine to form cohesive, nationally important landscapes." The Illinois and Michigan Canal Heritage Area was the first such area to be signed into law in 1984 (NPS, 2017).
- **Impacts to Natural Resource Conservation Service Lands.** SA-04-L3 would cross five Natural Resource Conservation Service ("NRCS") Wetland Reserve Program ("WRP") easements. The WRP was a voluntary program that offered landowners the opportunity to protect, restore and enhance wetlands on their property (U.S. Department of Agriculture, 2017). Crossing these properties could result in permitting difficulties and routing issues which could require significant reroutes because these parcels are encumbered with federal funding and possible use restrictions. The WRP program was replaced by the Agricultural Conservation Easement Program in 2014.
- **New Crossings of State Designated Lands.** SA-04-L3 would cross North Dakota Game and Fish ("NDGF"), Iowa Department of Natural Resources ("IADNR") Wildlife Management Area ("WMA") and Recreation Area lands, and Illinois Department of Natural Resources ("ILDNR") Natural Area and Nature Preserve lands, which may present construction constraints and permitting difficulties.
- **Increased Crossings of Karst and Fractured Bicarbonate Rock.** SA-04-L3 would cross 64.0 more miles of fractured bicarbonate rock, 325.5 more miles of potential karst landforms, and 462.9 more miles of bedrock. Fractured bicarbonate rock is limestone that may contain large, highly permeable voids or fissures due to fracturing and solution weathering. Karst landforms are known for cave-ins or surface slumps. Soil movement in these areas creates obvious dangers to pipelines. Regions where carbonate rocks are the uppermost bedrock may be more susceptible to groundwater contamination. The Preferred Route would not encounter carbonate bedrock because it is only present in southeastern Minnesota.
- **Increased Impacts to Minnesota River and Mississippi River Crossings.**
    - *Minnesota River* - SA-04-L3 would require one crossing of the Minnesota River north of Mankato, likely through use of the horizontal directional drill ("HDD") method. Geological studies of the area indicate that bedrock outcrops are prevalent, which would elevate the risks of using the HDD method. While

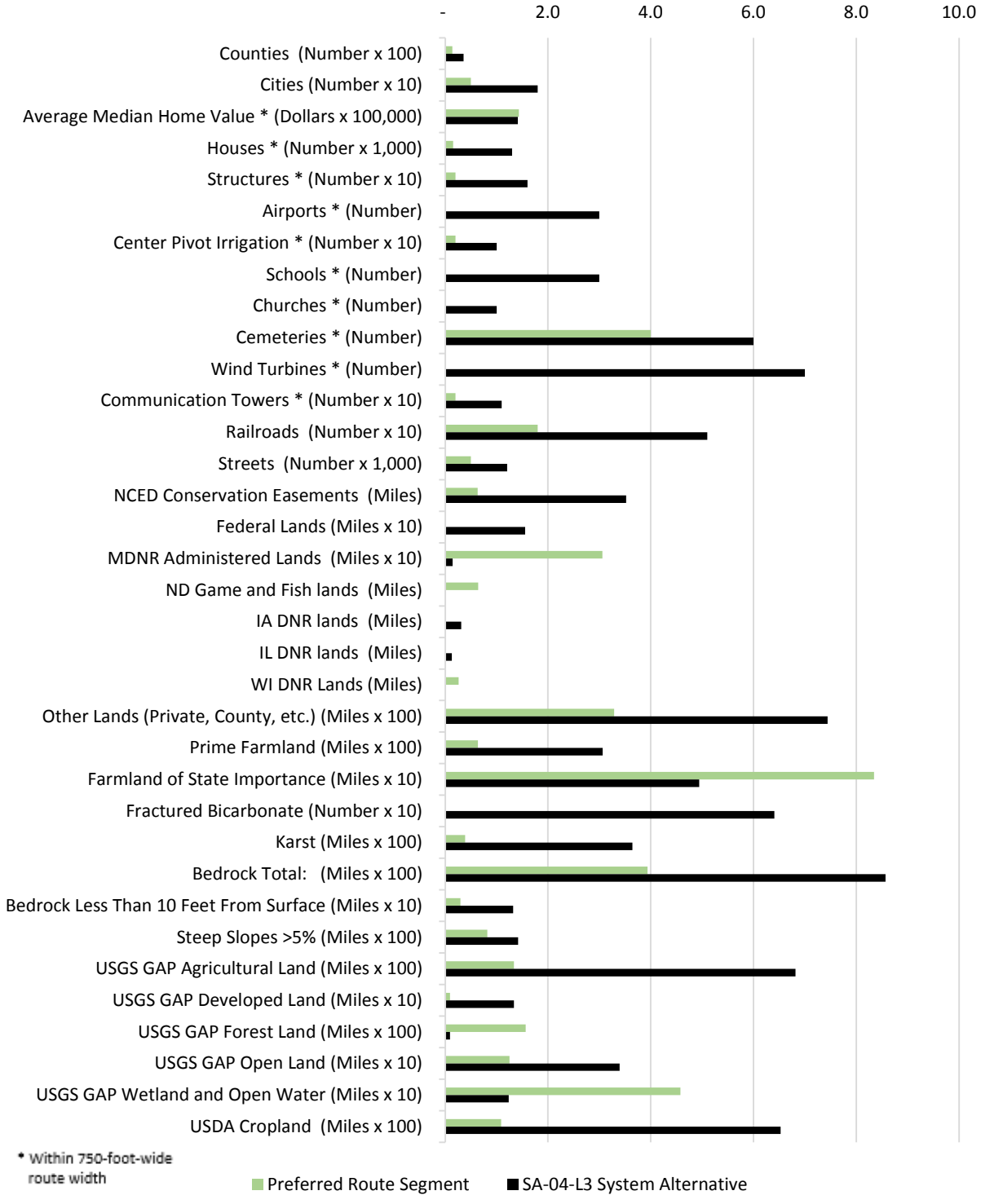
drilling in rock is possible, there are many variables that can quickly alter the successful completion of the drill.

- *Mississippi River* - As SA-04-L3 enters Illinois it encounters a second, substantial crossing of the Mississippi River that is approximately 2,100 feet wide. With meandering backwaters on the west side and several businesses on the east, Enbridge would need to complete a drill of significant length to install the pipeline. While this is not impossible, the inherent risks are elevated due to the developments surrounding the river and the existing environment.

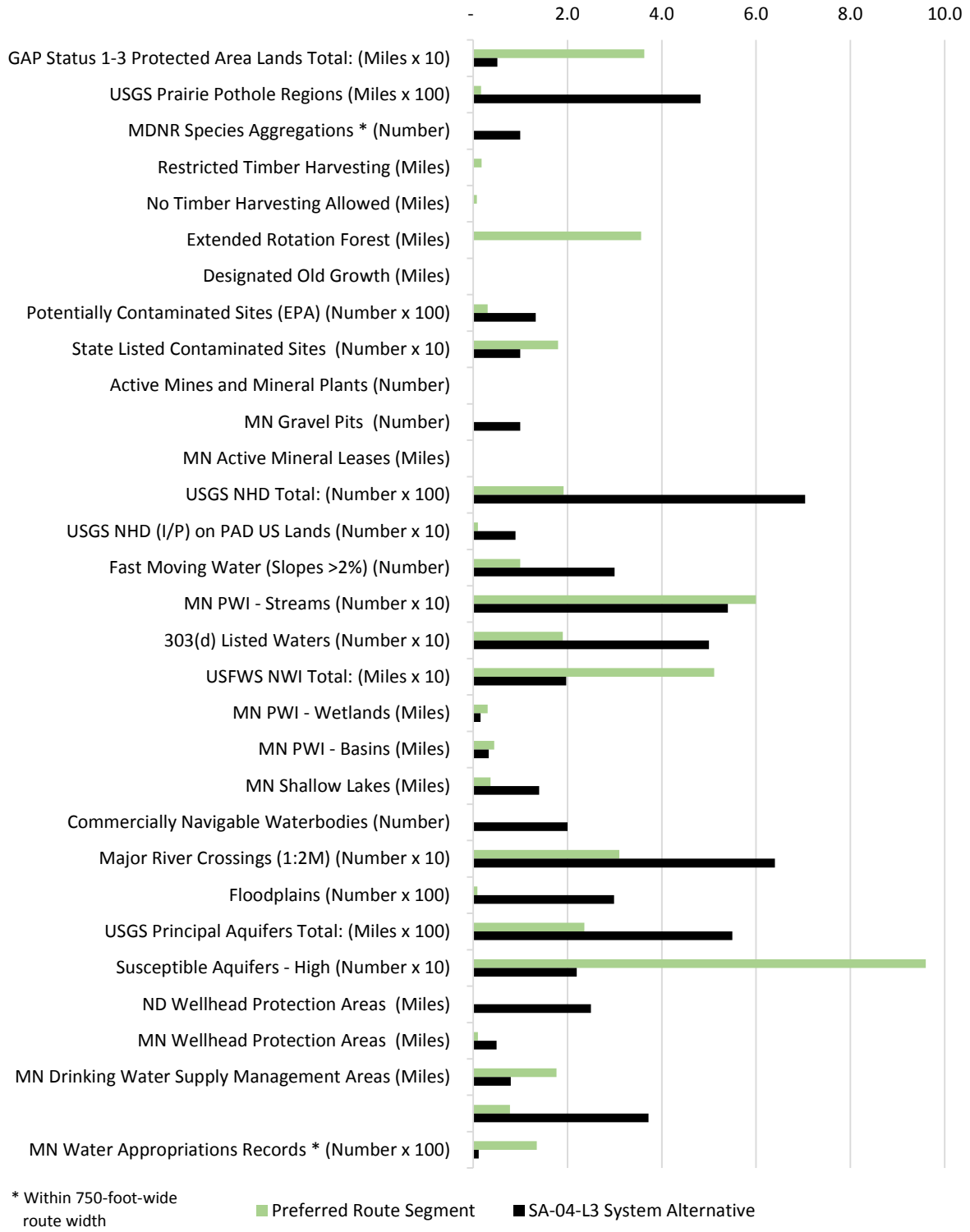
- **Significantly More High Consequence Areas.** There are 417 High Consequence Areas ("HCAs") within the 750-foot- wide route width of SA-04-L3, whereas the Preferred Route contains 68 HCAs within the 750-foot-wide route width.

- **Significantly Greater Cost.** SA-04-L3 would cost approximately $5.5 billion to construct, which is more than twice the cost of the Preferred Route. These increased costs would be borne by shippers on the Enbridge Mainline System. Even though SA-04-L3 provides no interconnection to the Minnesota Pipe Line System or Minnesota refineries, Minnesota refiners would still bear a portion of the increased costs.

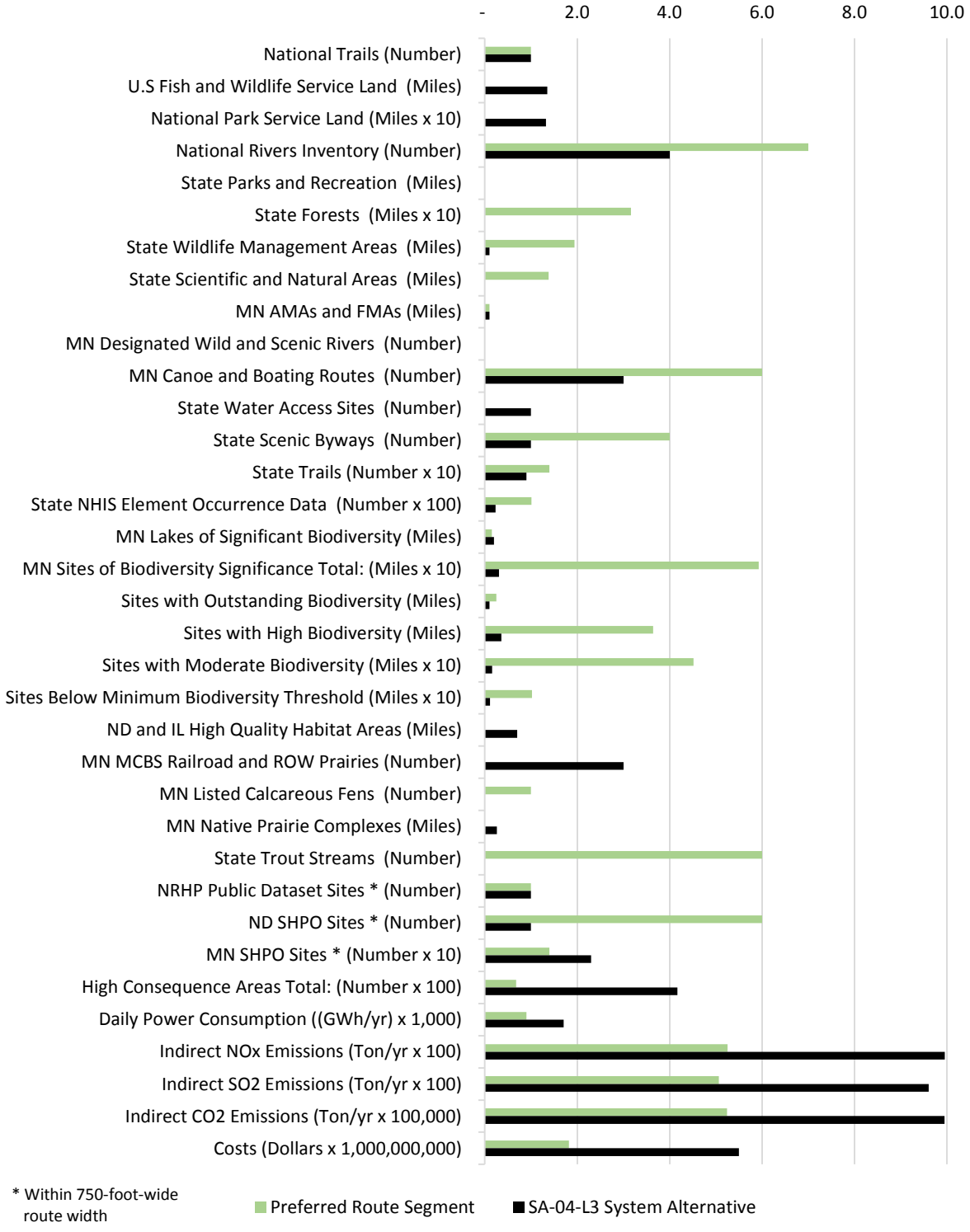
Resources Crossed by the Preferred Route Segment and SA-04-L3 System Alternative: Chart 1 of 3



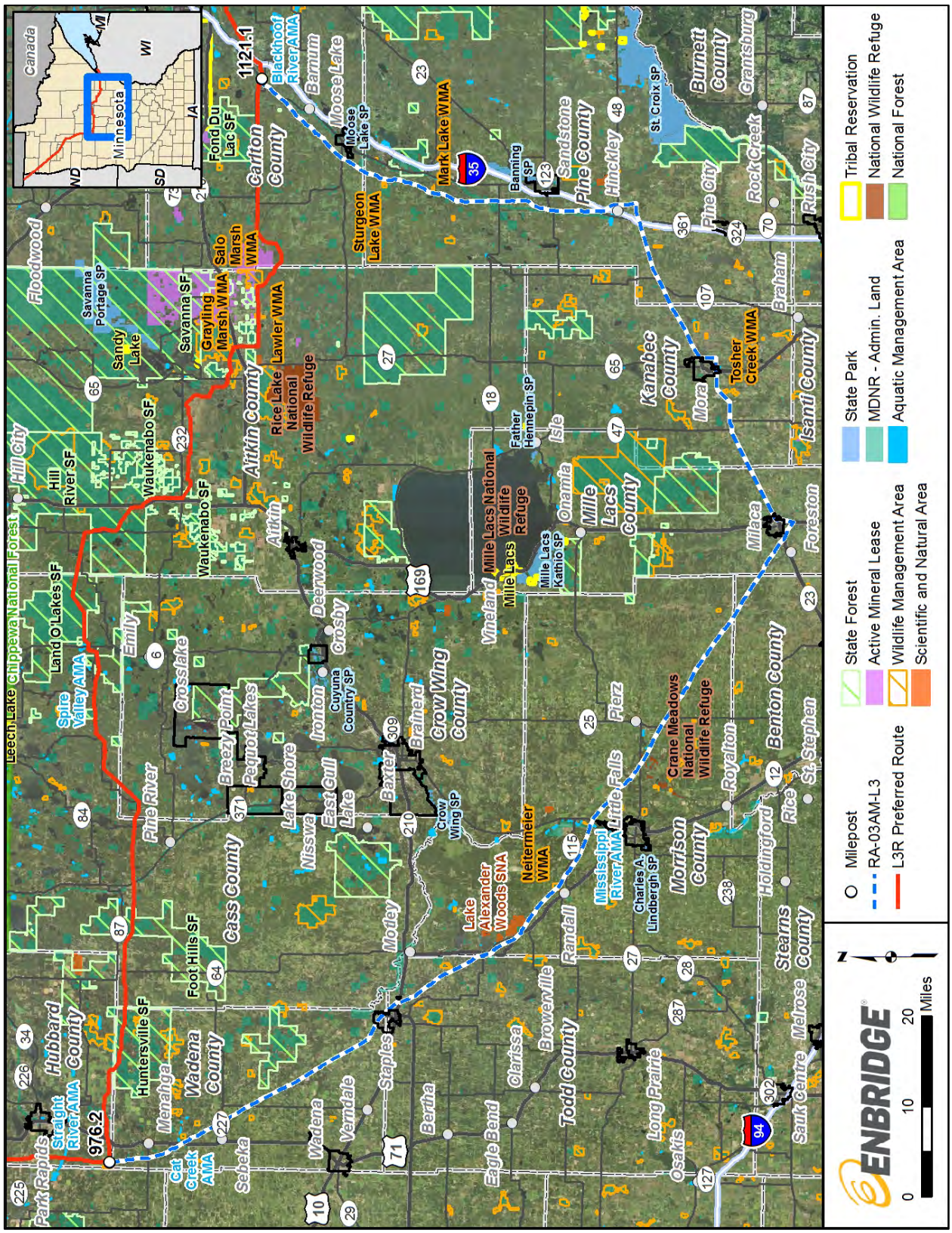
Resources Crossed by the Preferred Route Segment and SA-04-L3 System Alternative: Chart 2 of 3



Resources Crossed by the Preferred Route Segment and SA-04-L3 System Alternative: Chart 3 of 3



RA-03AM-L3


Milepost
RA-03AM-L3
L3R Preferred Route
State Forest
Active Mineral Lease
Wildlife Management Area
Scientific and Natural Area
State Park
MDNR - Admin. Land
Aquatic Management Area
Tribal Reservation
National Wildlife Refuge
National Forest
ENBRIDGE
0
10
20
Miles
Minnesota
Canada
ND
SD
IA
WI
MI
Hubbard County
Wadena County
Cass County
Crow Wing County
Aitkin County
Carlton County
Pine County
Kanabec County
Mille Lacs County
Morrison County
Todd County
Benton County
Stearns County
Isanti County
Chisago County
Burnett County
Leech Lake Chippewa National Forest
Rice Lake National Wildlife Refuge
Mille Lacs National Wildlife Refuge
Crane Meadows National Wildlife Refuge
Mississippi River AMA
Straight River AMA
Spire Valley AMA
Cat Creek AMA
Land O'Lakes SF
Hill River SF
Foot Hills SF
Huntersville SF
Waukenabo SF
Savanna SF
Savanna Portage SP
Sandy Lake
Floodwood
Hill City
Grayling Marsh WMA
Salo Marsh WMA
Fond Du Lac SF
Blackhoof River AMA
Barnum
Moose Lake
Moose Lake SP
Sturgeon Lake WMA
Mark Lake WMA
Banning SP
Sandstone
Hinckley
St. Croix SP
Pine City
Rock Creek
Grantsburg
Rush City
Braham
Mora
Tosher Creek WMA
Isle
Father Hennepin SP
Onamia
Mille Lacs Kathio SP
Milaca
Foreston
Vineland
Deerwood
Aitkin
Crosby
Ironton
Cuyuna Country SP
Crosslake
Emily
Breezy Point
Pequot Lakes
Pine River
Lake Shore
East Gull Lake
Nisswa
Baxter
Brainerd
Crow Wing SP
Pierz
Little Falls
Charles A. Lindbergh SP
Lake Alexander Woods SNA
Neitermeier WMA
Motley
Staples
Randall
Browerville
Clarissa
Eagle Bend
Bertha
Verndale
Wadena
Sebeka
Menahga
Park Rapids
Hwy 976.2
Hwy 1121.1
Royalton
Rice
St. Stephen
Holdingford
Melrose
Sauk Centre
Long Prairie
Osakis

Purpose

Route Alternative RA-03AM-L3 was proposed by the Minnesota Department of Natural Resources ("MDNR") to modify the Minnesota Pollution Control Agency ("MPCA") Sandpiper Pipeline Project system alternative SA-03AM, resulting in a southerly route that follows existing pipeline and road corridors.

Description

RA-03AM-L3 deviates from the Preferred Route at approximate MP 976.2 in the southwest corner of Hubbard County. RA-03AM-L3 travels south for 112 miles following the existing Viking Natural Gas Pipeline to Chisago County. It then turns northeast for 39 miles, paralleling Highway 23. Near Hinckley, it turns north and follows an existing utility corridor for 48 miles until it reconnects with the Preferred Route west of Interstate 35 at approximate MP 1121.1 in Carlton County.

	The Preferred Route Segment	RA-03AM-L3
Collocated Length (mi.)	98.6	144.5
Greenfield Length (mi.)	46.3	54.5
Total (mi.)	144.9	199.0

A comparison of the human and environmental characteristics of RA-03AM-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

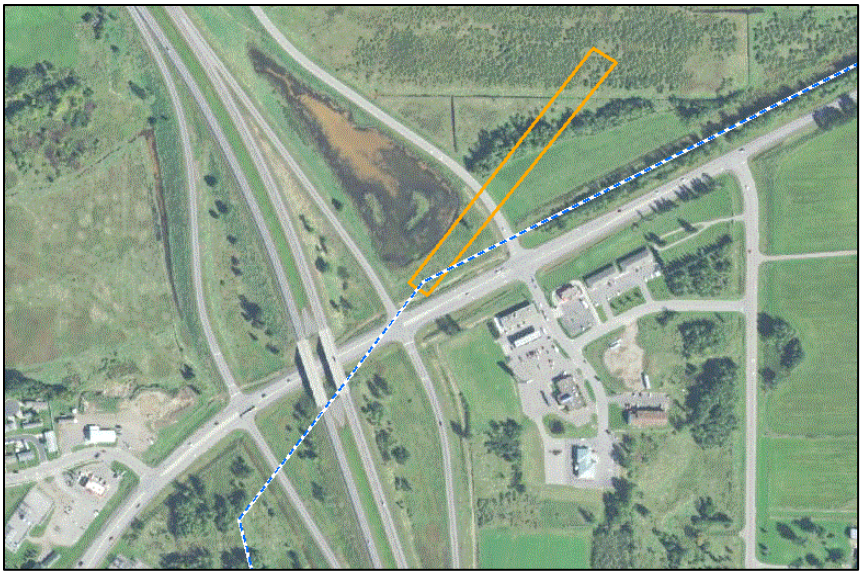
Enbridge Recommendation

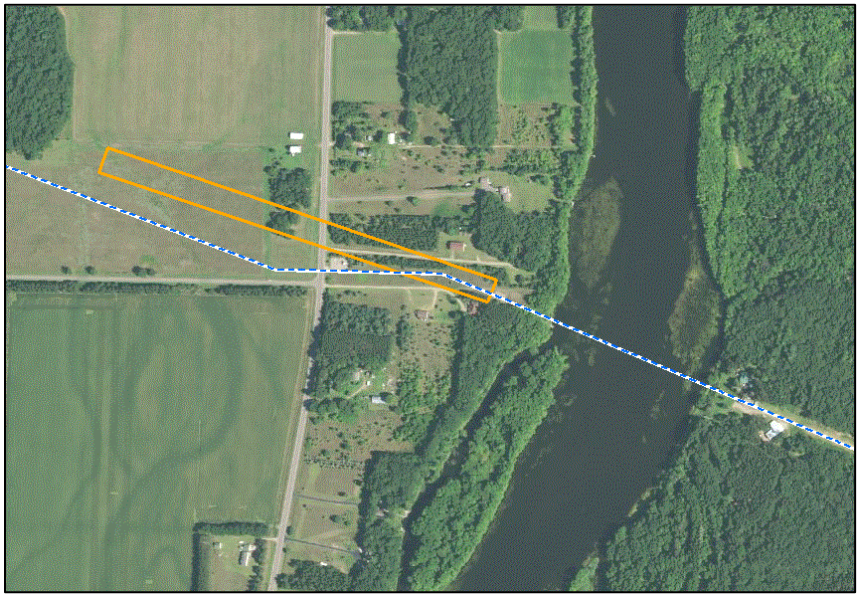
Enbridge does not recommend that RA-03AM-L3 be approved for the following reasons:

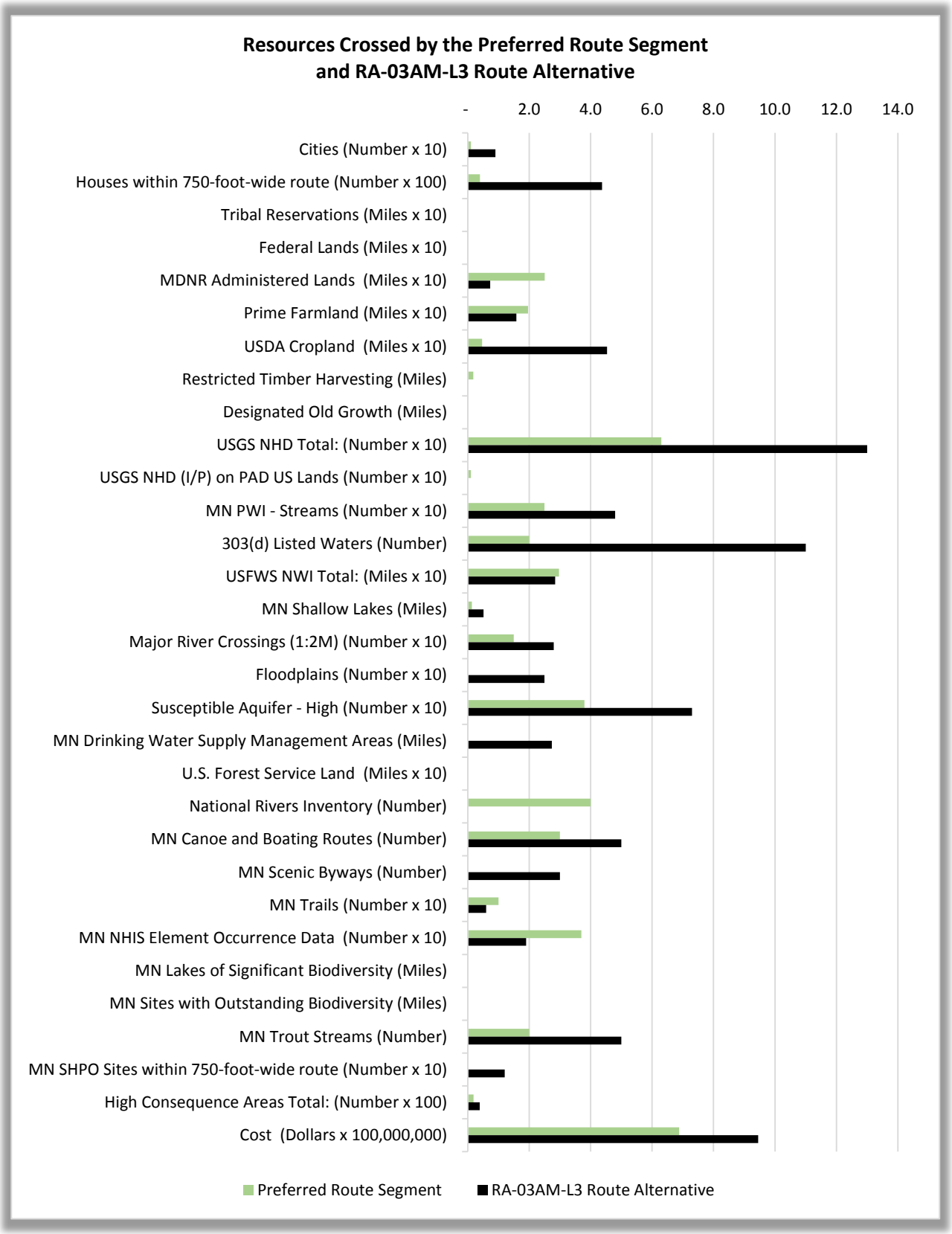
- **Greater Total Length and Construction Disturbance.** The Preferred Route provides a shorter, more direct route from Clearbrook to Superior. Because RA-03AM-L3 is approximately 54 miles longer than the Preferred Route, it would result in an increase in total acres disturbed and total environmental and human resources impacted during construction of the Project.
- **Increased Impacts to Waterbodies.** RA-03AM-L3 would cross 67 more waterbodies (13 of which are considered major) and 23 more Minnesota public waters inventory ("PWI") streams.
- **Increased Impacts to Residences and New Landowners.** RA-03AM-L3 is a substantial deviation from the Preferred Route. RA-03AM-L3 would require new easements on 1,094 parcels. There are 397 more houses within a 750-foot-wide route width over RA-03AM-L3. Numerous homes, garages, and commercial properties would need to be removed to construct RA-03AM-L3.
- **Increased Air Emissions.** RA-03AM-L3 would require the construction of one additional pump station, thereby increasing air emissions by 15 percent over the course of a year and power consumption by 131 GWh/year as compared to the Preferred Route.
- **Increased Impacts to Cities and Businesses.** RA-03AM-L3 would cross nine cities, including Staples, Little Falls, Milaca, Mora, and Hinckley, Minnesota (see image below that shows the RA-03-AM crossing Staples). Enbridge would need to install RA-03AM-L3 between public venues and businesses in congested and developed areas with constricted workspaces. Thirteen additional structures, three airports, one school, and two cemeteries are located within a 750-foot-wide route width over RA-03AM-L3.

- I**mpacts to Hinckley Golf Course.** RA-03AM-L3 would cross the Grand Casino golf course in Hinckley. Much of the course would need to be closed during construction and restoration (see image below).

- **Insufficient Workspace to Complete Major Road and River Crossings.** The images below depict RA-03AM-L3 crossing intersection of U.S. Highway 169 and Minnesota State Highway 23 in the town of Milaca and the Mississippi River at Little Falls, Minnesota. These crossings would need to be completed using the HDD method; however, there would not be sufficient room on either end of the drill for the pipe pull back string assembly areas. Enbridge would need 3.7 acres of additional workspace to complete the major road crossings and 4.6 acres of additional workspace for the Mississippi River crossing.






Resources Crossed by the Preferred Route Segment
and RA-03AM-L3 Route Alternative
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2.0
4.0
6.0
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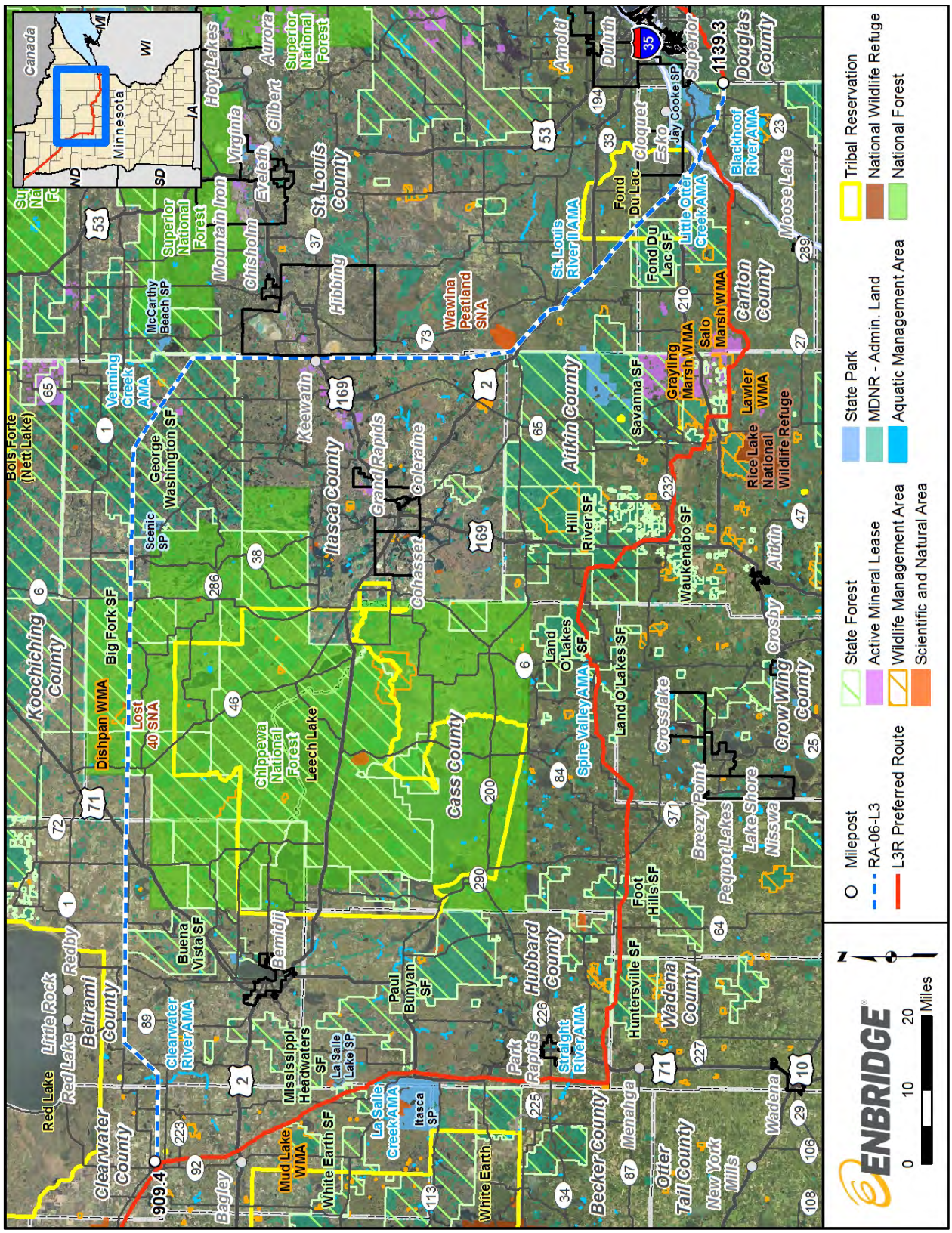
12.0
14.0
Cities (Number x 10)
Houses within 750-foot-wide route (Number x 100)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number x 10)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number x 10)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles x 10)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number x 10)
High Consequence Areas Total: (Number x 100)
Cost (Dollars x 100,000,000)
Preferred Route Segment
RA-03AM-L3 Route Alternative

RA-06-L3


Milepost
RA-06-L3
L3R Preferred Route
State Forest
Active Mineral Lease
Wildlife Management Area
Scientific and Natural Area
State Park
MDNR - Admin. Land
Aquatic Management Area
Tribal Reservation
National Wildlife Refuge
National Forest
ENBRIDGE
0
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Miles
909.4
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Red Lake
Little Rock
Redby
Beltrami County
Clearwater County
Bagley
Mud Lake WMA
White Earth SF
White Earth
Becker County
Menahga
Otter Tail County
New York Mills
Wadena
Wadena County
Hubbard County
Park Rapids
Straight River AMA
Hunters ville SF
Foot Hills SF
Breezy Point
Pequot Lakes
Lake Shore
Nisswa
Crow Wing County
Crosslake
Land O'Lakes
Land O'Lakes SF
Spire Valley AMA
Cass County
Chippewa National Forest
Leech Lake
Mississippi Headwaters SF
La Salle Lake SP
La Salle Creek AMA
Itasca SP
Paul Bunyan SF
Bemidji
Buena Vista SF
Clearwater River AMA
Koochiching County
Big Fork SF
Dishpan WMA
Lost 40 SNA
Venning Creek AMA
George Washington SF
Scenic SP
Bois Forte (Nett Lake)
McCarthy Beach SP
Superior National Forest
Mountain Iron
Virginia
Hoyt Lakes
Aurora
Gilbert
Eveleth
Chisholm
Hibbing
St. Louis County
Itasca County
Grand Rapids
Keewatin
Coleraine
Cohasset
Wawina Peatland SNA
St. Louis River IIAMA
Aitkin County
Hill River SF
Waukenabo SF
Savanna SF
Grayling Marsh WMA
Salo Marsh WMA
Rice Lake National Wildlife Refuge
Lawler WMA
Aitkin
Crosby
Fond Du Lac SF
Fond Du Lac
Cloquet
Esko
Jay Cooke SP
Superior
Duluth
Amold
Douglas County
Carlton County
Little Otter Creek AMA
Blackhoof River AMA
Moose Lake
Canada
Minnesota
WI
IA
SD
ND
MI

Purpose

Route Alternative RA-06-L3 was proposed by a private commenter and is located north of the Enbridge Mainline System corridor which contains the existing Line 3 pipeline.

Description

RA-06-L3 deviates from the Preferred Route at approximate MP 909.4 east of Clearbrook in Clearwater County. RA-06-L3 then proceeds eastward through primarily forest for 105 miles to Minnesota Highway 65, where it turns south through primarily forest for 55 miles to Highway 73. At Highway 73, it turns southeast through primarily forest for 45 miles and then exits Minnesota in Carlton County at approximate MP 1139.3.

	The Preferred Route Segment	RA-06-L3
Collocated Length (mi.)	176.1	64.0
Greenfield Length (mi.)	53.8	141.4
Total (mi.)	229.9	205.4

A comparison of the human and environmental characteristics of RA-06-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

Enbridge Recommendation

Enbridge does not recommend that RA-06-L3 be approved for the following reasons:

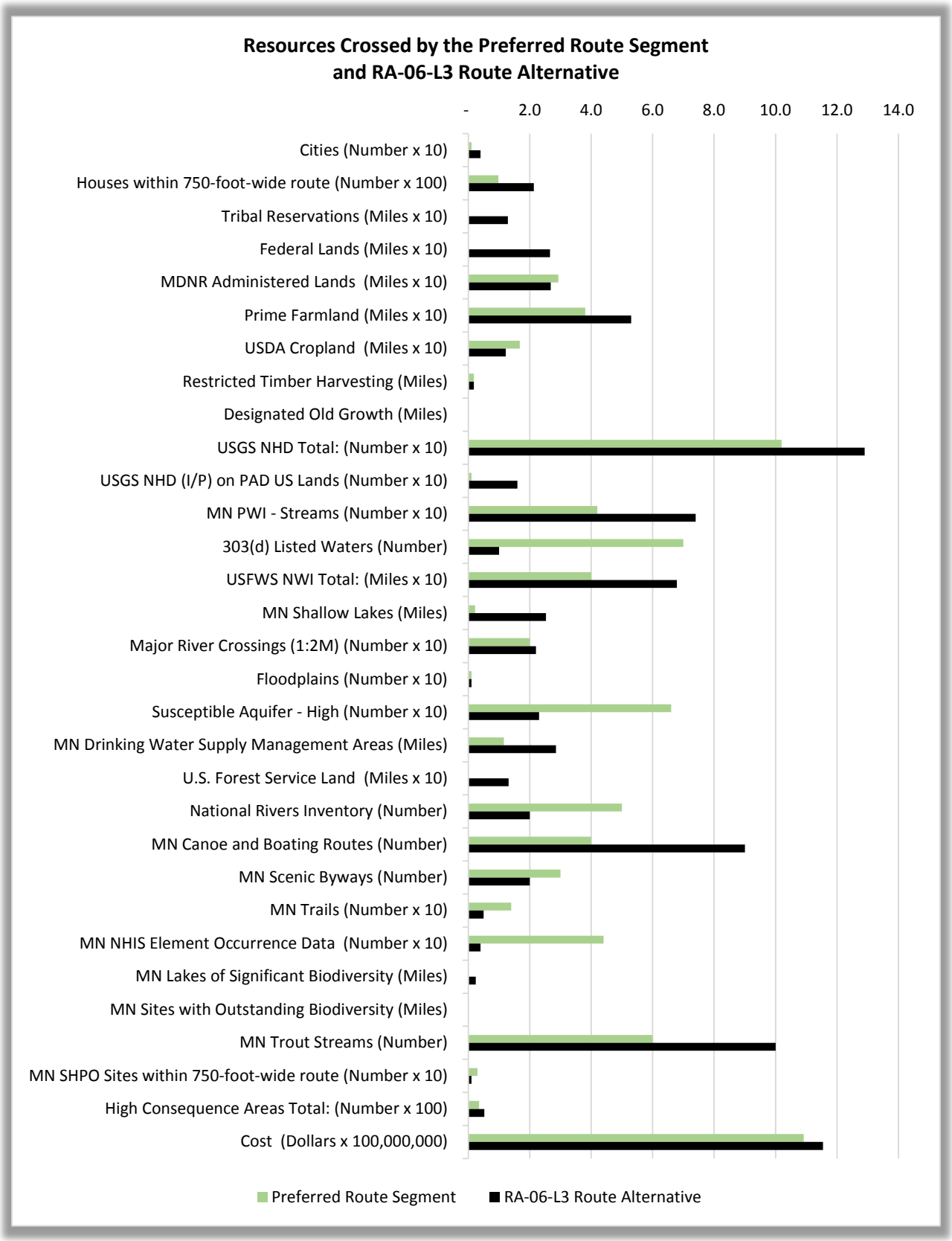
- **Crossing of the Chippewa National Forest**. RA-06-L3 would create 13.1 miles of new greenfield right-of-way through the Chippewa National Forest ("CNF"). The Preferred Route would avoid the CNF and all national forests.
- **Crossing of the Fond du Lac Reservation**. RA-06-L3 would cross 12.9 miles of the Fond du Lac Reservation; the Preferred Route avoids all tribal reservations. Absent agreement from the Tribe, Enbridge is unable to secure land rights and/or other approvals necessary to construct and operate the pipeline across the Reservation.
- **Crossing of City of Keewatin**. RA-06-L3 would pass directly through the city of Keewatin, Minnesota, which would require construction in close proximity to homes and businesses (see image below).

- **Crossing of the Active Keetac Taconite Mine**. RA-06-L3 would require construction through the active Keetac mine near Keewatin (see image below), which would present construction concerns due to consolidated and fractured rock, active blasting from mining, and coordination with active mining operations and heavy mine equipment traffic. Construction and operation of the Project would impact the operation of the mine, and Enbridge would need to reach an agreement with the mine operator.

- **Increased Impacts to Residences and New Landowners.** RA-06-L3 would impact more residences (most associated with the crossing of the city of Keewatin), and therefore more people, than the Preferred Route. There are 213 houses within 750 feet of RA-06-L3; in contrast, there are 98 homes within 750 feet of the Preferred Route. RA-06-L3 would require new easements for 953 parcels.
- **Increased Impact to Wetlands and Waterbodies**. Although RA-06-L3 would avoid the lakes, waterbodies, and wetlands along the corresponding segment of the Preferred Route, RA-06-L3 would not lower impacts to these resources statewide. RA-06-L3 would cross 27.9 additional

miles of NWI-mapped wetlands, including 23 more miles of forested wetlands. RA-06-L3 would cross 27 more waterbodies.

- **Area Lacks Existing Infrastructure.** RA-06-L3 would cross an area of Northern Minnesota that lacks existing electrical transmission lines and temporary housing for construction. RA-06-L3 would require the construction of approximately three new pump stations that would need new transmission lines; these pump stations also would result in additional permanent land disturbance.


Resources Crossed by the Preferred Route Segment
and RA-06-L3 Route Alternative
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2.0
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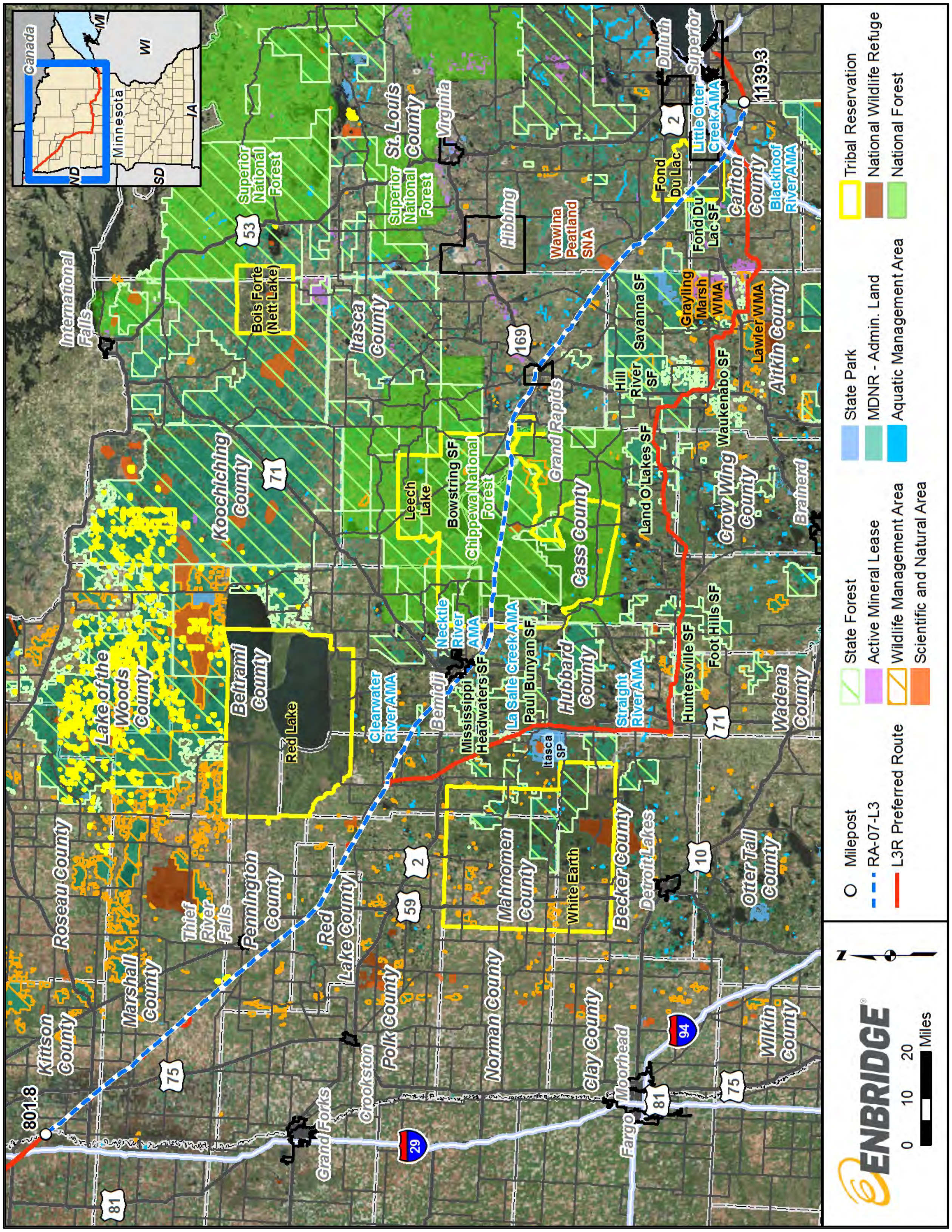
14.0
Cities (Number x 10)
Houses within 750-foot-wide route (Number x 100)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number x 10)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number x 10)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles x 10)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number x 10)
High Consequence Areas Total: (Number x 100)
Cost (Dollars x 100,000,000)
Preferred Route Segment
RA-06-L3 Route Alternative

RA-07-L3


Milepost
RA-07-L3
L3R Preferred Route
State Forest
Active Mineral Lease
Wildlife Management Area
Scientific and Natural Area
State Park
MDNR - Admin. Land
Aquatic Management Area
Tribal Reservation
National Wildlife Refuge
National Forest
ENBRIDGE
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Canada
Minnesota
ND
SD
IA
WI
MI
Kittson County
Roseau County
Marshall County
Lake of the Woods County
Koochiching County
Beltrami County
Pennington County
Red Lake County
Polk County
Norman County
Mahnomen County
Clay County
Becker County
Wilkin County
Otter Tail County
Wadena County
Hubbard County
Cass County
Crow Wing County
Aitkin County
Carlton County
Itasca County
St. Louis County
International Falls
Thief River Falls
Grand Forks
Crookston
Fargo
Moorhead
Detroit Lakes
Bemidji
Grand Rapids
Hibbing
Virginia
Duluth
Superior
Brainerd
Red Lake
White Earth
Leech Lake
Bois Forte (Nett Lake)
Fond Du Lac
Superior National Forest
Chippewa National Forest
Bowstring SF
Mississippi Headwaters SF
Paul Bunyan SF
Huntersville SF
Foot Hills SF
Land O'Lakes SF
Hill River SF
Savanna SF
Waukenabo SF
Fond Du Lac SF
Itasca SP
Clearwater River AMA
Necktie River AMA
La Salle Creek AMA
Straight River AMA
Little Otter Creek AMA
Blackhoof River AMA
Grayling Marsh WMA
Lawler WMA
Wawina Peatland SNA
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53
59
71
75
81
94
169

Purpose

Route Alternative RA-07-L3 would involve the removal of the existing Line 3 pipeline from its trench, followed by replacement of the pipeline within that same trench. Therefore, RA-07-L3 follows the Enbridge Mainline System corridor from the valve near Joliette, North Dakota, southeasterly to Clearbrook, Minnesota, and then on to Superior, Wisconsin. RA-07-L3 as described was developed by DOC-EERA in the FSDD.

Description

RA-07-L3 crosses the Minnesota/North Dakota border at approximate MP 801.8 in Kittson County. It travels 108 miles southeast through mainly agricultural land until reaching Clearbrook in Clearwater County. RA-07-L3 then travels southeast through primarily forest for 40 miles where it turns east and then begins to follow Highway 2 through primarily forest and developed areas for 51 miles. It then turns southeast, continuing to follow Highway 2, through primarily forest, wetland, and developed areas for 83 miles, and then exits Minnesota in Carlton County at approximate MP 1139.3.

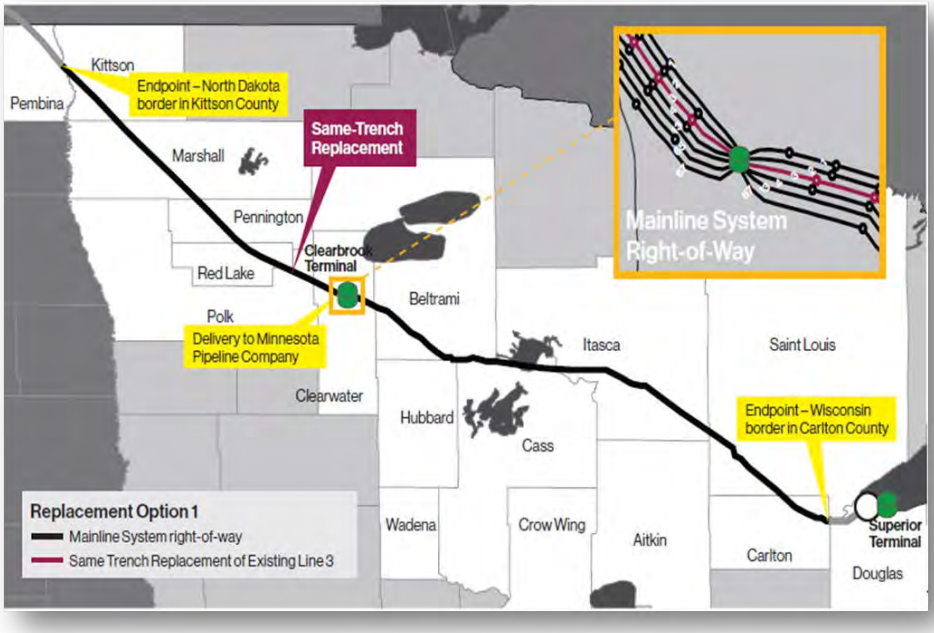
	The Preferred Route Segment	RA-07-L3
Collocated Length (mi.)	279.2	282.5
Greenfield Length (mi.)	60.5	0.0
Total (mi.)	339.7	282.5

A comparison of the human and environmental characteristics of RA-07-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

Enbridge Recommendation

Enbridge does not recommend that RA-07-L3 be approved for the following reasons:

- **Increased Safety Risks and Construction Challenges**
  - **Increased Safety Hazards.** Safety is Enbridge's first and foremost consideration. Line 3 is positioned in the middle of the Enbridge Mainline System right-of-way, which is a multi-pipeline corridor containing seven crude oil pipelines west of Clearbrook and six crude oil pipelines east of Clearbrook (see image below). The spacing between pipelines typically ranges between 10-15 feet on the north side of Line 3 and between 15-20 feet on the south side of Line 3. Enbridge has a strong and mature safety program and strict work rules when conducting operations near its pipelines. To replace Line 3 in the same trench, Enbridge would need to excavate, expose, cut, handle, remove, and then replace the existing pipeline. Because this process would take place between multiple operating pipelines and within a very restricted workspace, there would be an increased risk of damaging an operating pipeline through accidental contact with equipment, overloads on the surface above the pipelines, cave-ins, and adjacent pipe movement due to the varying depths of cover, among other risks.

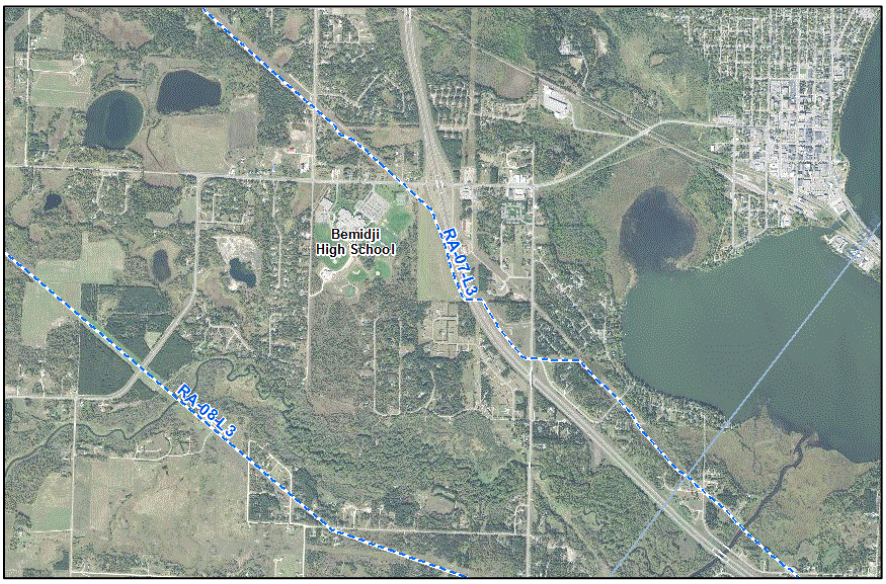


- **Working Over Existing Pipelines.** Enbridge would need to operate heavy equipment and place spoil (soil removed from the trench) directly on top of operating pipelines during construction. This work would create the risk of overstressing the operating pipelines or posing the threat of accidental strikes from backfilling equipment.
- **Multiple Pipeline Crossovers.** There are 12 locations west of Clearbrook where Enbridge's Line 67 and Line 65 pipelines cross back and forth under Line 3 to avoid special environmental features and minimize impacts to human settlements. Likewise, the same situation occurs east of Clearbrook where Line 67 and Line 13 cross back and forth 20 times under Line 3 to the avoid similar environmental and human impacts. In total, the back and forth crossing of Line 3 by other pipelines occurs 32 times. Therefore, Enbridge would need to disturb these crossings to replace the existing pipeline in trench and then duplicate the crossings. This would increase the difficulty of constructing the new line in the same trench.

- **Increased Human and Environmental Impacts.**
  - **Crossing of the Leech Lake and Fond du Lac Reservations.** RA-07-L3 would cross 55.4 miles of the Leech Lake and Fond du Lac Reservations; the Preferred Route avoids all reservations. Absent agreement from the Tribes, Enbridge is unable to secure land rights and/or other approvals necessary to construct and operate the pipeline across the Reservations. The Leech Lake Band of Ojibwe has previously filed comments with the Commission regarding constructing across its Reservation. See letters dated October 25, 2013 and January 2, 2017 in Schedule 6 of Mr. Eberth's direct testimony.
  - **Crossing of the Chippewa National Forest.** RA-07-L3 would cross 26.6 miles of the CNF, where the Preferred Route avoids all national forests.
  - **Crossing of Superfund Site**. RA-07-L3 would cross the southwestern boundary and either cross or be located in close proximity to the eastern boundary of the St. Regis Paper Company federal Superfund site in the town of Cass Lake, Minnesota. The administrative boundary of the Superfund site is irregular but lies generally south of an existing Burlington Northern Santa Fe ("BNSF") railroad right-of-way and east of State

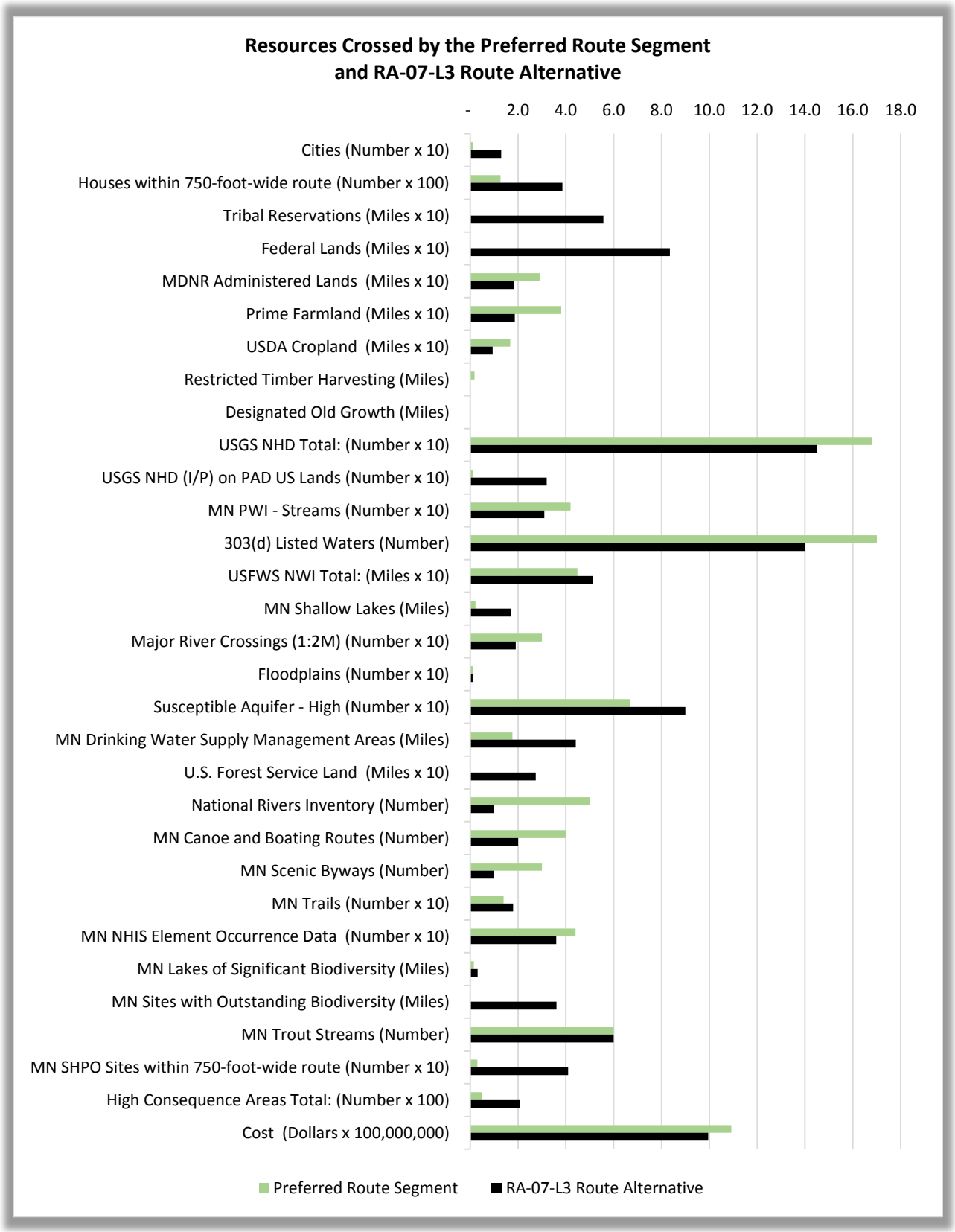
Highway 371. The site is bounded to the south and east by a wooded parcel owned by the U.S. Forest Service ("USFS") and beyond by a lake, Pike's Bay, which would constrain workspace in this area. Both the southwestern and eastern portion of the Superfund site are where the U.S. Environmental Protection Agency ("USEPA") has previously recommended placement of an engineered cap and groundwater extraction wells. RA-07-L3 would impact operation and monitoring activities at the Superfund site.

- **More Impacts to Cities.** RA-07-03 would cross 13 cities, including Leonard, Wilton, Bemidji, Cass Lake, Bena, Zemple, Cohasset, Ball Club, Warba, Grand Rapids, Coleraine, Floodwood, and Big Lake, Minnesota (see images of Bemidji and Grand Rapids crossings, below). In contrast, the Preferred Route would only cross Mahtowa. RA-07-L3 contains 207 HCAs within the 750-foot-wide route width, whereas the Preferred Route contains 49 HCAs within the 750-foot-wide route width.



- **Increased Impacts to Landowners**. Landowners along the existing Line 3 right-of-way would be impacted by the prolonged presence of construction crews and construction activity and would have limited or no access to the construction right-of-way for the duration of construction. The length of the construction process may result in multiple years of crop loss in agricultural areas, and the presence of an open trench would impact the ability to move farming equipment and livestock across the construction right-of-way.
- **Increased Traffic Impacts**. The extended construction operation would also result in more road use and increased traffic throughout the construction process.
- **Increased Construction Workspace and Disturbance Required.** Although RA-07-L3 was proposed to be constructed in an existing, previously disturbed right-of-way, the total construction workspace area would need to be increased for several reasons. Depending on the engineering specifications and environmental factors associated with the adjacent pipelines, such as depth of cover, pipe design, operating pressure, soil types, and ground conditions, the operating pipelines would need to be protected from damage through placement of equipment bridges, additional fill, and mats. This increase in workspace would increase the overall disturbance to all environmental features.
- **Increased Impacts to Wetlands and Waterbodies**. In-trench replacement also poses greater environmental impacts at wetland and waterbody crossings. It would take an extended period of time to remove existing pipe at wetland and waterbody crossings because Enbridge would need to use specialized construction techniques within a limited workspace. In addition, installing new pipeline at these same crossings with open trench methods would further increase the duration of wetland and waterbody crossings, which would increase impacts resulting from sedimentation and aquatic life disturbance, among others.
- **Protracted Open Trench.** Enbridge's Environmental Protection Plan ("EPP") normally restricts having an open trench to no more than 3 days. In-trench replacement of Line 3 would result in the trench being open for protracted periods, and in some cases significantly longer than 3 days, because Enbridge would need to first remove a section of the pipe and then replace it. During that time, changing weather conditions such as frost and rain could severely weaken the trench wall and contribute to trench cave-in, and rain could fill the trench with water. Both circumstances would prevent pipe installation and could result in an even longer period of open trench. Trench cave-ins would result in more time and activity to reconstruct the trench so that pipe may be installed, and collected rainwater/groundwater would need to be discharged out of the trench before installation could occur.

- **Increased Operational Impacts.** In-trench replacement would result in interruption of service for shippers on the Enbridge Mainline System, as the existing Line 3 would need to be taken out of service for approximately 16 months to allow for removal and replacement.


Resources Crossed by the Preferred Route Segment
and RA-07-L3 Route Alternative
- 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0
Cities (Number x 10)
Houses within 750-foot-wide route (Number x 100)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number x 10)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number x 10)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles x 10)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number x 10)
High Consequence Areas Total: (Number x 100)
Cost (Dollars x 100,000,000)
Preferred Route Segment
RA-07-L3 Route Alternative

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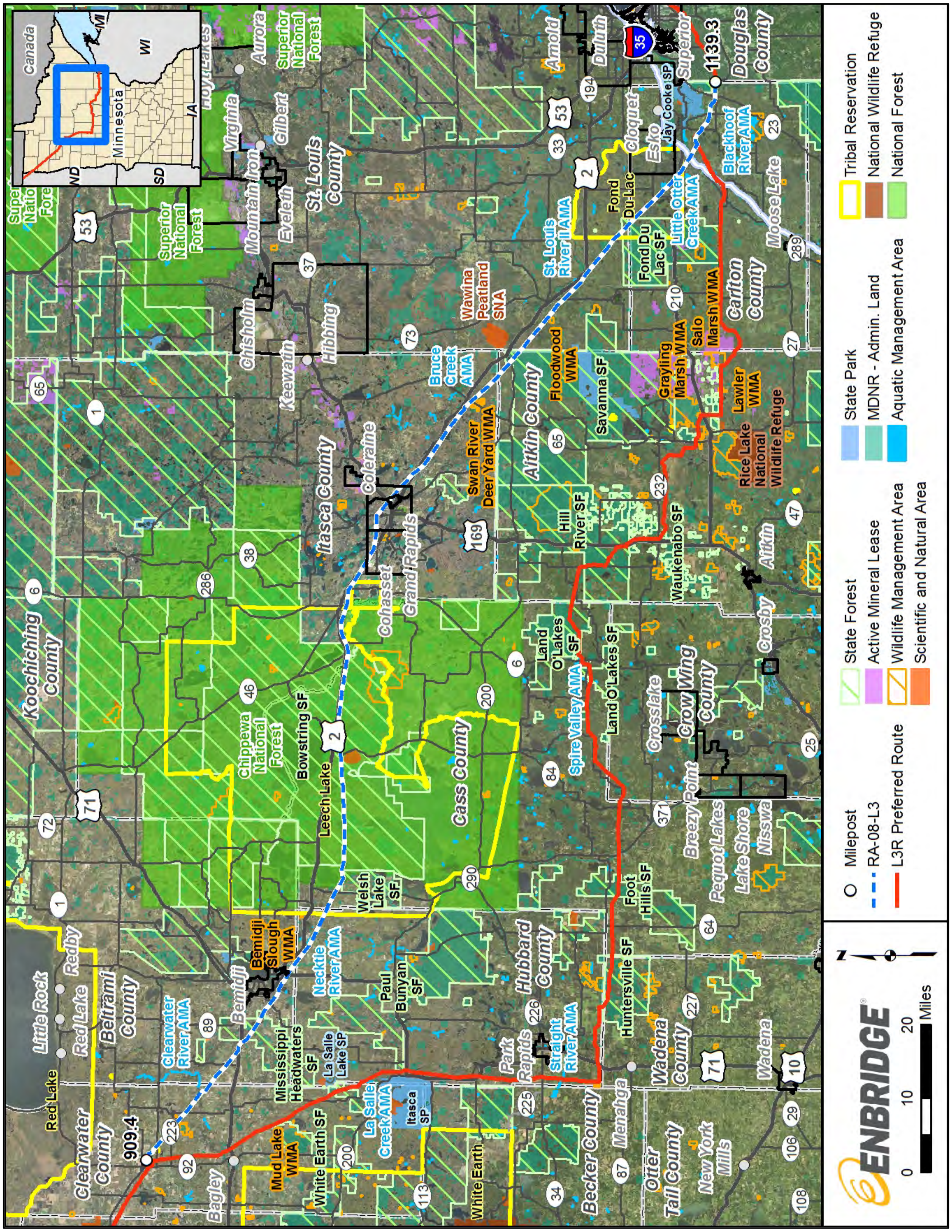
RA-08-L3


ENBRIDGE
Milepost
RA-08-L3
L3R Preferred Route
State Forest
Active Mineral Lease
Wildlife Management Area
Scientific and Natural Area
State Park
MDNR - Admin. Land
Aquatic Management Area
Tribal Reservation
National Wildlife Refuge
National Forest
0 10 20 Miles
909.4
1139.3

Purpose

Route Alternative RA-08-L3 was proposed by the MDNR to route the pipeline alongside portions of the existing Great Lakes Gas Transmission Company ("GLG") pipeline corridor.

Description

RA-08-L3 deviates from the Preferred Route at approximate MP 909.4, east of Clearbrook in Clearwater County. RA-08-L3 is generally located south of and parallel to Highway 2 along the existing GLG pipeline corridor for 44 miles southeast, 43 miles east, and 87 miles southeast and then exits Minnesota in Carlton County at approximate MP 1139.3.

	The Preferred Route Segment	RA-08-L3
Collocated Length (mi.)	176.1	150.8
Greenfield Length (mi.)	53.8	23.5
Total (mi.)	229.9	174.3

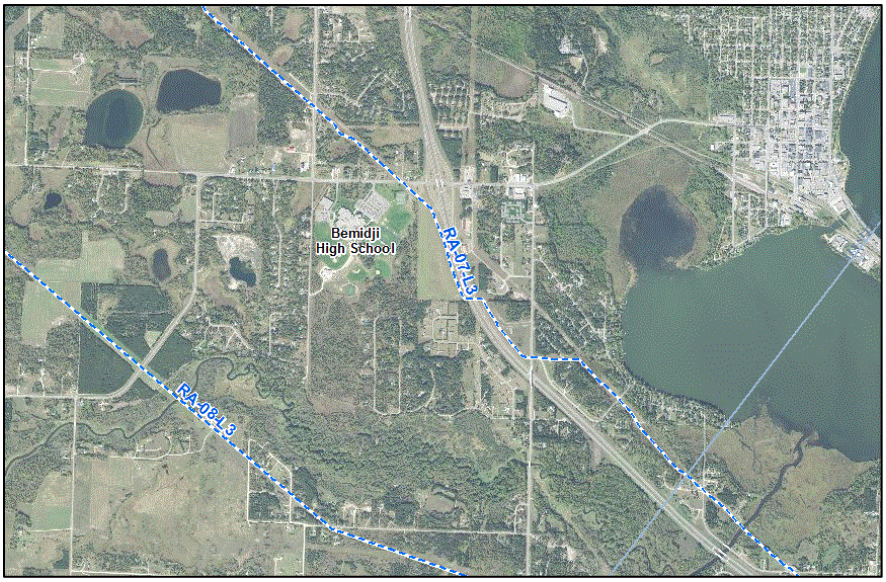
A comparison of the human and environmental characteristics of RA-08-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

Enbridge Recommendation

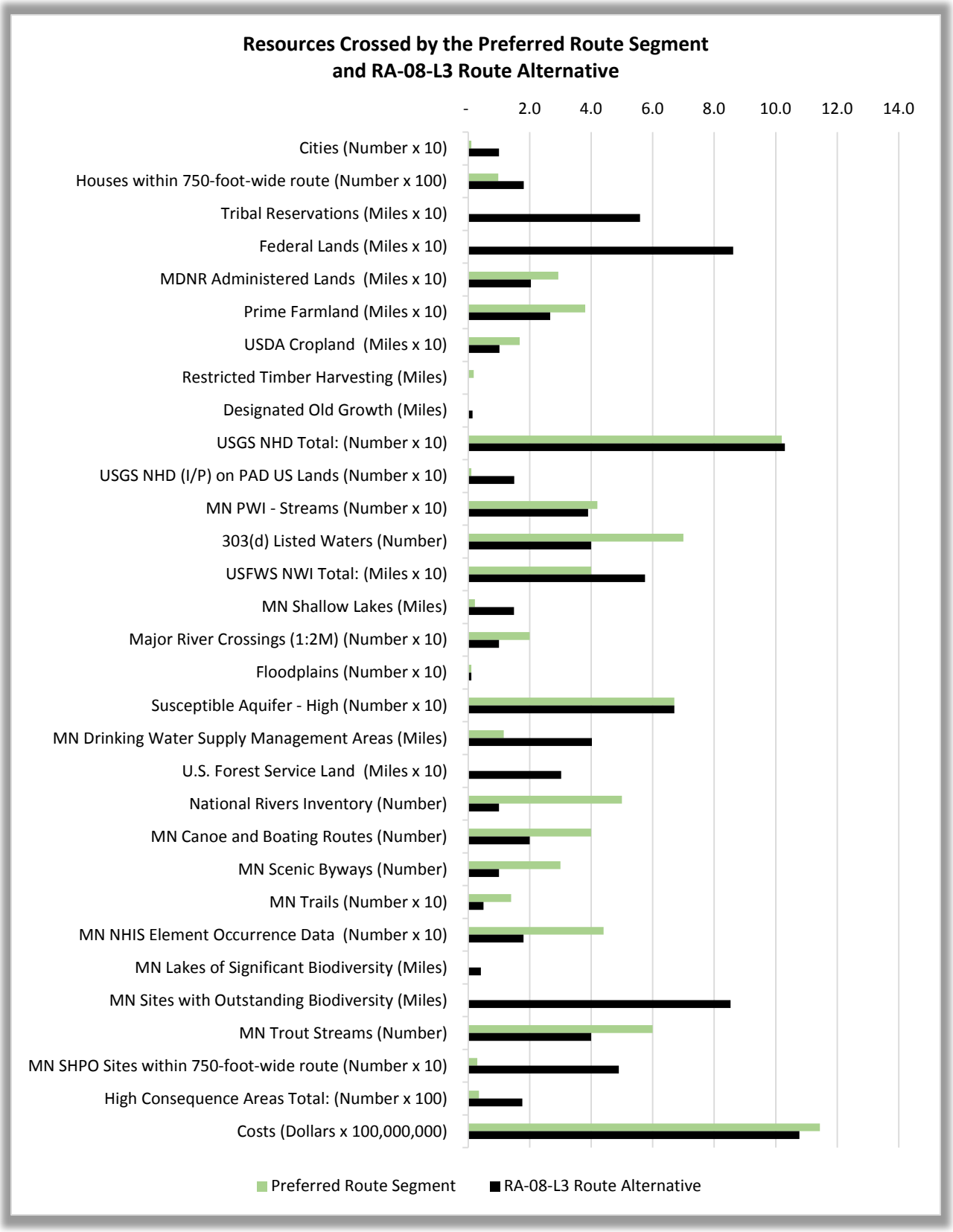
Enbridge does not recommend that RA-08-L3 be approved for the following reasons:

- **Crossing of the Chippewa National Forest**. RA-08-L3 would cross 30.3 miles of the CNF. The Preferred Route would avoid the CNF and all national forests.
- **Crossing of the Leech Lake and Fond du Lac Reservation**. RA-08-L3 would cross 55.9 miles of the Leech Lake and Fond du Lac Reservations, while the Preferred Route would avoid all tribal reservations. Absent agreement from the Tribes, Enbridge is unable to secure land rights and/or other approvals necessary to construct and operate the pipeline across these Reservations. The Leech Lake Band of Ojibwe has previously filed comments with the Commission regarding the regulatory feasibility of constructing a pipeline across the Reservation. See letters dated October 25, 2013 and January 2, 2017 in Schedule 6 of Mr. Eberth's direct testimony.
- **Routing Difficulties Established in Previous Environmental Review.** RA-08-L3 is routed along the "GLG Alternative" that was studied in the U.S. Department of State's 2009 Final Environmental Impact Statement for Enbridge's Alberta Clipper (Line 67) Project ("Alberta Clipper FEIS"). In the Alberta Clipper FEIS, the U.S. Department of State concluded that there were concerns with this route alignment, stating that, "It should be noted that both the CNF and LLBO [Leech Lake Band of Ojibwe] have expressed serious concerns about the GLG Alternative. The CNF has indicated that the GLG Alternative would result in substantially greater impact on its Experimental Forest. In addition, LLBO opposes consideration of the GLG Alternative due to increased impacts to sensitive forestland and wetland resources" (U.S. Department of State, 2009).
- **Increased Impacts to Residences.** There are 83 more houses within the RA-08-L3 750-foot-wide route width. Therefore, greater numbers of landowners would experience construction- and operation-related disruption.
- **Increased Impacts to Cities.** RA-08-L3 would cross 10 cities; including Bemidji, Zemple, Cohasset, Ball Club, Warba, Floodwood, La Prairie, Grand Rapids, Coleraine, and Big Lake, Minnesota (see images of crossings of Bemidji and Grand Rapids below). By comparison, the

corresponding Preferred Route segment would only cross the city of Mahtowa. RA-08-L3 would be within 750 feet of five additional structures, one school, one church, and one additional cemetery. RA-08-L3 contains 176 HCAs within the 750-foot-wide route width, whereas the Preferred Route contains 35 HCAs.



- **Increased Impacts to Wetlands.** RA-08-L3 would cross 17.5 more miles of NWI-mapped wetlands, including 15.6 more miles of forested wetlands.
- **Increased Impacts for a New Group of Landowners.** RA-08-L3 would require new easements for 964 parcels.


Resources Crossed by the Preferred Route Segment and RA-08-L3 Route Alternative
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12.0
14.0
Cities (Number x 10)
Houses within 750-foot-wide route (Number x 100)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number x 10)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number x 10)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles x 10)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number x 10)
High Consequence Areas Total: (Number x 100)
Costs (Dollars x 100,000,000)
Preferred Route Segment
RA-08-L3 Route Alternative

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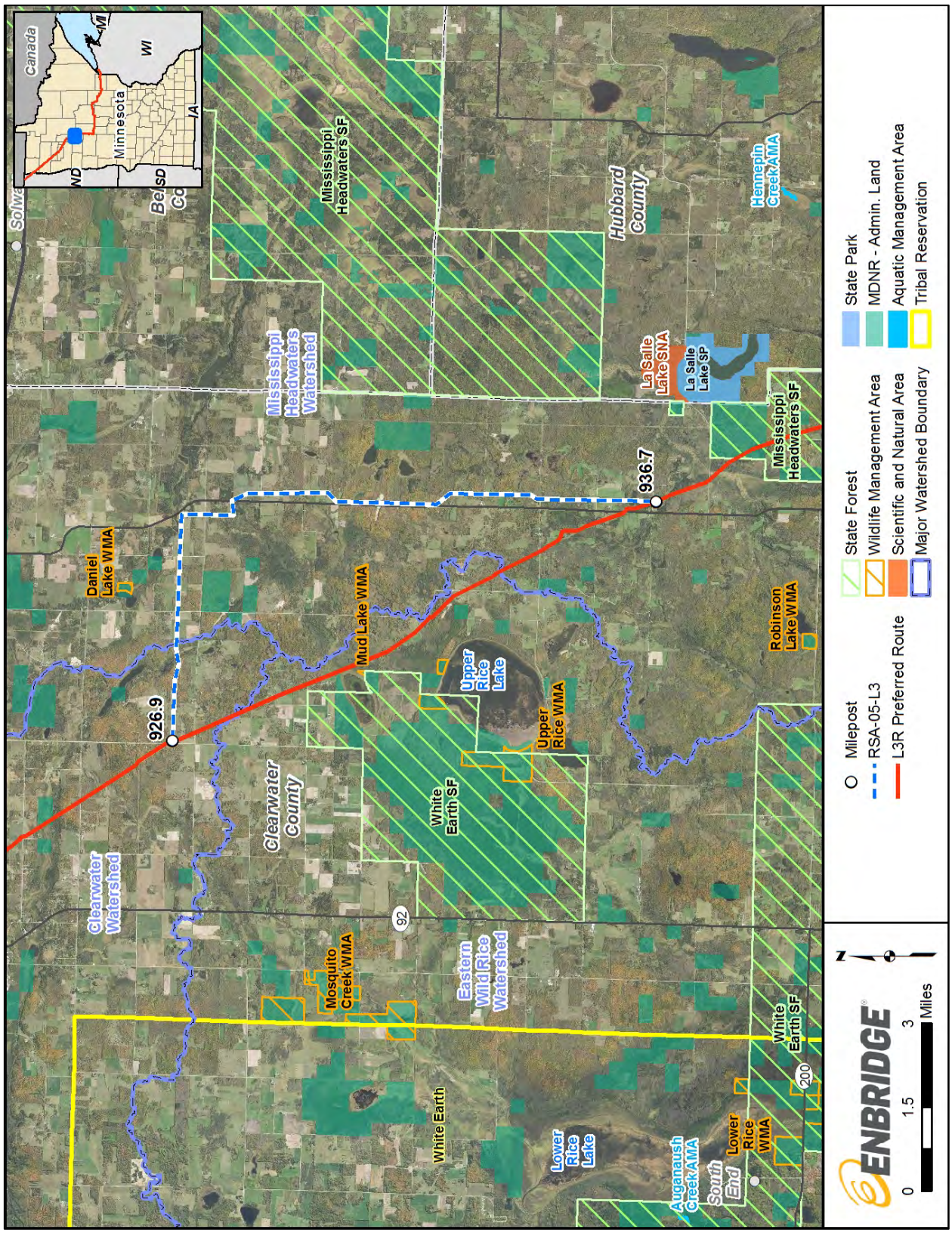
RSA-05-L3


Canada
MI
WI
Minnesota
ND
SD
IA
Mississippi Headwaters SF
Hubbard County
Hennepin Creek AMA
Mississippi Headwaters Watershed
La Salle Lake SNA
La Salle Lake SP
Mississippi Headwaters SF
936.7
Daniel Lake WMA
Mud Lake WMA
926.9
Upper Rice Lake
Upper Rice WMA
Robinson Lake WMA
Clearwater County
White Earth SF
Clearwater Watershed
92
Mosquito Creek WMA
Eastern Wild Rice Watershed
White Earth SF
200
White Earth
Lower Rice Lake
Auganaush Creek AMA
South End
Lower Rice WMA
Milepost
RSA-05-L3
L3R Preferred Route
State Forest
Wildlife Management Area
Scientific and Natural Area
Major Watershed Boundary
State Park
MDNR - Admin. Land
Aquatic Management Area
Tribal Reservation
ENBRIDGE
0
1.5
3
Miles

Purpose

Route Segment Alternative RSA-05-L3 was proposed by Enbridge in its May 26, 2016 Project scoping comments to avoid crossing lands within the boundaries of the Eastern Wild Rice Watershed.

Description

RSA-05-L3 deviates from the Preferred Route at approximate MP 926.9, approximately 5 miles southeast of Bagley in Clearwater County. RSA-05-L3 then travels east through forest and agricultural fields for 4 miles until it turns south through forest and agricultural fields for 9 miles. It rejoins the Preferred Route at approximate MP 936.7, all within Clearwater County.

	The Preferred Route Segment	RSA-05-L3
Collocated Length (mi.)	9.6	5.1
Greenfield Length (mi.)	0.2	7.9
Total (mi.)	9.8	13.0

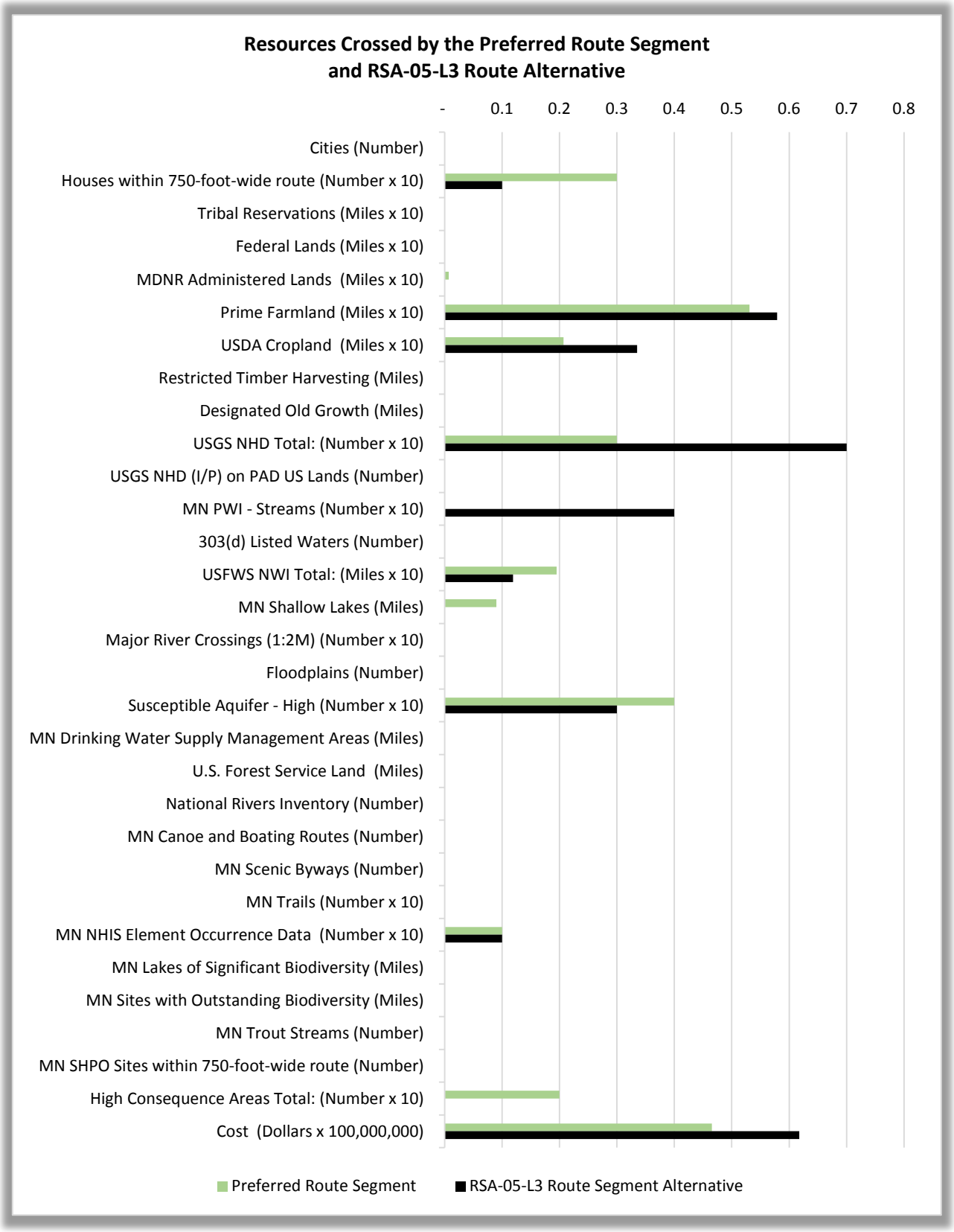
A comparison of the human and environmental characteristics of RSA-05-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

Enbridge Recommendation

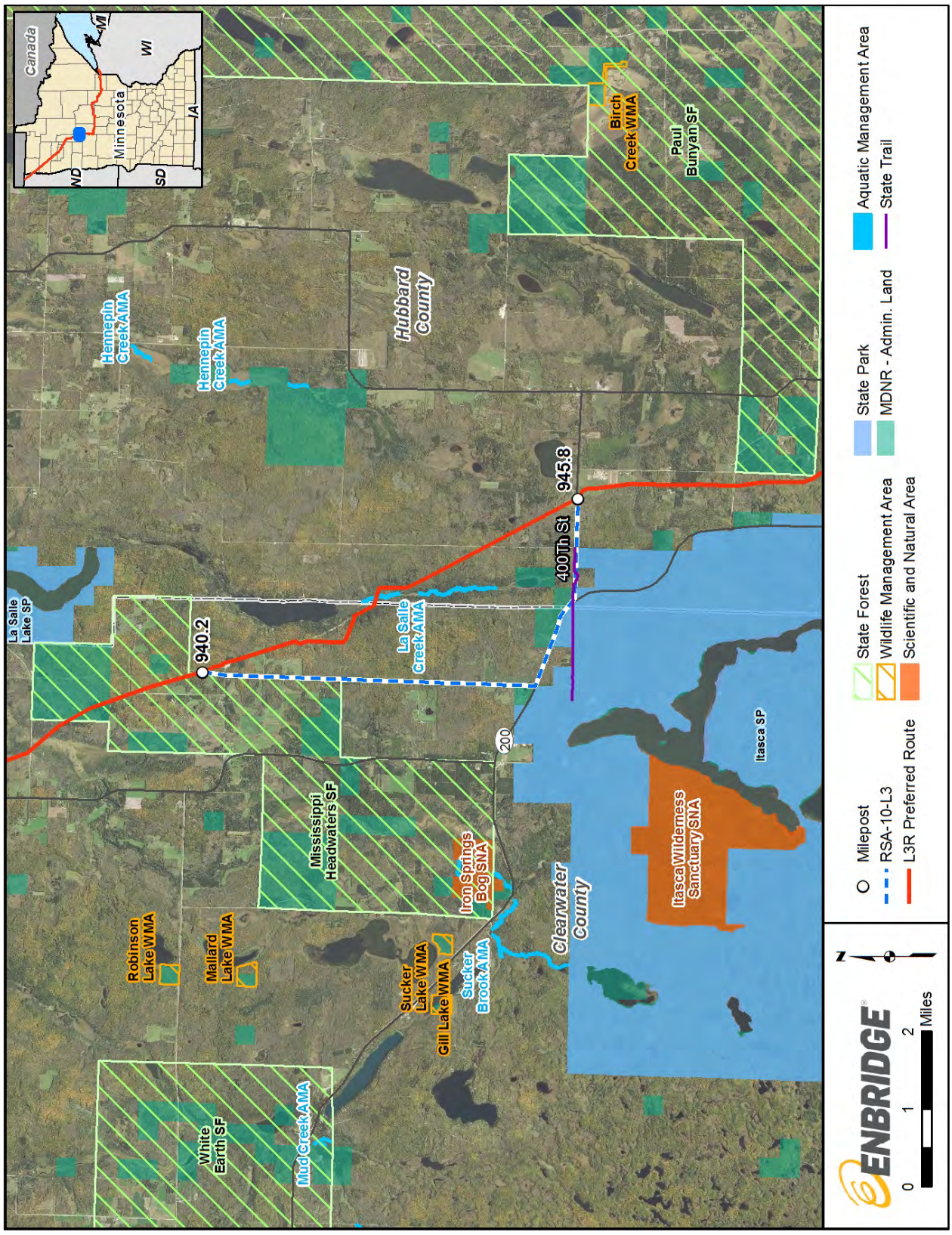
Enbridge recommends that RSA-05-L3 be approved for the following reasons:

- **Addresses White Earth Band of Ojibwe Concerns.** RSA-05-L3 would avoid the Eastern Wild Rice Watershed and would remove any hydrologic connection to Lower Rice Lake. According to the White Earth Band of Ojibwe, Lower Rice Lake is an important wild rice lake for tribal members and is located within the watershed. Specifically, representatives of the White Earth Band of Ojibwe stated during the Sandpiper Pipeline Project certificate of need proceedings that Lower Rice Lake is the most abundant, regularly producing wild rice lake for tribal members.[2]

[2] *See* Transcripts of June 3, 2015 MPUC Proceeding, filed by the Court Reporter on June 9, 2015 (MPUC Doc. ID 20156-111285-01), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project,* MPUC Docket No. PL6668/CN-13-473 (Attorney Joe Plummer remarks at pages 176:8 – 177:2 that "The White Earth Band doesn't regularly get involved in proceedings like this. But we were spurred into action because of the proposed route… Most importantly, the wild rice lake that this proposed route goes in very close proximity of is the most abundant, regularly producing wild rice lake at White Earth and it's known as Lower Rice Lake. It's over five miles long and it's over a mile and a half wide. It's a huge rice bed. And the proposed route is going to go right in between upper and lower Rice Lake. And we believe that we can't take the chance as to whether or not a spill is going to occur, because if there was one, it's going to be catastrophic..."). As shown on the figure depicting RSA-05-L3, the Preferred Route does not cross between Upper Rice Lake and Lower Rice Lake. Nonetheless, RSA-05-L3 avoids the watershed related to both lakes.


Resources Crossed by the Preferred Route Segment
and RSA-05-L3 Route Alternative
- 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Cost (Dollars x 100,000,000)
Preferred Route Segment
RSA-05-L3 Route Segment Alternative

RSA-10-L3


Canada
MI
WI
Minnesota
IA
ND
SD
Hennepin Creek AMA
Hennepin Creek AMA
Hubbard County
Birch Creek WMA
Paul Bunyan SF
945.8
400Th St
940.2
La Salle Lake SP
La Salle Creek AMA
200
Mississippi Headwaters SF
Iron Springs Bog SNA
Clearwater County
Itasca Wilderness Sanctuary SNA
Itasca SP
Robinson Lake WMA
Mallard Lake WMA
Sucker Lake WMA
Gill Lake WMA
Sucker Brook AMA
White Earth SF
Mud Creek AMA
Milepost
RSA-10-L3
L3R Preferred Route
State Forest
Wildlife Management Area
Scientific and Natural Area
State Park
MDNR - Admin. Land
Aquatic Management Area
State Trail
ENBRIDGE
0
1
2
Miles

Purpose

Route Segment Alternative RSA-10-L3 was proposed by the MPCA as an alternate route near the crossing of LaSalle Creek.

Description

RSA-10-L3 deviates from the Preferred Route at approximate MP 940.2, approximately 4 miles northeast of Lake Itasca in Clearwater County. RSA-10-L3 then travels south along a developed local road for 5 miles until it turns east and follows State Highway 200 and 400th Street for 2 miles through forest within Itasca State Park. It rejoins the Preferred Route at approximate MP 945.8 in Hubbard County.

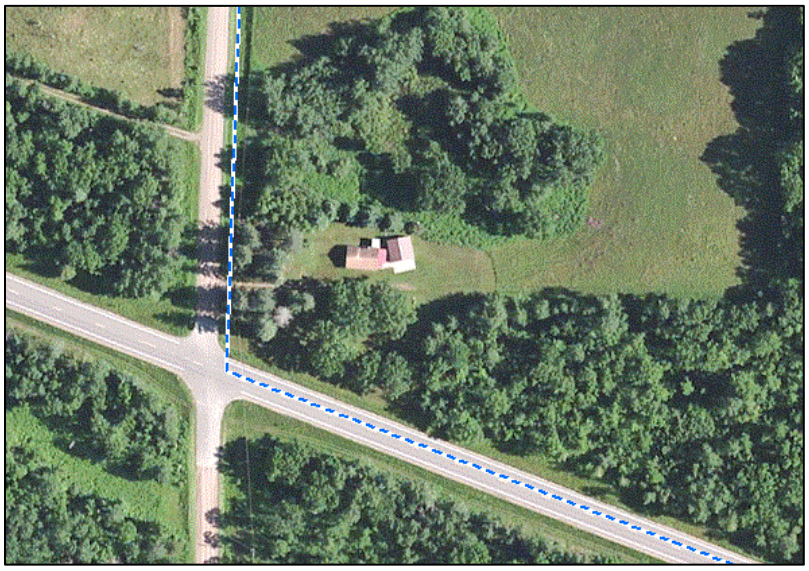
	The Preferred Route Segment	RSA-10-L3
Collocated Length (mi.)	4.6	6.7
Greenfield Length (mi.)	1.0	0.1
Total (mi.)	5.6	6.8

A comparison of the human and environmental characteristics of RSA-10-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

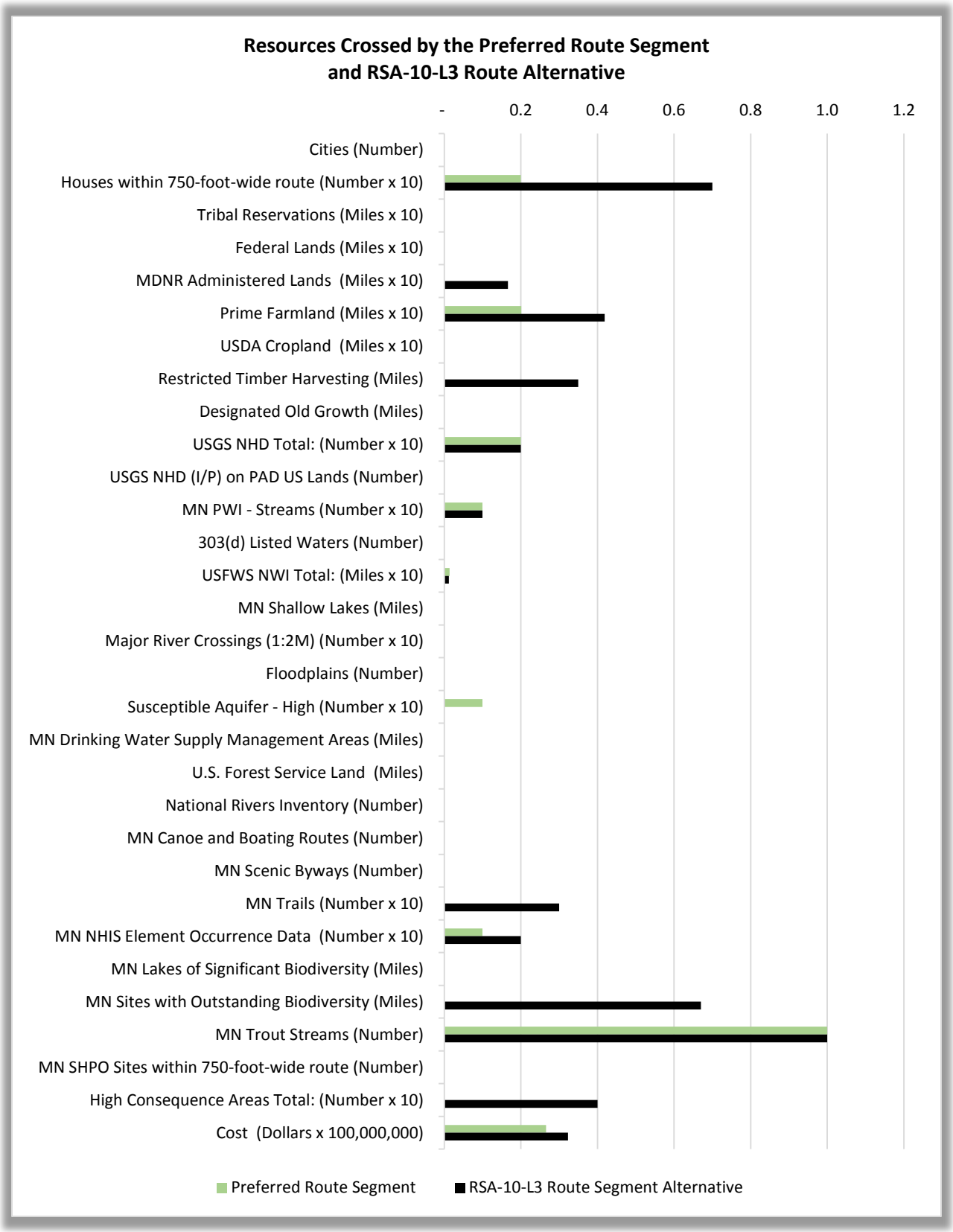
Enbridge Recommendation

Enbridge does not recommend that RSA-10-L3 be approved for the following reasons:

- **Impacts to Itasca State Park**. RSA-10-L3 would cross 0.7 mile of Itasca State Park; this crossing occurs along State Highway 200 and 400th Street. Construction of RSA-10-L3 would be visible to park visitors and would likely result in traffic conflicts along State Highway 200, the main road in and out of the park along its northern boundary. RSA-10-L3 also would cross a state trail leading into the park three times along 400th Street.
- **Impacts to Paved Highways**. Much of RSA-10-L3 runs down the middle of a road (see image below along State Highway 200) and a power line, which would not be constructible.



- **Increased Impacts to Residences.** RSA-10-L3 is located within 750 feet of seven houses. As noted above, constructing the pipeline under the road would not be feasible; therefore, depending on the location of the construction right-of-way along either side of the road, up to two of seven homes within 750 feet would be directly impacted by construction and operation. RSA-10-L3 would require new easements for 45 parcels.


Resources Crossed by the Preferred Route Segment and RSA-10-L3 Route Alternative
-
0.2
0.4
0.6
0.8
1.0
1.2
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Cost (Dollars x 100,000,000)
Preferred Route Segment
RSA-10-L3 Route Segment Alternative

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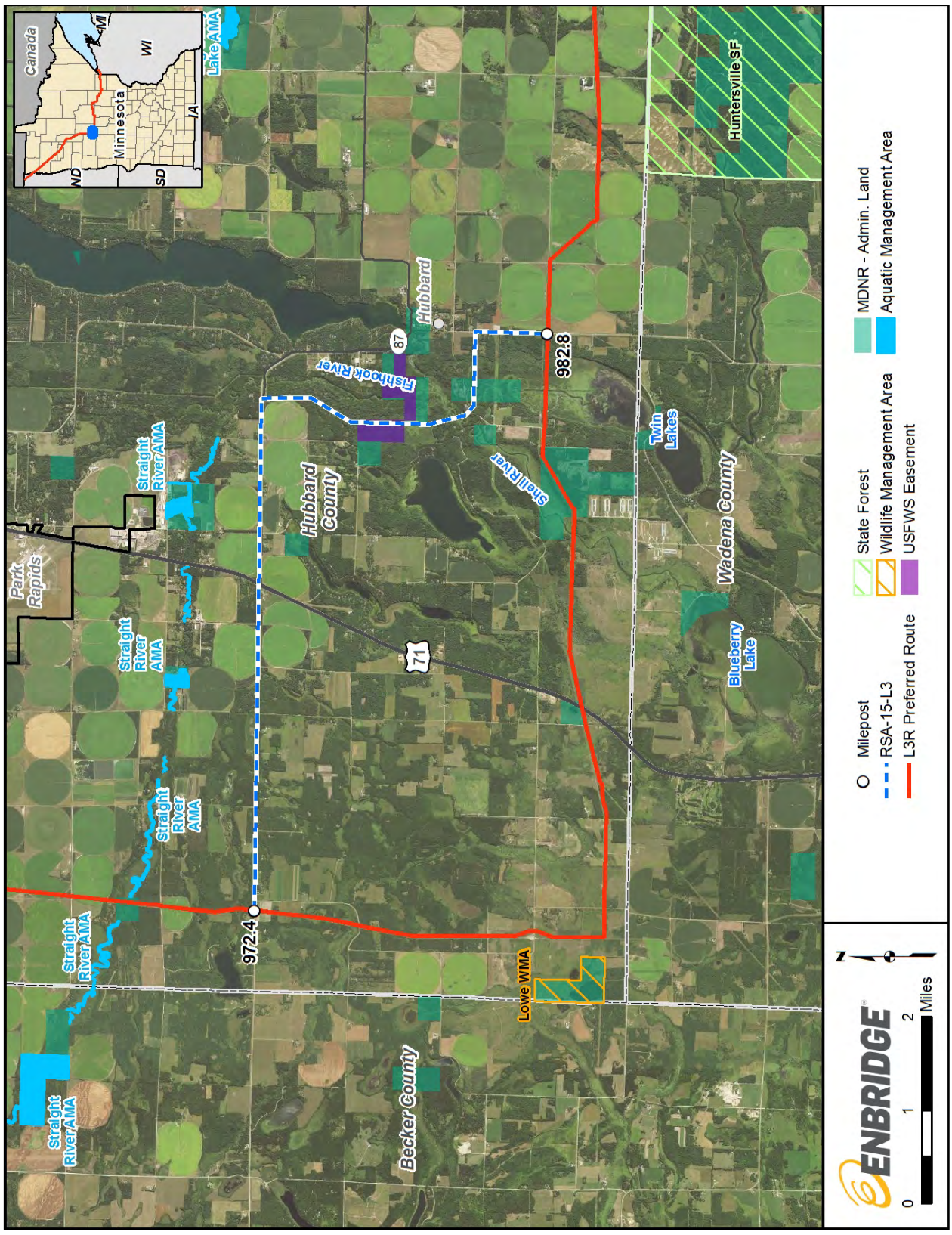
RSA-15-L3


Canada
MI
WI
Minnesota
IA
ND
SD
Lake AMA
Huntersville SF
Hubbard
87
Fishhook River
982.8
Twin Lakes
Shell River
Hubbard County
Wadena County
Straight River AMA
Park Rapids
71
Blueberry Lake
Straight River AMA
Straight River AMA
Straight River AMA
972.4
Lowe WMA
Becker County
Milepost
RSA-15-L3
L3R Preferred Route
State Forest
Wildlife Management Area
USFWS Easement
MDNR - Admin. Land
Aquatic Management Area
ENBRIDGE
0
1
2
Miles

Purpose

Route Segment Alternative RSA-15-L3 was proposed by the MPCA because of concerns related to impairment of the Twin Lakes for excess nutrients and mercury in fish tissue and concerns over accessibility between the lakes and the Preferred Route.

Description

RSA-15-L3 deviates from the Preferred Route at approximate MP 972.4, approximately 6.5 miles northwest of Hubbard in Hubbard County. RSA-15-L3 proceeds eastward along County Highway 14 and State Highway 87 for 5.5 miles, until it turns south and east following an existing utility for 2.5 miles 0.8 mile, respectively. It then turns south along County Road 6 for 0.8 mile until it intersects with the Preferred Route at approximate MP 982.8, all within Hubbard County.

	The Preferred Route Segment	RSA-15-L3
Collocated Length (mi.)	10.3	6.5
Greenfield Length (mi.)	0.1	3.0
Total (mi.)	10.4	9.5

A comparison of the human and environmental characteristics of RSA-15-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

Enbridge Recommendation

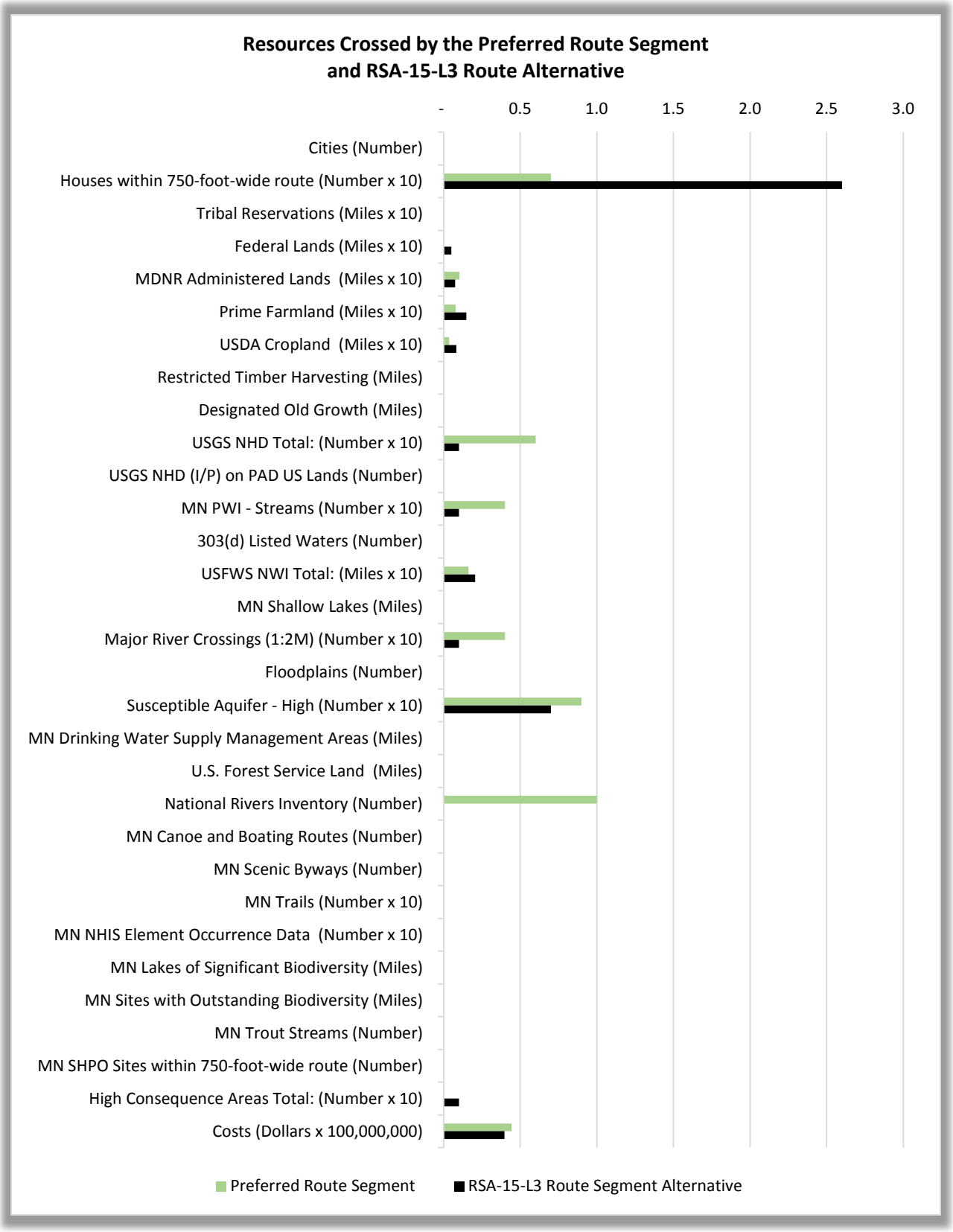
Enbridge does not recommend that RSA-15-L3 be approved for the following reasons:

- **Crossing of USFWS Easement**. RSA-15-L3 would cross 0.5 mile of a USFWS easement, while the Preferred Route would cross none. USFWS easements often require a compatible use review because some easements prohibit pipeline construction.
- **Increased Wetland Impacts at Fishhook River.** RSA-15-L3 would result in a more complicated crossing of the Fishhook River. The alternative alignment would not allow for the use of an HDD (as proposed for the Preferred Route), and would therefore require additional wetland impacts to accommodate the workspace required to complete the crossing using an alternative method (see image below).

- **Increased Impacts on Center Pivot Irrigation Systems**. RSA-15-L3 would increase impacts to farmers north of State Highway 87 that utilize center pivot irrigation systems by restricting these farmers from watering significant portions of their fields during construction (see image below).

- **Proximity to Residences**. RSA-15-L3 would increase construction risks along County Highway 14 because it contains numerous areas of construction near houses (see image below). RSA-15-L3 would require new easements for 52 parcels.

- **Constructability Issues**. Many portions of RSA-15-L3 are placed in the middle of highways (see image below along State Highway 87) or county roads (see image below along County Road 6), as well as run underneath overhead power lines and next to a large substation (see image below). These are not constructible routes. Therefore, Enbridge would need to move RSA-15-L3 to either side of the highway and place the pipeline across driveways or possibly across homes or other structures, increasing impacts to landowners.


Resources Crossed by the Preferred Route Segment
and RSA-15-L3 Route Alternative
-
0.5
1.0
1.5
2.0
2.5
3.0
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Costs (Dollars x 100,000,000)
Preferred Route Segment
RSA-15-L3 Route Segment Alternative

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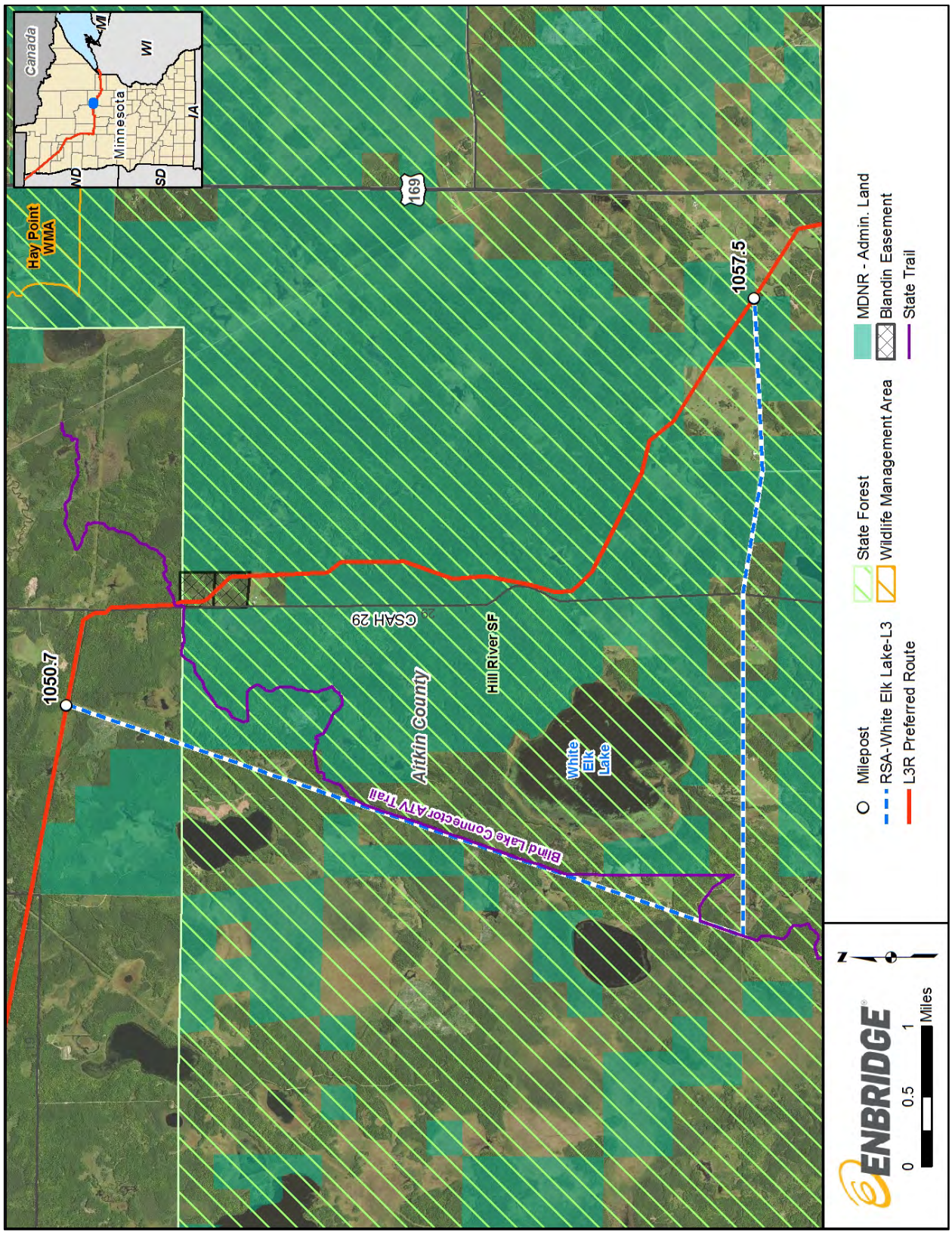
RSA-White Elk Lake-L3


Canada
MI
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Hay Point WMA
169
1057.5
1050.7
CSAH 29
Hill River SF
Aitkin County
Blind Lake Connector ATV Trail
White Elk Lake
Milepost
RSA-White Elk Lake-L3
L3R Preferred Route
State Forest
Wildlife Management Area
MDNR - Admin. Land
Blandin Easement
State Trail
ENBRIDGE
0
0.5
1
Miles

Purpose

Route Segment Alternative RSA-White Elk Lake-L3 was proposed by MDNR to avoid fragmenting Minnesota Biological Survey Site of Biodiversity Significance ("SOBS") lands and avoid a conservation easement held by the MDNR on land owned by the Blandin Paper Company as part of the Minnesota Forest Legacy Program. The objective of the conservation easement is to maintain forest land and minimize development to support future timber harvesting operations. Note that Enbridge has proposed an RSA in the same vicinity to address the routing concerns associated with the Blandin easement – see RSA-Blandin-L3 in the following section.

Description

RSA-White Elk Lake-L3 deviates from the Preferred Route at approximate MP 1050.7, approximately 4 miles southwest of Haypoint in Aitkin County. RSA-White Elk Lake-L3 travels southwest through forest along an existing utility corridor for 5 miles until it turns east and continues through forest, partially along Highway 68, for 4.5 miles. It reconnects with the Preferred Route at approximate MP 1057.5, all within Aitkin County.

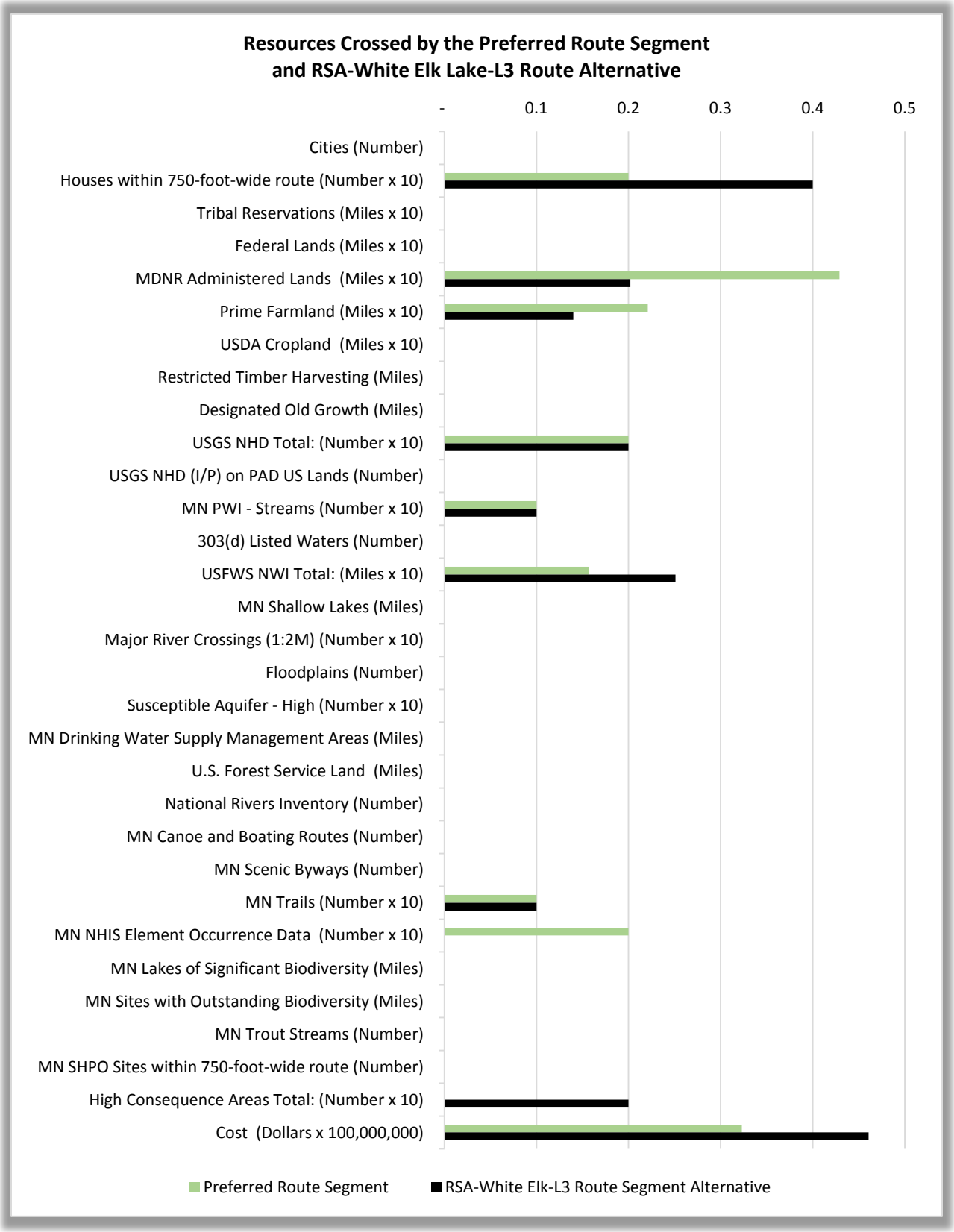
	The Preferred Route Segment	RSA-White Elk Lake-L3
Collocated Length (mi.)	2.3	8.2
Greenfield Length (mi.)	4.5	1.5
Total (mi.)	6.8	9.7

A comparison of the human and environmental characteristics of RSA-White Elk Lake-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

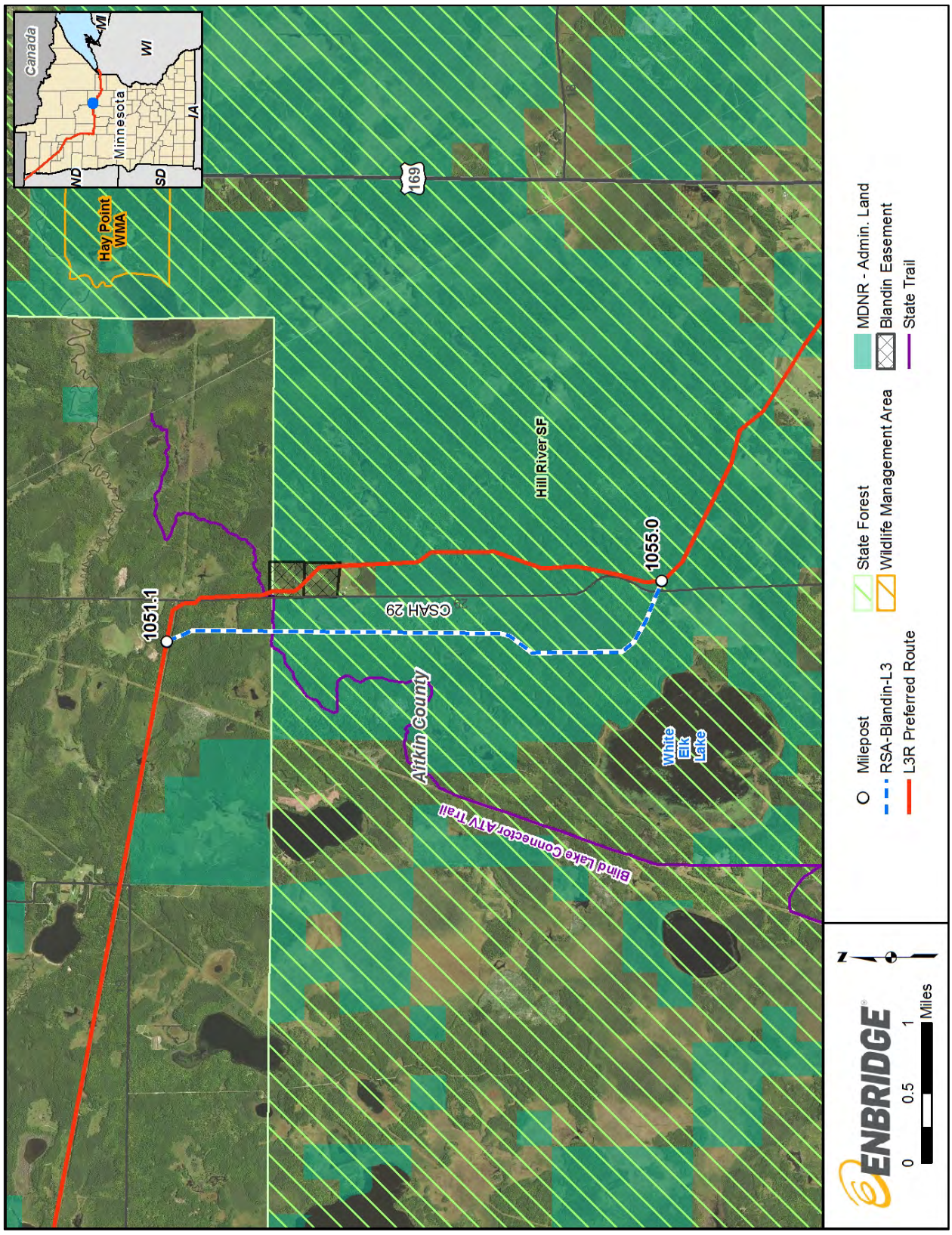
Enbridge Recommendation

Enbridge does not recommend that RSA-White Elk Lake-L3 be approved for the following reasons:

- **Increased Crossing Length of State Forest Land.** RSA-White Elk Lake-L3 would cross 3.4 more miles of Hill River State Forest land than the Preferred Route.
- **Proximity to Blind Lake Connector Trail.** RSA-White Elk-L3 is routed adjacent to the Blind Lake Connector All-Terrain Vehicle ("ATV") Trail for 2.0 miles; the Preferred Route would cross this trail once. Constructing adjacent to the trail would remove the trail from use during the construction season and would permanently remove trees from alongside the trail, effectively widening the trail and creating visual impacts on future trail users.
- **Hydrologic Connectivity to Wild Rice Lake.** RSA-White Elk Lake-L3 results in hydrologic connectivity to White Elk Lake, a known wild rice lake.
- **Constraints Related to Hydraulic Operation of the Pipeline**. RSA-White Elk Lake-L3 introduces engineering constraints to the hydraulic operations of the pipeline because the western portion of the RSA traverses in the opposite direction of flow. This introduces additional stresses upon the pipeline, which would affect pipeline design and potentially operability and maintenance.
- **Enbridge has Proposed an Alternate RSA**. RSA-Blandin-L3 (see following section) is shorter, crosses less state forest land, reduces impact to the Blind Lake ATV trail, avoids hydraulic connectivity to White Elk Lake, and does not introduce pipeline operation concerns.


Resources Crossed by the Preferred Route Segment
and RSA-White Elk Lake-L3 Route Alternative
-
0.1
0.2
0.3
0.4
0.5
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Cost (Dollars x 100,000,000)
Preferred Route Segment
RSA-White Elk-L3 Route Segment Alternative

RSA-Blandin-L3


Canada
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Hay Point WMA
169
Hill River SF
1055.0
1051.1
CSAH 29
Aitkin County
White Elk Lake
Blind Lake Connector ATV Trail
MDNR - Admin. Land
Blandin Easement
State Trail
State Forest
Wildlife Management Area
Milepost
RSA-Blandin-L3
L3R Preferred Route
ENBRIDGE
0
0.5
1
Miles

Purpose

Route Segment Alternative RSA-Blandin-L3 was proposed by Enbridge to avoid a conservation easement held by the MDNR on land owned by the Blandin Paper Company as part of the Minnesota Forest Legacy Program. The objective of the conservation easement is to maintain forest land and minimize development to support future timber harvesting operations. This RSA is in the same vicinity as RSA-White Elk Lake-L3 described in the previous section; both address the routing concerns associated with the Blandin easement.

Description

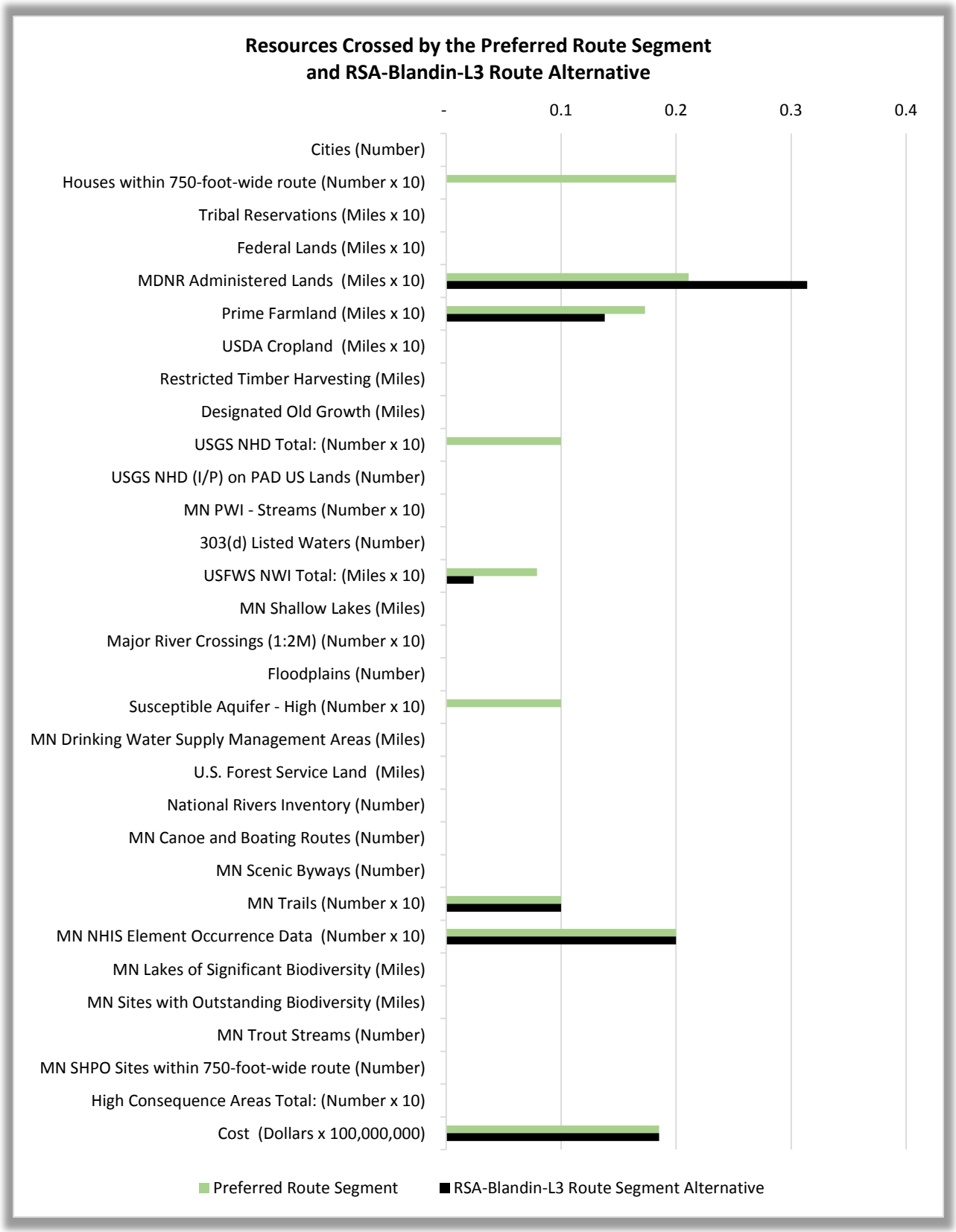
RSA-Blandin-L3 deviates from the Preferred Route at approximate MP 1051.1, approximately 4 miles southwest of Haypoint in Aitkin County. RSA-Blandin-L3 travels south through forest for 4 miles until it reconnects with the Preferred Route at approximate MP 1055.0, all within Aitkin County.

	The Preferred Route Segment	RSA-Blandin-L3
Collocated Length (mi.)	1.9	0.5
Greenfield Length (mi.)	2.0	3.4
Total (mi.)	3.9	3.9

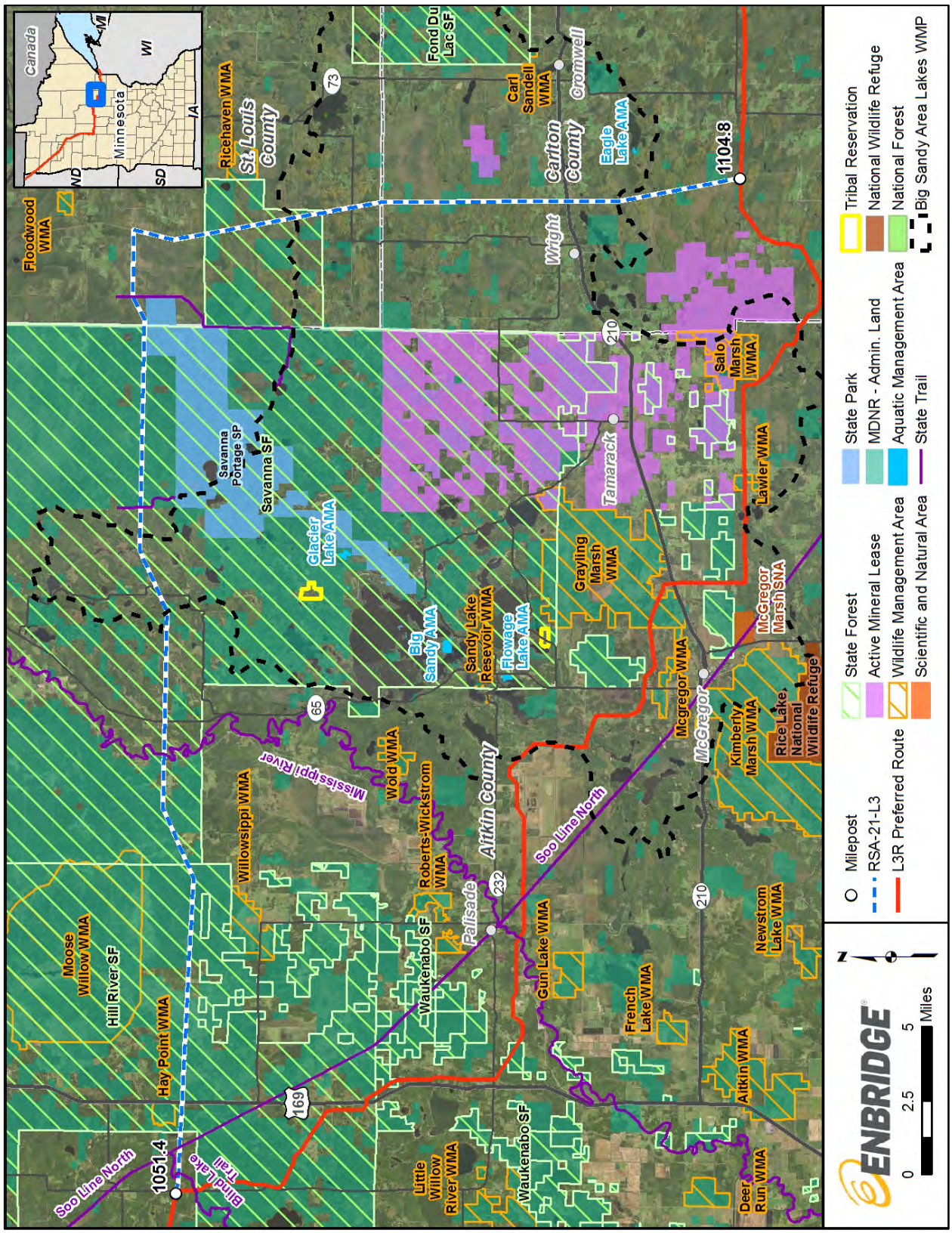
A comparison of the human and environmental characteristics of RSA-Blandin-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

Enbridge Recommendation

Although Enbridge believes the Preferred Route would decrease overall impacts, Enbridge would support approval of RSA-Blandin-L3 in the event that Enbridge is unable to obtain an easement across the Blandin easement parcels.


Resources Crossed by the Preferred Route Segment
and RSA-Blandin-L3 Route Alternative
-
0.1
0.2
0.3
0.4
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Cost (Dollars x 100,000,000)
Preferred Route Segment
RSA-Blandin-L3 Route Segment Alternative

RSA-21-L3


Canada
MI
WI
Minnesota
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Floodwood WMA
Ricehaven WMA
St. Louis County
Fond Du Lac SF
Carl Sandell WMA
Cromwell
Carlton County
Eagle Lake AMA
1104.8
Wright
Salo Marsh WMA
Savanna Portage SP
Savanna SF
Glacier Lake AMA
Tamarack
Lawler WMA
Grayling Marsh WMA
Big Sandy AMA
Sandy Lake Reservoir WMA
Flowage Lake AMA
McGregor Marsh SNA
Mcgregor WMA
McGregor
Kimberly Marsh WMA
Rice Lake National Wildlife Refuge
Mississippi River
Wold WMA
Willowsippi WMA
Roberts-Wickstrom WMA
Aitkin County
Palisade
Soo Line North
Moose Willow WMA
Hill River SF
Hay Point WMA
Waukenabo SF
Gun Lake WMA
French Lake WMA
Newstrom Lake WMA
Aitkin WMA
1051.4
Soo Line North
Blind Lake Trail
Little Willow River WMA
Waukenabo SF
Deer Run WMA
Milepost
RSA-21-L3
L3R Preferred Route
State Forest
Active Mineral Lease
Wildlife Management Area
Scientific and Natural Area
State Park
MDNR - Admin. Land
Aquatic Management Area
State Trail
Tribal Reservation
National Wildlife Refuge
National Forest
Big Sandy Area Lakes WMP
ENBRIDGE
0
2.5
5
Miles

Purpose

Route Segment Alternative RSA-21-L3 was proposed by the MDNR to avoid impacts to Sandy River fisheries, wild rice habitat, and trout streams. RSA-21-L3 attempts to maximize co-location with existing electric transmission line rights-of-way through Aitkin County.

Description

RSA-21-L3 deviates from the Preferred Route at approximate MP 1051.4, approximately 23 miles north of Aitkin in Aitkin County. RSA-21-L3 travels east through forest along an existing transmission line corridor for 34 miles until it turns south and follows another existing transmission line corridor through forest for 20 miles. It reconnects with the Preferred Route at approximate MP 1104.8 in Carlton County.

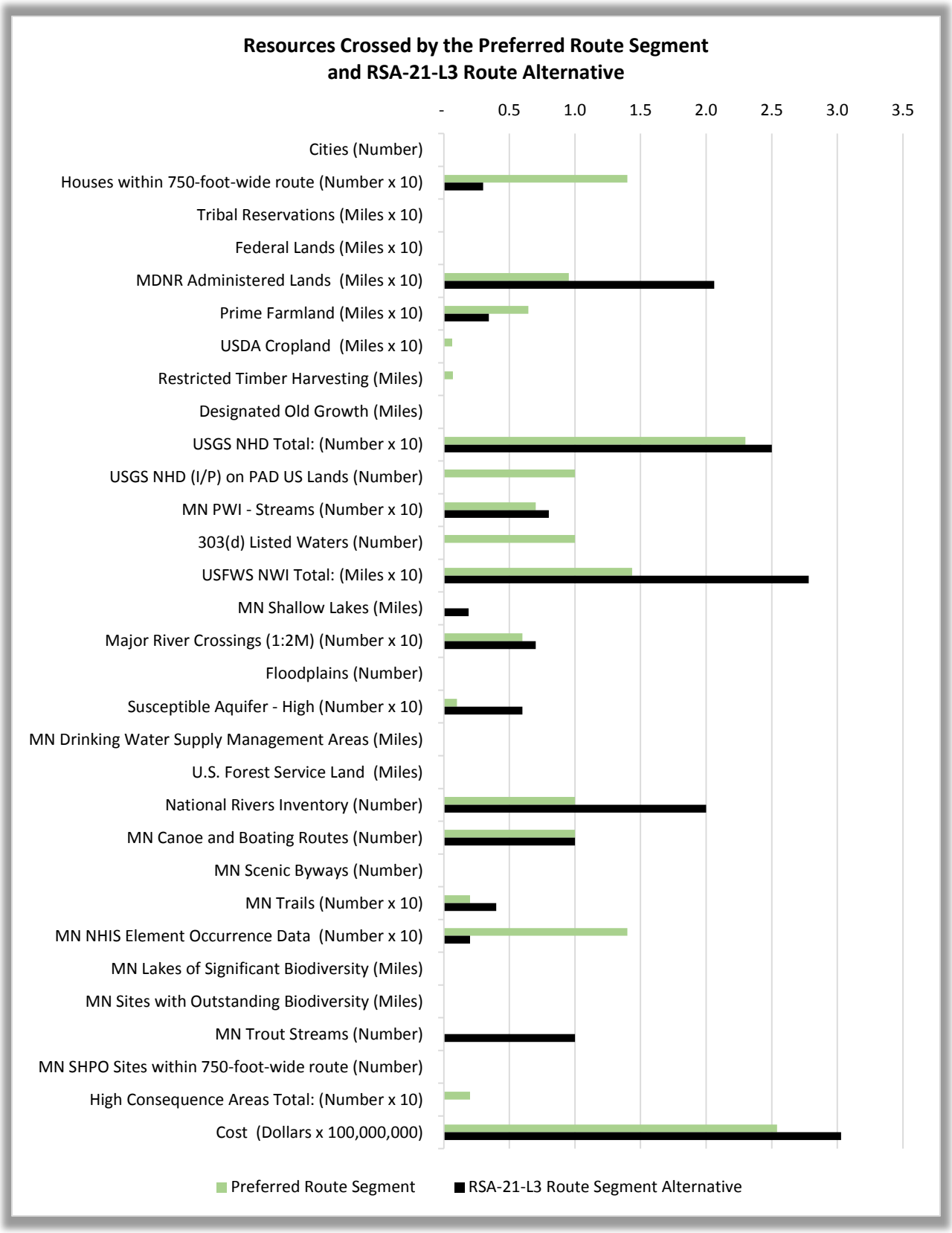
	The Preferred Route Segment	RSA-21-L3
Collocated Length (mi.)	19.2	53.9
Greenfield Length (mi.)	34.3	0.0
Total (mi.)	53.5	53.9

A comparison of the human and environmental characteristics of RSA-21-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

Enbridge Recommendation

Enbridge does not recommend that RSA-21-L3 be approved for the following reasons:

- **Increase in Wetland Impacts**. RSA-21-L3 would cross 13.4 more miles of NWI-mapped wetlands and 14.6 more miles of forested wetlands. Additional wetland impacts would occur because of the need for more permanent road access.
- **Increase in Impacts to Minnesota SOBS Sites**. RSA-21-L3 would cross 15.9 more miles of SOBS sites than the Preferred Route. The majority of SOBS sites crossed by the Preferred Route are sites with "moderate" biodiversity (14.7 of 16.7 miles or 88 percent). In contrast, the majority of SOBS sites crossed by RSA-21-L3 are sites of "high" biodiversity (21.3 of 32.6 miles, or 65 percent). Less than 5 percent of the SOBS sites crossed by the Preferred Route are ranked as "high."
- **Extended Construction Schedule Related to Mississippi and Willow River Crossing Locations**. The crossing of the Mississippi and the Willow Rivers would present significant construction challenges on RSA-21-L3. While the Preferred Route also would cross both of these features, the length required to travel around the crossings at the locations along RSA-21-L3 are greater than the proposed crossings on the Preferred Route. For RSA-21-L3, the move around distance for crews at the Mississippi and Willow River crossings would be approximately 23 miles and 10 miles in length, respectively. With move around distances of this magnitude, a 1- to 2-day delay to each crew would occur, adding an additional 2 to 3 weeks to the overall construction schedule. Increasing the amount of time required to complete waterbody crossings would not align with best management practices outlined in Enbridge's EPP.
- **New Landowners Impacted**. RSA-21-L3 would require new easements for 182 parcels. A majority of these parcels are administered by the MDNR or are within the jurisdictional boundaries of state forests; the remainder of the lands crossed are administered by Aitkin or Carlton County or are owned by private landowners.


Resources Crossed by the Preferred Route Segment
and RSA-21-L3 Route Alternative
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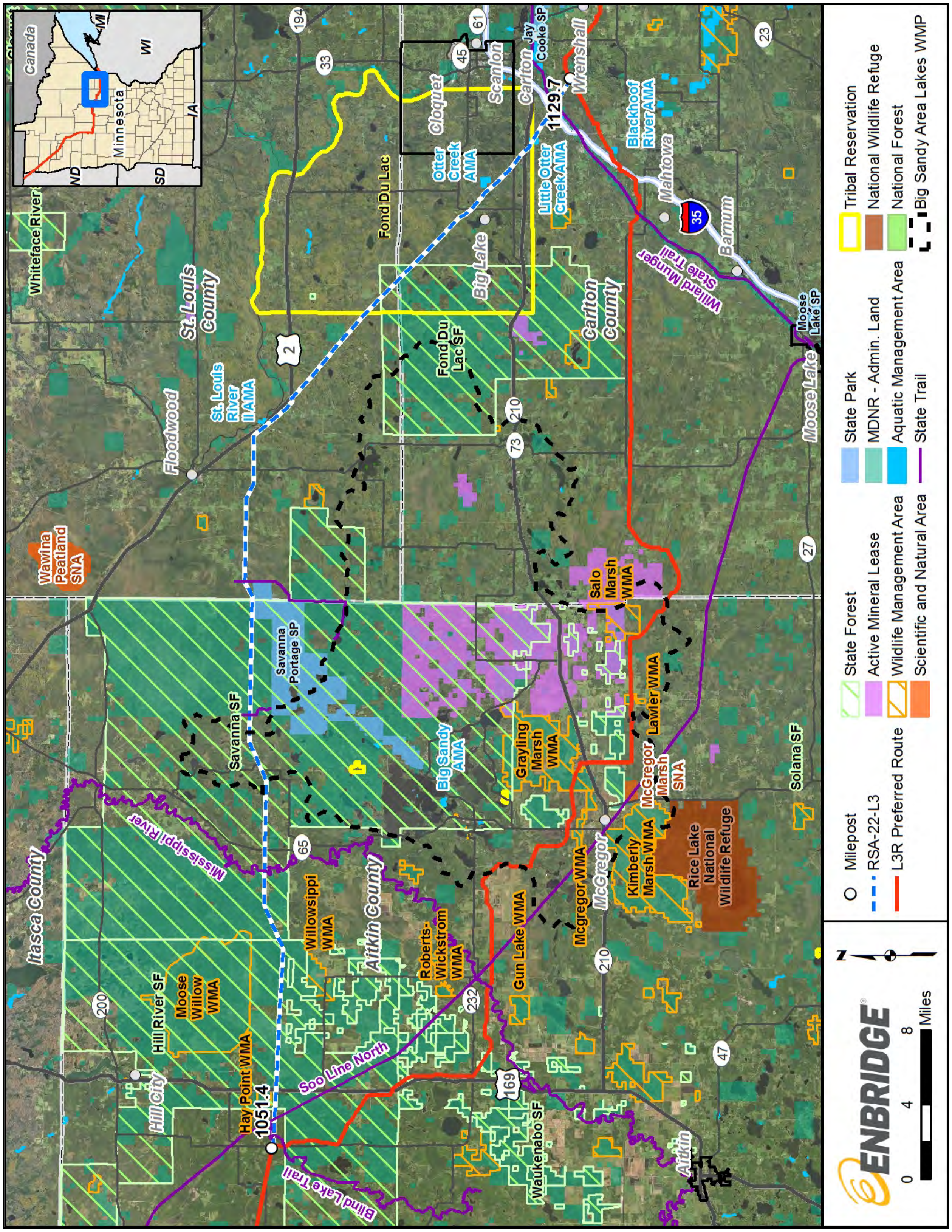
0.5
1.0
1.5
2.0
2.5
3.0
3.5
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Cost (Dollars x 100,000,000)
Preferred Route Segment
RSA-21-L3 Route Segment Alternative

RSA-22-L3


Canada
WI
MI
Minnesota
ND
SD
IA
Whiteface River
St. Louis County
St. Louis River II AMA
Floodwood
Wawina Peatland SNA
Fond Du Lac
Cloquet
Otter Creek AMA
Scanlon
Carlton
Jay Cooke SP
Wrenshall
1129.7
Little Otter Creek AMA
Blackhoof River AMA
Mahtowa
Barnum
Willard Munger State Trail
Big Lake
Carlton County
Fond Du Lac SF
Moose Lake SP
Moose Lake
Salo Marsh WMA
Savanna Portage SP
Savanna SF
Big Sandy AMA
Grayling Marsh WMA
Lawler WMA
McGregor Marsh SNA
Solana SF
Itasca County
Mississippi River
Aitkin County
Willowsippi WMA
Roberts-Wickstrom WMA
Gun Lake WMA
Mcgregor WMA
McGregor
Kimberly Marsh WMA
Rice Lake National Wildlife Refuge
Hill River SF
Moose Willow WMA
Hill City
Hay Point WMA
1051.4
Soo Line North
Blind Lake Trail
Waukenabo SF
Aitkin
ENBRIDGE
0 4 8 Miles
Milepost
RSA-22-L3
L3R Preferred Route
State Forest
Active Mineral Lease
Wildlife Management Area
Scientific and Natural Area
State Park
MDNR - Admin. Land
Aquatic Management Area
State Trail
Tribal Reservation
National Wildlife Refuge
National Forest
Big Sandy Area Lakes WMP

Purpose

Route Segment Alternative RSA-22-L3 was proposed by the MDNR to avoid critical habitat in the Big Sandy Lake watershed and avoid the Grayling Marsh, McGregor, Lawler, and Salo Marsh WMAs.

Description

RSA-22-L3 deviates from the Preferred Route at approximate MP 1051.4, approximately 4 miles southwest of Haypoint in Aitkin County. RSA-22-L3 then travels east along an existing transmission line corridor for 40 miles until it turns southeast and continues for 25 miles along the existing Enbridge Mainline System corridor. It reconnects with the Preferred Route at approximate MP 1129.7 in Carlton County.

	The Preferred Route Segment	RSA-22-L3
Collocated Length (mi.)	40.8	64.5
Greenfield Length (mi.)	37.5	0.2
Total (mi.)	78.3	64.7

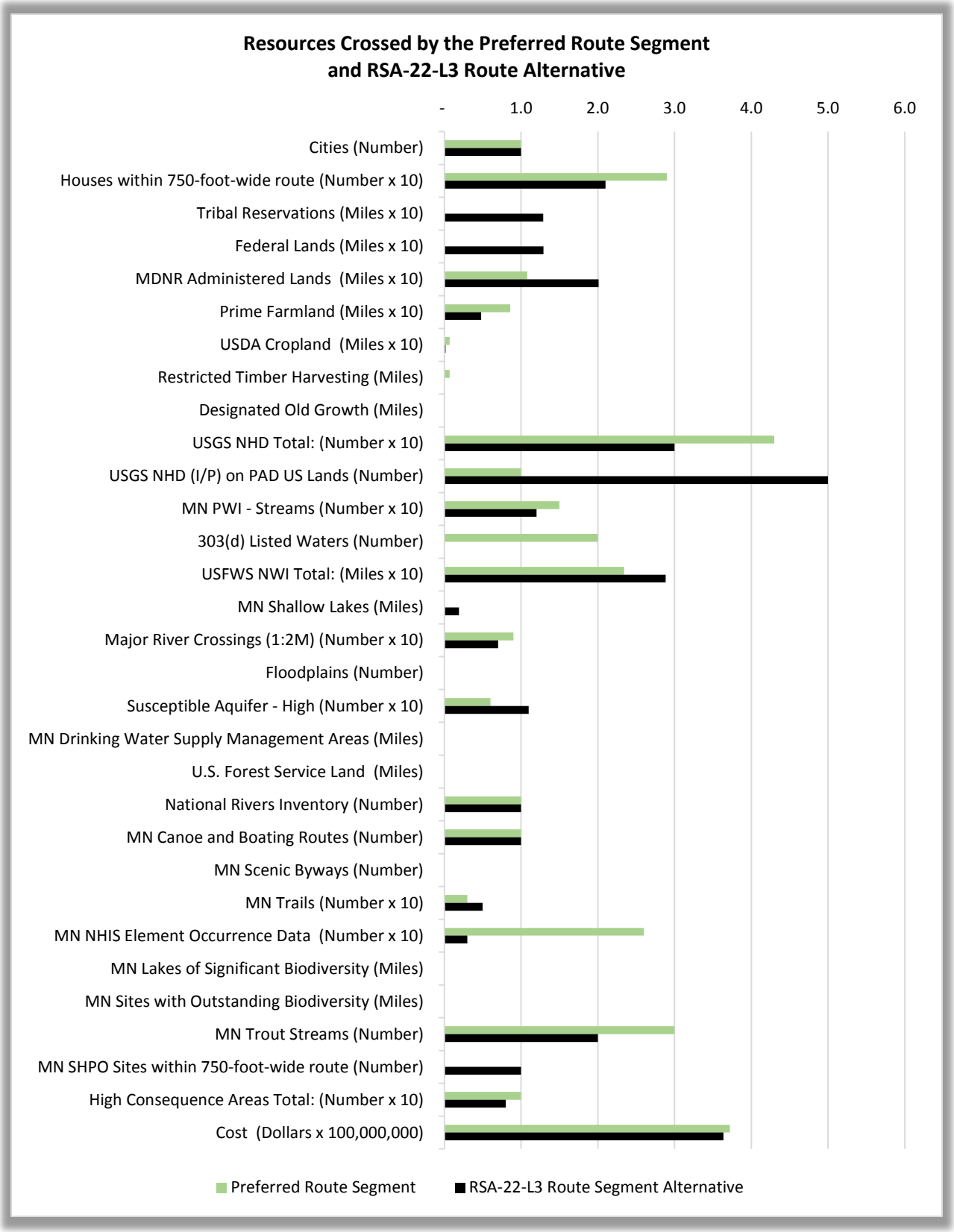
A comparison of the human and environmental characteristics of RSA-22-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

Enbridge Recommendation

Enbridge does not recommend that RSA-22-L3 be approved for the following reasons:

- **Crossing of Fond du Lac Reservation**. RSA-22-L3 would cross 12.9 miles of the Fond du Lac Reservation; the Preferred Route does not cross it. Absent agreement from the Tribe, Enbridge is unable to secure land rights and/or other approvals necessary to construct and operate the pipeline across the Reservation.
- **Does Not Avoid Big Sandy Lake Watershed**. Enbridge digitized the boundaries of the Big Sandy Area Lakes Watershed Management Project (Aitkin County Soil and Water Conservation District, 2010), which contains the Big Sandy Lake Outlet and the Headwaters Big Sandy Lake Watersheds. RSA-22-L3 would still cross the Headwaters Big Sandy Lake Watershed. The MDNR's description of RSA-22-L3 notes that the RSA would avoid critical habitat; however, Enbridge is not aware that the Preferred Route would cross any designated critical habitat.
- **Increase in Wetland Impacts**. RSA-22-L3 would cross 5.4 more miles of NWI-mapped wetlands and 7.5 more miles of forested wetlands as compared to the Preferred Route.
- **Increase in Impacts to Minnesota SOBS**. RSA-22-L3 would cross 11.9 more miles of SOBS sites than the Preferred Route. The majority of SOBS sites crossed by the Preferred Route are sites with "moderate" biodiversity" (18.7 of 23.4 miles or 80 percent). In contrast, the majority of SOBS sites crossed by RSA-22-L3 are sites of "high" biodiversity (17.3 of 35.3 miles, or 49 percent). Less than 10 percent of the SOBS sites crossed by the Preferred Route are ranked as "high."
- **Additional Aquatic Management Area crossings**. RSA-22-L3 would add two new Aquatic Management Area ("AMA") crossings – the Clearwater River and Little Otter Creek AMAs.
- **Preferred Route Already Avoids Two WMAs.** The purpose of RSA-22-L3 as stated above is to avoid four state WMAs. However, Enbridge's Preferred Route avoids two of the four WMAs noted: McGregor and Salo Marsh.

- **New Landowners Impacted.** RSA-22-L3 would require new easements for 277 parcels. Approximately 20.1 miles of the 64.7-mile long RSA are administered by the MDNR (31.1 percent) and 30.2 miles are within the jurisdictional boundaries of state forests (46.7 percent); the remainder of the lands crossed are administered by Aitkin or Carlton County, private landowners, or the Fond du Lac Reservation.


Resources Crossed by the Preferred Route Segment
and RSA-22-L3 Route Alternative
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6.0
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Cost (Dollars x 100,000,000)
Preferred Route Segment
RSA-22-L3 Route Segment Alternative

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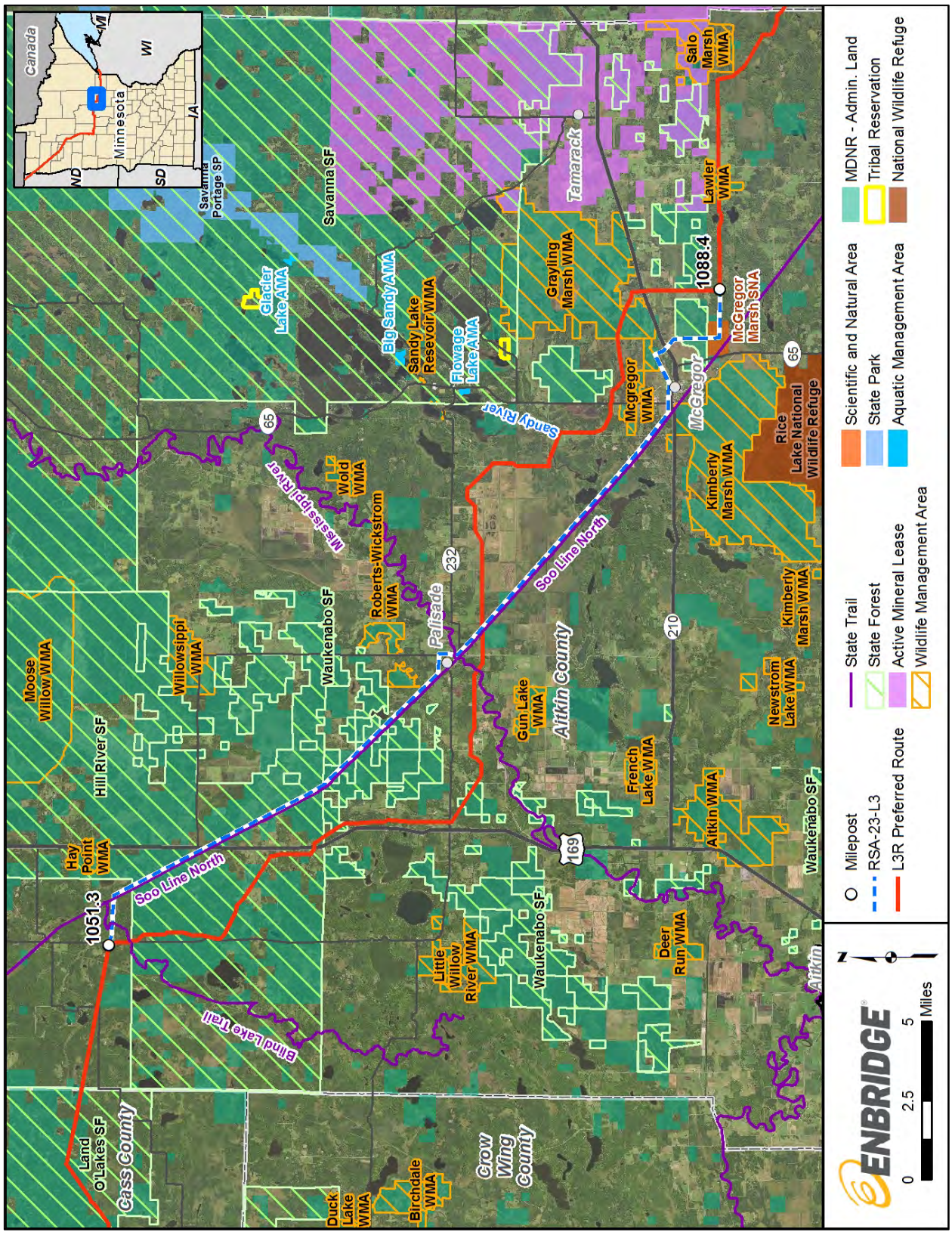
RSA-23-L3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Savanna SF
Glacier Lake AMA
Big Sandy AMA
Sandy Lake Reservoir WMA
Flowage Lake AMA
Tamarack
Grayling Marsh WMA
Salo Marsh WMA
Lawler WMA
1088.4
McGregor Marsh SNA
McGregor
Mcgregor WMA
Rice Lake National Wildlife Refuge
Kimberly Marsh WMA
Sandy River
Mississippi River
Wold WMA
Roberts-Wickstrom WMA
Waukenabo SF
Palisade
232
65
Soo Line North
Aitkin County
Gun Lake WMA
French Lake WMA
Newstrom Lake WMA
Aitkin WMA
Waukenabo SF
210
169
Moose Willow WMA
Willowsippi WMA
Hill River SF
Hay Point WMA
1051.3
Soo Line North
Blind Lake Trail
Little Willow River WMA
Deer Run WMA
Land O'Lakes SF
Cass County
Crow Wing County
Duck Lake WMA
Birchdale WMA
Milepost
RSA-23-L3
L3R Preferred Route
State Trail
State Forest
Active Mineral Lease
Wildlife Management Area
MDNR - Admin. Land
Tribal Reservation
National Wildlife Refuge
Scientific and Natural Area
State Park
Aquatic Management Area
ENBRIDGE
0
2.5
5
Miles

Purpose

Route Segment Alternative RSA-23-L3 was proposed by the MDNR to maximize collocation with the existing Soo Line Trail, an existing recreational ATV trail.

Description

RSA-23-L3 deviates from the Preferred Route at approximate MP 1051.3, approximately 4 miles southwest of Haypoint in Aitkin County. RSA-23-L3 travels east along an existing utility corridor through forest for 1.5 miles. It then turns south and follows the Soo Line ATV Trail through forest for 24 miles. It then turns northeast through forest and agricultural fields for 2 miles and then south for 2 miles until it turns east and follows an existing utility corridor for 1.5 miles. It rejoins the Preferred Route at approximate MP 1088.4, all within Aitkin County.

	The Preferred Route Segment	RSA-23-L3
Collocated Length (mi.)	11.3	14.0
Greenfield Length (mi.)	25.8	17.2
Total (mi.)	37.1	31.2

A comparison of the human and environmental characteristics of RSA-23-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

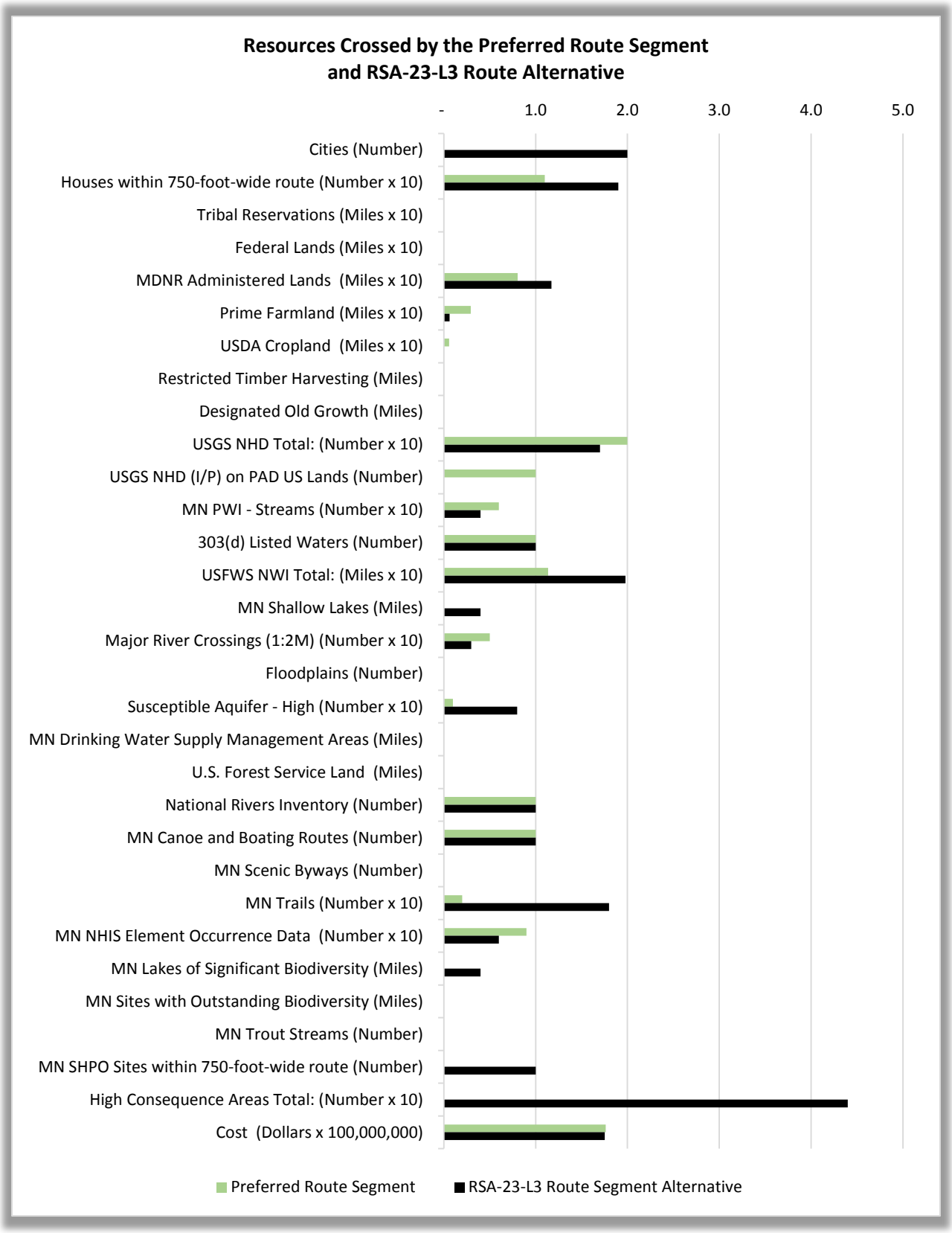
Enbridge Recommendation

Enbridge does not recommend that RSA-23-L3 be approved for the following reasons:

- **Constructability Constraints and Adverse Permanent Trail Impacts**.
  - **Construction Constraints.** The Soo Line Trail Easement is approximately 100 feet wide. Installing pipelines requires space for spoil, the ditch, the pipe, and a travel lane for equipment, all adjacent to each other during the construction process. The idea of installing the pipe directly underneath the trail and not impacting the land outside of the trail easement is not realistic. During construction, the trail would have to be completely cleared, graded down, and leveled off, which would not be feasible in the wetland areas that are adjacent to the Soo Line Trail. Should the pipeline be placed immediately adjacent to the trail, only one side of the right-of-way would be usable and the trail in many areas would be permanently impacted via grading and/or cutting down of the trail.
  - **Permanent Impacts Due to New Access Roads.** Because the trail was a former railroad grade, existing access from public roads is very limited. The need for access would result in several new permanent access roads and adjacent landowner impacts.
  - **Extended Trail Closure During Construction**. RSA-23-L3 would require trail closure for about one year because the trail would be the primary method of ingress/egress for construction.

- **Increase in Wetland and Scientific and Natural Area Impacts**. RSA-23-L3 would cross 8.4 more miles of NWI-mapped wetlands and 0.9 mile of the McGregor Marsh Scientific and Natural Area ("SNA"). Enbridge believes it would be very difficult to gain approval from MDNR to construct a pipeline through the SNA.

- **Increased Proximity to Residences**. RSA-23-L3 would be within 750 feet of 19 residences, while the Preferred Route is near 11 residences. Some of the residences along RSA-23-L3 would be within the necessary construction workspace. RSA-23-L3 also would cross the cities of Palisade and McGregor. RSA-23-L3 would require new easements for 200 parcels. Additionally, RSA-23-L3 contains 44 HCAs within the 750-foot-route width whereas the Preferred Route contains none. In nearly all locations along the RSA, the construction footprint would extend beyond the 100-foot-wide easement of the Soo Line Trail, creating impacts to new landowners.
- **Construction Impacts Associated with Public Transportation**. An HDD of the Mississippi River would be necessary near the city of Palisade to accommodate the alignment approaching the river which runs down the center of 480th Street. This intersection is the main ingress and egress to and from Palisade; therefore, tearing up the highway to install the access point would not be favorable. The HDD would likely need to be extended to include Great River Road, 480th Street, the Mississippi River, and the Soo Line Trail. Additionally, the temporary closure of the intersection of Great River Road and 480th Street would interfere with tourism along the Mississippi River for persons traveling the Great River Road, which is a National Scenic Byway.


Resources Crossed by the Preferred Route Segment
and RSA-23-L3 Route Alternative
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2.0
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5.0
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Cost (Dollars x 100,000,000)
Preferred Route Segment
RSA-23-L3 Route Segment Alternative

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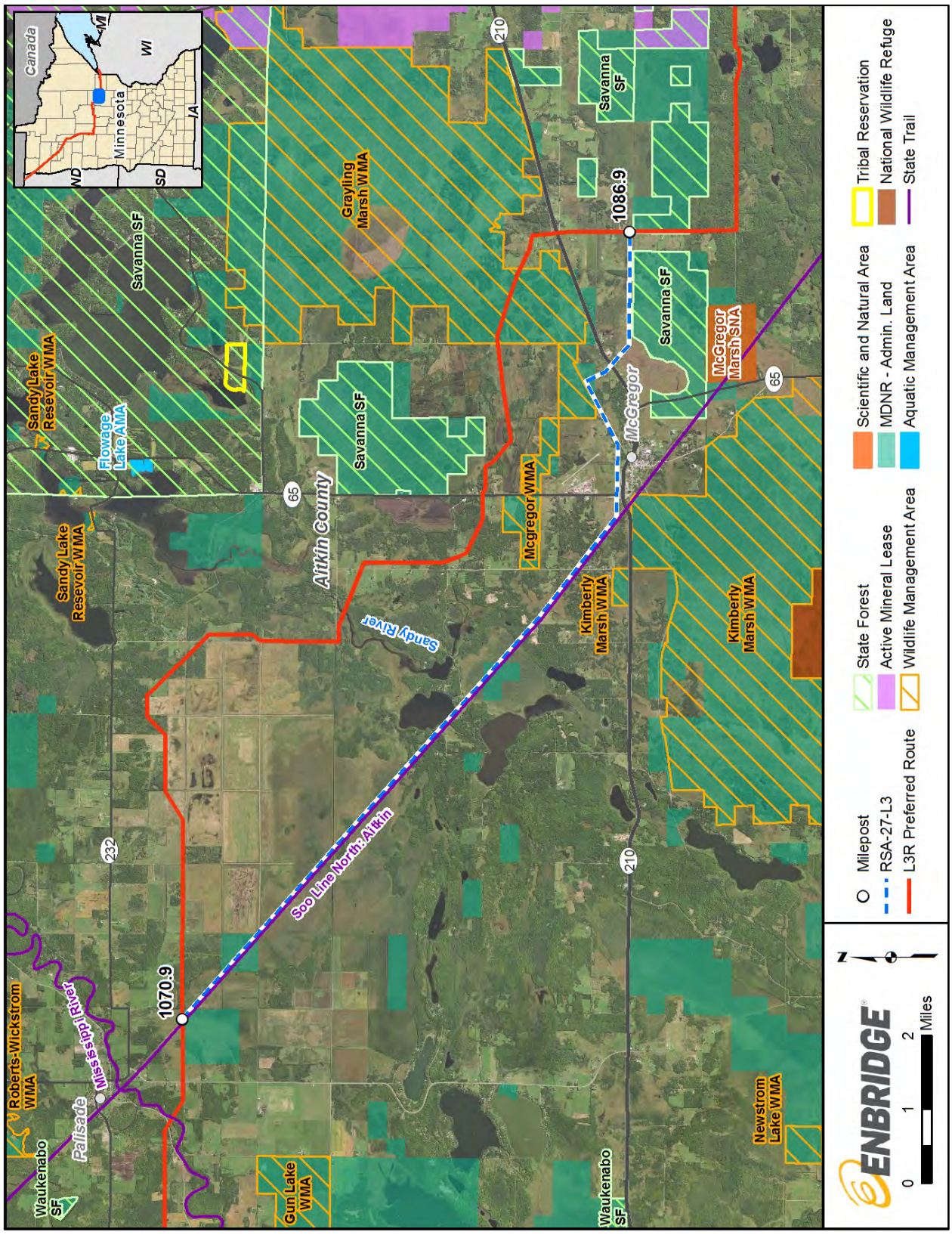
RSA-27-L3


Canada
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Milepost
RSA-27-L3
L3R Preferred Route
State Forest
Active Mineral Lease
Wildlife Management Area
Scientific and Natural Area
MDNR - Admin. Land
Aquatic Management Area
Tribal Reservation
National Wildlife Refuge
State Trail
ENBRIDGE
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2
Miles
1070.9
1086.9
Soo Line North: Aitkin
Aitkin County
Sandy River
Mississippi River
Palisade
McGregor
Savanna SF
Grayling Marsh WMA
Sandy Lake Reservoir WMA
Flowage Lake AMA
Mcgregor WMA
Kimberly Marsh WMA
McGregor Marsh SNA
Roberts-Wickstrom WMA
Waukenabo SF
Gun Lake WMA
Newstrom Lake WMA
65
210
232

Purpose

Route Segment Alternative RSA-27-L3 was proposed by the MDNR as a modification to the proposed RSA-23-L3 that would avoid the McGregor Marsh SNA.

Description

RSA-27-L3 deviates from the Preferred Route at approximate MP 1070.9, approximately 1.5 miles southeast of Palisade in Aitkin County. It then travels southeast and follows the Soo Line ATV Trail through forest for 9 miles. It then turns northeast through forest and agricultural fields for 2 miles, south for 0.5 mile, and east for 1.5 miles. It rejoins the Preferred Route at approximate MP 1086.9, all within Aitkin County.

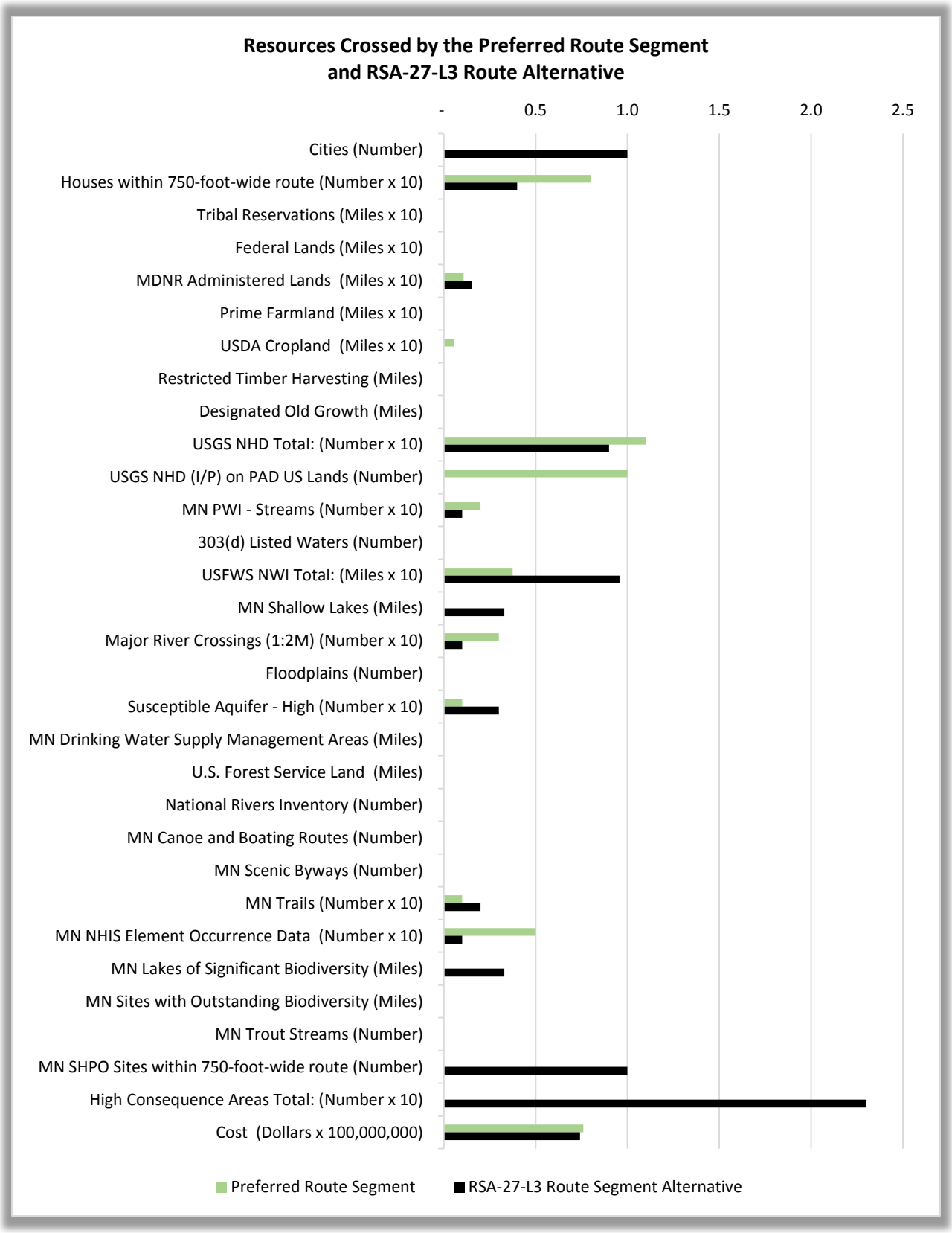
	The Preferred Route Segment	RSA-27-L3
Collocated Length (mi.)	6.4	8.0
Greenfield Length (mi.)	9.6	5.2
Total (mi.)	16.0	13.2

A comparison of the human and environmental characteristics of RSA-27-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

Enbridge Recommendation

Enbridge does not recommend that RSA-27-L3 be approved for the following reasons:

- **Construction Constraints**. The Soo Line Trail easement is approximately 100 feet wide. Installing pipelines requires space for spoil, the ditch, the pipe, and a travel lane for equipment, all adjacent to each other during the construction process. The idea of installing the pipe directly underneath the trail and not impacting the land outside of the trail easement is not realistic. To accomplish this, the trail would have to be completely cleared, graded down, and leveled off, which would not be feasible in the wetland areas that line the Soo Line Trail. Should the pipeline be placed immediately adjacent to the trail, only one side of the right-of-way would be usable and the trail in many areas would be permanently impacted via grading and/or cutting down of the trail.
- **Permanent Impacts Due to New Access Roads.** As the trail was a former railroad grade, existing access from public roads is very limited. The need for access would result in several new permanent access roads and adjacent landowner impacts.
- **Extended Trail Closure During Construction**. Construction of the Project along the trail right-of-way would require trail closure for about a year as the trail would be the primary method of ingress/egress for construction.
- **Increase in Wetland Impacts**. RSA-27-L3 would cross 5.8 more miles of NWI-mapped wetlands, including two wetland complexes that are more than 1.0 mile long.
- **New Landowners Impacted.** RSA-27-L3 would cross the town of McGregor and require new easements for 82 parcels. Additionally, RSA-27-L3 contains 24 HCAs within the 750-foot-wide route width whereas the Preferred Route contains none. In nearly all locations along the RSA, the construction footprint would extend beyond the 100-foot-wide easement of the Soo Line Trail, creating impacts to new landowners.


Resources Crossed by the Preferred Route Segment
and RSA-27-L3 Route Alternative
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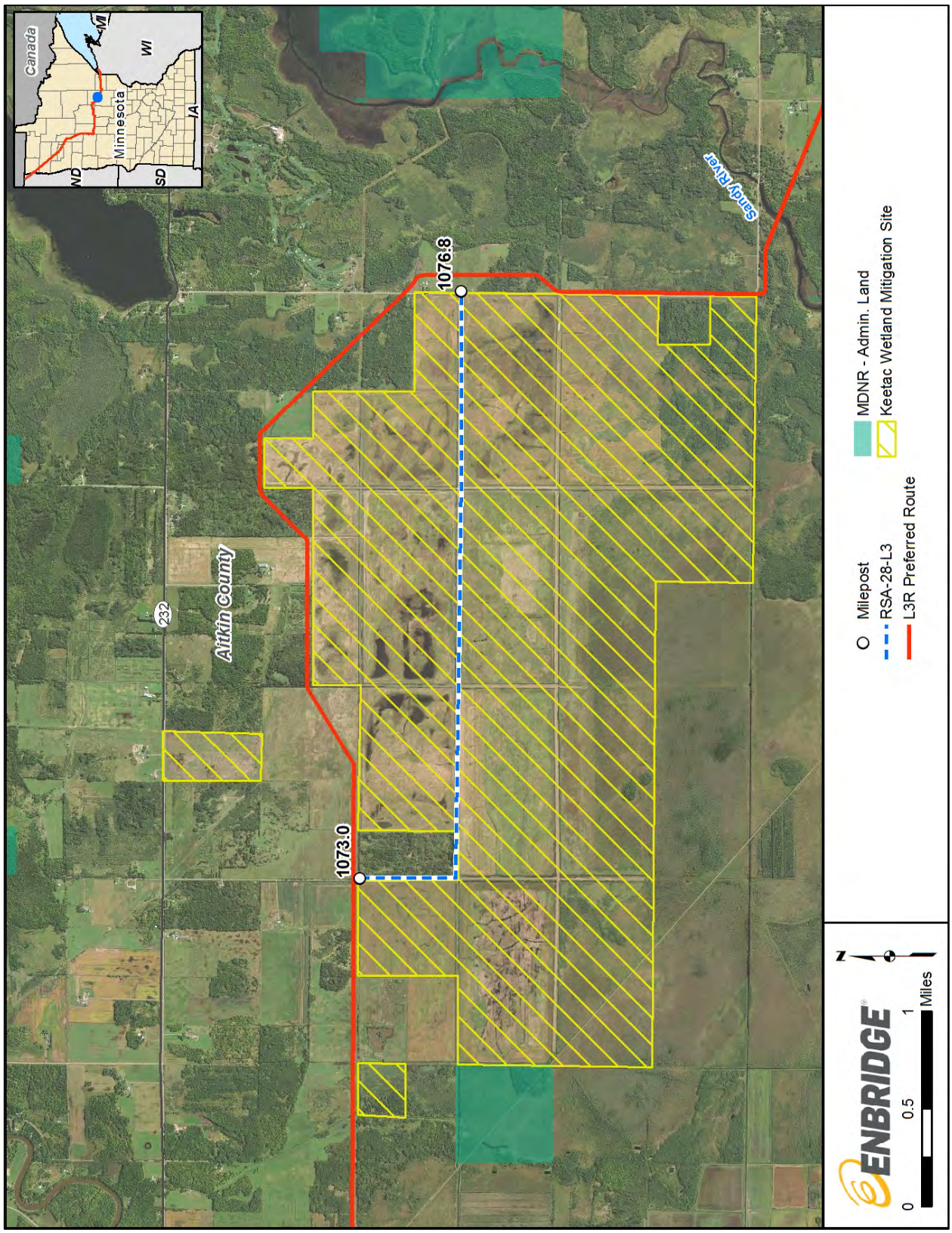
0.5
1.0
1.5
2.0
2.5
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Cost (Dollars x 100,000,000)
Preferred Route Segment
RSA-27-L3 Route Segment Alternative

RSA-28-L3


Canada
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WI
Minnesota
IA
ND
SD
Sandy River
1076.8
1073.0
Aitkin County
232
Milepost
RSA-28-L3
L3R Preferred Route
MDNR - Admin. Land
Keetac Wetland Mitigation Site
ENBRIDGE
0
0.5
1
Miles

Purpose

Route Segment Alternative RSA-28-L3 was proposed to avoid a private wetland mitigation site built for the U.S. Steel – Keetac Expansion Project. Enbridge notes that the DOC-EERA Alternatives Screening Report has misstated the purpose for the RSA from the map submitted during the comment period. The Alternatives Screening Report states that the RSA was suggested to avoid gravel pits; however, the noted features crossed are not gravel pits, but wetland mitigation areas.

Description

RSA-28-L3 deviates from the Preferred Route at approximate MP 1073.0, approximately 3.5 miles southeast of Palisade in Aitkin County. RSA-28-L3 travels south along a local road through forest for 0.5 mile until it turns east and follows a local road through the wetland mitigation site for 3 miles. It reconnects with the Preferred Route at approximate MP 1076.8, all within Aitkin County.

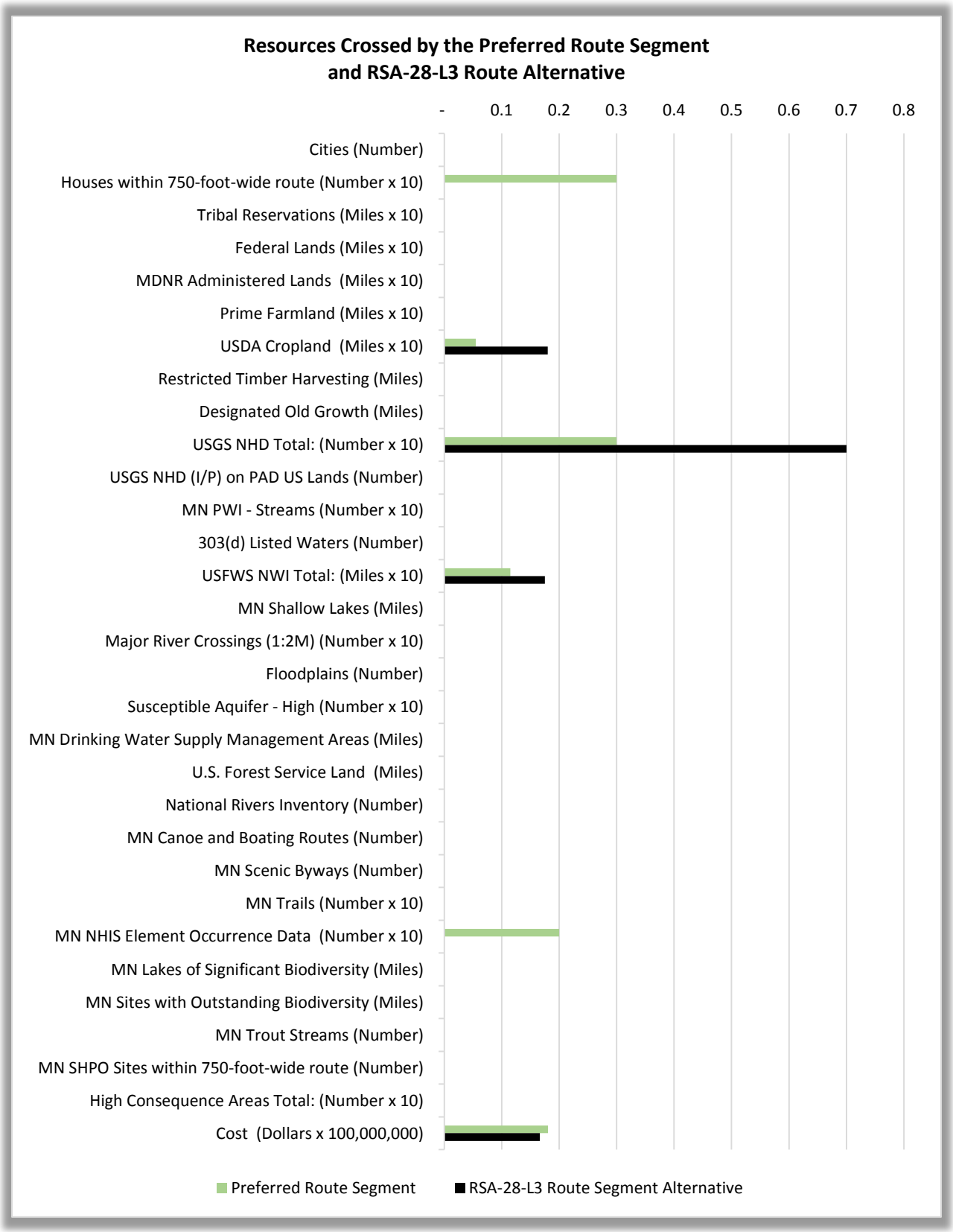
	The Preferred Route Segment	RSA-28-L3
Collocated Length (mi.)	1.1	0.9
Greenfield Length (mi.)	2.7	2.6
Total (mi.)	3.8	3.5

A comparison of the human and environmental characteristics of RSA-28-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

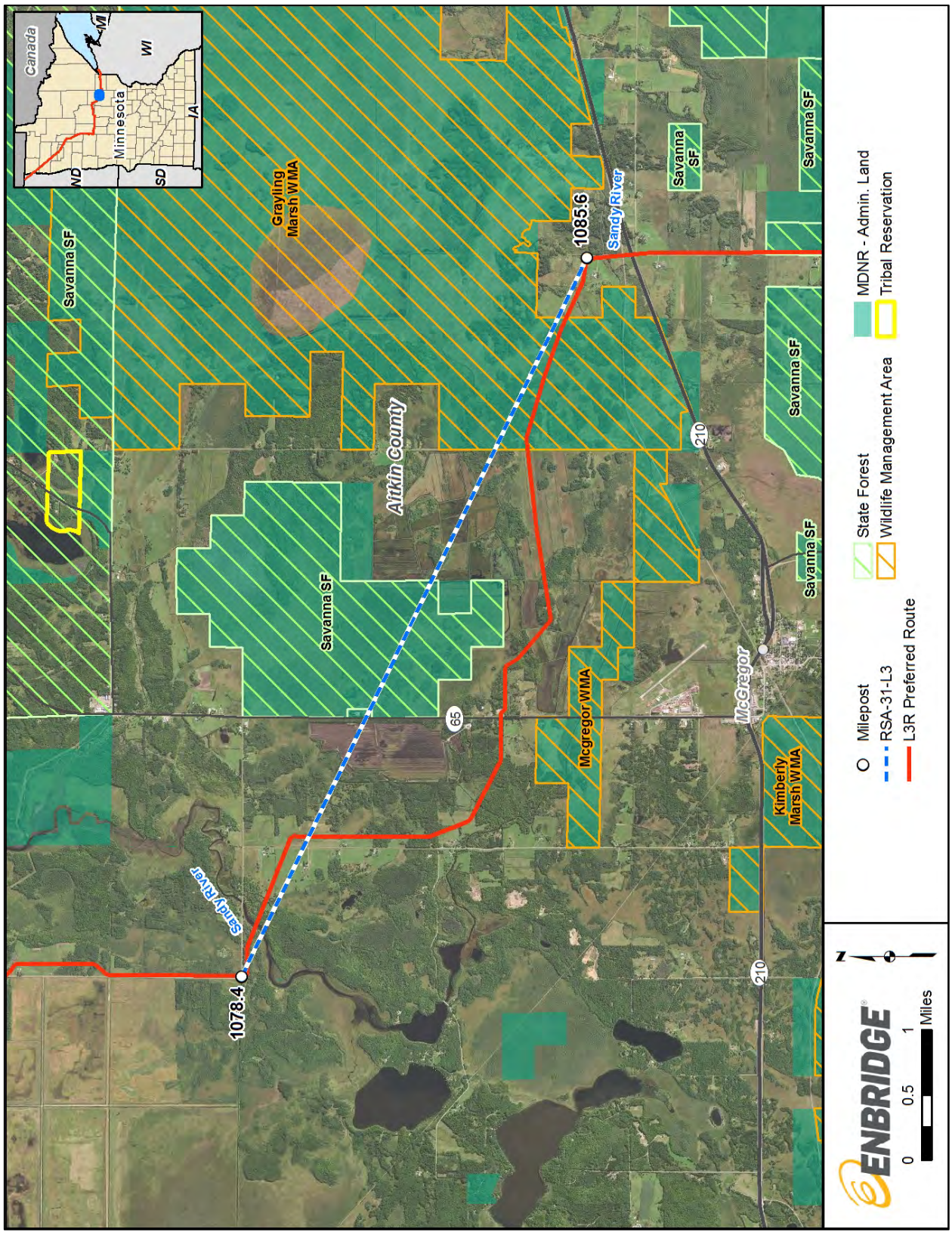
Enbridge Recommendation

Enbridge does not recommend that RSA-28-L3 be approved for the following reason:

- **Impacts to Existing Wetland Mitigation Site.** RSA-28-L3 would cross the Keetac wetland mitigation site as shown on the figure for this RSA. Through landowner communication, Enbridge learned that the purpose of the wetland mitigation site is to restore wetland habitat. Typically, wetland mitigation sites have either deed restrictions or conservations easements associated with them that prevent pipeline construction. Enbridge's Preferred Route would completely avoid the wetland mitigation site.


Resources Crossed by the Preferred Route Segment and RSA-28-L3 Route Alternative
- 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Cost (Dollars x 100,000,000)
Preferred Route Segment
RSA-28-L3 Route Segment Alternative

RSA-31-L3


Canada
MI
WI
Minnesota
ND
SD
IA
Grayling Marsh WMA
Savanna SF
Aitkin County
Sandy River
1085.6
1078.4
Savanna SF
Savanna SF
Savanna SF
Savanna SF
Savanna SF
Mcgregor WMA
McGregor
Kimberly Marsh WMA
65
210
210
MDNR - Admin. Land
Tribal Reservation
State Forest
Wildlife Management Area
Milepost
RSA-31-L3
L3R Preferred Route
ENBRIDGE
0
0.5
1
Miles

Purpose

Route Segment Alternative RSA-31-L3 was proposed by a commenter suggesting that the route cut straight and diagonally across several miles in Aitkin County.

Description

RSA-31-L3 deviates from the Preferred Route at approximate MP 1078.4, approximately 5 miles northwest of McGregor in Aitkin County. It then travels southeast through forest, a peat farm, and agricultural fields for 6 miles until it rejoins the Preferred Route at approximate MP 1085.6, all within Aitkin County.

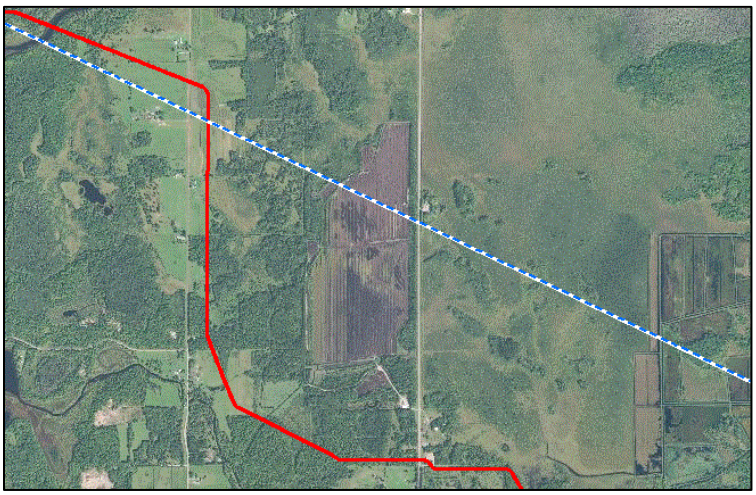
	The Preferred Route Segment	RSA-31-L3
Collocated Length (mi.)	0.8	0.5
Greenfield Length (mi.)	6.4	5.6
Total (mi.)	7.2	6.1

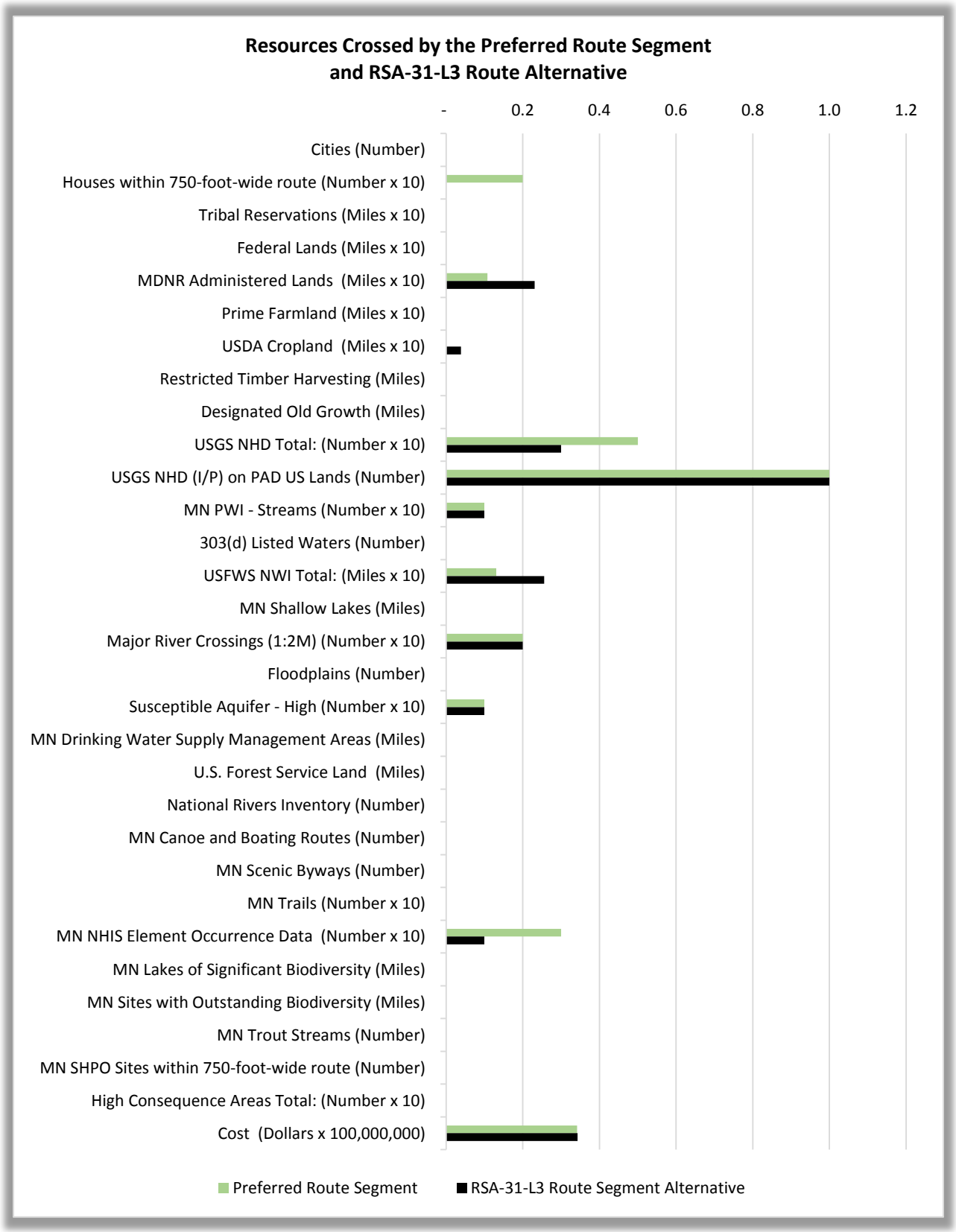
A comparison of the human and environmental characteristics of RSA-31-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

Enbridge Recommendation

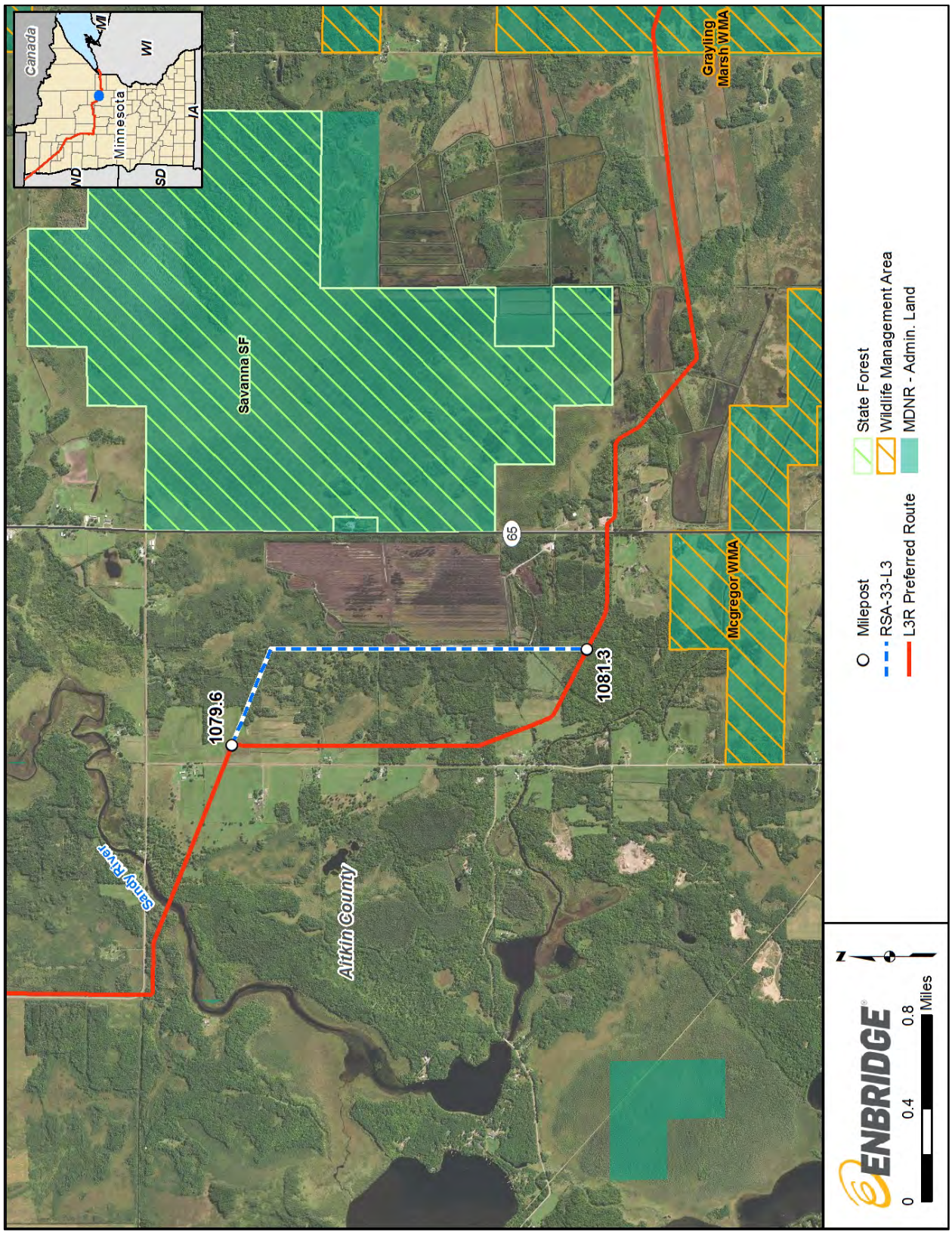
Enbridge does not recommend that RSA-31-L3 be approved for the following reason:

- **Impacts to Operation of an Active Peat Farm**. RSA-31-L3 would directly impact an active peat farming operation (see image below). Maintaining the necessary depth of cover required by 49 Code of Federal Regulations ("CFR") Part 195 and Minnesota Statute § 216G.07 would be extremely difficult because peat is removed annually.




Resources Crossed by the Preferred Route Segment and RSA-31-L3 Route Alternative
-
0.2
0.4
0.6
0.8
1.0
1.2
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Cost (Dollars x 100,000,000)
Preferred Route Segment
RSA-31-L3 Route Segment Alternative

RSA-33-L3


Canada
MI
WI
Minnesota
IA
ND
SD
Grayling Marsh WMA
Savanna SF
65
Mcgregor WMA
1079.6
1081.3
Sandy River
Aitkin County
State Forest
Wildlife Management Area
MDNR - Admin. Land
Milepost
RSA-33-L3
L3R Preferred Route
N
ENBRIDGE
0
0.4
0.8
Miles

Purpose

Route Segment Alternative RSA-33-L3 was proposed by a commenter suggesting that the route be moved to the edge of his property where it is adjacent to a peat farming operation.

Description

RSA-33-L3 deviates from the Preferred Route at approximate MP 1079.6 in Section 12, Township 48N, Range 24W in Aitkin County. RSA-33-L3 travels southeast through forest and agricultural fields for 0.5 mile. It then turns south for 1.5 miles through forest and partially follows an existing utility corridor until it reconnects with the Preferred Route at approximate MP 1081.3 in Section 13, Township 48N, Range 24W.

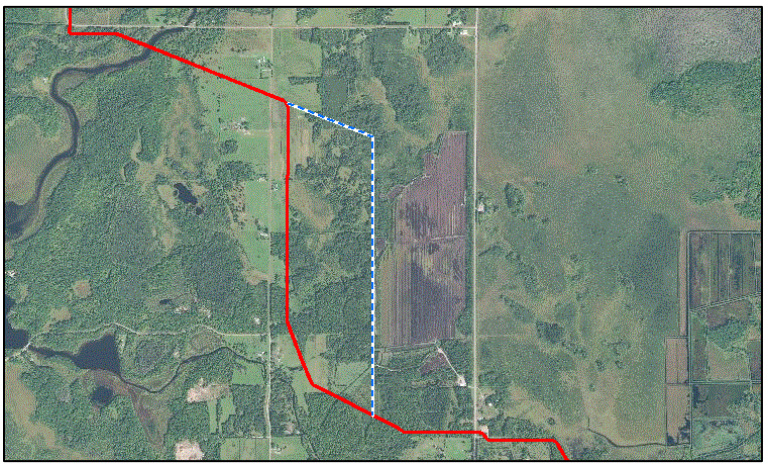
	The Preferred Route Segment	RSA-33-L3
Collocated Length (mi.)	0.0	0.0
Greenfield Length (mi.)	1.7	1.7
Total (mi.)	1.7	1.7

A comparison of the human and environmental characteristics of RSA-33-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

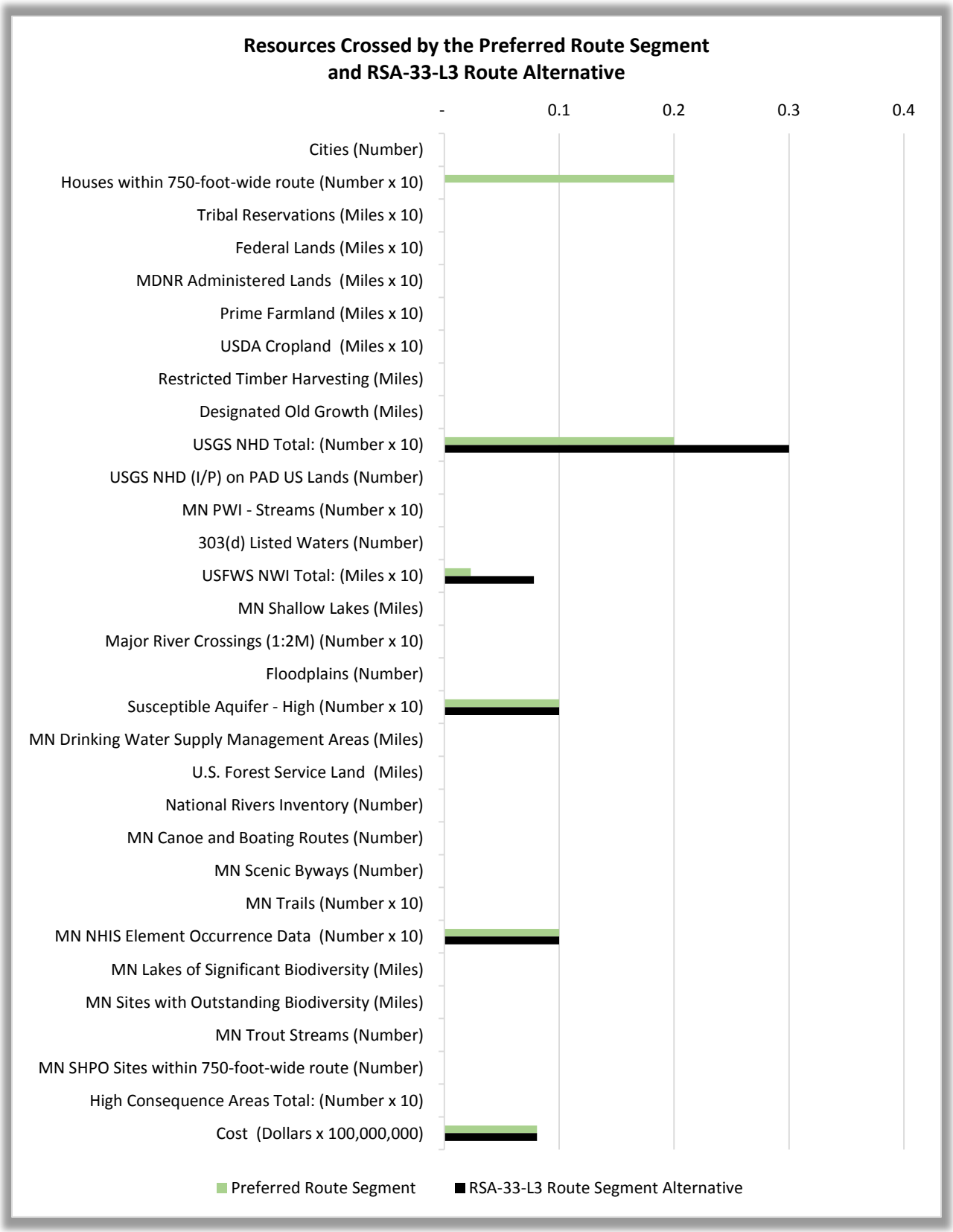
Enbridge Recommendation

Enbridge does not recommend that RSA-33-L3 be approved for the following reasons:

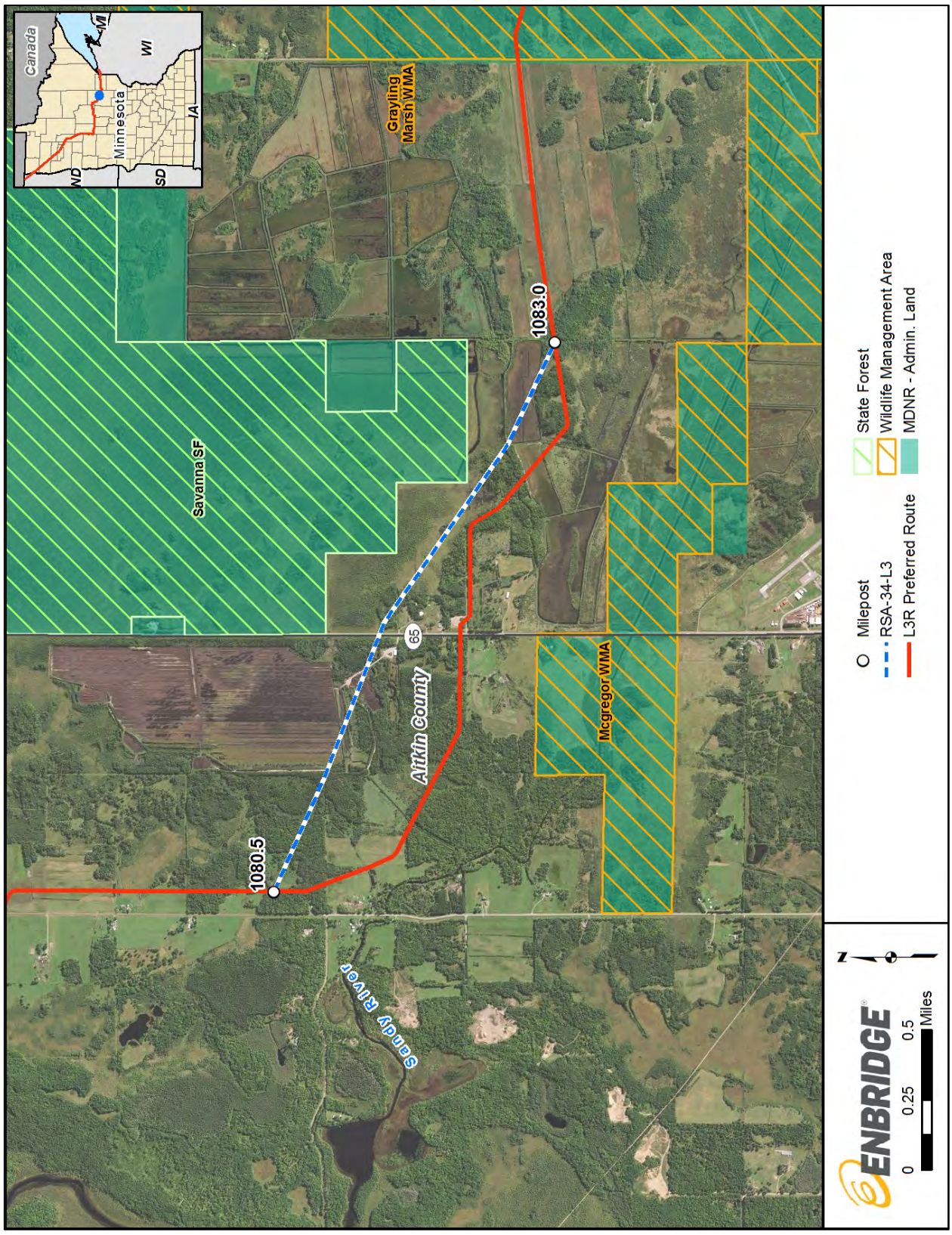
- **Possible Future Impacts to Operation of an Active Peat Farm.** RSA-33-L3 follows the edge of a property owned by a peat-farming operation (see image below). Depending on future plans of the peat farm owners, RSA-33-L3 could impact the peat farming operation.



- **Increase in Forest and Wetland Impacts.** RSA-33-L3 would cross 0.4 more mile of forested land and 0.6 more mile of NWI-mapped wetlands than the Preferred Route.


Resources Crossed by the Preferred Route Segment and RSA-33-L3 Route Alternative
-
0.1
0.2
0.3
0.4
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Cost (Dollars x 100,000,000)
Preferred Route Segment
RSA-33-L3 Route Segment Alternative

RSA-34-L3


Canada
MI
WI
Minnesota
IA
ND
SD
Grayling Marsh WMA
1083.0
Savanna SF
65
Aitkin County
Mcgregor WMA
1080.5
Sandy River
State Forest
Wildlife Management Area
MDNR - Admin. Land
Milepost
RSA-34-L3
L3R Preferred Route
ENBRIDGE
0
0.25
0.5
Miles

Purpose

Route Segment Alternative RSA-34-L3 was proposed by a commenter suggesting the route be shifted to the north to avoid impacts to his property and trees planted as part of Forest Stewardship plans.

Description

RSA-34-L3 deviates from the Preferred Route at approximate MP 1080.5 in Section 13, Township 48N, Range 24W in Aitkin County. RSA-34-L3 travels southeast for 2 miles through forest, a peat farm, and agricultural fields and parallels the Preferred Route to the north until it reconnects with the Preferred Route at approximate MP 1083.0 in Section 19, Township 48N, Range 23W.

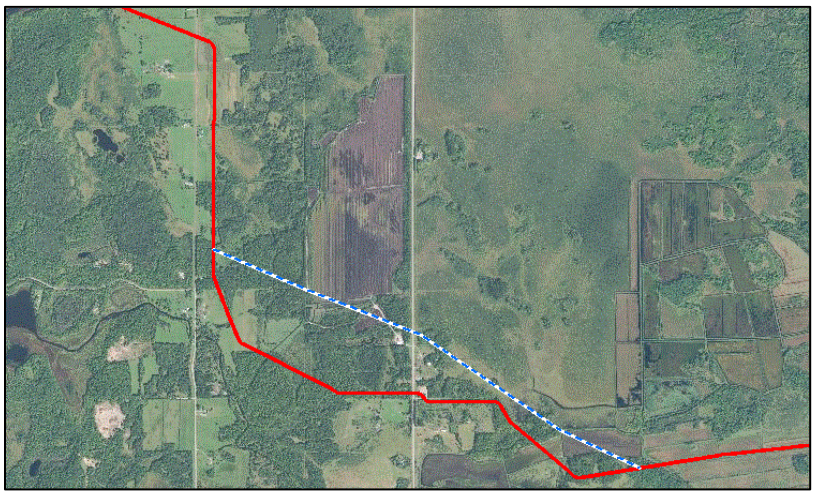
	The Preferred Route Segment	RSA-34-L3
Collocated Length (mi.)	0.1	0.1
Greenfield Length (mi.)	2.4	2.1
Total (mi.)	2.5	2.2

A comparison of the human and environmental characteristics of RSA-34-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

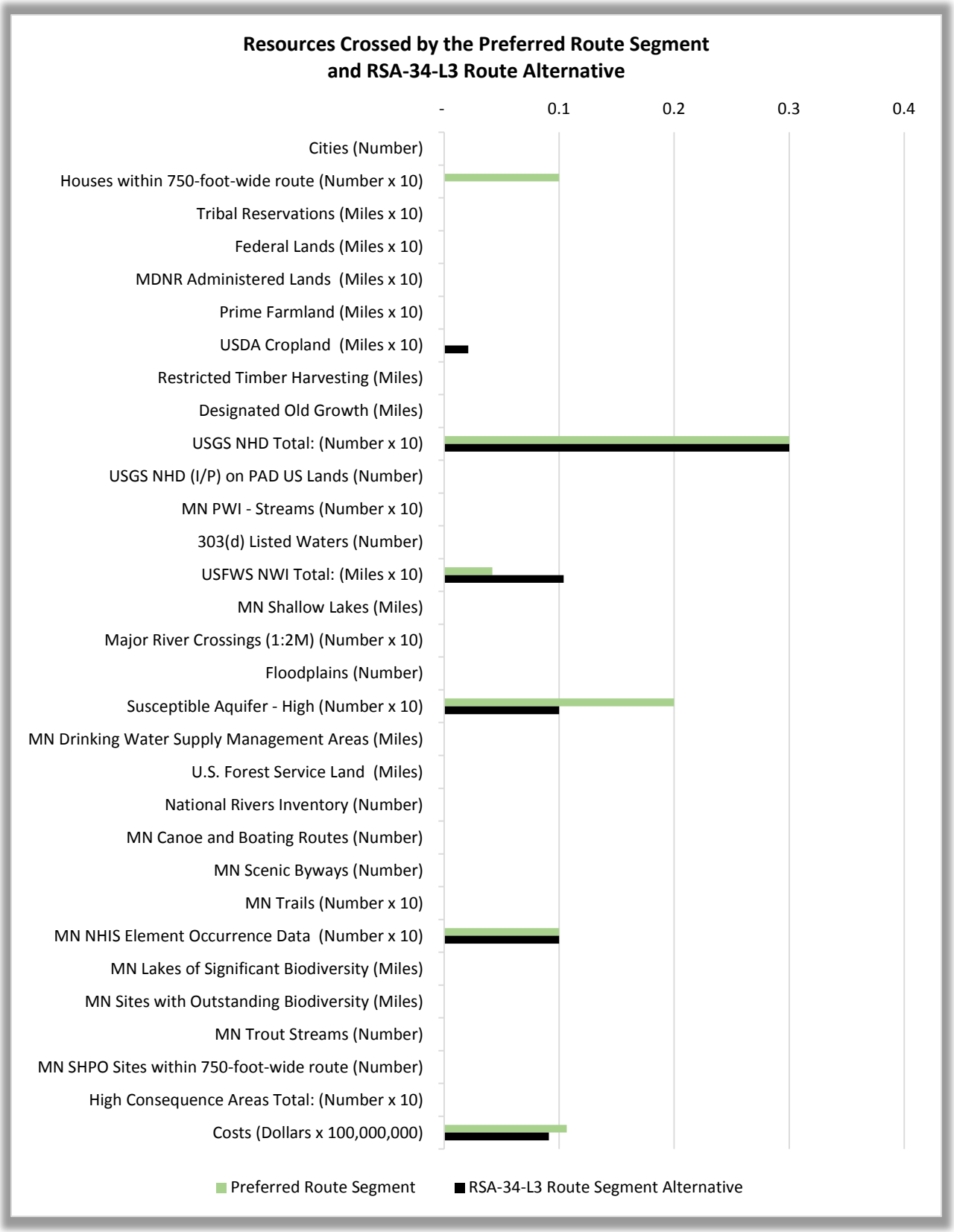
Enbridge Recommendation

Enbridge does not recommend that RSA-34-L3 be approved for the following reasons:

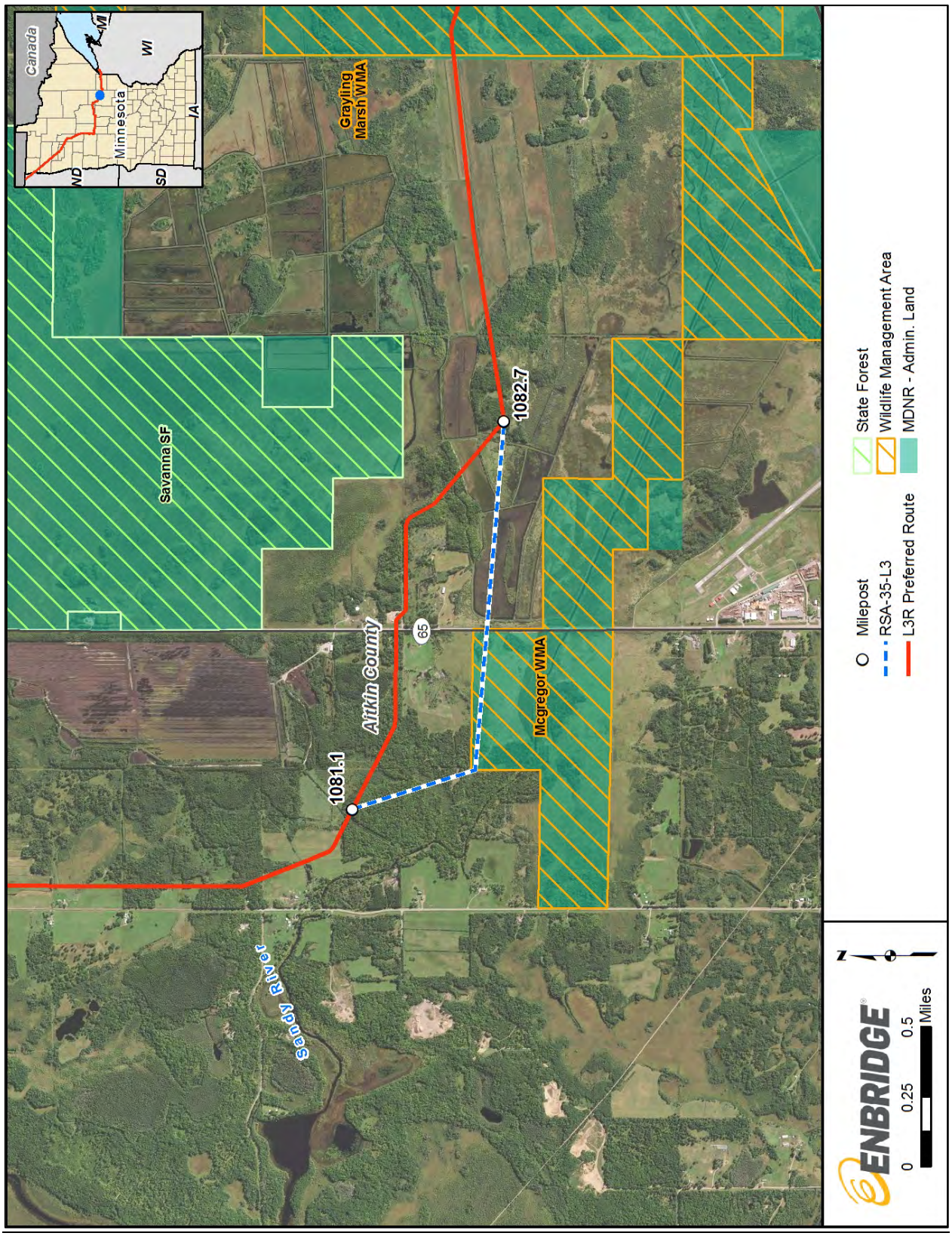
- **Impacts to Operation of an Active Peat Farm**. RSA-34-L3 would directly impact an active peat farming operation (see image below). Maintaining the necessary depth of cover required by 49 CFR Part 195 and Minnesota Statute § 216G.07 would be extremely difficult because peat is removed annually.



- **Increase Wetland Impacts.** RSA-34-L3 would cross 0.6 more mile of NWI-mapped wetlands than the Preferred Route.


Resources Crossed by the Preferred Route Segment
and RSA-34-L3 Route Alternative
-
0.1
0.2
0.3
0.4
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Costs (Dollars x 100,000,000)
Preferred Route Segment
RSA-34-L3 Route Segment Alternative

RSA-35-L3


Canada
MI
WI
Minnesota
IA
ND
SD
Grayling Marsh WMA
Savanna SF
1082.7
1081.1
Aitkin County
65
Mcgregor WMA
Sandy River
State Forest
Wildlife Management Area
MDNR - Admin. Land
Milepost
RSA-35-L3
L3R Preferred Route
N
ENBRIDGE
0
0.25
0.5
Miles

Purpose

Route Segment Alternative RSA-35-L3 was proposed by a commenter suggesting that the route be shifted to the south to avoid impacts to his property and trees planted as part of Forest Stewardship plans.

Description

RSA-35-L3 deviates from the Preferred Route at approximate MP 1081.1 in Section 13, Township 48N, Range 24W in Aitkin County. RSA-35-L3 travels southeast through forest for 0.5 mile and then turns east through open lands and agricultural fields for 1.5 miles. It reconnects with the Preferred Route at approximate MP 1082.7 in Section 19, Township 48N, Range 23W.

	The Preferred Route Segment	RSA-35-L3
Collocated Length (mi.)	0.1	0.1
Greenfield Length (mi.)	1.5	1.6
Total (mi.)	1.6	1.7

A comparison of the human and environmental characteristics of RSA-35-L3 and the corresponding Preferred Route segment is presented in Appendix A.

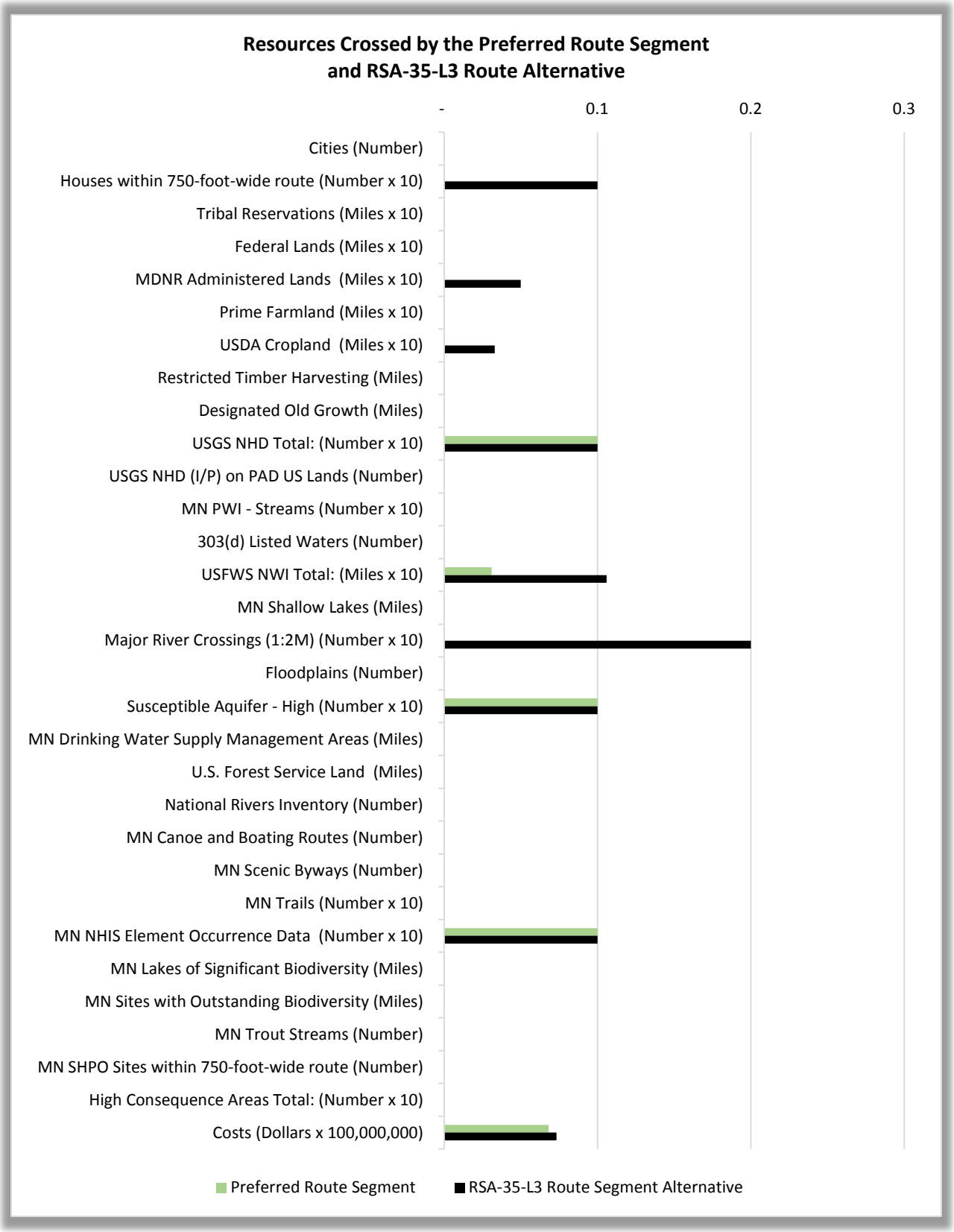
Enbridge Recommendation

Enbridge does not recommend that RSA-35-L3 be approved for the following reasons:

- **Impacts to a Wildlife Management Area.** RSA-35-L3 would cross 0.5 mile of the McGregor WMA. The Preferred Route segment crosses no WMAs.
- **Impacts to Structures**. RSA-35-L3 would be within 50 feet of a house and large shed (see image below).

- **Crossing of State Highway 65.** RSA-35-L3 would pose a more challenging crossing of State Highway 65 because a large waterbody on the east side of the highway would not accommodate any trenchless highway crossing technique (see image above). Open-cutting the highway would

also be difficult to successfully complete given the water to the east of the highway and the apparent saturated conditions on the west. Safety risks would increase during construction due to working within a congested right-of-way in close proximity to a private residence.


Resources Crossed by the Preferred Route Segment
and RSA-35-L3 Route Alternative
-
0.1
0.2
0.3
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Costs (Dollars x 100,000,000)
Preferred Route Segment
RSA-35-L3 Route Segment Alternative

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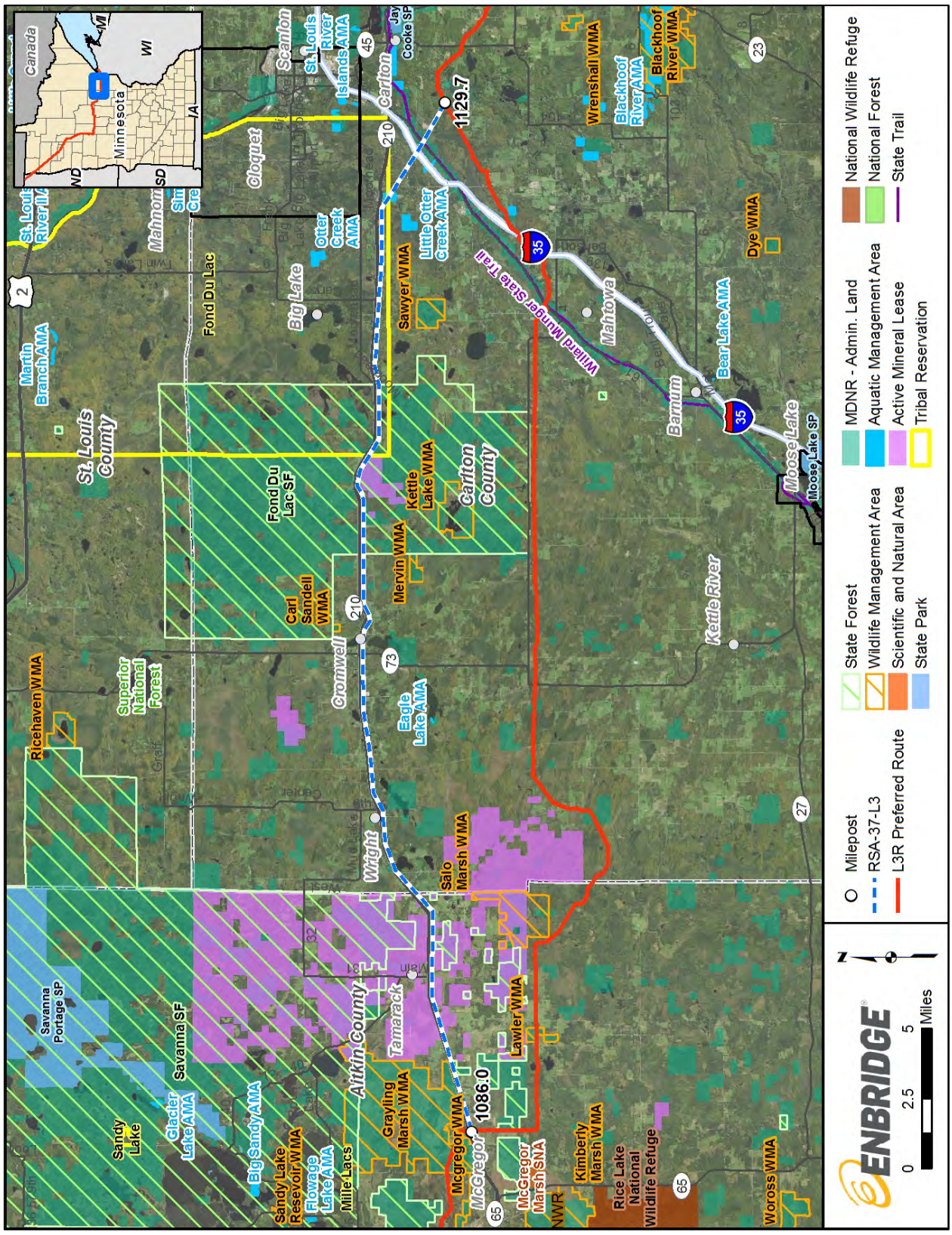
RSA-37-L3


Milepost
RSA-37-L3
L3R Preferred Route
State Forest
Wildlife Management Area
Scientific and Natural Area
State Park
MDNR - Admin. Land
Aquatic Management Area
Active Mineral Lease
Tribal Reservation
National Wildlife Refuge
National Forest
State Trail
ENBRIDGE
0 2.5 5 Miles
1129.7
1086.0
St. Louis County
Carlton County
Aitkin County
Cromwell
Wright
Barnum
Moose Lake
Kettle River
Fond Du Lac
Big Lake
Cloquet
Scanlon
Carlton
Sawyer WMA
Mahtowa
Bear Lake AMA
Dye WMA
Wrenshall WMA
Blackhoof River AMA
Blackhoof River WMA
Willard Munger State Trail
Fond Du Lac SF
Carl Sandell WMA
Kettle Lake WMA
Mervin WMA
Eagle Lake AMA
Superior National Forest
Ricehaven WMA
Savanna Portage SP
Savanna SF
Glacier Lake AMA
Sandy Lake
Big Sandy AMA
Sandy Lake Reservoir WMA
Flowage Lake AMA
Mille Lacs
Grayling Marsh WMA
Tamarack
Mcgregor WMA
McGregor
McGregor Marsh SNA
Lawler WMA
Salo Marsh WMA
Kimberly Marsh WMA
Rice Lake National Wildlife Refuge
Woross WMA
Martin Branch AMA
Otter Creek AMA
Little Otter Creek AMA
St. Louis River Islands AMA
Jay Cooke SP
Moose Lake SP
Canada
Minnesota
WI
ND
SD
IA
MI

Purpose

Route Segment Alternative RSA-37-L3 was proposed by a commenter suggesting a route that would parallel State Highway 210 east of McGregor, thereby avoiding the Salo Marsh and Lawler WMAs.

Description

RSA-37-L3 deviates from the Preferred Route at approximate MP 1086.0 near McGregor in Aitkin County. RSA-37-L3 then travels west along Highway 210 for 35 miles, where it turns southeast for 4 miles and follows the Enbridge Mainline System corridor. It reconnects with the Preferred Route at approximate MP 1129.7 in Carlton County.

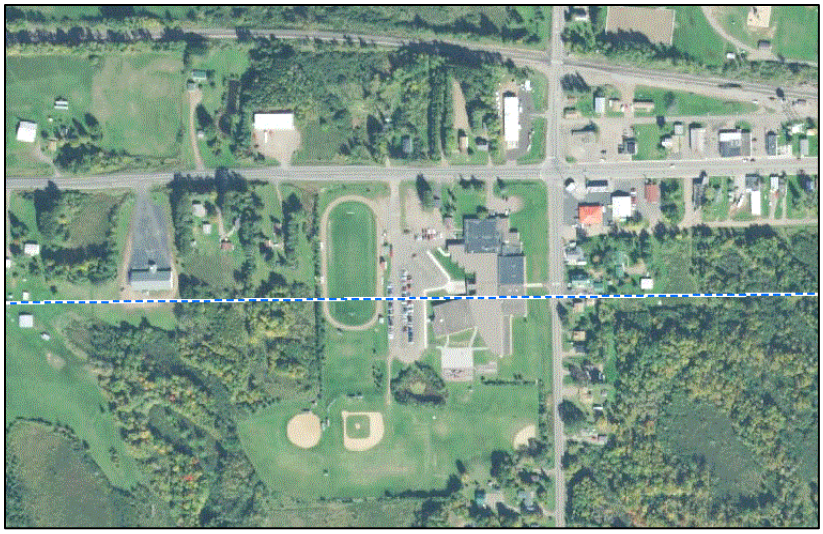
	The Preferred Route Segment	RSA-37-L3
Collocated Length (mi.)	31.6	11.2
Greenfield Length (mi.)	12.1	27.5
Total (mi.)	43.7	38.7

A comparison of the human and environmental characteristics of RSA-37-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

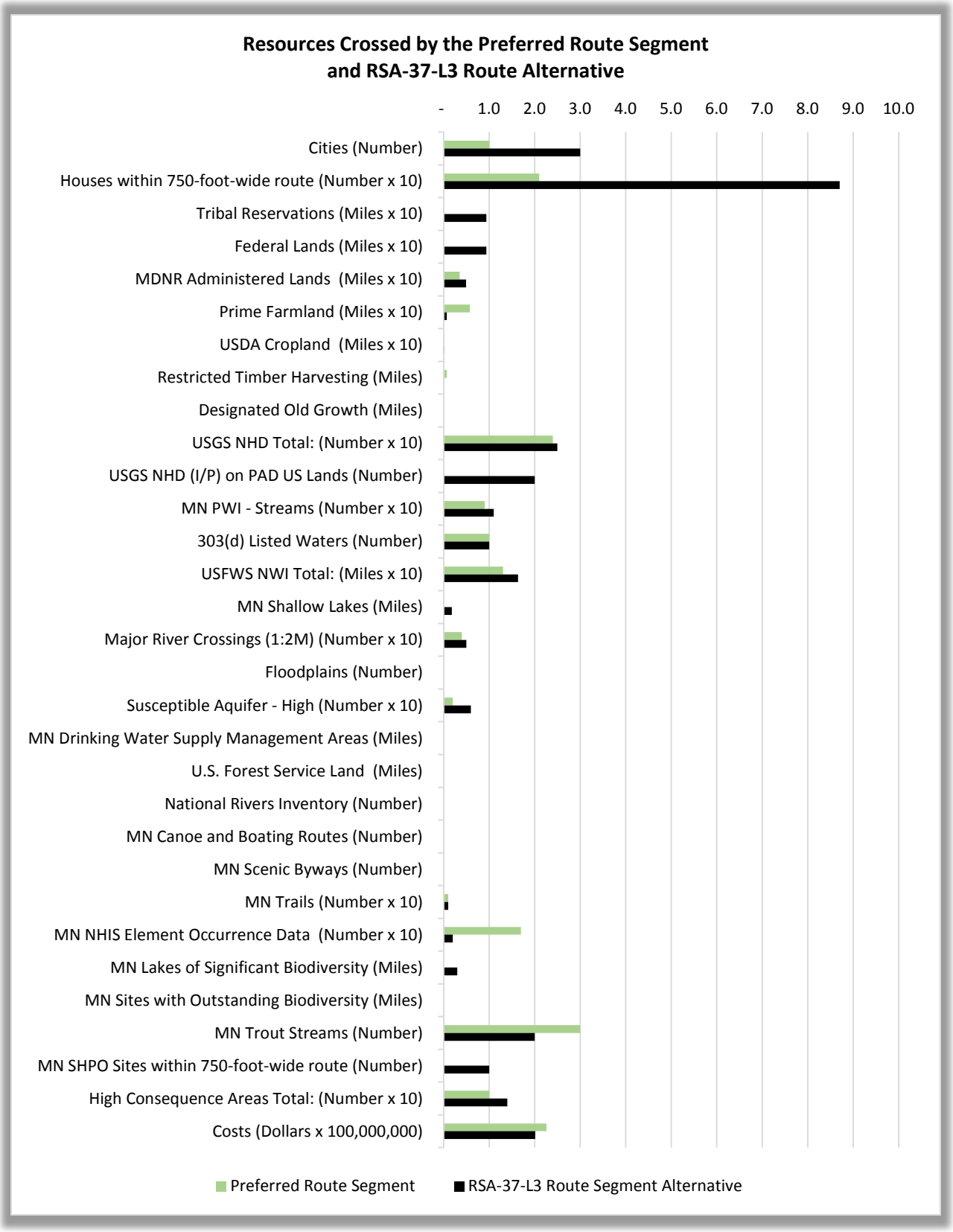
Enbridge Recommendation

Enbridge does not recommend that RSA-37-L3 be approved for the following reasons:

- **Crossing of Fond du Lac Reservation**. RSA-37-L3 would cross 9.4 miles of the Fond du Lac Reservation; the Preferred Route would not cross the Reservation. Absent agreement from the Tribe, Enbridge is unable to secure land rights and/or other approvals necessary to construct and operate the pipeline across the Reservation.
- **Increased Impacts to Cities.** RSA-37-L3 would require construction and operation through several populated areas and cities along State Highway 210, including Tamarack, Wright, Cromwell, and Sawyer. As a result, this RSA would require extensive close-proximity construction for private residences and Highway 210.
- **Removal of Homes and Garages.** RSA-37-L3 is within 750 feet of 87 residences; the Preferred Route is within 750 feet of 21 residences. In addition to the impacts of constructing in close proximity to 87 residences, Enbridge estimates that of those 87 residences, RSA-37-L3 would result in removal and dislocation of 22 homes and 24 garages. RSA-37-L3 would require new easements for 265 parcels.
- **Crossing of Cromwell School Building and Grounds.** RSA-37-L3 would travel directly under the school building, athletic field, and parking lot. Traffic around the grounds, as well as the presence of large numbers of young children, would pose safety risks during construction and operation of this RSA.



- **Impacts to Active Mineral Leases.** RSA-37-L3 would cross 4.9 miles of active mineral lease lands; the Preferred Route would cross none. Active mineral leases present significant routing issues, and it is uncertain whether Enbridge could obtain the necessary regulatory and land rights to construct along this route.
- **Impacts to Little Otter Creek AMA.** RSA-37-L3 would cross the Little Otter Creek AMA. The Preferred Route segment would avoid AMAs.


Resources Crossed by the Preferred Route Segment
and RSA-37-L3 Route Alternative
- 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Costs (Dollars x 100,000,000)
Preferred Route Segment
RSA-37-L3 Route Segment Alternative

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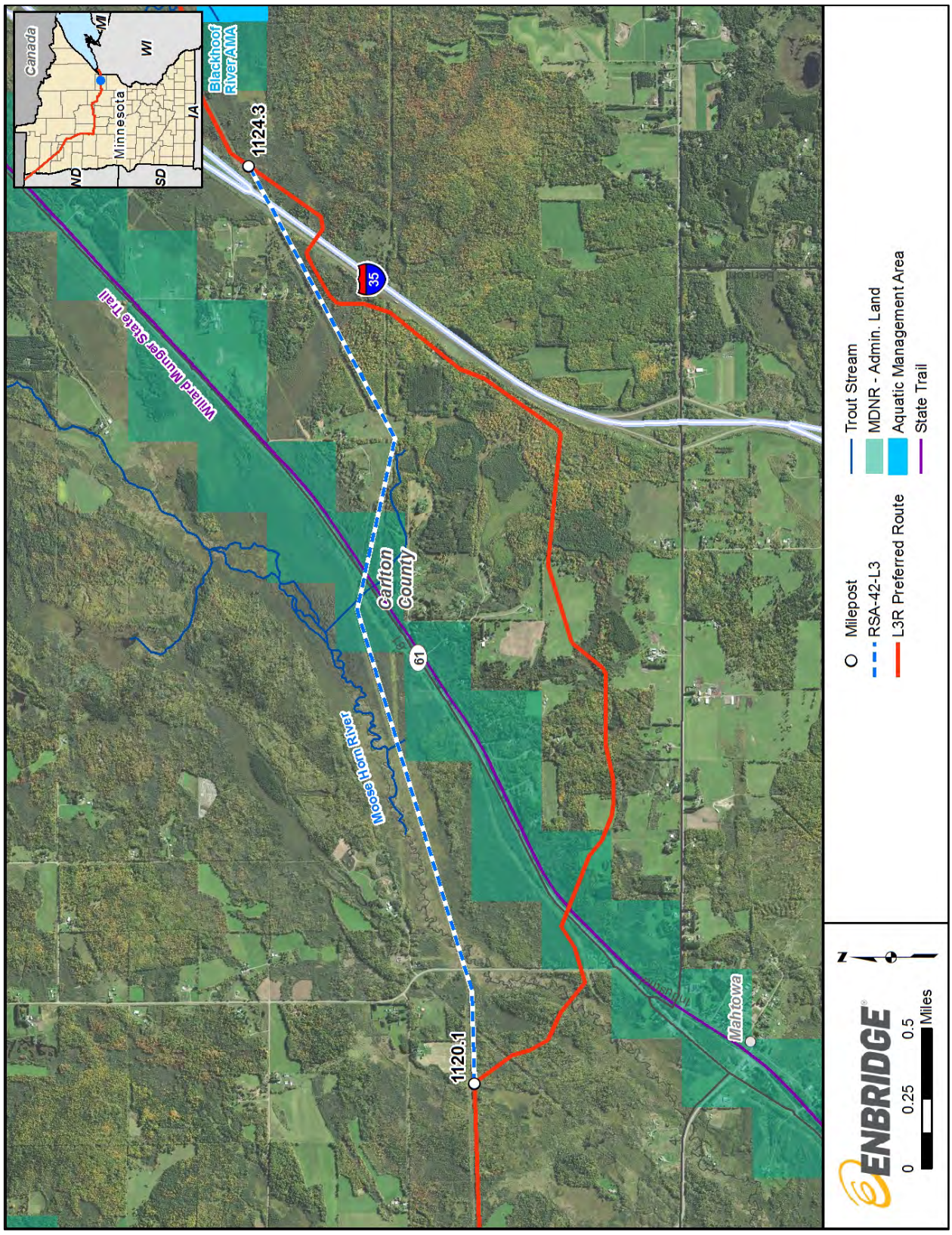
RSA-42-L3


Canada
MI
WI
Minnesota
IA
ND
SD
Blackhoof River AMA
1124.3
35
Willard Munger State Trail
Carlton County
61
Moose Horn River
1120.1
Mahtowa
Trout Stream
MDNR - Admin. Land
Aquatic Management Area
State Trail
Milepost
RSA-42-L3
L3R Preferred Route
N
ENBRIDGE
0
0.25
0.5
Miles

Purpose

Route Segment Alternative RSA-42-L3 was proposed by a commenter suggesting that the route be moved to the north side of U.S. Highway 61, co-locating it with an existing power line corridor to avoid farmland and trees.

Description

RSA-42-L3 deviates from the Preferred Route at approximate MP 1120.1 in Section 4, Township 47N, Range 18W in Carlton County. RSA-42-L3 travels east, adjacent to an existing utility corridor, through forest for 3.5 miles until it crosses Interstate 35 and rejoins the Preferred Route at approximate MP 1124.3 in Section 36, Township 48N, Range 18W.

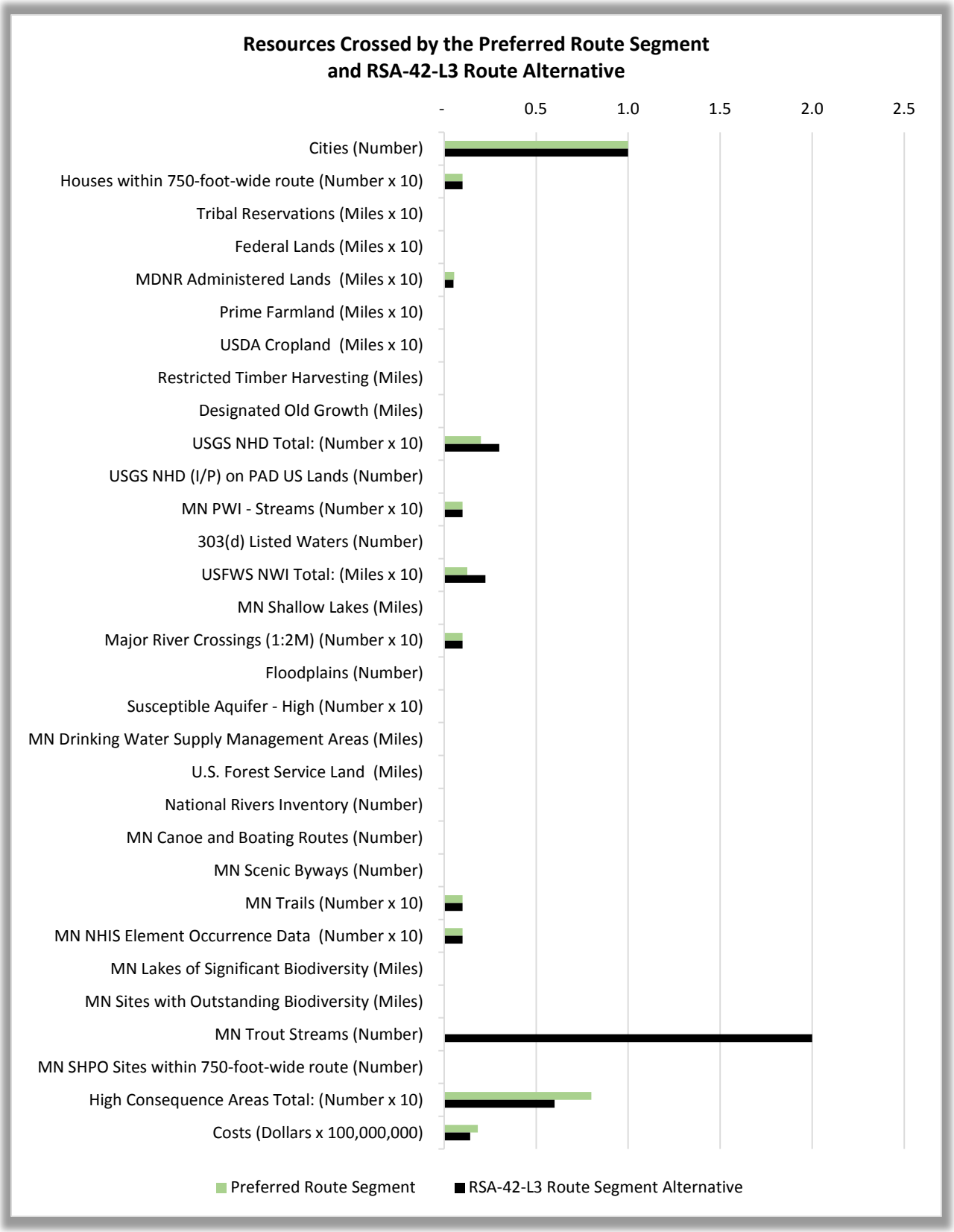
	The Preferred Route Segment	RSA-42-L3
Collocated Length (mi.)	1.4	3.5
Greenfield Length (mi.)	2.9	0.0
Total (mi.)	4.3	3.5

A comparison of the human and environmental characteristics of RSA-42-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

Enbridge Recommendation

Enbridge does not recommend that RSA-42-L3 be approved for the following reasons:

- **Difficult Construction Near Moose Horn River**. The route along RSA-42-L3 was studied by Enbridge early in the routing process and, though portions of the route were promising, Enbridge engineers identified multiple areas of significant concern. For example, RSA-42-L3 would be constructed adjacent to and parallel to the Moose Horn River for approximately 1.3 miles through an area of shallow bedrock and saturated wetlands, which would create difficult construction conditions because of anticipated soft soils in the river floodway. In addition, the crossings of the Moose Horn River are at a poor angle; construction would likely result in extensive disturbance to a large portion of the banks of the river and would make it difficult to achieve depth of cover. Typically, crossing of streams and rivers are held to as close to 90 degrees as possible to avoid this type of issue.
- **Increased Impacts to Wetlands.** RSA-42-L3 would cross 0.9 more mile of NWI-mapped wetlands than the Preferred Route.
- **Increased Impacts to Trout Streams.** RSA-42-L3 would cross two trout streams (two crossings of the Moose Horn River); the Preferred Route segment would cross no trout streams.
- **Engineering Limitations Associated with Interstate 35 Crossing.** RSA-42-L3 would cross Interstate 35 at an angle greater than 45 degrees, which can result in greater direct impacts to the roadway and a longer, more difficult crossing with higher risk of failure (see image below). Road crossings should be as close to 90 degrees as possible to minimize direct impacts to the feature being crossed. The Preferred Route allows for a preferable crossing angle at Interstate 35.


Resources Crossed by the Preferred Route Segment
and RSA-42-L3 Route Alternative
-
0.5
1.0
1.5
2.0
2.5
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Costs (Dollars x 100,000,000)
Preferred Route Segment
RSA-42-L3 Route Segment Alternative

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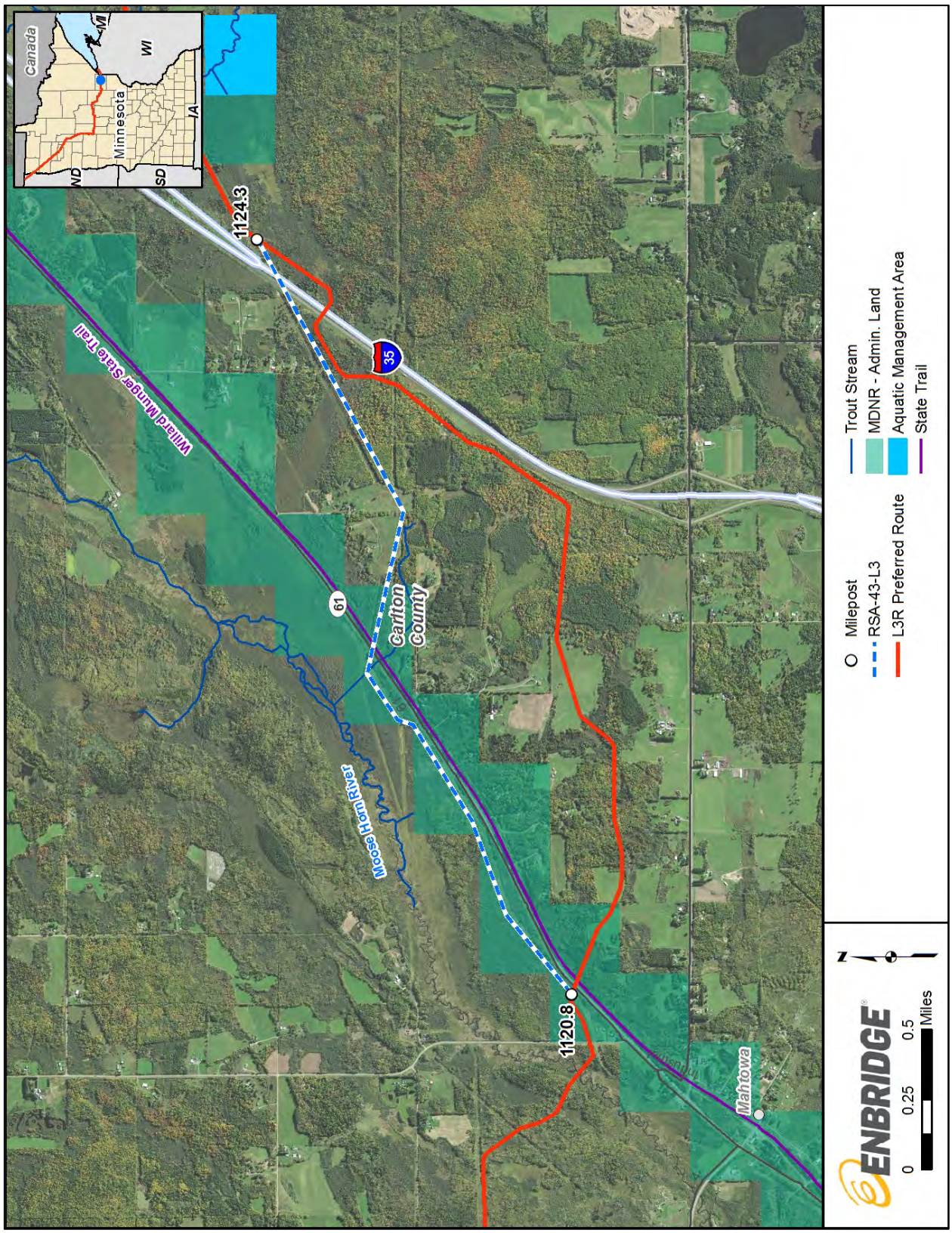
RSA-43-L3


Canada
MI
WI
Minnesota
IA
ND
SD
1124.3
1120.8
35
61
Willard Munger State Trail
Carlton County
Moose Horn River
Mahtowa
Trout Stream
MDNR - Admin. Land
Aquatic Management Area
State Trail
Milepost
RSA-43-L3
L3R Preferred Route
N
ENBRIDGE
0
0.25
0.5
Miles

Purpose

Route Segment Alternative RSA-43-L3 was proposed by a commenter to move the route to the north side of U.S. Highway 61 and co-locate it with an existing utility corridor.

Description

RSA-43-L3 deviates from the Preferred Route at approximate MP 1120.8 in Section 4, Township 47N, Range 18W in Carlton County. RSA-43-L3 travels northeast, adjacent to an existing utility corridor, through forest for 3 miles until it crosses Interstate 35 and rejoins the Preferred Route at approximate MP 1124.3 in Section 36, Township 48N, Range 18W.

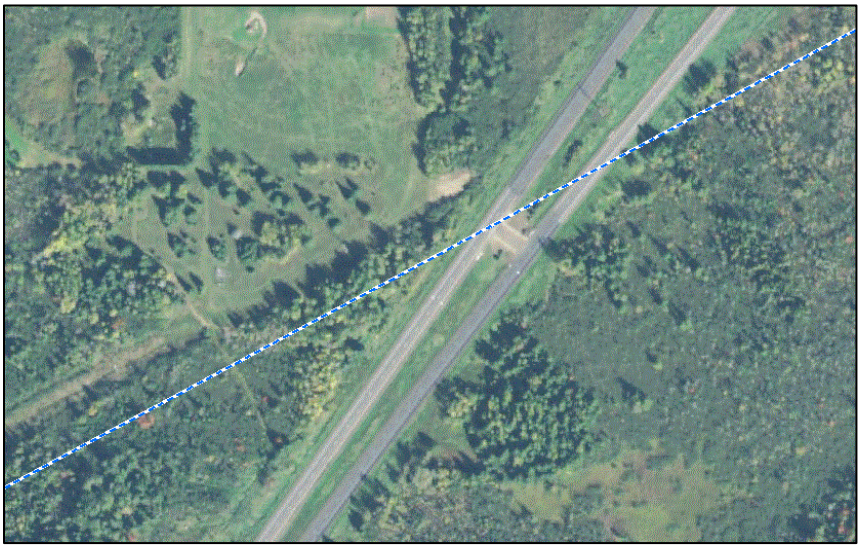
	The Preferred Route Segment	RSA-43-L3
Collocated Length (mi.)	0.9	3.1
Greenfield Length (mi.)	2.6	0.0
Total (mi.)	3.5	3.1

A comparison of the human and environmental characteristics of RSA-43-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

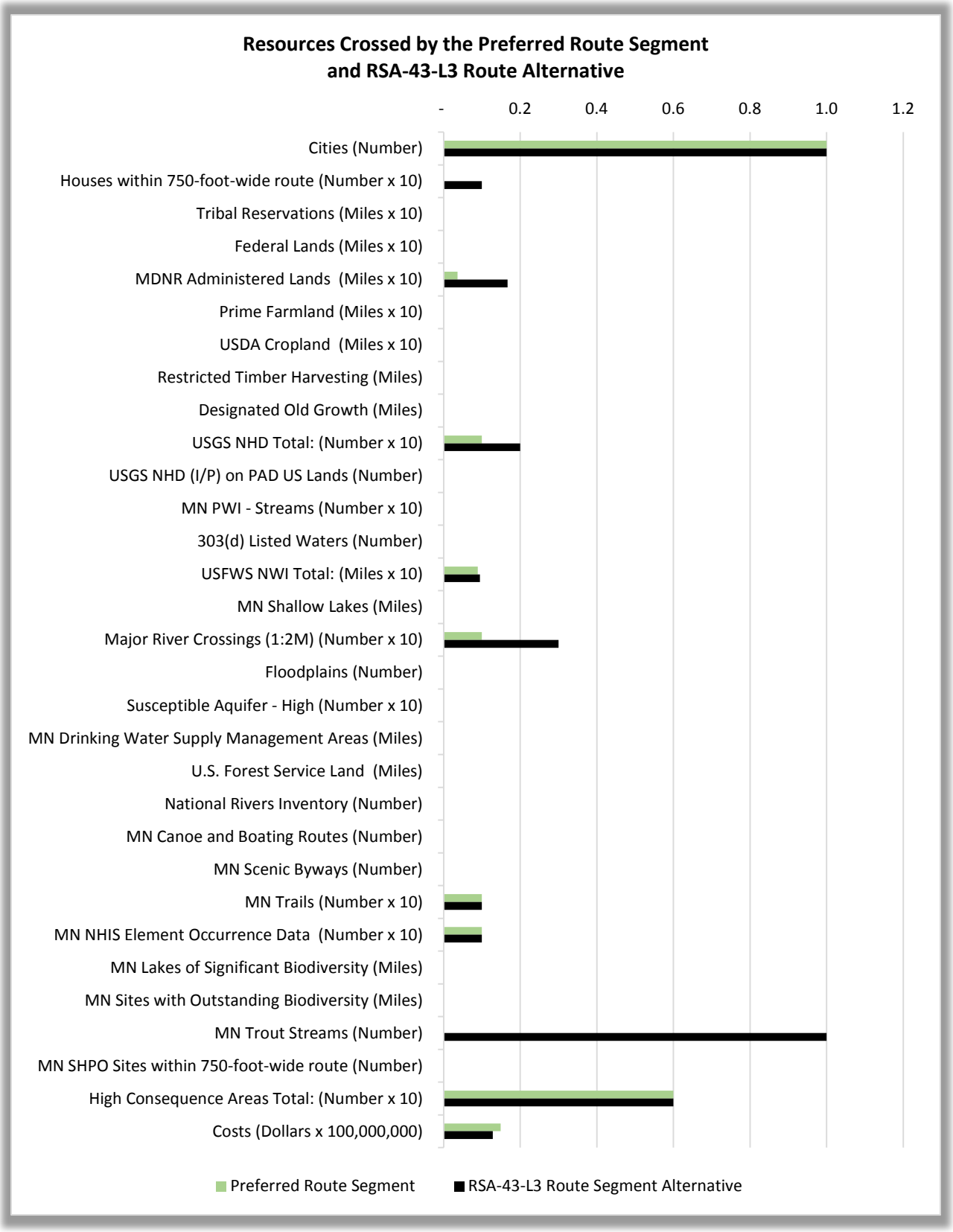
Enbridge Recommendation

Enbridge does not recommend that RSA-43-L3 be approved for the following reasons:

- **Increased Trout Stream Impacts.** RSA-43-L3 would cross one trout stream (a tributary of the Moose Horn River); the Preferred Route segment would cross no trout streams.
- **Engineering Limitations Associated with Interstate 35 Crossing.** RSA-43-L3 has the same crossing of Interstate 35 as RSA-42-L3 and, therefore, the same concerns. The crossing of Interstate 35 is at an angle greater than 45 degrees, which can result in greater direct impacts to the roadway and a longer, more difficult crossing with higher risk of failure (see image below). Road crossings should be as close to 90 degrees as possible to minimize direct impacts to the feature being crossed. The Preferred Route allows for a preferable crossing angle at Interstate 35.



- **Increased Impacts to Residents**. There are no houses within 750 feet of the Preferred Route, but one house is directly crossed by the centerline of RSA-43-L3 (see image below).


Resources Crossed by the Preferred Route Segment
and RSA-43-L3 Route Alternative
-
0.2
0.4
0.6
0.8
1.0
1.2
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Costs (Dollars x 100,000,000)
Preferred Route Segment
RSA-43-L3 Route Segment Alternative

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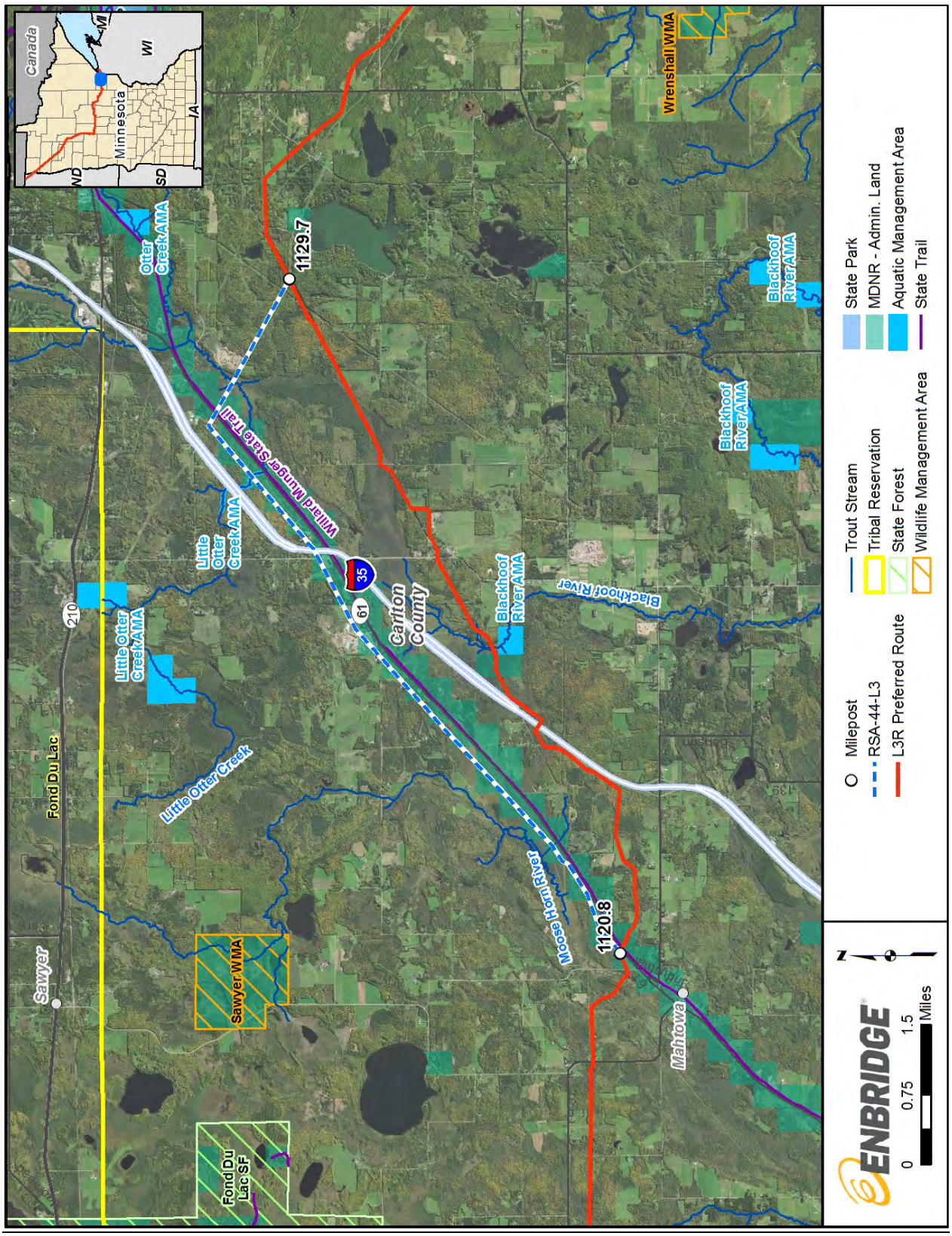
RSA-44-L3


Canada
MI
WI
Minnesota
IA
ND
SD
Milepost
RSA-44-L3
L3R Preferred Route
Trout Stream
Tribal Reservation
State Forest
Wildlife Management Area
State Park
MDNR - Admin. Land
Aquatic Management Area
State Trail
ENBRIDGE
0
0.75
1.5
Miles
1129.7
1120.8
Wrenshall WMA
Otter Creek AMA
Willard Munger State Trail
Little Otter Creek AMA
Blackhoof River AMA
Blackhoof River
Carlton County
Little Otter Creek
Fond Du Lac
Sawyer
Sawyer WMA
Fond Du Lac SF
Moose Horn River
Mahtowa
35
61
210

Purpose

Route Segment Alternative RSA-44-L3 was proposed by Minnesota Trout Unlimited to move the route to the north side of U.S. Highway 61, co-locating it with a utility corridor, to avoid the Blackhoof River watershed.

Description

RSA-44-L3 deviates from the Proposed Route at approximate MP 1120.8 in Section 4, Township 47N, Range 18W in Carlton County. RSA-44-L3 travels northeast through forest for 9 miles, crosses Interstate 35, and then turns southeast and follows an existing utility corridor for 1.5 miles. It reconnects with the Preferred Route at approximate MP 1129.7 in Section 22, Township 48N, Range 17W.

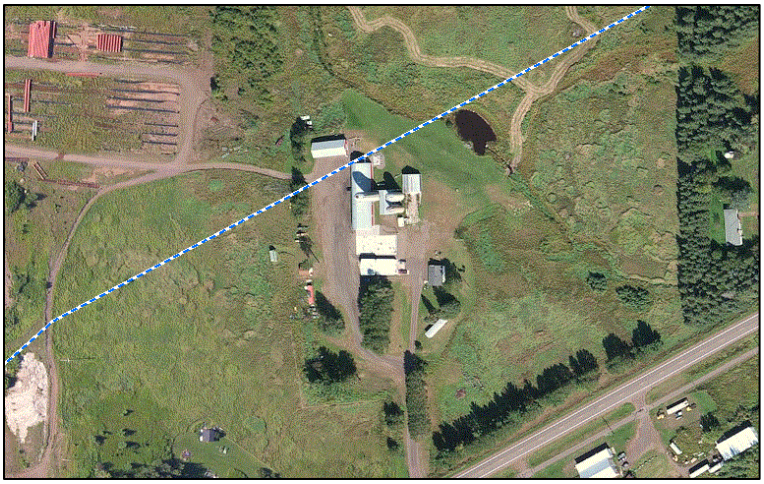
	The Preferred Route Segment	RSA-44-L3
Collocated Length (mi.)	5.9	6.0
Greenfield Length (mi.)	3.0	3.1
Total (mi.)	8.9	9.1

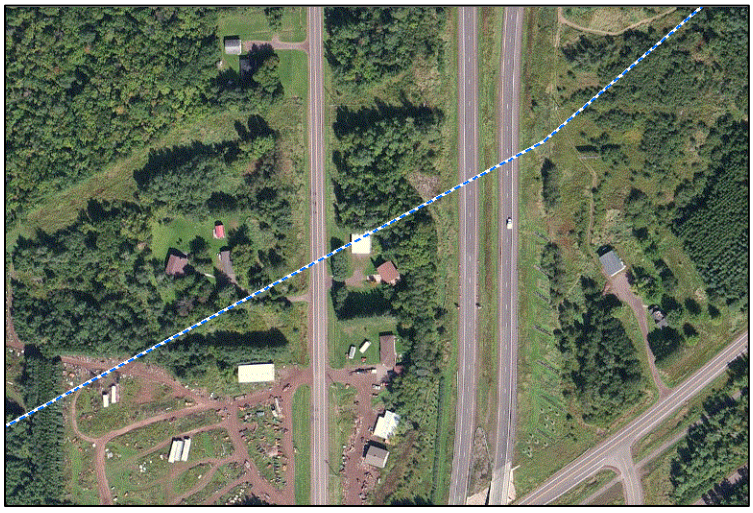
A comparison of the human and environmental characteristics of RSA-44-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

Enbridge Recommendation

Enbridge does not recommend that RSA-44-L3 be approved for the following reasons:

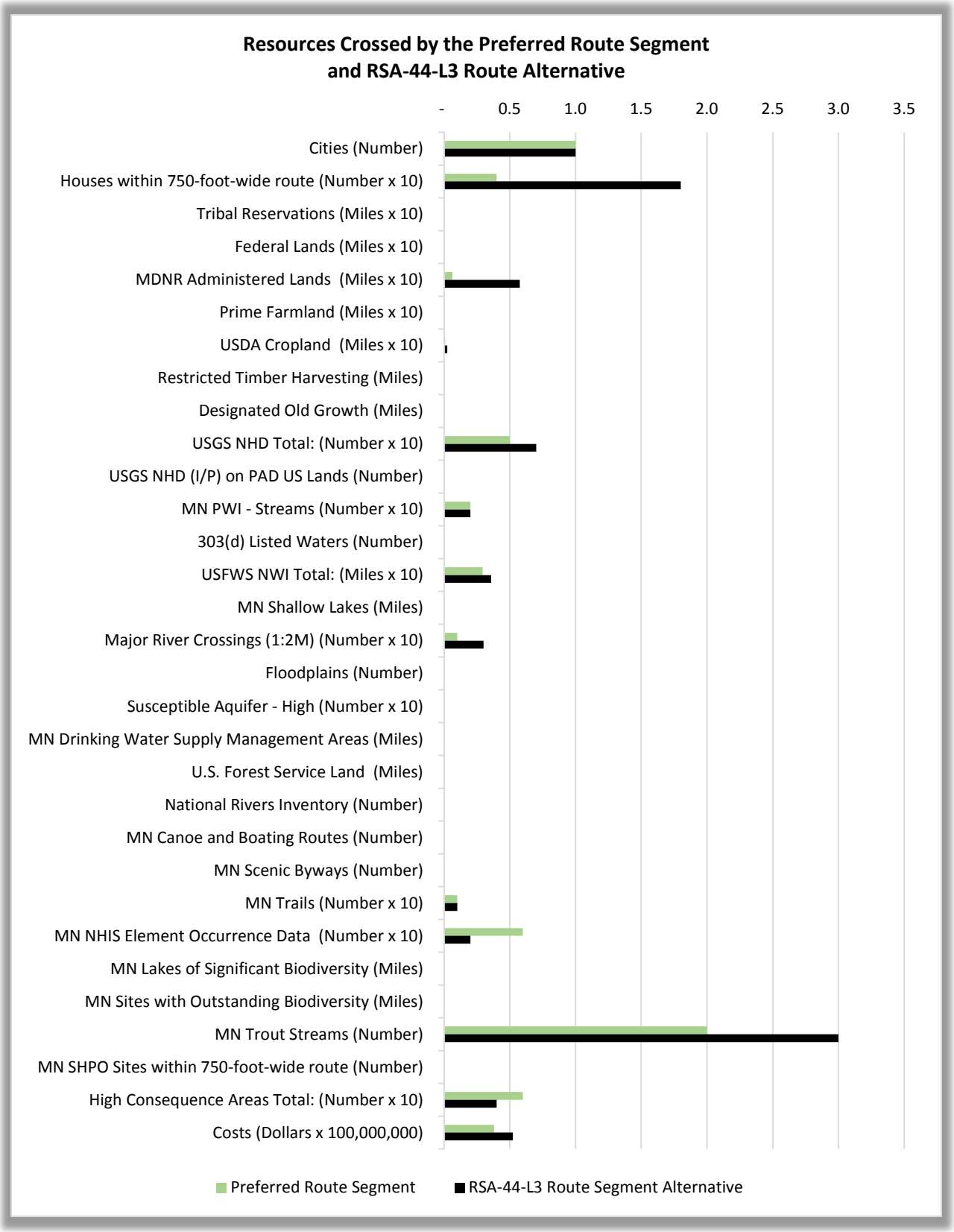
- **Increased Impacts on Forests and Wetlands**. RSA-44-L3 would cross 1.2 more miles of forested land than the Preferred Route, and RSA-44-L3 would cross 0.7 more mile of NWI-mapped wetlands, including some extensively saturated wetlands.
- **Increased Impacts to Trout Streams and AMAs**. RSA-44-L3 would cross three trout streams (a tributary of the Moose Horn River and two crossings of Little Otter Creek); the Preferred Route segment would cross two trout streams (a main channel and a tributary crossing of the Blackhoof River). One of the RSA-44-L3 crossings of Little Otter Creek occurs at a point where it has been classified as an AMA. While RSA-44-L3 would avoid a direct crossing of the Blackhoof River, it would result in impacts to the Little Otter Creek AMA, which the Preferred Route avoids. Both RSA-44-L3 and the Preferred Route are located within the Blackhoof River Watershed.
- **Increased Impacts to Residents.** RSA-44-L3 is located in close proximity to a significant number of landowners along County Highway 61 which are not impacted by the Preferred Route (see images below). RSA-44-L3 would require new easements for 70 parcels.



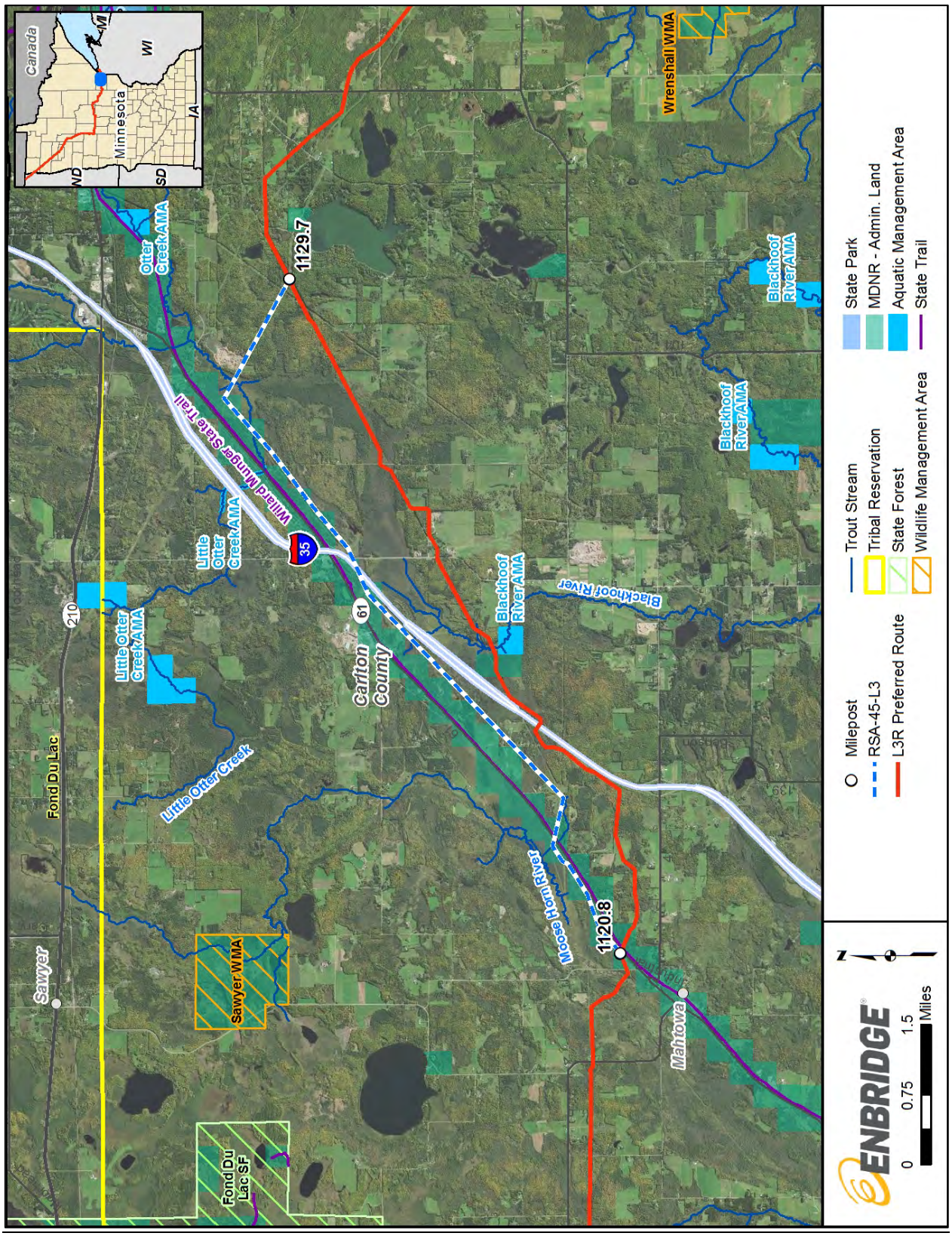


- **Impacts to an Active Gravel Pit.** RSA-44-L3 would require construction through an active gravel pit, presenting pipeline integrity concerns due to heavy equipment traffic and pit operation. Routing a pipeline through an active gravel mine presents difficulties in maintaining the depth of

cover over the pipeline, as mandated by law, and could potentially compromise the safety of the pipeline.


Resources Crossed by the Preferred Route Segment
and RSA-44-L3 Route Alternative
-
0.5
1.0
1.5
2.0
2.5
3.0
3.5
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Costs (Dollars x 100,000,000)
Preferred Route Segment
RSA-44-L3 Route Segment Alternative

RSA-45-L3


Canada
MI
WI
Minnesota
IA
ND
SD
Milepost
RSA-45-L3
L3R Preferred Route
Trout Stream
Tribal Reservation
State Forest
Wildlife Management Area
State Park
MDNR - Admin. Land
Aquatic Management Area
State Trail
ENBRIDGE
0
0.75
1.5
Miles
1129.7
1120.8
Wrenshall WMA
Otter Creek AMA
Willard Munger State Trail
Little Otter Creek AMA
Blackhoof River AMA
Blackhoof River
Carlton County
Fond Du Lac
Little Otter Creek
Moose Horn River
Sawyer
Sawyer WMA
Mahtowa
Fond Du Lac SF
35
61
210

Purpose

Route Segment Alternative RSA-45-L3 was proposed by Minnesota Trout Unlimited to move the route to the south side of U.S. Highway 61 to avoid the Blackhoof River watershed.

Description

RSA-45-L3 deviates from the Preferred Route at approximate MP 1120.8 in Section 4, Township 47N, Range 18W in Carlton County. RSA-45-L3 travels northeast through forest for 7.5 miles, crosses Interstate 35, and then turns southeast and follows an existing utility corridor for 1.5 miles. It reconnects with the Preferred Route at approximate MP 1129.7 in Section 22, Township 48N, Range 17W.

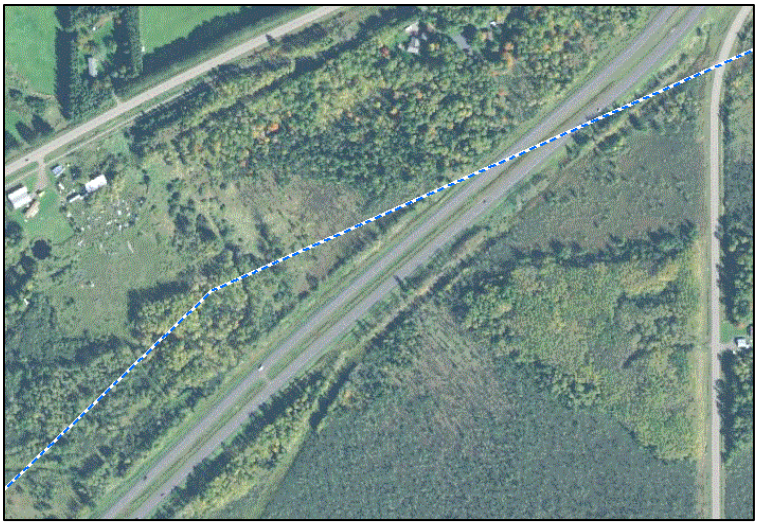
	The Preferred Route Segment	RSA-45-L3
Collocated Length (mi.)	5.9	6.8
Greenfield Length (mi.)	3.0	2.2
Total (mi.)	8.9	9.0

A comparison of the human and environmental characteristics of RSA-45-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

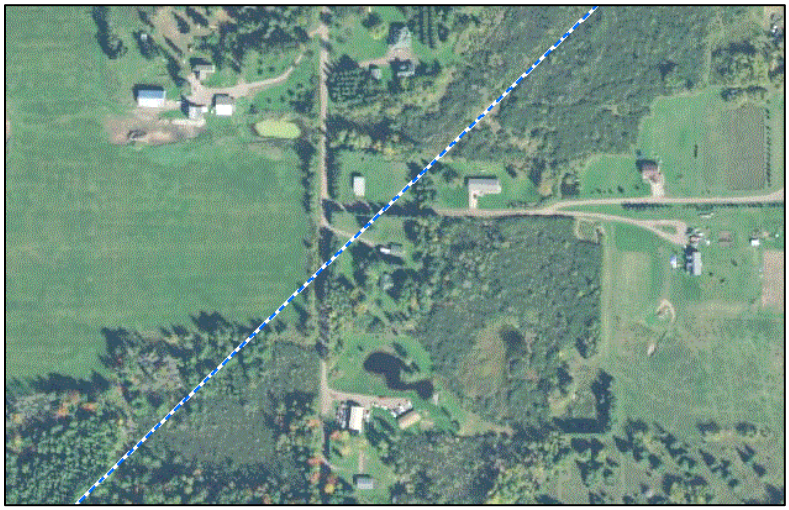
Enbridge Recommendation

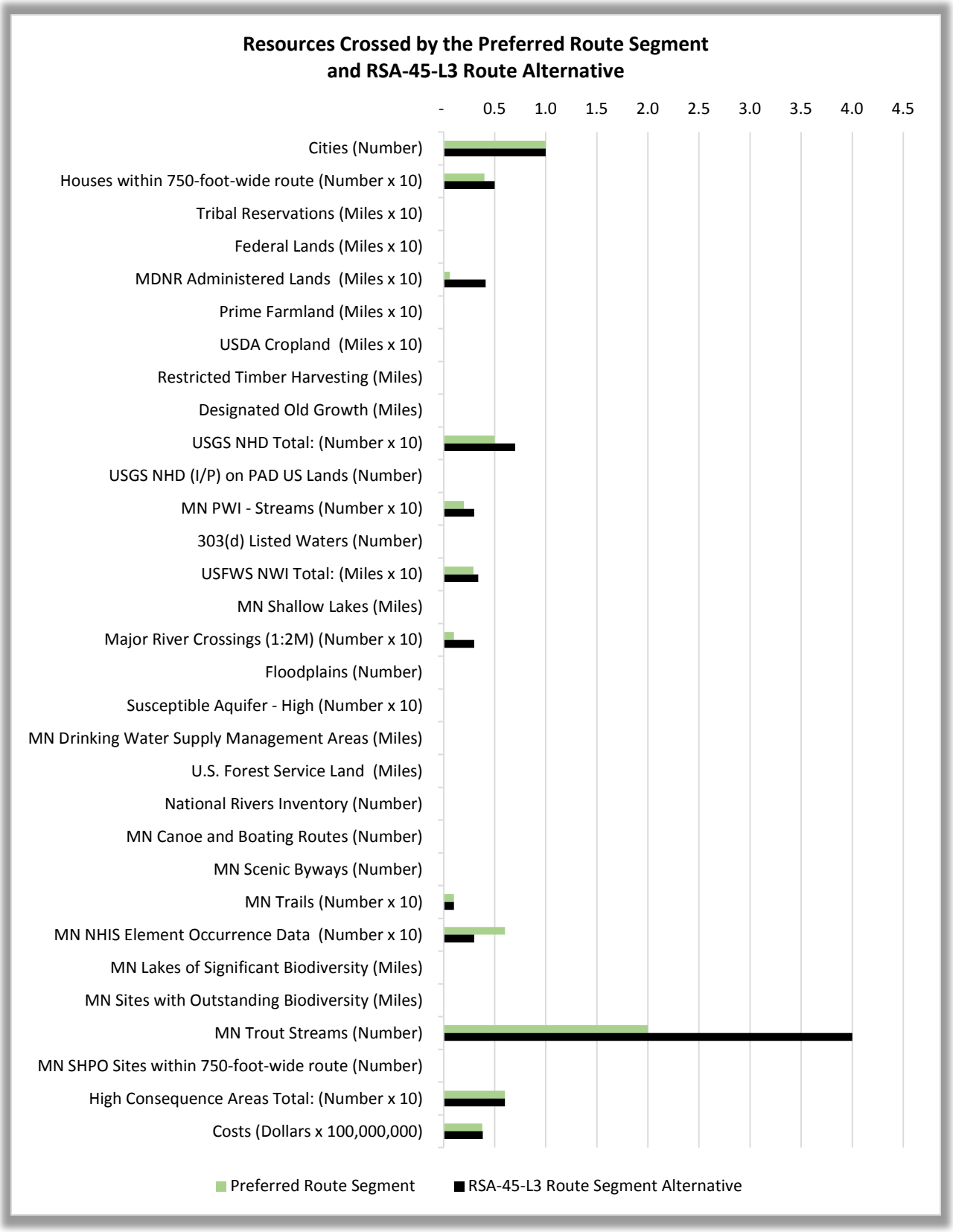
Enbridge does not recommend that RSA-45-L3 be approved for the following reasons:

- **Increased Impacts to Forests and Wetlands.** RSA-45-L3 would cross 0.8 more mile of forested land and 0.5 more mile of NWI-mapped wetlands than the Preferred Route.
- **Increased Impacts to Trout Streams.** RSA-45-L3 would cross four trout streams (a tributary of the Moose Horn River, a tributary of the Blackhoof River, and two crossings of Little Otter Creek); the Preferred Route would cross two trout streams (a main channel and a tributary crossing of the Blackhoof River).
- **Impacts to an Active Gravel Pit.** RSA-45-L3 would require construction through an active gravel pit, presenting pipeline integrity concerns due to heavy equipment traffic and pit operation. Constructing in an active gravel pit would result in difficulties maintaining the depth of cover over the pipeline, as mandated by law, and potentially compromise the safety of the pipeline.
- **Engineering Limitations Associated with Interstate 35 Crossing**. RSA-45-L3 has the same crossing of Interstate 35 as RSA-42-L3 and RSA-43-L3, leading to the same crossing concerns. The crossing is at an angle greater than 45 degrees which can result in greater direct impacts to the roadway and a longer, more difficult crossing with higher risk of failure (see image below). Road crossings should be as close to 90 degrees as possible to minimize direct impacts to the feature being crossed. The Preferred Route allows for a preferable crossing angle at Interstate 35.



- **Increased Impacts to Residents.** RSA-45-L3 is in close proximity to a significant number of landowners along County Highway 61 not impacted by the Preferred Route (see image below). If RSA-45-L3 is approved, Enbridge would need to acquire easements within 50 feet of three houses. No houses are that close to the Preferred Route. RSA-45-L3 would require new easements for 62 parcels.




Resources Crossed by the Preferred Route Segment
and RSA-45-L3 Route Alternative
- 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Costs (Dollars x 100,000,000)
Preferred Route Segment
RSA-45-L3 Route Segment Alternative

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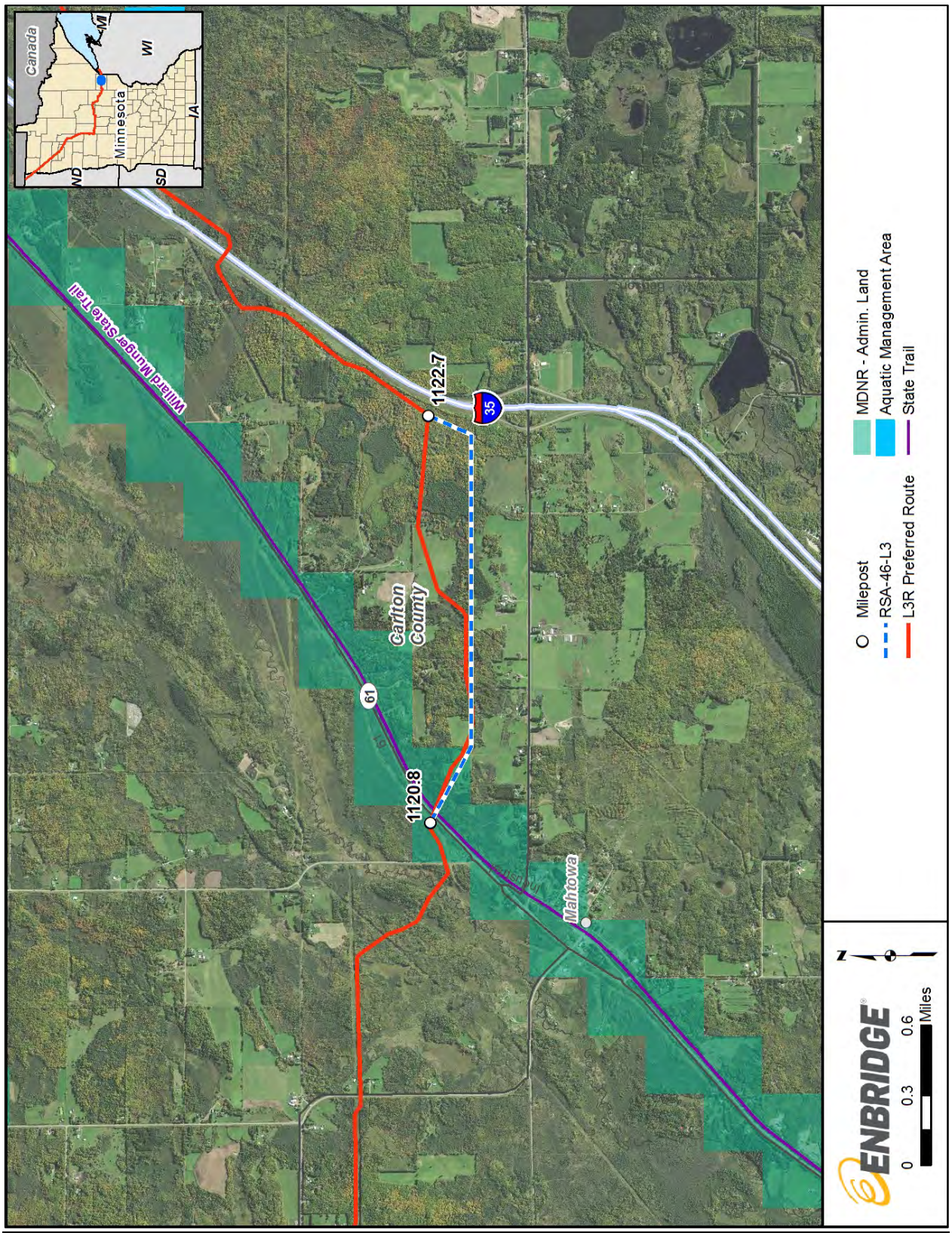
RSA-46-L3


Canada
MI
WI
Minnesota
IA
ND
SD
Willard Munger State Trail
1122.7
35
Carlton County
61
1120.8
Mahtowa
Milepost
RSA-46-L3
L3R Preferred Route
MDNR - Admin. Land
Aquatic Management Area
State Trail
N
ENBRIDGE
0
0.3
0.6
Miles

Purpose

Route Segment Alternative RSA-46-L3 was proposed by a commenter to shift the route south and avoid impacts to the commenter's property.

Description

RSA-46-L3 deviates from the Preferred Route at approximate MP 1120.8 in Section 4, Township 47N, Range 18W in Carlton County. RSA-46-L3 travels east through forest for approximately 2 miles until it reconnects with the Preferred Route at approximate MP 1122.7 in Section 2, Township 47N, Range 18W.

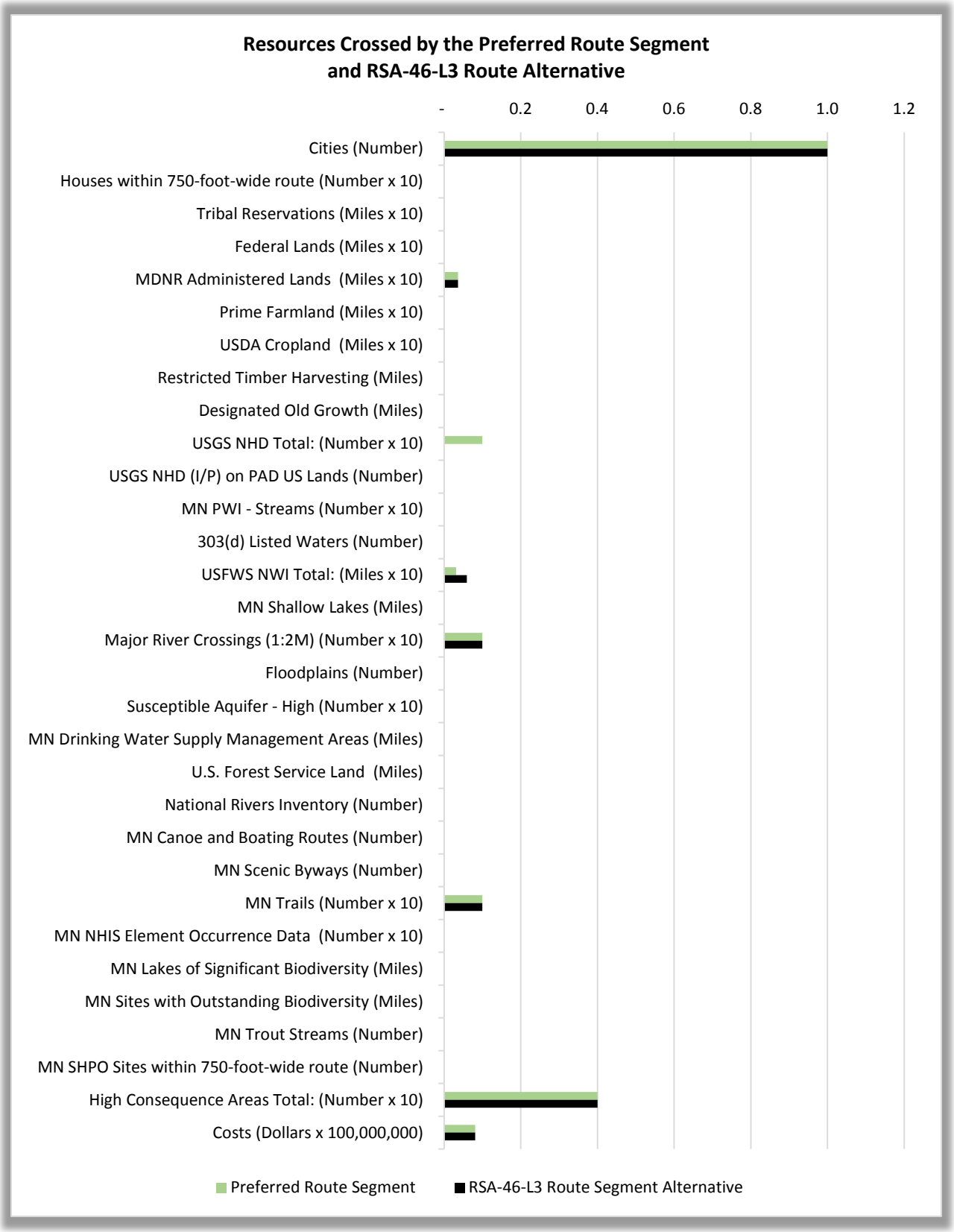
	The Preferred Route Segment	RSA-46-L3
Collocated Length (mi.)	0.4	0.2
Greenfield Length (mi.)	1.5	1.7
Total (mi.)	1.9	1.9

A comparison of the human and environmental characteristics of RSA-46-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

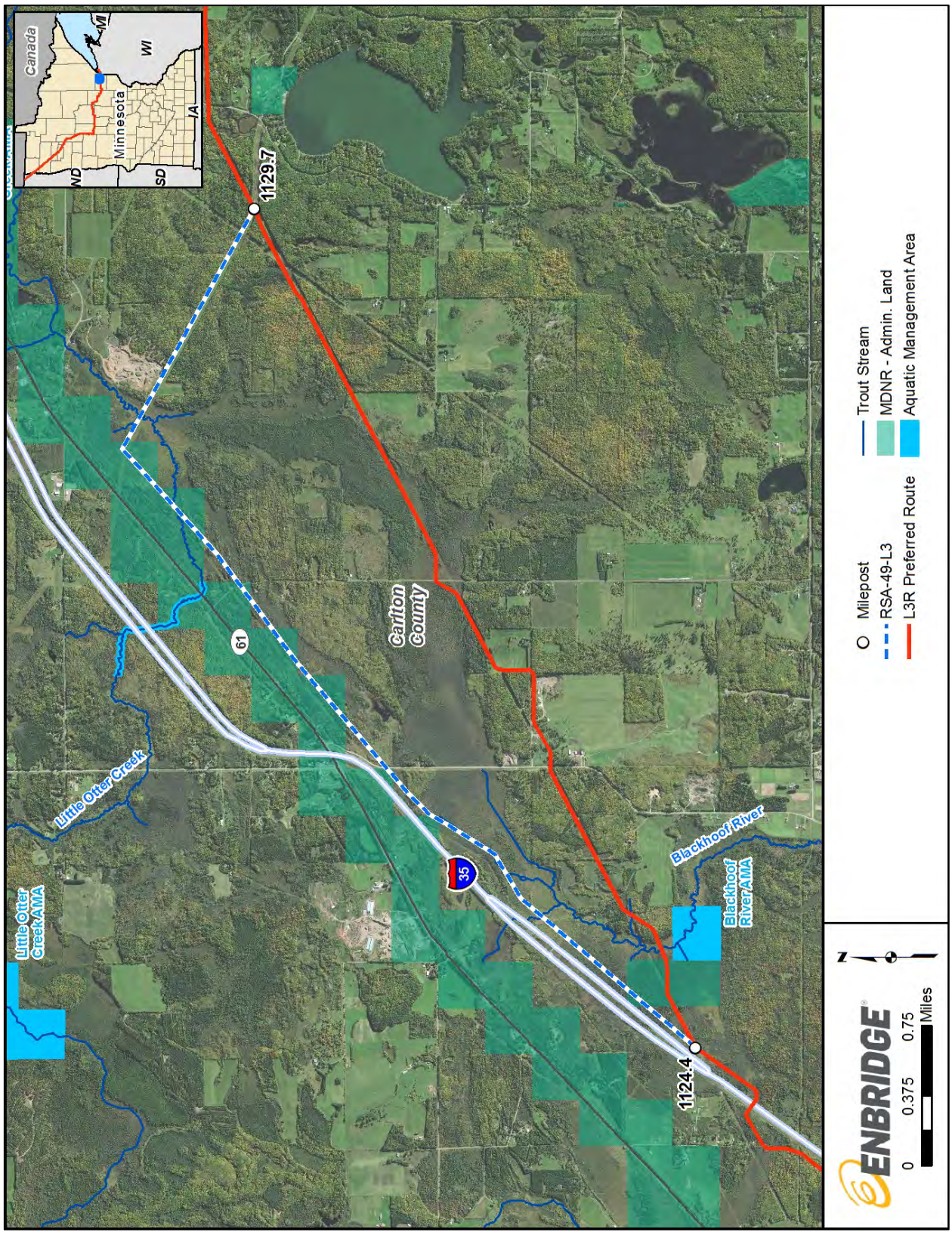
Enbridge Recommendation

Enbridge does not recommend that RSA-46-L3 be approved for the following reasons:

- **Increase in Forest Impacts**. RSA-46-L3 would cross slightly more forested land (0.3 mile more). Although the commenter proposed the alternative to avoid specific forested areas on the commenter's property, it would increase impacts to forested areas overall.
- **Safety and Routing Concerns Associated with Radio Tower**. Enbridge could not construct the RSA as proposed because of a radio tower with guy wires that extends through RSA-46-L3 (see image below). If constructed, construction crews, their equipment, and personnel would be required to work directly under the guy wire, raising safety concerns.


Resources Crossed by the Preferred Route Segment
and RSA-46-L3 Route Alternative
-
0.2
0.4
0.6
0.8
1.0
1.2
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Costs (Dollars x 100,000,000)
Preferred Route Segment
RSA-46-L3 Route Segment Alternative

RSA-49-L3


Canada
MI
WI
Minnesota
ND
SD
IA
1129.7
1124.4
Carlton County
61
35
Little Otter Creek
Little Otter Creek AMA
Blackhoof River
Blackhoof River AMA
Milepost
RSA-49-L3
L3R Preferred Route
Trout Stream
MDNR - Admin. Land
Aquatic Management Area
N
ENBRIDGE
0
0.375
0.75
Miles

Purpose

Route Segment Alternative RSA-49-L3 was proposed by a commenter suggesting that the route be shifted north to follow the south sides of Interstate 35 and U.S. Highway 61 to avoid residential properties.

Description

RSA-49-L3 deviates from the Preferred Route at approximate MP 1124.4 in Section 36, Township 48N, Range 18W in Carlton County. RSA-49-L3 then travels northeast through forest for 4.5 miles until it turns southeast and follows an existing utility corridor for 1.5 miles. It reconnects with the Preferred Route at approximate MP 1129.7 in Section 22, Township 48N, Range 17W.

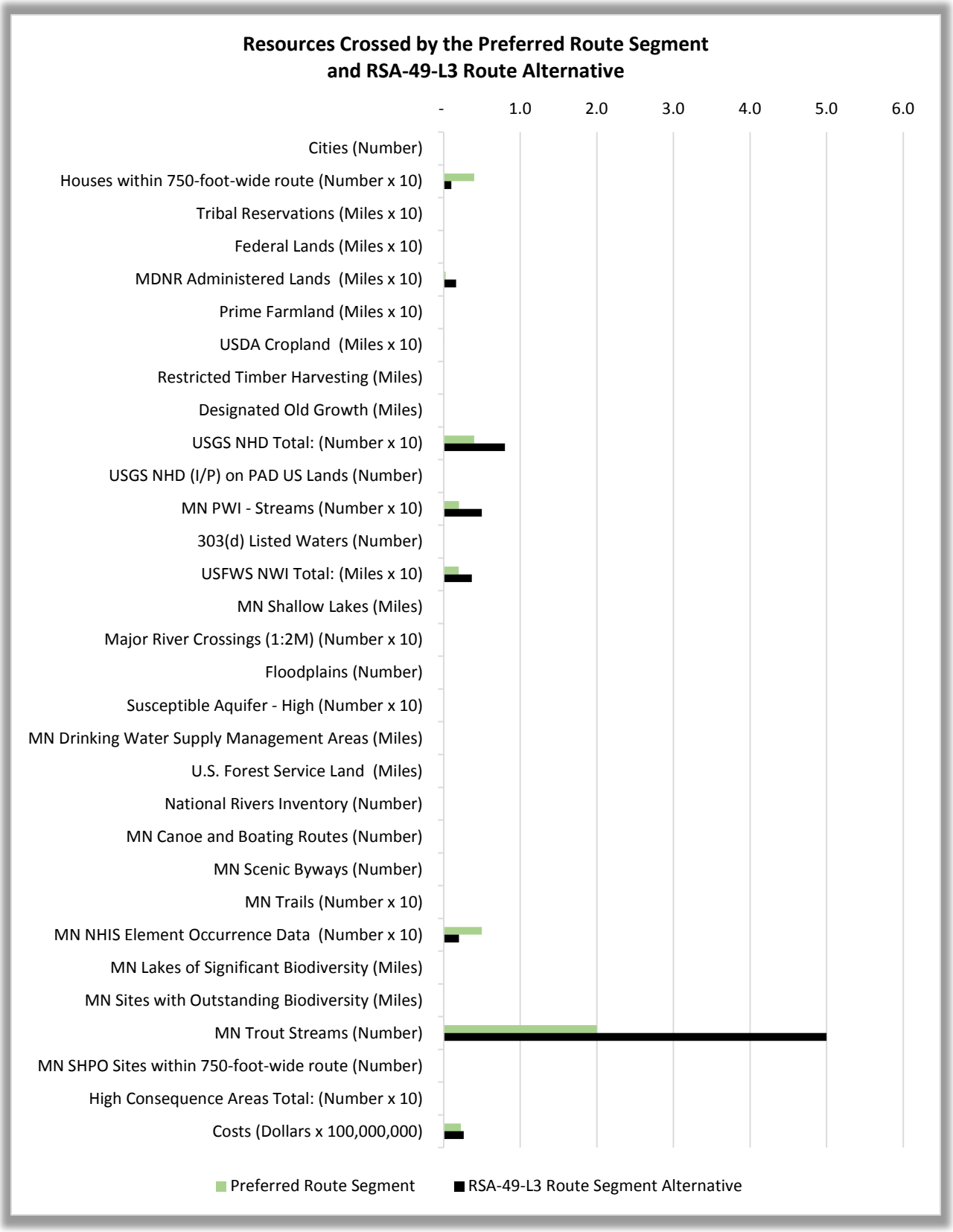
	The Preferred Route Segment	RSA-49-L3
Collocated Length (mi.)	4.9	3.6
Greenfield Length (mi.)	0.4	2.4
Total (mi.)	5.3	6.0

A comparison of the human and environmental characteristics of RSA-49-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

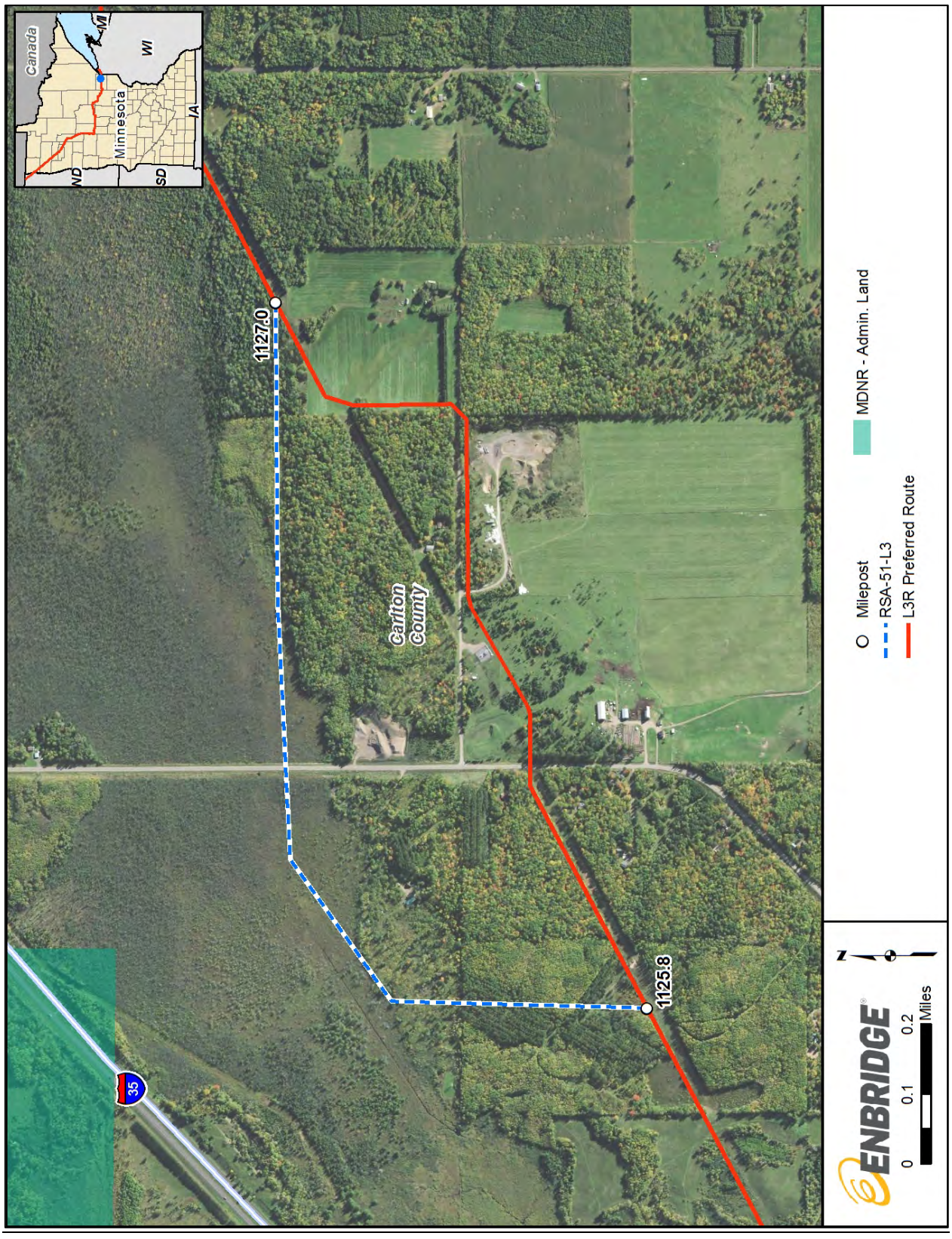
Enbridge Recommendation

Enbridge does not recommend that RSA-49-L3 be approved for the following reasons:

- **Impacts a New Group of Landowners**. RSA-49-L3 would require new easements for 36 parcels.
- **Increased Impacts to Forested Land and Wetlands.** RSA-49-L3 would cross an additional 0.9 mile of forested land and an additional 1.7 miles of NWI-mapped wetlands than the Preferred Route.
- **Increased Impacts to Waterbodies and Trout Streams.** RSA-49-L3 would cross seven perennial streams while the Preferred Route would cross two perennial streams. RSA-49-L3 also would cross five trout streams while the Preferred Route would cross two.


Resources Crossed by the Preferred Route Segment
and RSA-49-L3 Route Alternative
-
1.0
2.0
3.0
4.0
5.0
6.0
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Costs (Dollars x 100,000,000)
Preferred Route Segment
RSA-49-L3 Route Segment Alternative

RSA-51-L3


Canada
MI
WI
Minnesota
IA
ND
SD
1127.0
1125.8
Carlton County
35
Milepost
RSA-51-L3
L3R Preferred Route
MDNR - Admin. Land
N
ENBRIDGE
0
0.1
0.2
Miles

Purpose

Route Segment Alternative RSA-51-L3 was proposed by a commenter suggesting that the route be shifted north to follow the tree line and to avoid residential properties and potential future gravel mining operations.

Description

RSA-51-L3 deviates from the Preferred Route at approximate MP 1125.8 in Section 30, Township 48N, Range 17W in Carlton County. RSA-51-L3 then travels north through forest and wetland for 0.6 mile until it turns east and continues through forest and wetland for 0.8 mile. It reconnects with the Preferred Route at approximate MP 1127.0 in Section 29, Township 48N, Range 17W.

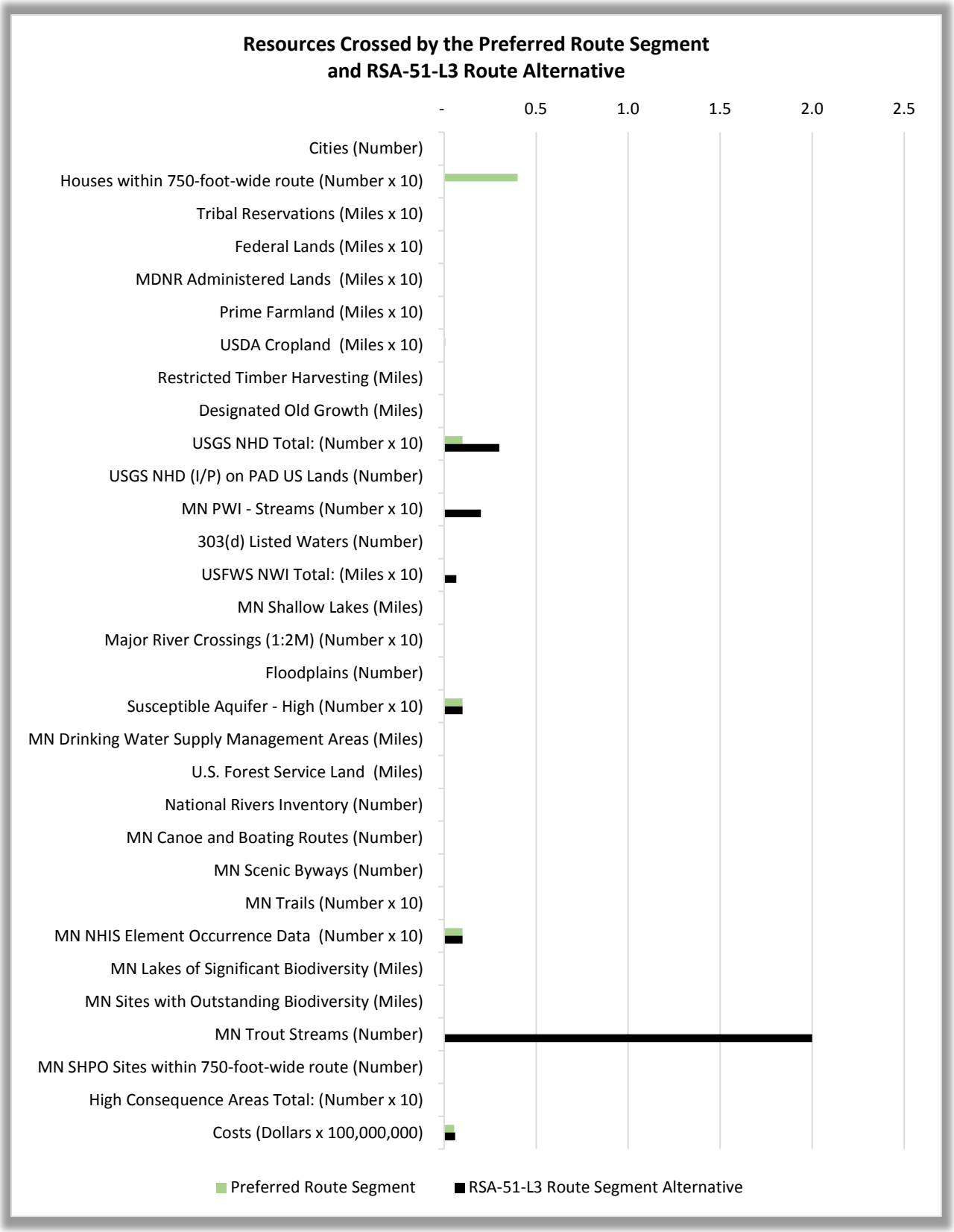
	The Preferred Route Segment	RSA-51-L3
Collocated Length (mi.)	1.2	0.2
Greenfield Length (mi.)	0.1	1.2
Total (mi.)	1.3	1.4

A comparison of the human and environmental characteristics of RSA-51-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

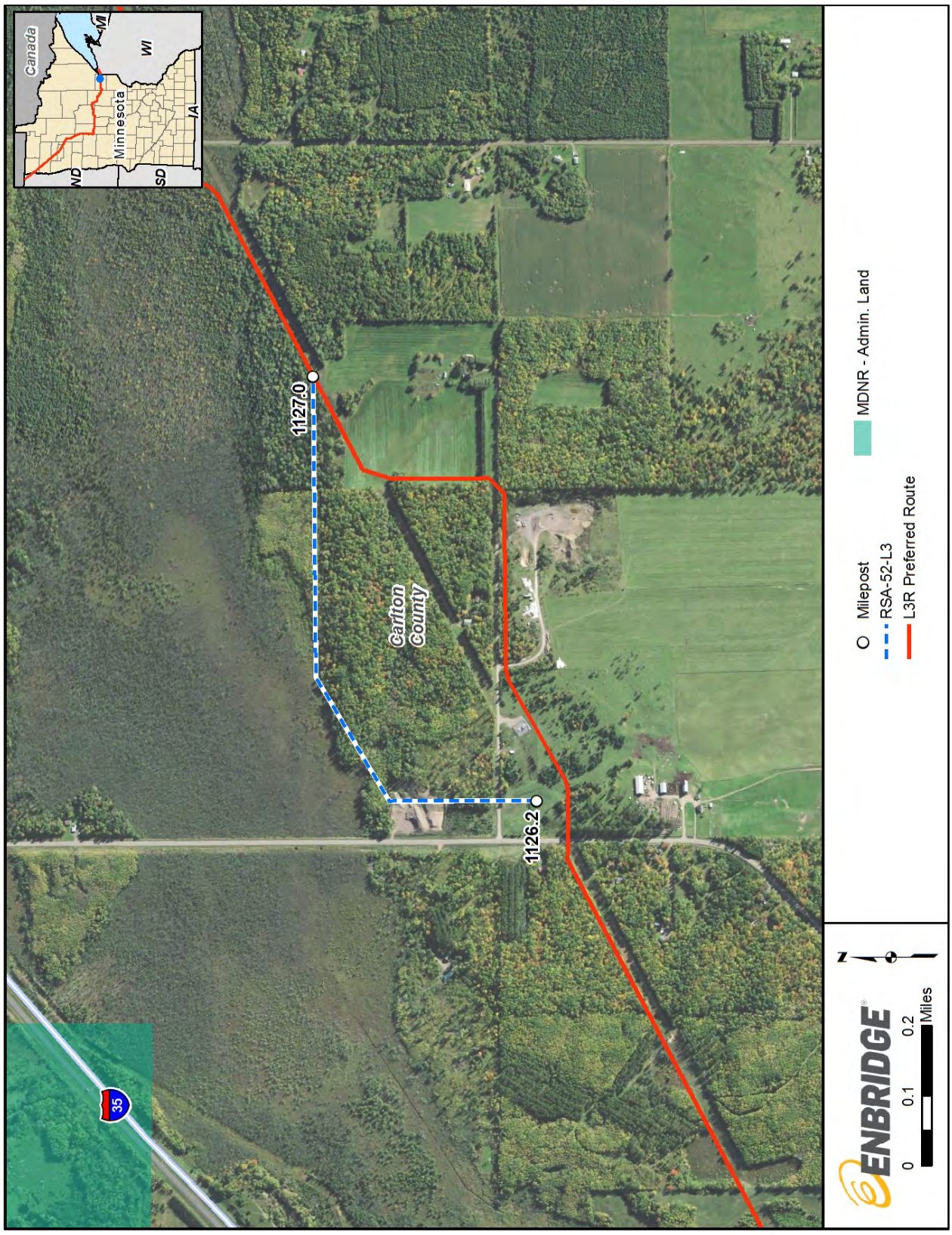
Enbridge Recommendation

Enbridge does not recommend that RSA-51-L3 be approved for the following reason:

- **Enbridge has Addressed the Commenter's Concerns**. Enbridge has made other route modifications to avoid the commenter's residence since the comment suggesting this RSA was submitted, and these modifications are reflected in the current Preferred Route.


Resources Crossed by the Preferred Route Segment
and RSA-51-L3 Route Alternative
-
0.5
1.0
1.5
2.0
2.5
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Costs (Dollars x 100,000,000)
Preferred Route Segment
RSA-51-L3 Route Segment Alternative

RSA-52-L3


Canada
MI
WI
Minnesota
IA
ND
SD
1127.0
1126.2
Carlton County
35
Milepost
RSA-52-L3
L3R Preferred Route
MDNR - Admin. Land
N
ENBRIDGE
0
0.1
0.2
Miles

Purpose

Route Segment Alternative RSA-52-L3 was proposed by a commenter to shift the route north to follow the tree line and to avoid residential properties and potential future gravel mining operations.

Description

RSA-52-L3 deviates from the Preferred Route at approximate MP 1126.2 in Section 29, Township 48N, Range 17W in Carlton County. RSA-52-L3 then travels north along the edge of a forest area for 0.4 mile until it turns east and continues alongside forest for 0.4 mile. It reconnects with the Preferred Route at approximate MP 1127.0 in Section 29, Township 48N, Range 17W.

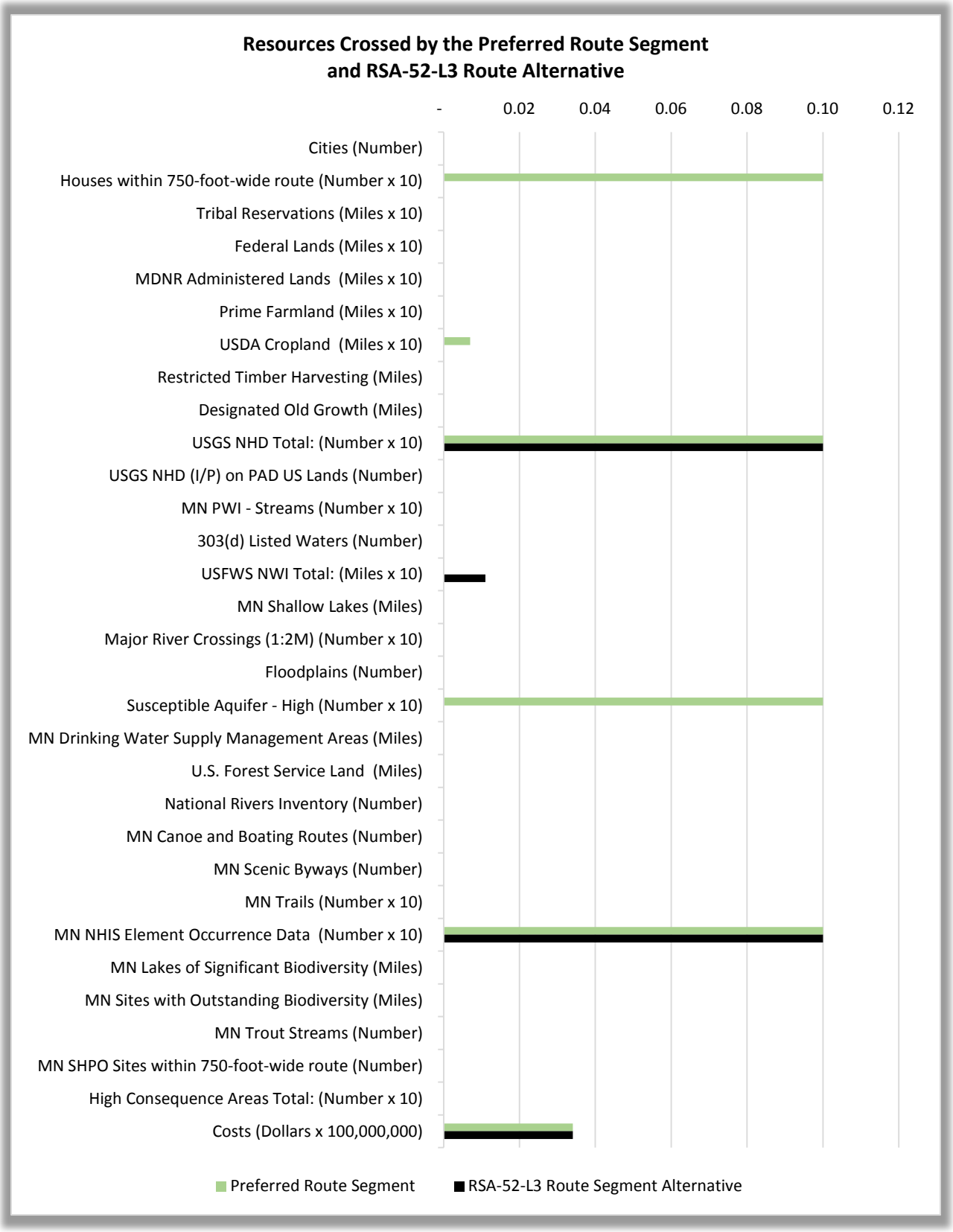
	The Preferred Route Segment	RSA-52-L3
Collocated Length (mi.)	0.8	0.2
Greenfield Length (mi.)	0.0	0.6
Total (mi.)	0.8	0.8

A comparison of the human and environmental characteristics of RSA-52-L3 and the corresponding Preferred Route Segment is presented in Appendix A.

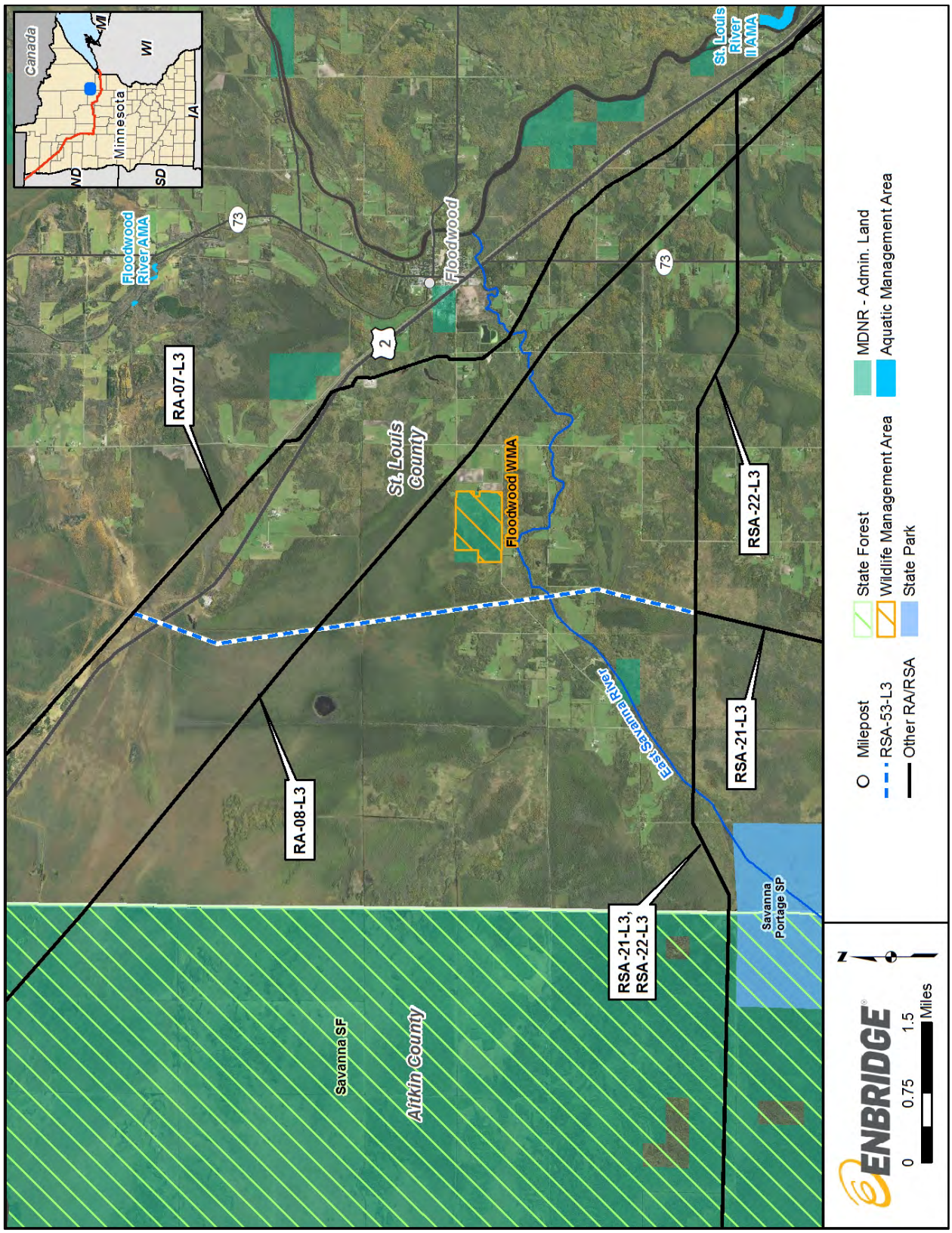
Enbridge Recommendation

Enbridge does not recommend that RSA-52-L3 be approved for the following reason:

- **Enbridge has Addressed the Commenter's Concerns**. Enbridge has made other route modifications to avoid the commenter's residence since the comment suggesting this RSA was submitted, and these modifications are reflected in the current Preferred Route.


Resources Crossed by the Preferred Route Segment
and RSA-52-L3 Route Alternative
-
0.02
0.04
0.06
0.08
0.10
0.12
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Costs (Dollars x 100,000,000)
Preferred Route Segment
RSA-52-L3 Route Segment Alternative

RSA-53-L3


Canada
MI
WI
Minnesota
ND
SD
IA
Floodwood River AMA
73
Floodwood
St. Louis River II AMA
RA-07-L3
2
St. Louis County
Floodwood WMA
RSA-22-L3
East Savanna River
RSA-21-L3
RA-08-L3
RSA-21-L3, RSA-22-L3
Savanna Portage SP
Savanna SF
Aitkin County
Milepost
RSA-53-L3
Other RA/RSA
State Forest
Wildlife Management Area
State Park
MDNR - Admin. Land
Aquatic Management Area
ENBRIDGE
0
0.75
1.5
Miles

Purpose

Route Segment Alternative RSA-53-L3 (also known as RSA-CS in the FSDD) was proposed by the Commission as a new RSA to allow for potential connections between other proposed RAs and RSAs. RSA-53-L3 could not exist on its own as a viable RSA; it would only be approved to connect RA-07-L3 or RA-08-L3 to RSA-21-L3 or RSA-22-L3. Because there is no corresponding segment of the Preferred Route, Enbridge has analyzed impacts of the proposed RSA only.

Description

RSA-53-L3 is located approximately 3.3 miles west of Floodwood in St. Louis County. It is 6 miles long and generally runs from north to south. It primarily crosses lands classified as wetland/open water, with some forested areas towards the southern end. RSA-53-L3 is located entirely within St. Louis County.

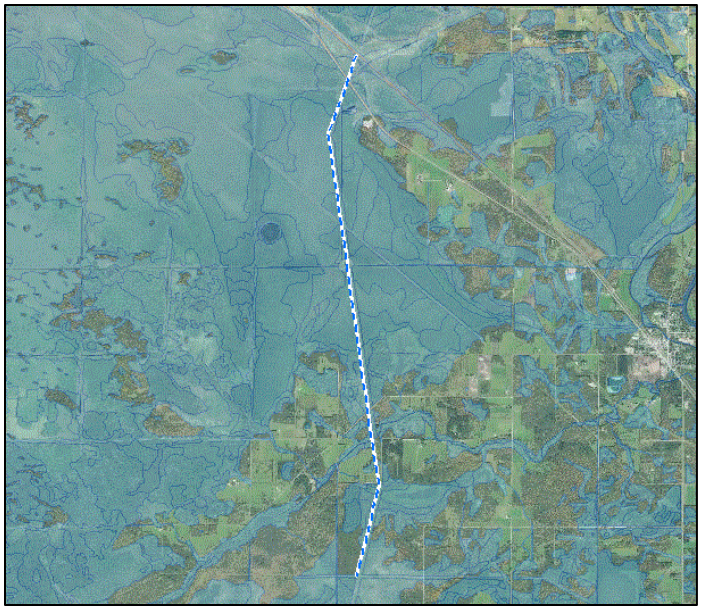
	The Preferred Route Segment	RSA-53-L3
Collocated Length (mi.)	N/A	6.2
Greenfield Length (mi.)	N/A	0.0
Total (mi.)	N/A	6.2

The human and environmental characteristics of RSA-53-L3 are presented in Appendix A.

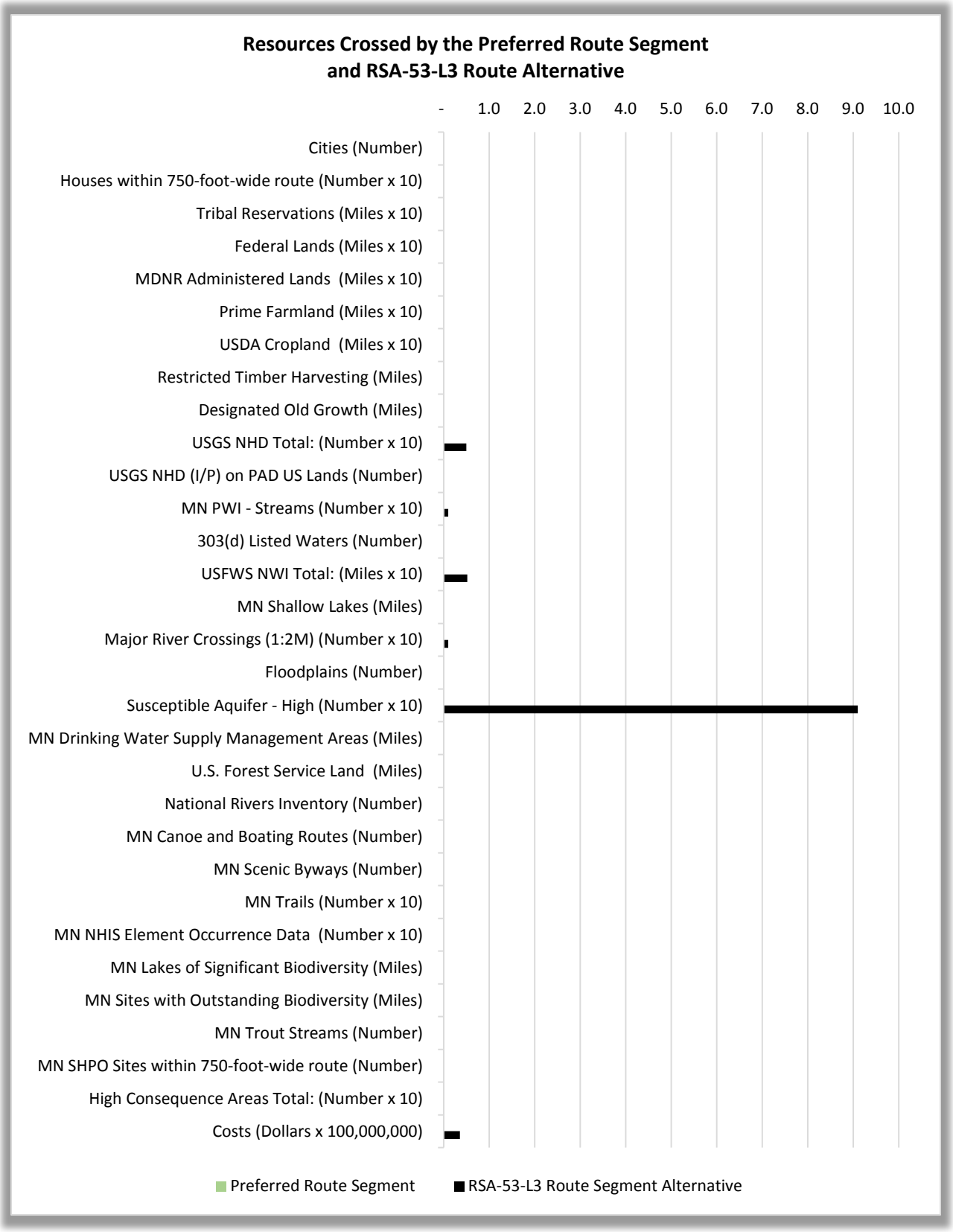
Enbridge Recommendation

Enbridge does not recommend that RSA-53-L3 be approved for the following reasons:

- **Crossing of Leech Lake Reservation.** As noted in the Purpose section above, RSA-53-L3 would only be viable in the event RA-07-L3 or RA-08-L3 were approved. Absent agreement from the Leech Lake Band of Ojibwe, Enbridge is unable to secure land rights and/or other approvals necessary to construct and operate the pipeline across the Leech Lake Reservation. The Leech Lake Band of Ojibwe has previously filed comments with the Commission regarding constructing across the Reservation. See letters dated October 25, 2013 and January 2, 2017 in Schedule 6 of Mr. Eberth's direct testimony
- **Impacts to Wetlands**. RSA-53-L3 would cross 5.2 miles of NWI-mapped wetland, of which 5 miles are classified as forest/shrub wetland and consists of a large black spruce bog with a sphagnum moss substrate (see image below which shows NWI wetlands).



- **New Impacts to the East Savanna River/St. Louis River**. RSA-53-L3 would cross five canals/ditches, one of which is classified as a Minnesota PWI stream (the East Savanna River) which drains into the St. Louis River.
- **Addition of Impacts from Other Route Alternatives**. Because RSA-53 can only be accessed from RA-07-L3 or RA-08-L3 and would need to connect to RSA-21-L3 or RSA-22-L3, Enbridge notes that all the same human and environmental impacts and constructability constraints of those respective RAs and RSAs would still occur.


Resources Crossed by the Preferred Route Segment
and RSA-53-L3 Route Alternative
- 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0
Cities (Number)
Houses within 750-foot-wide route (Number x 10)
Tribal Reservations (Miles x 10)
Federal Lands (Miles x 10)
MDNR Administered Lands (Miles x 10)
Prime Farmland (Miles x 10)
USDA Cropland (Miles x 10)
Restricted Timber Harvesting (Miles)
Designated Old Growth (Miles)
USGS NHD Total: (Number x 10)
USGS NHD (I/P) on PAD US Lands (Number)
MN PWI - Streams (Number x 10)
303(d) Listed Waters (Number)
USFWS NWI Total: (Miles x 10)
MN Shallow Lakes (Miles)
Major River Crossings (1:2M) (Number x 10)
Floodplains (Number)
Susceptible Aquifer - High (Number x 10)
MN Drinking Water Supply Management Areas (Miles)
U.S. Forest Service Land (Miles)
National Rivers Inventory (Number)
MN Canoe and Boating Routes (Number)
MN Scenic Byways (Number)
MN Trails (Number x 10)
MN NHIS Element Occurrence Data (Number x 10)
MN Lakes of Significant Biodiversity (Miles)
MN Sites with Outstanding Biodiversity (Miles)
MN Trout Streams (Number)
MN SHPO Sites within 750-foot-wide route (Number)
High Consequence Areas Total: (Number x 10)
Costs (Dollars x 100,000,000)
Preferred Route Segment
RSA-53-L3 Route Segment Alternative

References

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Appendix A
Human and Environmental Resources Summary Table

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	SA-04-L3	
		Preferred Route [b]	System Alternative
Cost [c]	Dollars	$1,820,089,827	$5,500,000,000
Length			
Co-located Length [d]	Miles	299.6	599.4
Greenfield Length	Miles	60.6	162.4
Total Length	Miles	360.2	761.8
Human Settlement and Population			
Counties	Number	14	36
Cities	Number	5	18
Population within 750-foot-wide route width	Number	5,563	15,399
Average Median Home Value within 750-foot-wide route width	Dollars	$143,631	$141,141
Houses within 750-foot-wide route width	Number	156	1,303
Structures within 750-foot-wide route width	Number	2	16
Airports within 750-foot-wide route width	Number	-	3
Center Pivot Irrigation within 750-foot-wide route width	Number	2	10
Schools within 750-foot-wide route width	Number	-	3
Churches within 750-foot-wide route width	Number	-	1
Cemeteries within 750-foot-wide route width	Number	4	6
Wind Turbines within 750-foot-wide route width	Number	-	7
Communication Towers within 750-foot-wide route width	Number	2	11
Railroads	Number	18	51
Streets	Number	501	1,204
Land Ownership and Management			
NCED Conservation Easements	Miles	0.6	3.5
Tribal Reservations	Miles	-	-
Federal Lands	Miles	-	15.6
MDNR Administered Lands	Miles	30.6	1.5
ND Game and Fish lands	Miles	0.6	-
IA DNR lands	Miles	-	0.3
IL DNR lands	Miles	-	0.1
WI DNR Lands	Miles	0.3	-
Other Lands (Private, County, etc.)	Miles	329.0	744.3
Soils and Geology			
Prime Farmland	Miles	63.8	306.2
Farmland of State Importance	Miles	83.4	49.4
Prime Farmland if drained, irrigated or protected	Miles	81.8	348.0
Fractured Bicarbonate	Number	-	64
Karst	Miles	38.6	364.1
Bedrock Total:	Miles	393.9	856.8
Paleozoic	*Miles*	38.6	435.3
Precambrian	*Miles*	353.0	302.1
Mesozoic	*Miles*	2.3	119.4
Bedrock Less Than 10 Feet From Surface	Miles	3.0	13.2
Relief/Changes in Topography, Deeply Incised River Valleys, Steep Slopes			
0-1%	*Miles*	108.6	372.7
1%-5%	*Miles*	178.3	248.3
>5%	*Miles*	81.9	142.1
Land Use and Land Cover			
USGS GAP Agricultural Land	Miles	133.7	681.4
USGS GAP Developed Land	Miles	0.9	13.4
USGS GAP Forest Land	Miles	156.5	9.3
USGS GAP Open Land	Miles	12.5	33.9
USGS GAP Wetland and Open Water	Miles	45.8	12.3
USDA Cropland	Miles	108.7	652.9
GAP Status 1-3 Protected Area Lands Total:	Miles	36.3	5.1
Lands Managed for Biodiversity (GAP Status 1 and 2)	*Miles*	*2.0*	*5.1*

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	SA-04-L3	
		Preferred Route [b]	System Alternative
GAP Status 3 Lands	*Miles*	*34.4*	*0.1*
USGS Prairie Pothole Regions	Miles	17.0	482.0
MDNR Species Aggregations within 750-foot-wide route width	Number	-	1
Forest Stand - Timber Status Total:	Miles	20.2	0.0
Normal Harvest Allowed	*Miles*	*16.4*	*0.0*
Restricted Timber Harvesting	*Miles*	*0.2*	-
No Timber Harvesting Allowed	*Miles*	*0.1*	-
Extended Rotation Forest	*Miles*	*3.6*	-
Designated Old Growth	*Miles*	-	-
Potentially Contaminated Sites that are Federally Listed (EPA)	Number	31	133
State listed sites (CERCLA/RCRA/Superfund, What's In My Neighborhood)	Number	18	10
Active Mines and Mineral Plants	Number	-	-
MN Gravel Pits	Number	-	1
MN Active Mineral Leases	Miles	-	-
Waterbodies and Wetlands			
Watershed Health Assessment Scale Total [e]:	Miles	278.8	251.3
Exceptional Warm Water Habitat	*Miles*	-	-
Modified Warm Water Habitat	*Miles*	*23.4*	*151.8*
General Warm Water Habitat	*Miles*	*223.6*	*99.4*
General Cold Water Habitat	*Miles*	*31.8*	-
USGS NHD Total:	Number	192	704
NHD Perennial	*Number*	*55*	*161*
NHD Intermittent	*Number*	*79*	*418*
NHD Canal/Ditch/Other	*Number*	*58*	*125*
USGS NHD - Intermittent and Perennial on PAD US Lands	Number	1	8
Fast Moving Water (Slopes >2%)	Number	2	3
MN PWI - Streams	Number	60	54
303(d) Listed Waters	Number	19	50
USFWS NWI Total:	Miles	51.1	19.8
NWI Riverine	*Miles*	*1.1*	*4.9*
NWI Emergent	*Miles*	*14.9*	*10.3*
NWI Forest Shrub	*Miles*	*34.3*	*2.9*
NWI Pond/Lake/Other	*Miles*	*0.8*	*1.6*
MN PWI - Wetlands	Miles	0.3	0.2
MN PWI - Basins	Miles	0.5	0.3
MN Shallow Lakes	Miles	0.4	1.4
Commercially Navigable Waterbodies	Number	-	2
Major River Crossings (1:2M)	Number	31	64
Floodplains	Number	9	299
Hydraulic Connectivity			
Hydraulically Connected Lakes crossed	*Number*	*2*	*24*
First Downstream Hydraulically Connected Lakes	*Number*	*36*	*33*
Lakes with Hydrologic Connections via Wetland or Topography	*Number*	*89*	*182*
Lakes with Hydrologic Connections via Streams	*Number*	*88*	*211*
Lakes within Watershed but not Hydraulically Connected	*Number*	*7,722*	*58,926*
Aquifers and Water Use			
USGS Principal Aquifers Total:	Miles	235.9	549.7
Bedrock Aquifers	*Miles*	*40.4*	*525.1*
Glacial Aquifers	*Miles*	*195.6*	*24.6*
USGS Recharge Areas Total:	Miles	365.3	760.2
High (>8 in/yr)	*Miles*	*73.3*	*13.8*
Moderate (2-8 in/year)	*Miles*	*233.1*	*496.4*
Low (<2 in/year)	*Miles*	*59.0*	*250.0*
Susceptible Aquifers Total:	Number	340	249
Low	*Number*	*137*	*50*
Moderate	*Number*	*79*	*173*
High	*Number*	*96*	*22*

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	SA-04-L3	
		Preferred Route [b]	System Alternative
Unrated	*Number*	*28*	*4*
ND Wellhead Protection Areas	Miles	-	2.5
MN Wellhead Protection Areas	Miles	0.1	0.5
MN Drinking Water Supply Management Areas	Miles	1.8	0.8
MN Wells within 750-foot-wide route width	Number	78	372
MN Water Appropriations Permit Records within 750-foot-wide route width	Number	135	12
National Areas of Interest			
National Trails	Number	1	1
U.S Fish and Wildlife Service Land	Miles	-	1.4
U.S. Forest Service Land	Miles	-	-
National Park Service Land	Miles	-	13.2
National Rivers Inventory	Number	7	4
State Areas of Interest			
State Parks and Recreation	Miles	-	-
State Forests	Miles	31.6	-
State Wildlife Management Areas	Miles	1.9	0.1
State Scientific and Natural Areas	Miles	1.4	-
MN Aquatic Management Areas and Fish Management Areas	Miles	<0.1	<0.1
MN Designated Wild and Scenic Rivers	Number	-	-
MN Canoe and Boating Routes	Number	6	3
State Water Access Sites	Number	-	1
State Scenic Byways	Number	4	1
State Trails	Number	14	9
State NHIS Element Occurrence Data	Number	101	23
MN Lakes of Significant Biodiversity	Miles	0.2	0.2
MN Sites of Biodiversity Significance Total:	Miles	59.3	3.1
Sites with Outstanding Biodiversity	*Miles*	*0.3*	*<0.1*
Sites with High Biodiversity	*Miles*	*3.6*	*0.4*
Sites with Moderate Biodiversity	*Miles*	*45.1*	*1.6*
Sites Below Minimum Biodiversity Threshold	*Miles*	*10.2*	*1.1*
ND and IL High Quality Habitat Areas	Miles	-	0.7
MN MCBS Railroad and ROW Prairies	Number	-	3
MN Listed Calcareous Fens	Number	1	-
MN Native Prairie Complexes	Miles	-	0.3
State Trout Streams	Number	6	-
MN Wild Rice Waters			
MN Wild Rice Waters Crossed	*Number*	*1*	-
MN Wild Rice Waters Connected First Downstream	*Number*	*21*	-
MN Wild Rice Waters with Hydrologic Connections via Wetland or Topography	*Number*	*18*	-
MN Wild Rice Waters with Hydrological Connections via Streams but not First Downstream Wild Rice Waters	*Number*	*48*	-
MN Wild Rice Waters with No Hydrological Connections within Watershed and 1 Mile	*Number*	*919*	*87*
Lands of Historical, Archaeological, and Cultural Significance			
NRHP Public Dataset Sites within 750-foot-wide route width	Number	1	1
ND SHPO Sites within 750-foot-wide route width	Number	6	1
MN SHPO Sites within 750-foot-wide route width	Number	14	23
High Consequence Areas			
High Consequence Areas Total:	Number	68	417
Environmentally Sensitive Area Direct	*Number*	*10*	*66*
Environmentally Sensitive Area Indirect	*Number*	*10*	*70*
Drinking Water Direct	*Number*	*4*	*74*
Drinking Water Indirect	*Number*	*10*	*139*
Commercially Navigable Waterway Direct	*Number*	*3*	*4*
Commercially Navigable Waterway Indirect	*Number*	*3*	*4*
Other Populated Area Direct	*Number*	*11*	*23*
Other Populated Area Indirect	*Number*	*15*	*27*
High Population Area Direct	*Number*	*1*	*5*
High Population Area Indirect	*Number*	*1*	*5*

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	SA-04-L3	
		Preferred Route [b]	System Alternative
Daily Power Consumption and Emissions			
Daily Power Consumption	(GWh/yr)	898.0	1703.0
Indirect Emissions:			
NO_X	Ton/yr	*525.5*	*995.0*
SO_2	Ton/yr	*506.2*	*960.3*
CO_2e	Ton/yr	*524333.3*	*994639.2*
Percent Increase in Emissions as Compared to Preferred Route	*Percent*	*N/A*	*90%*

a Geographic Information System length data was compiled using the Albers Equal Area Conic Projection.
b The Preferred Route is the same route that the Minnesota Public Utilities Commission accepted for study as "Line 3 Applicant's Proposed Route" or "APR" in the December 2016 Final Scoping Decision Document in Docket No. PL9/ PPL-15-137.
c Numbers represent mainline and facilities construction and engineering costs only.
d Based on the narrative in the Final Scoping Decision Document, Enbridge has assumed 100 percent co-location with the Alliance pipeline in Minnesota and Iowa. However, there are significant differences in the digital data between SA-04-L3 and the Alliance pipeline ROW as it enters Illinois, resulting in greenfield areas through Illinois.
e These are preliminary and recommended aquatic life use classifications. Most are preliminary and haven't gone through the full MPCA aquatic life use review process. The recommended classifications have been reviewed by the MPCA, but they have not gone through the require rule making. All of the Modified and Exceptional reaches will require a rule making before they can be designated. As a result, the assigned use is subject to change pending MPCA review and a public rule making process. Based upon analysis of MPCA's draft list, 12% of the data has some type of error.
Note: Sum totals may not add due to rounding.

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RA-03AM-L3		RA-06-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
Cost [c]	Dollars	$741,459,803	$1,062,665,710	$1,143,451,720	$1,324,209,424
Length					
Co-located Length	Miles	98.6	144.5	176.1	64.0
Greenfield Length	Miles	46.3	54.5	53.8	141.4
Total Length	Miles	144.9	199.0	229.9	205.4
Human Settlement and Population					
Counties	Number	6	9	7	6
Cities	Number	1	9	1	4
Population within 750-foot-wide route width	Number	1,773	9,082	4,068	3,642
Average Median Home Value within 750-foot-wide route width	Dollars	$171,600	$145,872	$166,617	$147,542
Houses within 750-foot-wide route width	Number	40	437	98	213
Structures within 750-foot-wide route width	Number	-	13	-	1
Airports within 750-foot-wide route width	Number	-	3	-	-
Center Pivot Irrigation within 750-foot-wide route width	Number	1	8	2	-
Schools within 750-foot-wide route width	Number	-	1	-	-
Churches within 750-foot-wide route width	Number	-	-	-	2
Cemeteries within 750-foot-wide route width	Number	-	2	2	-
Wind Turbines within 750-foot-wide route width	Number	-	-	-	-
Communication Towers within 750-foot-wide route width	Number	2	-	2	-
Railroads	Number	5	18	8	9
Streets	Number	151	500	275	202
Land Ownership and Management					
NCED Conservation Easements	Miles	-	1.0	-	0.5
Tribal Reservations	Miles	-	-	-	12.9
Federal Lands	Miles	-	-	-	26.6
MDNR Administered Lands	Miles	25.0	7.3	29.3	26.9
ND Game and Fish lands	Miles	-	-	-	-
IA DNR lands	Miles	-	-	-	-
IL DNR lands	Miles	-	-	-	-
WI DNR Lands	Miles	-	-	-	-
Other Lands (Private, County, etc.)	Miles	119.9	191.7	200.6	151.9
Soils and Geology					
Prime Farmland	Miles	19.6	15.8	38.1	53.0
Farmland of State Importance	Miles	30.7	46.0	60.3	29.6
Prime Farmland if drained, irrigated or protected	Miles	19.8	13.8	22.7	23.9
Fractured Bicarbonate	Number	-	-	-	-
Karst	Miles	-	49.0	-	-
Bedrock Total:	Miles	144.9	198.9	229.9	205.3
Paleozoic	*Miles*	-	-	-	-
Precambrian	*Miles*	144.9	198.9	229.9	205.3
Mesozoic	*Miles*	-	-	-	-
Bedrock Less Than 10 Feet From Surface	Miles	1.5	4.3	3.0	21.2
Relief/Changes in Topography, Deeply Incised River Valleys, Steep Slopes					
0-1%	*Miles*	28.9	34.5	38.4	52.1
1%-5%	*Miles*	79.0	110.1	119.7	102.4
>5%	*Miles*	36.9	54.3	71.7	50.8
Land Use and Land Cover					
USGS GAP Agricultural Land	Miles	17.1	71.5	36.7	17.3
USGS GAP Developed Land	Miles	0.1	8.2	0.3	3.0
USGS GAP Forest Land	Miles	92.3	63.5	141.7	103.9
USGS GAP Open Land	Miles	4.3	12.4	6.6	3.6
USGS GAP Wetland and Open Water	Miles	26.4	31.6	36.8	74.9
USDA Cropland	Miles	4.7	45.3	16.8	12.2
GAP Status 1-3 Protected Area Lands Total:	Miles	31.2	1.4	32.9	68.6
Lands Managed for Biodiversity (GAP Status 1 and 2)	*Miles*	*1.3*	*1.4*	*1.3*	-

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RA-03AM-L3		RA-06-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
GAP Status 3 Lands	*Miles*	*29.8*	-	*31.6*	*68.6*
USGS Prairie Pothole Regions	Miles	-	-	-	-
MDNR Species Aggregations within 750-foot-wide route width	Number	-	-	-	2
Forest Stand - Timber Status Total:	Miles	19.1	0.8	20.2	20.9
Normal Harvest Allowed	*Miles*	*15.3*	*0.8*	*16.4*	*16.3*
Restricted Timber Harvesting	*Miles*	*0.2*	-	*0.2*	*0.2*
No Timber Harvesting Allowed	*Miles*	*0.1*	-	*0.1*	*<0.1*
Extended Rotation Forest	*Miles*	*3.6*	*<0.1*	*3.6*	*4.3*
Designated Old Growth	*Miles*	-	-	-	-
Potentially Contaminated Sites that are Federally Listed (EPA)	Number	4	93	25	30
State listed sites (CERCLA/RCRA/Superfund, What's In My Neighborhood)	Number	-	39	12	8
Active Mines and Mineral Plants	Number	-	1	-	-
MN Gravel Pits	Number	-	6	-	2
MN Active Mineral Leases	Miles	-	-	-	0.2
Waterbodies and Wetlands					
Watershed Health Assessment Scale Total [d]:	Miles	105.8	109.0	179.6	190.3
Exceptional Warm Water Habitat	*Miles*	-	-	-	*3.5*
Modified Warm Water Habitat	*Miles*	-	-	*0.2*	-
General Warm Water Habitat	*Miles*	*105.8*	*106.4*	*150.3*	*173.3*
General Cold Water Habitat	*Miles*	-	*2.6*	*29.0*	*13.6*
USGS NHD Total:	Number	63	130	102	129
NHD Perennial	*Number*	*25*	*41*	*37*	*70*
NHD Intermittent	*Number*	*22*	*52*	*46*	*34*
NHD Canal/Ditch/Other	*Number*	*16*	*37*	*19*	*25*
USGS NHD - Intermittent and Perennial on PAD US Lands	Number	1	-	1	13
Fast Moving Water (Slopes >2%)	Number	-	3	2	1
MN PWI - Streams	Number	25	48	42	74
303(d) Listed Waters	Number	2	11	7	1
USFWS NWI Total:	Miles	29.7	28.5	40.0	67.9
NWI Riverine	*Miles*	*0.4*	*0.6*	*0.6*	*1.3*
NWI Emergent	*Miles*	*8.1*	*13.3*	*10.5*	*9.6*
NWI Forest Shrub	*Miles*	*20.9*	*14.4*	*28.3*	*51.3*
NWI Pond/Lake/Other	*Miles*	*0.3*	*0.2*	*0.6*	*5.7*
MN PWI - Wetlands	Miles	<0.1	0.4	0.2	0.4
MN PWI - Basins	Miles	0.2	0.1	0.5	5.1
MN Shallow Lakes	Miles	0.1	0.5	0.2	2.5
Commercially Navigable Waterbodies	Number	-	-	-	-
Major River Crossings (1:2M)	Number	15	28	20	22
Floodplains	Number	-	25	1	1
Hydraulic Connectivity					
Hydraulically Connected Lakes crossed	*Number*	*1*	*5*	*2*	*17*
First Downstream Hydraulically Connected Lakes	*Number*	*20*	*14*	*28*	*32*
Lakes with Hydrologic Connections via Wetland or Topography	*Number*	*55*	*26*	*84*	*23*
Lakes with Hydrologic Connections via Streams	*Number*	*37*	*21*	*66*	*56*
Lakes within Watershed but not Hydraulically Connected	*Number*	*72*	*78*	*107*	*102*
Aquifers and Water Use					
USGS Principal Aquifers Total:	Miles	116.6	141.7	195.4	156.2
Bedrock Aquifers	*Miles*	*7.5*	*57.6*	*14.7*	*18.4*
Glacial Aquifers	*Miles*	*109.0*	*84.0*	*180.8*	*137.8*
USGS Recharge Areas Total:	Miles	144.9	198.9	229.9	205.3
High (>8 in/yr)	*Miles*	*56.4*	*42.3*	*73.3*	*113.3*
Moderate (2-8 in/year)	*Miles*	*88.4*	*156.5*	*156.6*	*74.6*
Low (<2 in/year)	*Miles*	-	-	-	*17.4*
Susceptible Aquifers Total:	Number	145	200	221	196
Low	*Number*	*44*	*86*	*63*	*77*
Moderate	*Number*	*34*	*34*	*64*	*77*

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RA-03AM-L3		RA-06-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
High	*Number*	*38*	*73*	*66*	*23*
Unrated	*Number*	*29*	*7*	*28*	*19*
ND Wellhead Protection Areas	Miles	-	-	-	-
MN Wellhead Protection Areas	Miles	-	1.4	-	1.9
MN Drinking Water Supply Management Areas	Miles	-	2.7	1.2	2.9
MN Wells within 750-foot-wide route width	Number	41	231	69	133
MN Water Appropriations Permit Records within 750-foot-wide route width	Number	3	63	89	73
National Areas of Interest					
National Trails	Number	-	-	1	1
U.S Fish and Wildlife Service Land	Miles	-	-	-	0.5
U.S. Forest Service Land	Miles	-	-	-	13.1
National Park Service Land	Miles	-	-	-	-
National Rivers Inventory	Number	4	-	5	2
State Areas of Interest					
State Parks and Recreation	Miles	-	-	-	-
State Forests	Miles	29.8	-	31.6	55.2
State Wildlife Management Areas	Miles	1.3	0.4	1.3	-
State Scientific and Natural Areas	Miles	-	<0.1	-	-
MN Aquatic Management Areas and Fish Management Areas	Miles	-	-	<0.1	0.4
MN Designated Wild and Scenic Rivers	Number	-	2	-	-
MN Canoe and Boating Routes	Number	3	5	4	9
State Water Access Sites	Number	-	-	-	1
State Scenic Byways	Number	-	3	3	2
State Trails	Number	10	6	14	5
State NHIS Element Occurrence Data	Number	37	19	44	4
MN Lakes of Significant Biodiversity	Miles	-	-	-	0.2
MN Sites of Biodiversity Significance Total:	Miles	44.4	14.5	55.9	15.4
Sites with Outstanding Biodiversity	*Miles*	-	-	-	-
Sites with High Biodiversity	*Miles*	*2.9*	*0.5*	*3.6*	*1.4*
Sites with Moderate Biodiversity	*Miles*	*34.4*	*5.7*	*44.3*	*11.9*
Sites Below Minimum Biodiversity Threshold	*Miles*	*7.1*	*8.3*	*8.0*	*2.1*
ND and IL High Quality Habitat Areas	Miles	-	-	-	-
MN MCBS Railroad and ROW Prairies	Number	-	-	-	-
MN Listed Calcareous Fens	Number	-	-	-	-
MN Native Prairie Complexes	Miles	-	-	-	-
State Trout Streams	Number	2	5	6	10
MN Wild Rice Waters					
MN Wild Rice Waters Crossed	*Number*	-	*1*	*1*	*2*
MN Wild Rice Waters Connected First Downstream	*Number*	*16*	*7*	*20*	*10*
MN Wild Rice Waters with Hydrologic Connections via Wetland or Topography	*Number*	*9*	*4*	*17*	*7*
MN Wild Rice Waters with Hydrological Connections via Streams but not First Downstream Wild Rice Waters	*Number*	*29*	*15*	*48*	*17*
MN Wild Rice Waters with No Hydrological Connections within Watershed and 1 Mile	*Number*	*7*	*7*	*11*	*8*
Lands of Historical, Archaeological, and Cultural Significance					
NRHP Public Dataset Sites within 750-foot-wide route width	Number	-	1	1	-
ND SHPO Sites within 750-foot-wide route width	Number	-	-	-	-
MN SHPO Sites within 750-foot-wide route width	Number	-	12	3	1
High Consequence Areas					
High Consequence Areas Total:	Number	19	39	35	52
Environmentally Sensitive Area Direct	*Number*	*7*	*2*	*10*	*12*
Environmentally Sensitive Area Indirect	*Number*	*7*	*4*	*10*	*13*
Drinking Water Direct	*Number*	-	*3*	*1*	*5*
Drinking Water Indirect	*Number*	-	*6*	*1*	*5*
Commercially Navigable Waterway Direct	*Number*	-	-	-	-
Commercially Navigable Waterway Indirect	*Number*	-	-	-	-
Other Populated Area Direct	*Number*	*2*	*11*	*5*	*7*
Other Populated Area Indirect	*Number*	*3*	*13*	*8*	*10*

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RA-03AM-L3		RA-06-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
High Population Area Direct	*Number*	-	-	-	-
High Population Area Indirect	*Number*	-	-	-	-
Daily Power Consumption and Emissions					
Daily Power Consumption	(GWh/yr)	N/A	1029.0	N/A	852.0
Indirect Emissions:					
NO_X	Ton/yr	*N/A*	*600.9*	*N/A*	*497.6*
SO_2	Ton/yr	*N/A*	*579.9*	*N/A*	*480.2*
CO_2e	Ton/yr	*N/A*	*600673.0*	*N/A*	*497435.9*
Percent Increase in Emissions as Compared to Preferred Route	*Percent*	*N/A*	*15%*	*N/A*	*-5%*

a Geographic Information System length data was compiled using the Albers Equal Area Conic Projection.
b The Preferred Route is the same route that the Minnesota Public Utilities Commission accepted for study as "Line 3 Applicant's Proposed Route" or "APR" in the December 2016 Final Scoping Decision Document in Docket No. PL9/PPL-15-137.
c Numbers represent mainline and facilities construction and engineering costs only.
d These are preliminary and recommended aquatic life use classifications. Most are preliminary and haven't gone through the full MPCA aquatic life use review process. The recommended classifications have been reviewed by the MPCA, but they have not gone through the require rule making. All of the Modified and Exceptional reaches will require a rule making before they can be designated. As a result, the assigned use is subject to change pending MPCA review and a public rule making process. Based upon analysis of MPCA's draft list, 12% of the data has some type of error.
Note: Sum totals may not add due to rounding.

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RA-07-L3		RA-08-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
Cost [c]	Dollars	$1,702,645,108	$2,412,475,587	$1,143,451,720	$1,076,999,647
Length					
Collocated Length	Miles	279.2	282.5	176.1	150.8
Greenfield Length	Miles	60.5	0.0	53.8	23.5
Total Length	Miles	339.7	282.5	229.9	174.3
Human Settlement and Population					
Counties	Number	12	13	7	8
Cities	Number	4	17	1	10
Population within 750-foot-wide route width	Number	4,960	8,629	4,068	6,825
Average Median Home Value within 750-foot-wide route width	Dollars	$153,849	$130,255	$166,617	$150,180
Houses within 750-foot-wide route width	Number	127	386	98	181
Structures within 750-foot-wide route width	Number	1	4	-	5
Airports within 750-foot-wide route width	Number	-	-	-	-
Center Pivot Irrigation within 750-foot-wide route width	Number	2	-	2	-
Schools within 750-foot-wide route width	Number	-	1	-	1
Churches within 750-foot-wide route width	Number	-	3	-	1
Cemeteries within 750-foot-wide route width	Number	2	1	2	3
Wind Turbines within 750-foot-wide route width	Number	-	-	-	-
Communication Towers within 750-foot-wide route width	Number	2	1	2	-
Railroads	Number	13	18	8	12
Streets	Number	490	549	275	277
Land Ownership and Management					
NCED Conservation Easements	Miles	-	0.4	-	0.1
Tribal Reservations	Miles	-	55.4	-	55.9
Federal Lands	Miles	-	82.3	-	86.2
MDNR Administered Lands	Miles	31.0	17.1	29.3	20.4
ND Game and Fish lands	Miles	-	-	-	-
IA DNR lands	Miles	-	-	-	-
IL DNR lands	Miles	-	-	-	-
WI DNR Lands	Miles	-	-	-	-
Other Lands (Private, County, etc.)	Miles	308.7	183.1	200.6	67.7
Soils and Geology					
Prime Farmland	Miles	62.5	43.1	38.1	26.6
Farmland of State Importance	Miles	75.1	42.9	60.3	38.0
Prime Farmland if drained, irrigated or protected	Miles	76.2	67.5	22.7	13.0
Fractured Bicarbonate	Number	-	-	-	-
Karst	Miles	-	6.9	-	-
Bedrock Total:	Miles	368.3	310.5	229.9	174.3
Paleozoic	*Miles*	28.6	28.0	-	-
Precambrian	*Miles*	339.7	282.5	229.9	174.3
Mesozoic	*Miles*	-	-	-	-
Bedrock Less Than 10 Feet From Surface	Miles	3.0	0.5	3.0	0.5
Relief/Changes in Topography, Deeply Incised River Valleys, Steep Slopes					
0-1%	*Miles*	89.2	72.7	38.4	37.7
1%-5%	*Miles*	169.9	155.7	119.7	99.8
>5%	*Miles*	80.6	53.3	70.7	36.7
Land Use and Land Cover					
USGS GAP Agricultural Land	Miles	127.0	110.6	36.7	22.3
USGS GAP Developed Land	Miles	0.7	6.5	0.3	0.8
USGS GAP Forest Land	Miles	146.5	81.8	141.7	86.0
USGS GAP Open Land	Miles	21.8	25.9	6.6	4.4
USGS GAP Wetland and Open Water	Miles	43.8	57.7	36.8	55.7
USDA Cropland	Miles	102.9	91.2	16.8	10.2
GAP Status 1-3 Protected Area Lands Total:	Miles	32.9	62.6	32.9	70.1
Lands Managed for Biodiversity (GAP Status 1 and 2)	*Miles*	*1.3*	*8.3*	*1.3*	*5.9*

Line 3 Replacement Project

Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RA-07-L3		RA-08-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
GAP Status 3 Lands	*Miles*	*31.6*	*54.3*	*31.6*	*64.2*
USGS Prairie Pothole Regions	Miles	9.8	9.8	-	-
MDNR Species Aggregations within 750-foot-wide route width	Number	-	1	-	1
Forest Stand - Timber Status Total:	Miles	20.2	4.1	20.2	7.3
Normal Harvest Allowed	*Miles*	*16.4*	*4.1*	*16.4*	*7.2*
Restricted Timber Harvesting	*Miles*	*0.2*	-	*0.2*	-
No Timber Harvesting Allowed	*Miles*	*0.1*	-	*0.1*	-
Extended Rotation Forest	*Miles*	*3.6*	-	*3.6*	-
Designated Old Growth	*Miles*	-	-	-	*0.1*
Potentially Contaminated Sites that are Federally Listed (EPA)	Number	27	65	25	14
State listed sites (CERCLA/RCRA/Superfund, What's In My Neighborhood)	Number	15	18	12	5
Active Mines and Mineral Plants	Number	-	-	-	-
MN Gravel Pits	Number	-	4	-	5
MN Active Mineral Leases	Miles	-	-	-	-
Waterbodies and Wetlands					
Watershed Health Assessment Scale Total [d]:	Miles	268.0	228.9	179.6	130.1
Exceptional Warm Water Habitat	*Miles*	*0.0*	*7.3*	-	-
Modified Warm Water Habitat	*Miles*	*22.8*	*22.4*	*0.2*	*4.3*
General Warm Water Habitat	*Miles*	*216.2*	*174.5*	*150.3*	*98.7*
General Cold Water Habitat	*Miles*	*29.0*	*24.7*	*29.0*	*27.1*
USGS NHD Total:	Number	177	158	102	103
NHD Perennial	*Number*	*50*	*45*	*37*	*37*
NHD Intermittent	*Number*	*73*	*52*	*46*	*32*
NHD Canal/Ditch/Other	*Number*	*54*	*61*	*19*	*34*
USGS NHD - Intermittent and Perennial on PAD US Lands	Number	1	9	1	15
Fast Moving Water (Slopes >2%)	Number	2	3	2	2
MN PWI - Streams	Number	60	55	42	39
303(d) Listed Waters	Number	17	14	7	4
USFWS NWI Total:	Miles	44.8	51.3	40.0	57.5
NWI Riverine	*Miles*	*1.0*	*0.9*	*0.6*	*0.4*
NWI Emergent	*Miles*	*13.0*	*11.8*	*10.5*	*11.5*
NWI Forest Shrub	*Miles*	*30.1*	*38.3*	*28.3*	*43.9*
NWI Pond/Lake/Other	*Miles*	*0.7*	*0.3*	*0.6*	*1.6*
MN PWI - Wetlands	Miles	0.3	0.1	0.2	0.4
MN PWI - Basins	Miles	0.5	1.6	0.5	2.1
MN Shallow Lakes	Miles	0.4	1.1	0.2	1.5
Commercially Navigable Waterbodies	Number	-	-	-	-
Major River Crossings (1:2M)	Number	30	19	20	10
Floodplains	Number	1	1	1	1
Hydraulic Connectivity					
Hydraulically Connected Lakes crossed	*Number*	*2*	*6*	*2*	*5*
First Downstream Hydraulically Connected Lakes	*Number*	*36*	*27*	*28*	*23*
Lakes with Hydrologic Connections via Wetland or Topography	*Number*	*89*	*37*	*84*	*16*
Lakes with Hydrologic Connections via Streams	*Number*	*88*	*52*	*66*	*37*
Lakes within Watershed but not Hydraulically Connected	*Number*	*7,722*	*4,391*	*107*	*70*
Aquifers and Water Use					
USGS Principal Aquifers Total:	Miles	219.0	146.4	195.4	122.0
Bedrock Aquifers	*Miles*	*23.4*	*24.0*	*14.7*	*14.7*
Glacial Aquifers	*Miles*	*195.6*	*122.4*	*180.8*	*107.4*
USGS Recharge Areas Total:	Miles	339.8	282.5	229.9	174.2
High (>8 in/yr)	*Miles*	*73.3*	*93.7*	*73.3*	*99.6*
Moderate (2-8 in/year)	*Miles*	*219.8*	*137.8*	*156.6*	*72.3*
Low (<2 in/year)	*Miles*	*46.7*	*51.0*	-	*2.3*
Susceptible Aquifers Total:	Number	340	283	221	165
Low	*Number*	*137*	*93*	*61*	*32*
Moderate	*Number*	*79*	*49*	*65*	*52*

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RA-07-L3		RA-08-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
High	*Number*	*96*	*122*	*67*	*67*
Unrated	*Number*	*28*	*19*	*28*	*14*
ND Wellhead Protection Areas	Miles	-	-	-	-
MN Wellhead Protection Areas	Miles	0.1	3.4	-	2.7
MN Drinking Water Supply Management Areas	Miles	1.8	4.4	1.2	4.0
MN Wells within 750-foot-wide route width	Number	78	202	69	69
MN Water Appropriations Permit Records within 750-foot-wide route width	Number	135	251	89	96
National Areas of Interest					
National Trails	Number	1	1	1	1
U.S Fish and Wildlife Service Land	Miles	-	0.4	-	-
U.S. Forest Service Land	Miles	-	26.6	-	30.3
National Park Service Land	Miles	-	-	-	-
National Rivers Inventory	Number	7	3	5	1
State Areas of Interest					
State Parks and Recreation	Miles	-	-	-	-
State Forests	Miles	31.6	35.6	31.6	39.0
State Wildlife Management Areas	Miles	1.3	-	1.3	0.8
State Scientific and Natural Areas	Miles	-	-	-	-
MN Aquatic Management Areas and Fish Management Areas	Miles	<0.1	0.4	<0.1	0.3
MN Designated Wild and Scenic Rivers	Number	-	-	-	-
MN Canoe and Boating Routes	Number	5	3	4	2
State Water Access Sites	Number	-	-	-	1
State Scenic Byways	Number	4	2	3	1
State Trails	Number	14	14	14	5
State NHIS Element Occurrence Data	Number	94	61	44	18
MN Lakes of Significant Biodiversity	Miles	0.2	0.3	-	0.4
MN Sites of Biodiversity Significance Total:	Miles	59.3	31.6	55.9	43.9
Sites with Outstanding Biodiversity	*Miles*	*0.3*	*3.3*	-	*8.5*
Sites with High Biodiversity	*Miles*	*3.6*	*4.5*	*3.6*	*12.2*
Sites with Moderate Biodiversity	*Miles*	*45.1*	*19.3*	*44.3*	*21.0*
Sites Below Minimum Biodiversity Threshold	*Miles*	*10.2*	*4.4*	*8.0*	*2.2*
ND and IL High Quality Habitat Areas	Miles	-	-	-	-
MN MCBS Railroad and ROW Prairies	Number	-	1	-	-
MN Listed Calcareous Fens	Number	1	1	-	-
MN Native Prairie Complexes	Miles	-	0.5	-	-
State Trout Streams	Number	6	5	6	4
MN Wild Rice Waters					
MN Wild Rice Waters Crossed	*Number*	*1*	*2*	*1*	-
MN Wild Rice Waters Connected First Downstream	*Number*	*21*	*9*	*20*	*12*
MN Wild Rice Waters with Hydrologic Connections via Wetland or Topography	*Number*	*18*	*3*	*17*	*2*
MN Wild Rice Waters with Hydrological Connections via Streams but not First Downstream Wild Rice Waters	*Number*	*48*	*23*	*48*	*24*
MN Wild Rice Waters with No Hydrological Connections within Watershed and 1 Mile	*Number*	*919*	*533*	*11*	*14*
Lands of Historical, Archaeological, and Cultural Significance					
NRHP Public Dataset Sites within 750-foot-wide route width	Number	1	-	1	-
ND SHPO Sites within 750-foot-wide route width	Number	-	-	-	-
MN SHPO Sites within 750-foot-wide route width	Number	15	63	3	49
High Consequence Areas					
High Consequence Areas Total:	Number	49	207	35	176
Environmentally Sensitive Area Direct	*Number*	*10*	*34*	*10*	*39*
Environmentally Sensitive Area Indirect	*Number*	*10*	*38*	*10*	*67*
Drinking Water Direct	*Number*	*4*	*16*	*1*	*4*
Drinking Water Indirect	*Number*	*6*	*26*	*1*	*7*
Commercially Navigable Waterway Direct	*Number*	*3*	*7*	-	*4*
Commercially Navigable Waterway Indirect	*Number*	*3*	*11*	-	*6*
Other Populated Area Direct	*Number*	*5*	*33*	*5*	*18*
Other Populated Area Indirect	*Number*	*8*	*42*	*8*	*31*

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RA-07-L3		RA-08-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
High Population Area Direct	*Number*	-	-	-	-
High Population Area Indirect	*Number*	-	-	-	-
Daily Power Consumption and Emissions					
Daily Power Consumption	(GWh/yr)	N/A	800.0	N/A	796.0
Indirect Emissions:					
NO_x	Ton/yr	*N/A*	*467.5*	*N/A*	*464.8*
SO_2	Ton/yr	*N/A*	*451.2*	*N/A*	*448.6*
CO_2e	Ton/yr	*N/A*	*467349.5*	*N/A*	*464648.7*
Percent Increase in Emissions as Compared to Preferred Route	*Percent*	*N/A*	*-11%*	*N/A*	*-11%*

a Geographic Information System length data was compiled using the Albers Equal Area Conic Projection.
b The Preferred Route is the same route that the Minnesota Public Utilities Commission accepted for study as "Line 3 Applicant's Proposed Route" or "APR" in the December 2016 Final Scoping Decision Document in Docket No. PL9/PPL-15-137.
c Numbers represent mainline and facilities construction and engineering costs only.
d These are preliminary and recommended aquatic life use classifications. Most are preliminary and haven't gone through the full MPCA aquatic life use review process. The recommended classifications have been reviewed by the MPCA, but they have not gone through the require rule making. All of the Modified and Exceptional reaches will require a rule making before they can be designated. As a result, the assigned use is subject to change pending MPCA review and a public rule making process. Based upon analysis of MPCA's draft list, 12% of the data has some type of error.
Note: Sum totals may not add due to rounding.

Line 3 Replacement Project

Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-05-L3		RSA-10-L3		RSA-15-L3		RSA-White Elk Lake-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
Cost [c]	Dollars	$41,766,143	$58,178,496	$23,866,367	$30,021,000	$44,323,254	$39,707,279	$28,980,589	$43,854,284
Length									
Collocated Length	Miles	9.6	5.1	4.6	6.7	10.3	6.5	2.3	8.2
Greenfield Length	Miles	0.2	7.9	1.0	0.1	0.1	3.0	4.5	1.5
Total Length	Miles	9.8	13.0	5.6	6.8	10.4	9.5	6.8	9.7
Human Settlement and Population									
Counties	Number	1	1	2	2	1	1	1	1
Cities	Number	-	-	-	-	-	-	-	-
Population within 750-foot-wide route width	Number	195	266	38	79	137	408	47	44
Average Median Home Value within 750-foot-wide route width	Dollars	$146,100	$146,100	$173,300	$173,300	$177,450	$177,450	$152,100	$136,750
Houses within 750-foot-wide route width	Number	3	1	2	7	7	26	2	4
Structures within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Airports within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Center Pivot Irrigation within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Schools within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Churches within 750-foot-wide route width	Number	-	-	-	-	-	1	-	-
Cemeteries within 750-foot-wide route width	Number	1	-	-	-	-	-	-	-
Wind Turbines within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Communication Towers within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Railroads	Number	-	-	-	-	1	1	-	-
Streets	Number	15	14	7	21	22	20	4	7
Land Ownership and Management									
NCED Conservation Easements	Miles	-	-	-	-	-	0.5	-	-
Tribal Reservations	Miles	-	-	-	-	-	-	-	-
Federal Lands	Miles	-	-	-	-	-	0.5	-	-
MDNR Administered Lands	Miles	0.1	-	-	1.7	1.0	0.8	4.3	2.0
ND Game and Fish lands	Miles	-	-	-	-	-	-	-	-
IA DNR lands	Miles	-	-	-	-	-	-	-	-
IL DNR lands	Miles	-	-	-	-	-	-	-	-
WI DNR Lands	Miles	-	-	-	-	-	-	-	-
Other Lands (Private, County, etc.)	Miles	9.7	13.0	5.6	5.1	9.4	8.3	2.5	7.7
Soils and Geology									
Prime Farmland	Miles	5.3	5.8	2.0	4.2	0.8	1.5	2.2	1.4
Farmland of State Importance	Miles	2.2	4.9	1.7	1.7	5.8	4.7	0.5	1.2
Prime Farmland if drained, irrigated or protected	Miles	0.8	0.6	0.2	-	-	-	1.3	0.7
Fractured Bicarbonate	Number	-	-	-	-	-	-	-	-
Karst	Miles	-	-	-	-	-	-	-	-
Bedrock Total:	Miles	9.8	13.0	5.6	6.8	10.4	9.5	6.8	9.7
Paleozoic	*Miles*	-	-	-	-	-	-	-	-
Precambrian	*Miles*	9.8	13.0	5.6	6.8	10.4	9.5	6.8	9.7
Mesozoic	*Miles*	-	-	-	-	-	-	-	-
Bedrock Less Than 10 Feet From Surface	Miles	-	-	-	-	-	-	-	-
Relief/Changes in Topography, Deeply Incised River Valleys, Steep Slopes									
0-1%	*Miles*	1.3	1.5	0.2	0.2	1.9	2.2	1.1	1.2
1%-5%	*Miles*	5.3	7.3	2.5	2.7	6.8	4.3	3.7	4.6
>5%	*Miles*	3.2	4.2	3.0	3.9	1.7	2.9	1.9	3.9
Land Use and Land Cover									
USGS GAP Agricultural Land	Miles	2.2	4.6	0.1	<0.1	1.1	2.4	<0.1	0.3
USGS GAP Developed Land	Miles	-	<0.1	-	<0.1	0.1	0.3	-	-
USGS GAP Forest Land	Miles	4.6	6.6	4.9	1.9	5.6	2.8	5.3	6.7
USGS GAP Open Land	Miles	0.3	0.2	0.1	4.7	0.2	2.4	0.3	0.5
USGS GAP Wetland and Open Water	Miles	2.1	1.2	0.4	0.1	2.5	1.1	1.2	1.6
USDA Cropland	Miles	2.1	3.4	<0.1	-	0.4	0.8	-	-
GAP Status 1-3 Protected Area Lands Total:	Miles	0.0	0.0	0.0	0.4	0.0	0.0	5.4	8.8
Lands Managed for Biodiversity (GAP Status 1 and 2)	*Miles*	-	-	-	-	-	-	-	-
GAP Status 3 Lands	*Miles*	-	-	-	*0.4*	-	-	*5.4*	*8.8*
USGS Prairie Pothole Regions	Miles	-	-	-	-	-	-	-	-
MDNR Species Aggregations within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Forest Stand - Timber Status Total:	Miles	0.1	-	-	1.0	0.2	0.8	4.3	1.6
Normal Harvest Allowed	*Miles*	*0.1*	-	-	*0.6*	*0.2*	*0.8*	*1.5*	*1.2*
Restricted Timber Harvesting	*Miles*	-	-	-	*0.4*	-	-	-	-

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-05-L3		RSA-10-L3		RSA-15-L3		RSA-White Elk Lake-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
No Timber Harvesting Allowed	*Miles*	-	-	-	-	-	-	-	-
Extended Rotation Forest	*Miles*	-	-	-	-	-	-	*2.7*	*0.3*
Designated Old Growth	*Miles*	-	-	-	-	-	-	-	-
Potentially Contaminated Sites that are Federally Listed (EPA)	Number	-	2	-	-	-	1	-	1
State listed sites (CERCLA/RCRA/Superfund, What's In My Neighborhood)	Number	-	-	-	-	-	-	-	-
Active Mines and Mineral Plants	Number	-	-	-	-	-	-	-	-
MN Gravel Pits	Number	-	-	-	-	-	-	-	-
MN Active Mineral Leases	Miles	-	-	-	-	-	-	-	-
Waterbodies and Wetlands									
Watershed Health Assessment Scale Total [d]:	Miles	8.7	11.3	5.6	17.8	10.4	9.5	6.8	8.6
Exceptional Warm Water Habitat	*Miles*	-	-	-	*11.0*	-	-	-	-
Modified Warm Water Habitat	*Miles*	*0.2*	-	-	-	-	-	-	-
General Warm Water Habitat	*Miles*	*8.4*	*11.3*	*4.7*	*3.6*	*10.4*	*8.0*	*6.8*	*8.6*
General Cold Water Habitat	*Miles*	-	-	*0.9*	*3.3*	*0.0*	*1.5*	-	-
USGS NHD Total:	Number	3	7	2	2	6	1	2	2
NHD Perennial	*Number*	-	*1*	*1*	*1*	*6*	*1*	*1*	*1*
NHD Intermittent	*Number*	*3*	*6*	*1*	*1*	-	-	*1*	*1*
NHD Canal/Ditch/Other	*Number*	-	-	-	-	-	-	-	-
USGS NHD - Intermittent and Perennial on PAD US Lands	Number	-	-	-	-	-	-	-	-
Fast Moving Water (Slopes >2%)	Number	-	-	1	1	-	-	-	-
MN PWI - Streams	Number	-	4	1	1	4	1	1	1
303(d) Listed Waters	Number	-	-	-	-	-	-	-	-
USFWS NWI Total:	Miles	2.0	1.2	0.1	0.1	1.6	2.1	1.6	2.5
NWI Riverine	*Miles*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*0.1*	*<0.1*	*<0.1*	-
NWI Emergent	*Miles*	*0.8*	*0.6*	*0.1*	*<0.1*	*0.5*	*0.7*	*0.8*	*1.3*
NWI Forest Shrub	*Miles*	*1.1*	*0.6*	*<0.1*	*0.1*	*1.1*	*1.4*	*0.7*	*1.2*
NWI Pond/Lake/Other	*Miles*	*<0.1*	-	-	-	*<0.1*	-	-	-
MN PWI - Wetlands	Miles	-	-	-	-	-	-	-	-
MN PWI - Basins	Miles	0.1	-	-	-	-	-	-	-
MN Shallow Lakes	Miles	0.1	-	-	-	-	-	-	-
Commercially Navigable Waterbodies	Number	-	-	-	-	-	-	-	-
Major River Crossings (1:2M)	Number	-	-	-	-	4	1	-	-
Floodplains	Number	-	-	-	-	-	-	-	-
Hydraulic Connectivity									
Hydraulically Connected Lakes crossed	*Number*	-	-	-	-	*N/A*	*N/A*	-	-
First Downstream Hydraulically Connected Lakes	*Number*	*1*	*3*	*1*	*2*	*N/A*	*N/A*	*2*	*2*
Lakes with Hydrologic Connections via Wetland or Topography	*Number*	*3*	*4*	*4*	*1*	*N/A*	*N/A*	-	*2*
Lakes with Hydrologic Connections via Streams	*Number*	*13*	*17*	*15*	*17*	*N/A*	*N/A*	*1*	-
Lakes within Watershed but not Hydraulically Connected	*Number*	*1*	*10*	-	*2*	*N/A*	*N/A*	*1*	*1*
Aquifers and Water Use									
USGS Principal Aquifers Total:	Miles	9.8	13.0	5.6	6.8	10.4	9.5	6.7	9.7
Bedrock Aquifers	*Miles*	-	-	-	-	-	-	*6.6*	*9.5*
Glacial Aquifers	*Miles*	*9.8*	*13.0*	*5.6*	*6.8*	*10.4*	*9.5*	*0.1*	*0.2*
USGS Recharge Areas Total:	Miles	9.8	13.0	5.6	6.8	10.4	9.5	6.8	9.7
High (>8 in/yr)	*Miles*	-	-	-	-	-	-	*6.8*	*9.7*
Moderate (2-8 in/year)	*Miles*	*9.8*	*13.0*	*5.6*	*6.8*	*10.4*	*9.5*	-	-
Low (<2 in/year)	*Miles*	-	-	-	-	-	-	-	-
Susceptible Aquifers Total:	Number	10	14	6	7	11	10	7	10
Low	*Number*	*2*	*9*	*5*	*7*	*2*	*3*	-	-
Moderate	*Number*	*4*	*2*	-	-	-	-	*6*	*10*
High	*Number*	*4*	*3*	*1*	-	*9*	*7*	-	-
Unrated	*Number*	-	-	-	-	-	-	*1*	-
ND Wellhead Protection Areas	Miles	-	-	-	-	-	-	-	-
MN Wellhead Protection Areas	Miles	-	-	-	-	-	-	-	-
MN Drinking Water Supply Management Areas	Miles	-	-	-	-	-	-	-	-
MN Wells within 750-foot-wide route width	Number	1	-	-	1	5	24	1	3
MN Water Appropriations Permit Records within 750-foot-wide route width	Number	16	2	5	-	2	3	-	-
National Areas of Interest									
National Trails	Number	-	-	-	-	-	-	-	-
U.S Fish and Wildlife Service Land	Miles	-	-	-	-	-	0.5	-	-
U.S. Forest Service Land	Miles	-	-	-	-	-	-	-	-
National Park Service Land	Miles	-	-	-	-	-	-	-	-
National Rivers Inventory	Number	-	-	-	-	1	-	-	-

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-05-L3		RSA-10-L3		RSA-15-L3		RSA-White Elk Lake-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
State Areas of Interest									
State Parks and Recreation	Miles	-	-	-	0.7	-	-	-	-
State Forests	Miles	-	-	-	0.4	-	-	5.4	8.8
State Wildlife Management Areas	Miles	-	-	-	-	-	-	-	-
State Scientific and Natural Areas	Miles	-	-	-	-	-	-	-	-
MN Aquatic Management Areas and Fish Management Areas	Miles	-	-	<0.1	-	-	-	-	-
MN Designated Wild and Scenic Rivers	Number	-	-	-	-	-	-	-	-
MN Canoe and Boating Routes	Number	-	-	-	-	-	-	-	-
State Water Access Sites	Number	-	-	-	-	-	-	-	-
State Scenic Byways	Number	-	-	-	-	-	-	-	-
State Trails	Number	-	-	-	3	-	-	1	1
State NHIS Element Occurrence Data	Number	1	1	1	2	-	-	2	-
MN Lakes of Significant Biodiversity	Miles	-	-	-	-	-	-	-	-
MN Sites of Biodiversity Significance Total:	Miles	0.0	0.0	0.7	0.8	2.3	1.9	4.6	8.3
Sites with Outstanding Biodiversity	*Miles*	-	-	-	*0.7*	-	-	-	-
Sites with High Biodiversity	*Miles*	-	-	*0.7*	*0.1*	-	-	-	-
Sites with Moderate Biodiversity	*Miles*	-	-	-	-	*2.3*	*1.9*	*4.6*	*8.3*
Sites Below Minimum Biodiversity Threshold	*Miles*	-	-	-	-	-	-	-	-
ND and IL High Quality Habitat Areas	Miles	-	-	-	-	-	-	-	-
MN MCBS Railroad and ROW Prairies	Number	-	-	-	-	-	-	-	-
MN Listed Calcareous Fens	Number	-	-	-	-	-	-	-	-
MN Native Prairie Complexes	Miles	-	-	-	-	-	-	-	-
State Trout Streams	Number	-	-	1	1	-	-	-	-
MN Wild Rice Waters									
MN Wild Rice Waters Crossed	*Number*	-	-	-	-	*N/A*	*N/A*	-	-
MN Wild Rice Waters Connected First Downstream	*Number*	*2*	*3*	-	*1*	*N/A*	*N/A*	*2*	*1*
MN Wild Rice Waters with Hydrologic Connections via Wetland or Topography	*Number*	*2*	-	-	-	*N/A*	*N/A*	-	*1*
MN Wild Rice Waters with Hydrological Connections via Streams but not First Downstream Wild Rice Waters	*Number*	*12*	*15*	*13*	*12*	*N/A*	*N/A*	-	-
MN Wild Rice Waters with No Hydrological Connections within Watershed and 1 Mile	*Number*	-	-	-	*1*	*N/A*	*N/A*	*1*	*1*
Lands of Historical, Archaeological, and Cultural Significance									
NRHP Public Dataset Sites within 750-foot-wide route width	Number	-	-	1	1	-	-	-	-
ND SHPO Sites within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
MN SHPO Sites within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
High Consequence Areas									
High Consequence Areas Total:	Number	2	-	-	4	-	1	-	2
Environmentally Sensitive Area Direct	*Number*	*1*	-	-	*2*	-	-	-	*1*
Environmentally Sensitive Area Indirect	*Number*	*1*	-	-	*2*	-	-	-	*1*
Drinking Water Direct	*Number*	-	-	-	-	-	-	-	-
Drinking Water Indirect	*Number*	-	-	-	-	-	-	-	-
Commercially Navigable Waterway Direct	*Number*	-	-	-	-	-	-	-	-
Commercially Navigable Waterway Indirect	*Number*	-	-	-	-	-	-	-	-
Other Populated Area Direct	*Number*	-	-	-	-	-	-	-	-
Other Populated Area Indirect	*Number*	-	-	-	-	-	*1*	-	-
High Population Area Direct	*Number*	-	-	-	-	-	-	-	-
High Population Area Indirect	*Number*	-	-	-	-	-	-	-	-
Daily Power Consumption and Emissions									
Daily Power Consumption	(GWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indirect Emissions:									
NO_X	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
SO_2	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
CO_2e	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Percent Increase in Emissions as Compared to Preferred Route	*Percent*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*

[a] Geographic Information System length data was compiled using the Albers Equal Area Conic Projection.
[b] The Preferred Route is the same route that the Minnesota Public Utilities Commission accepted for study as "Line 3 Applicant's Proposed Route" or "APR" in the December 2016 Final Scoping Decision Document in Docket No. PL9/PPL-15-137.
[c] Numbers represent mainline and facilities construction and engineering costs only.
[d] These are preliminary and recommended aquatic life use classifications. Most are preliminary and haven't gone through the full MPCA aquatic life use review process. The recommended classifications have been reviewed by the MPCA, but they have not gone through the require rule making. All of the Modified and Exceptional reaches will require a rule making before they can be designated. As a result, the assigned use is subject to change pending MPCA review and a public rule making process. Based upon analysis of MPCA's draft list, 12% of the data has some type of error.
Note: Sum totals may not add due to rounding.

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-Blandin-L3		RSA-21-L3		RSA-22-L3		RSA-23-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
Cost [c]	Dollars	$16,621,220	$16,621,220	$272,777,626	$355,187,286	$378,471,538	$404,978,221	$202,883,264	$219,559,411
Length									
Collocated Length	Miles	1.9	0.5	19.2	53.9	40.8	64.5	11.3	14.0
Greenfield Length	Miles	2.0	3.4	34.3	-	37.5	0.2	25.8	17.2
Total Length	Miles	3.9	3.9	53.5	53.9	78.3	64.7	37.1	31.2
Human Settlement and Population									
Counties	Number	1	1	2	3	2	3	1	1
Cities	Number	-	-	-	-	1	1	-	2
Population within 750-foot-wide route width	Number	33	33	418	318	1,160	1,120	356	442
Average Median Home Value within 750-foot-wide route width	Dollars	$152,100	$152,100	$149,686	$167,625	$159,333	$170,540	$147,180	$147,180
Houses within 750-foot-wide route width	Number	2	-	14	3	29	21	11	19
Structures within 750-foot-wide route width	Number	-	-	-	-	-	-	-	3
Airports within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Center Pivot Irrigation within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Schools within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Churches within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Cemeteries within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Wind Turbines within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Communication Towers within 750-foot-wide route width	Number	-	-	2	-	2	-	2	-
Railroads	Number	-	-	2	3	3	3	2	4
Streets	Number	4	3	45	33	71	66	38	35
Land Ownership and Management									
NCED Conservation Easements	Miles	-	-	-	-	-	-	-	-
Tribal Reservations	Miles	-	-	-	-	-	12.9	-	-
Federal Lands	Miles	-	-	-	-	-	12.9	-	-
MDNR Administered Lands	Miles	2.1	3.1	9.5	20.6	10.8	20.1	8.0	11.7
ND Game and Fish lands	Miles	-	-	-	-	-	-	-	-
IA DNR lands	Miles	-	-	-	-	-	-	-	-
IL DNR lands	Miles	-	-	-	-	-	-	-	-
WI DNR Lands	Miles	-	-	-	-	-	-	-	-
Other Lands (Private, County, etc.)	Miles	1.8	0.8	44.0	33.3	67.5	31.7	29.1	19.5
Soils and Geology									
Prime Farmland	Miles	1.7	1.4	6.5	3.4	8.6	4.8	2.9	0.6
Farmland of State Importance	Miles	0.3	0.4	6.9	5.0	13.2	8.1	1.5	0.8
Prime Farmland if drained, irrigated or protected	Miles	0.3	1.1	12.8	10.3	14.8	8.4	10.3	4.4
Fractured Bicarbonate	Number	-	-	-	-	-	-	-	-
Karst	Miles	-	-	-	-	-	-	-	-
Bedrock Total:	Miles	3.9	3.9	53.4	53.9	78.3	64.7	37.0	31.2
Paleozoic	*Miles*	-	-	-	-	-	-	-	-
Precambrian	*Miles*	3.9	3.9	53.4	53.9	78.3	64.7	37.0	31.2
Mesozoic	*Miles*	-	-	-	-	-	-	-	-
Bedrock Less Than 10 Feet From Surface	Miles	-	-	-	-	3.0	0.5	-	-
Relief/Changes in Topography, Deeply Incised River Valleys, Steep Slopes									
0-1%	*Miles*	0.5	0.4	15.5	22.8	19.5	21.0	13.1	6.4
1%-5%	*Miles*	2.1	2.1	30.0	24.5	44.5	31.3	20.5	15.7
>5%	*Miles*	1.3	1.4	8.0	6.6	14.4	12.4	3.5	9.1
Land Use and Land Cover									
USGS GAP Agricultural Land	Miles	-	-	8.3	0.1	9.9	1.5	6.5	0.3
USGS GAP Developed Land	Miles	-	-	0.1	<0.1	0.2	<0.1	<0.1	0.1
USGS GAP Forest Land	Miles	3.2	3.7	31.1	32.0	47.6	44.4	19.1	12.3
USGS GAP Open Land	Miles	0.3	0.1	2.1	0.5	2.8	1.3	2.1	0.8
USGS GAP Wetland and Open Water	Miles	0.4	0.1	11.0	20.1	16.6	16.9	8.9	17.4
USDA Cropland	Miles	-	-	0.6	-	0.7	0.2	0.6	<0.1
GAP Status 1-3 Protected Area Lands Total:	Miles	2.9	3.1	11.4	31.8	11.4	30.2	11.2	9.0
Lands Managed for Biodiversity (GAP Status 1 and 2)	*Miles*	-	-	*1.3*	-	*1.3*	-	*1.1*	*1.2*
GAP Status 3 Lands	*Miles*	*2.9*	*3.1*	*10.1*	*31.8*	*10.1*	*30.2*	*10.1*	*7.8*
USGS Prairie Pothole Regions	Miles	-	-	-	-	-	-	-	-
MDNR Species Aggregations within 750-foot-wide route width	Number	-	-	-	1	-	1	-	1
Forest Stand - Timber Status Total:	Miles	2.1	3.1	9.0	9.7	9.5	10.1	7.7	9.9
Normal Harvest Allowed	*Miles*	*0.2*	*1.8*	*5.7*	*3.7*	*6.2*	*3.9*	*4.6*	*8.8*
Restricted Timber Harvesting	*Miles*	-	-	*0.1*	-	*0.1*	*<0.1*	-	-

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-Blandin-L3		RSA-21-L3		RSA-22-L3		RSA-23-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
No Timber Harvesting Allowed	*Miles*	-	-	*0.1*	-	*0.1*	-	-	*0.8*
Extended Rotation Forest	*Miles*	*1.9*	*1.3*	*3.1*	*6.0*	*3.1*	*6.2*	*3.1*	*0.2*
Designated Old Growth	*Miles*	-	-	-	-	-	-	-	-
Potentially Contaminated Sites that are Federally Listed (EPA)	Number	-	-	4	-	23	2	4	-
State listed sites (CERCLA/RCRA/Superfund, What's In My Neighborhood)	Number	-	-	-	3	11	2	-	4
Active Mines and Mineral Plants	Number	-	-	-	-	-	-	-	-
MN Gravel Pits	Number	-	-	-	-	-	1	-	-
MN Active Mineral Leases	Miles	-	-	-	-	-	-	-	-
Waterbodies and Wetlands									
Watershed Health Assessment Scale Total [d]:	Miles	3.9	3.9	35.7	49.3	42.6	63.2	26.5	26.0
Exceptional Warm Water Habitat	*Miles*	-	-	-	-	-	-	-	-
Modified Warm Water Habitat	*Miles*	-	-	-	*1.2*	-	*1.2*	-	*4.9*
General Warm Water Habitat	*Miles*	*3.9*	*3.9*	*35.7*	*42.2*	*35.7*	*48.9*	*26.5*	*21.2*
General Cold Water Habitat	*Miles*	-	-	-	*5.9*	*6.9*	*13.0*	-	-
USGS NHD Total:	Number	1	0	23	25	43	30	20	17
NHD Perennial	*Number*	-	-	*6*	*9*	*13*	*15*	*4*	*6*
NHD Intermittent	*Number*	*1*	-	*10*	*3*	*20*	*3*	*9*	*3*
NHD Canal/Ditch/Other	*Number*	-	-	*7*	*13*	*10*	*12*	*7*	*8*
USGS NHD - Intermittent and Perennial on PAD US Lands	Number	-	-	1	-	1	3	1	-
Fast Moving Water (Slopes >2%)	Number	-	-	-	-	-	-	-	-
MN PWI - Streams	Number	-	-	7	8	15	12	6	4
303(d) Listed Waters	Number	-	-	1	-	2	-	1	1
USFWS NWI Total:	Miles	0.8	0.2	14.4	27.8	23.4	28.8	11.4	19.8
NWI Riverine	*Miles*	*<0.1*	-	*0.2*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*
NWI Emergent	*Miles*	*0.2*	*0.1*	*3.4*	*2.1*	*5.5*	*3.2*	*2.6*	*5.6*
NWI Forest Shrub	*Miles*	*0.6*	*0.2*	*10.8*	*25.4*	*17.6*	*25.1*	*8.6*	*14.1*
NWI Pond/Lake/Other	*Miles*	-	-	*0.1*	*0.2*	*0.1*	*0.4*	*0.1*	-
MN PWI - Wetlands	Miles	-	-	-	-	-	-	-	-
MN PWI - Basins	Miles	-	-	-	0.2	-	0.2	-	0.4
MN Shallow Lakes	Miles	-	-	-	0.2	-	0.2	-	0.4
Commercially Navigable Waterbodies	Number	-	-	-	-	-	-	-	-
Major River Crossings (1:2M)	Number	-	-	6	7	9	7	5	3
Floodplains	Number	-	-	-	-	-	-	-	-
Hydraulic Connectivity									
Hydraulically Connected Lakes crossed	*Number*	-	-	-	*1*	-	*1*	*N/A*	*N/A*
First Downstream Hydraulically Connected Lakes	*Number*	*2*	*1*	*8*	*3*	*9*	*3*	*N/A*	*N/A*
Lakes with Hydrologic Connections via Wetland or Topography	*Number*	-	*1*	*7*	*5*	*9*	*8*	*N/A*	*N/A*
Lakes with Hydrologic Connections via Streams	*Number*	*1*	-	*11*	*8*	*14*	*8*	*N/A*	*N/A*
Lakes within Watershed but not Hydraulically Connected	*Number*	*1*	-	*6*	*13*	*8*	*17*	*N/A*	*N/A*
Aquifers and Water Use									
USGS Principal Aquifers Total:	Miles	3.9	3.9	37.3	19.8	46.4	26.2	37.0	31.1
Bedrock Aquifers	*Miles*	*3.9*	*3.9*	*6.0*	*11.6*	*6.0*	*11.6*	*6.0*	*5.1*
Glacial Aquifers	*Miles*	-	-	*31.3*	*8.2*	*40.4*	*14.6*	*31.0*	*26.0*
USGS Recharge Areas Total:	Miles	3.9	3.9	53.4	53.9	78.3	64.7	37.0	31.2
High (>8 in/yr)	*Miles*	*3.9*	*3.9*	*24.6*	*46.4*	*49.5*	*57.2*	*16.4*	*16.2*
Moderate (2-8 in/year)	*Miles*	-	-	*28.8*	*7.5*	*28.8*	*7.5*	*20.6*	*15.0*
Low (<2 in/year)	*Miles*	-	-	-	-	-	-	-	-
Susceptible Aquifers Total:	Number	4	4	54	55	79	65	38	32
Low	*Number*	-	-	*8*	*6*	*20*	*7*	-	-
Moderate	*Number*	*2*	*4*	*20*	*37*	*25*	*36*	*12*	*18*
High	*Number*	*1*	-	*1*	*6*	*6*	*11*	*1*	*8*
Unrated	*Number*	*1*	-	*25*	*6*	*28*	*11*	*25*	*6*
ND Wellhead Protection Areas	Miles	-	-	-	-	-	-	-	-
MN Wellhead Protection Areas	Miles	-	-	-	-	-	-	-	-
MN Drinking Water Supply Management Areas	Miles	-	-	-	-	-	-	-	-
MN Wells within 750-foot-wide route width	Number	1	-	15	1	20	13	15	14
MN Water Appropriations Permit Records within 750-foot-wide route width	Number	-	-	1	-	1	33	1	-
National Areas of Interest									
National Trails	Number	-	-	-	-	-	-	-	-
U.S Fish and Wildlife Service Land	Miles	-	-	-	-	-	-	-	-
U.S. Forest Service Land	Miles	-	-	-	-	-	-	-	-
National Park Service Land	Miles	-	-	-	-	-	-	-	-
National Rivers Inventory	Number	-	-	1	2	1	1	1	1

Line 3 Replacement Project
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Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-Blandin-L3		RSA-21-L3		RSA-22-L3		RSA-23-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
State Areas of Interest									
State Parks and Recreation	Miles	-	-	-	-	-	-	-	-
State Forests	Miles	2.9	3.1	10.1	31.8	10.1	30.2	10.1	7.8
State Wildlife Management Areas	Miles	-	-	1.3	-	1.3	-	1.1	-
State Scientific and Natural Areas	Miles	-	-	-	-	-	-	-	0.9
MN Aquatic Management Areas and Fish Management Areas	Miles	-	-	-	-	-	0.3	-	-
MN Designated Wild and Scenic Rivers	Number	-	-	-	-	-	-	-	-
MN Canoe and Boating Routes	Number	-	-	1	1	1	1	1	1
State Water Access Sites	Number	-	-	-	-	-	-	-	2
State Scenic Byways	Number	-	-	-	-	-	-	-	-
State Trails	Number	1	1	2	4	3	5	2	18
State NHIS Element Occurrence Data	Number	2	2	14	2	26	3	9	6
MN Lakes of Significant Biodiversity	Miles	-	-	-	<0.1	-	<0.1	-	0.4
MN Sites of Biodiversity Significance Total:	Miles	3.4	3.9	16.7	32.6	23.4	35.3	6.7	8.5
Sites with Outstanding Biodiversity	*Miles*	-	-	-	-	-	-	-	-
Sites with High Biodiversity	*Miles*	-	-	*0.8*	*21.3*	*2.3*	*17.3*	-	*3.1*
Sites with Moderate Biodiversity	*Miles*	*3.4*	*3.9*	*14.7*	*11.3*	*18.7*	*17.1*	*5.4*	*5.4*
Sites Below Minimum Biodiversity Threshold	*Miles*	-	-	*1.3*	-	*2.4*	*0.9*	*1.3*	-
ND and IL High Quality Habitat Areas	Miles	-	-	-	-	-	-	-	-
MN MCBS Railroad and ROW Prairies	Number	-	-	-	-	-	-	-	-
MN Listed Calcareous Fens	Number	-	-	-	-	-	-	-	-
MN Native Prairie Complexes	Miles	-	-	-	-	-	-	-	-
State Trout Streams	Number	-	-	-	1	3	2	-	-
MN Wild Rice Waters									
MN Wild Rice Waters Crossed	*Number*	-	-	-	*1*	-	*1*	*N/A*	*N/A*
MN Wild Rice Waters Connected First Downstream	*Number*	*2*	-	*8*	*5*	*7*	*4*	*N/A*	*N/A*
MN Wild Rice Waters with Hydrologic Connections via Wetland or Topography	*Number*	-	*1*	-	-	-	-	*N/A*	*N/A*
MN Wild Rice Waters with Hydrological Connections via Streams but not First Downstream Wild Rice Waters	*Number*	-	-	*9*	*5*	*13*	*5*	*N/A*	*N/A*
MN Wild Rice Waters with No Hydrological Connections within Watershed and 1 Mile	*Number*	*1*	-	*3*	*3*	*3*	*6*	*N/A*	*N/A*
Lands of Historical, Archaeological, and Cultural Significance									
NRHP Public Dataset Sites within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
ND SHPO Sites within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
MN SHPO Sites within 750-foot-wide route width	Number	-	-	-	-	-	1	-	1
High Consequence Areas									
High Consequence Areas Total:	Number	-	-	2	-	10	8	-	44
Environmentally Sensitive Area Direct	*Number*	-	-	*1*	-	*1*	-	-	*1*
Environmentally Sensitive Area Indirect	*Number*	-	-	*1*	-	*1*	-	-	*2*
Drinking Water Direct	*Number*	-	-	-	-	-	-	-	*8*
Drinking Water Indirect	*Number*	-	-	-	-	-	-	-	*27*
Commercially Navigable Waterway Direct	*Number*	-	-	-	-	-	*2*	-	*2*
Commercially Navigable Waterway Indirect	*Number*	-	-	-	-	-	-	-	-
Other Populated Area Direct	*Number*	-	-	-	-	*4*	*2*	-	*2*
Other Populated Area Indirect	*Number*	-	-	-	-	*4*	*4*	-	*2*
High Population Area Direct	*Number*	-	-	-	-	-	-	-	-
High Population Area Indirect	*Number*	-	-	-	-	-	-	-	-
Daily Power Consumption and Emissions									
Daily Power Consumption	(GWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indirect Emissions:									
NO_x	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
SO_2	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
CO_2e	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Percent Increase in Emissions as Compared to Preferred Route	*Percent*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*

[a] Geographic Information System length data was compiled using the Albers Equal Area Conic Projection.
[b] The Preferred Route is the same route that the Minnesota Public Utilities Commission accepted for study as "Line 3 Applicant's Proposed Route" or "APR" in the December 2016 Final Scoping Decision Document in Docket No. PL9/PPL-15-137.
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Note: Sum totals may not add due to rounding.

Line 3 Replacement Project

Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-27-L3		RSA-28-L3		RSA-31-L3		RSA-33-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
Cost [c]	Dollars	$68,189,621	$73,263,452	$16,195,035	$14,656,377	$30,685,329	$34,024,743	$7,245,147	$7,245,147
Length									
Collocated Length	Miles	6.4	8.0	1.1	0.9	0.8	0.5	-	-
Greenfield Length	Miles	9.6	5.2	2.7	2.6	6.4	5.6	1.7	1.7
Total Length	Miles	16.0	13.2	3.8	3.5	7.2	6.1	1.7	1.7
Human Settlement and Population									
Counties	Number	1	1	1	1	1	1	1	1
Cities	Number	-	1	-	-	-	-	-	-
Population within 750-foot-wide route width	Number	170	266	48	48	59	59	9	9
Average Median Home Value within 750-foot-wide route width	Dollars	$154,133	$154,133	$173,300	$173,300	$176,650	$176,650	$173,300	$173,300
Houses within 750-foot-wide route width	Number	8	4	3	-	2	-	2	-
Structures within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Airports within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Center Pivot Irrigation within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Schools within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Churches within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Cemeteries within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Wind Turbines within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Communication Towers within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Railroads	Number	2	3	-	-	-	-	-	-
Streets	Number	18	17	2	2	5	5	-	-
Land Ownership and Management									
NCED Conservation Easements	Miles	-	-	-	-	-	-	-	-
Tribal Reservations	Miles	-	-	-	-	-	-	-	-
Federal Lands	Miles	-	-	-	-	-	-	-	-
MDNR Administered Lands	Miles	1.1	1.5	-	-	1.1	2.3	-	-
ND Game and Fish lands	Miles	-	-	-	-	-	-	-	-
IA DNR lands	Miles	-	-	-	-	-	-	-	-
IL DNR lands	Miles	-	-	-	-	-	-	-	-
WI DNR Lands	Miles	-	-	-	-	-	-	-	-
Other Lands (Private, County, etc.)	Miles	14.9	11.7	3.8	3.5	6.1	3.8	1.7	1.7
Soils and Geology									
Prime Farmland	Miles	-	-	-	-	-	-	-	-
Farmland of State Importance	Miles	0.2	0.2	0.2	-	-	-	-	-
Prime Farmland if drained, irrigated or protected	Miles	4.7	0.4	1.6	2.4	1.0	0.7	0.3	0.1
Fractured Bicarbonate	Number	-	-	-	-	-	-	-	-
Karst	Miles	-	-	-	-	-	-	-	-
Bedrock Total:	Miles	16.0	13.2	3.8	3.5	7.2	6.1	1.7	1.8
Paleozoic	*Miles*	-	-	-	-	-	-	-	-
Precambrian	*Miles*	16.0	13.2	3.8	3.5	7.2	6.1	1.7	1.8
Mesozoic	*Miles*	-	-	-	-	-	-	-	-
Bedrock Less Than 10 Feet From Surface	Miles	-	-	-	-	-	-	-	-
Relief/Changes in Topography, Deeply Incised River Valleys, Steep Slopes									
0-1%	*Miles*	6.8	3.0	1.7	0.2	3.3	2.4	0.8	0.5
1%-5%	*Miles*	8.4	7.0	2.0	1.1	3.5	3.3	0.8	0.9
>5%	*Miles*	0.8	3.3	0.1	2.3	0.4	0.4	0.1	0.4
Land Use and Land Cover									
USGS GAP Agricultural Land	Miles	4.2	<0.1	1.1	1.6	1.9	0.8	0.5	0.1
USGS GAP Developed Land	Miles	<0.1	0.1	-	-	<0.1	-	-	-
USGS GAP Forest Land	Miles	6.3	4.3	1.4	0.2	3.4	2.9	0.7	1.1
USGS GAP Open Land	Miles	1.3	0.2	0.1	<0.1	0.1	0.1	-	-
USGS GAP Wetland and Open Water	Miles	4.0	8.5	1.1	1.0	1.7	2.4	0.6	0.6
USDA Cropland	Miles	0.6	-	0.6	1.8	<0.1	0.4	-	-
GAP Status 1-3 Protected Area Lands Total:	Miles	1.1	0.3	0.0	0.0	1.1	2.2	0.0	0.0
Lands Managed for Biodiversity (GAP Status 1 and 2)	*Miles*	*1.1*	*0.3*	-	-	*1.1*	*1.1*	-	-
GAP Status 3 Lands	*Miles*	-	-	-	-	-	*1.1*	-	-
USGS Prairie Pothole Regions	Miles	-	-	-	-	-	-	-	-
MDNR Species Aggregations within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Forest Stand - Timber Status Total:	Miles	0.8	1.2	-	-	0.8	1.6	-	-
Normal Harvest Allowed	*Miles*	*0.8*	*1.2*	-	-	*0.8*	*1.4*	-	-
Restricted Timber Harvesting	*Miles*	-	-	-	-	-	-	-	-

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-27-L3		RSA-28-L3		RSA-31-L3		RSA-33-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
No Timber Harvesting Allowed	*Miles*	-	-	-	-	-	-	-	-
Extended Rotation Forest	*Miles*	-	-	-	-	-	*0.2*	-	-
Designated Old Growth	*Miles*	-	-	-	-	-	-	-	-
Potentially Contaminated Sites that are Federally Listed (EPA)	Number	4	-	-	-	2	2	-	-
State listed sites (CERCLA/RCRA/Superfund, What's In My Neighborhood)	Number	-	2	-	-	-	-	-	-
Active Mines and Mineral Plants	Number	-	-	-	-	-	-	-	1
MN Gravel Pits	Number	-	-	-	-	-	-	-	-
MN Active Mineral Leases	Miles	-	-	-	-	-	-	-	-
Waterbodies and Wetlands									
Watershed Health Assessment Scale Total [d]:	Miles	12.4	10.2	2.3	1.8	7.2	6.1	1.7	1.8
Exceptional Warm Water Habitat	*Miles*	-	-	-	-	-	-	-	-
Modified Warm Water Habitat	*Miles*	-	-	-	-	-	-	-	-
General Warm Water Habitat	*Miles*	*12.4*	*10.2*	*2.3*	*1.8*	*7.2*	*6.1*	*1.7*	*1.8*
General Cold Water Habitat	*Miles*	-	-	-	-	-	-	-	-
USGS NHD Total:	Number	11	9	3	7	5	3	2	3
NHD Perennial	*Number*	*1*	*1*	-	-	*1*	*1*	-	-
NHD Intermittent	*Number*	*4*	*2*	-	-	*4*	*2*	*2*	*3*
NHD Canal/Ditch/Other	*Number*	*6*	*6*	*3*	*7*	-	-	-	-
USGS NHD - Intermittent and Perennial on PAD US Lands	Number	1	-	-	-	1	1	-	-
Fast Moving Water (Slopes >2%)	Number	-	-	-	-	-	-	-	-
MN PWI - Streams	Number	2	1	-	-	1	1	-	-
303(d) Listed Waters	Number	-	-	-	-	-	-	-	-
USFWS NWI Total:	Miles	3.8	9.6	1.2	1.8	1.3	2.6	0.2	0.8
NWI Riverine	*Miles*	*0.1*	*<0.1*	*<0.1*	*1.1*	*0.1*	*0.1*	*<0.1*	*<0.1*
NWI Emergent	*Miles*	*1.4*	*2.4*	*0.8*	*0.6*	*0.2*	*0.3*	-	-
NWI Forest Shrub	*Miles*	*2.2*	*7.1*	*0.3*	-	*1.1*	*2.2*	*0.2*	*0.8*
NWI Pond/Lake/Other	*Miles*	*0.1*	-	-	-	-	-	-	-
MN PWI - Wetlands	Miles	-	-	-	-	-	-	-	-
MN PWI - Basins	Miles	-	0.3	-	-	-	-	-	-
MN Shallow Lakes	Miles	-	0.3	-	-	-	-	-	-
Commercially Navigable Waterbodies	Number	-	-	-	-	-	-	-	-
Major River Crossings (1:2M)	Number	3	1	-	-	2	2	-	-
Floodplains	Number	-	-	-	-	-	-	-	-
Hydraulic Connectivity									
Hydraulically Connected Lakes crossed	*Number*	-	*1*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
First Downstream Hydraulically Connected Lakes	*Number*	*4*	*5*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Lakes with Hydrologic Connections via Wetland or Topography	*Number*	-	-	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Lakes with Hydrologic Connections via Streams	*Number*	*7*	*7*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Lakes within Watershed but not Hydraulically Connected	*Number*	*1*	*2*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Aquifers and Water Use									
USGS Principal Aquifers Total:	Miles	16.0	13.2	3.8	3.5	7.2	6.1	1.7	1.8
Bedrock Aquifers	*Miles*	-	-	-	-	-	-	-	-
Glacial Aquifers	*Miles*	*16.0*	*13.2*	*3.8*	*3.5*	*7.2*	*6.1*	*1.7*	*1.8*
USGS Recharge Areas Total:	Miles	16.0	13.2	3.8	3.5	7.2	6.1	1.8	1.8
High (>8 in/yr)	*Miles*	*6.4*	*5.6*	-	-	*5.1*	*3.8*	*1.0*	*1.7*
Moderate (2-8 in/year)	*Miles*	*9.6*	*7.7*	*3.8*	*3.5*	*2.1*	*2.3*	*0.8*	*0.1*
Low (<2 in/year)	*Miles*	-	-	-	-	-	-	-	-
Susceptible Aquifers Total:	Number	16	14	4	4	8	7	2	2
Low	*Number*	-	-	-	-	-	-	-	-
Moderate	*Number*	*3*	*10*	-	*1*	*1*	*3*	-	*1*
High	*Number*	*1*	*3*	-	-	*1*	*1*	*1*	*1*
Unrated	*Number*	*12*	*1*	*4*	*3*	*6*	*3*	*1*	-
ND Wellhead Protection Areas	Miles	-	-	-	-	-	-	-	-
MN Wellhead Protection Areas	Miles	-	-	-	-	-	-	-	-
MN Drinking Water Supply Management Areas	Miles	-	-	-	-	-	-	-	-
MN Wells within 750-foot-wide route width	Number	6	10	1	4	4	-	2	-
MN Water Appropriations Permit Records within 750-foot-wide route width	Number	-	-	-	-	-	-	-	2
National Areas of Interest									
National Trails	Number	-	-	-	-	-	-	-	-
U.S Fish and Wildlife Service Land	Miles	-	-	-	-	-	-	-	-
U.S. Forest Service Land	Miles	-	-	-	-	-	-	-	-
National Park Service Land	Miles	-	-	-	-	-	-	-	-
National Rivers Inventory	Number	-	-	-	-	-	-	-	-

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-27-L3		RSA-28-L3		RSA-31-L3		RSA-33-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
State Areas of Interest									
State Parks and Recreation	Miles	-	-	-	-	-	-	-	-
State Forests	Miles	-	-	-	-	-	1.1	-	-
State Wildlife Management Areas	Miles	1.1	-	-	-	1.1	1.1	-	-
State Scientific and Natural Areas	Miles	-	-	-	-	-	-	-	-
MN Aquatic Management Areas and Fish Management Areas	Miles	-	-	-	-	-	-	-	-
MN Designated Wild and Scenic Rivers	Number	-	-	-	-	-	-	-	-
MN Canoe and Boating Routes	Number	-	-	-	-	-	-	-	-
State Water Access Sites	Number	-	1	-	-	-	-	-	-
State Scenic Byways	Number	-	-	-	-	-	-	-	-
State Trails	Number	1	2	-	-	-	-	-	-
State NHIS Element Occurrence Data	Number	5	1	2	-	3	1	1	1
MN Lakes of Significant Biodiversity	Miles	-	0.3	-	-	-	-	-	-
MN Sites of Biodiversity Significance Total:	Miles	1.3	1.2	0.0	0.0	0.9	2.1	0.0	0.0
Sites with Outstanding Biodiversity	*Miles*	-	-	-	-	-	-	-	-
Sites with High Biodiversity	*Miles*	-	*1.2*	-	-	-	-	-	-
Sites with Moderate Biodiversity	*Miles*	*0.9*	-	-	-	*0.9*	*2.1*	-	-
Sites Below Minimum Biodiversity Threshold	*Miles*	*0.4*	*<0.1*	-	-	-	-	-	-
ND and IL High Quality Habitat Areas	Miles	-	-	-	-	-	-	-	-
MN MCBS Railroad and ROW Prairies	Number	-	-	-	-	-	-	-	-
MN Listed Calcareous Fens	Number	-	-	-	-	-	-	-	-
MN Native Prairie Complexes	Miles	-	-	-	-	-	-	-	-
State Trout Streams	Number	-	-	-	-	-	-	-	-
MN Wild Rice Waters									
MN Wild Rice Waters Crossed	*Number*	-	-	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
MN Wild Rice Waters Connected First Downstream	*Number*	*4*	*5*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
MN Wild Rice Waters with Hydrologic Connections via Wetland or Topography	*Number*	-	-	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
MN Wild Rice Waters with Hydrological Connections via Streams but not First Downstream Wild Rice Waters	*Number*	*6*	*6*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
MN Wild Rice Waters with No Hydrological Connections within Watershed and 1 Mile	*Number*	*1*	*1*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Lands of Historical, Archaeological, and Cultural Significance									
NRHP Public Dataset Sites within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
ND SHPO Sites within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
MN SHPO Sites within 750-foot-wide route width	Number	-	1	-	-	-	-	-	-
High Consequence Areas									
High Consequence Areas Total:	Number	-	23	-	-	-	-	-	-
Environmentally Sensitive Area Direct	*Number*	-	*1*	-	-	-	-	-	-
Environmentally Sensitive Area Indirect	*Number*	-	*2*	-	-	-	-	-	-
Drinking Water Direct	*Number*	-	*4*	-	-	-	-	-	-
Drinking Water Indirect	*Number*	-	*13*	-	-	-	-	-	-
Commercially Navigable Waterway Direct	*Number*	-	*1*	-	-	-	-	-	-
Commercially Navigable Waterway Indirect	*Number*	-	-	-	-	-	-	-	-
Other Populated Area Direct	*Number*	-	*1*	-	-	-	-	-	-
Other Populated Area Indirect	*Number*	-	*1*	-	-	-	-	-	-
High Population Area Direct	*Number*	-	-	-	-	-	-	-	-
High Population Area Indirect	*Number*	-	-	-	-	-	-	-	-
Daily Power Consumption and Emissions									
Daily Power Consumption	(GWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indirect Emissions:									
NO_x	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
SO_2	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
CO_2e	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Percent Increase in Emissions as Compared to Preferred Route	*Percent*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*

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Line 3 Replacement Project

Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-34-L3		RSA-35-L3		RSA-37-L3		RSA-42-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
Cost [c]	Dollars	$10,654,628	$9,115,970	$6,818,962	$7,331,848	$225,812,538	$201,168,235	$18,325,961	$14,222,872
Length									
Collocated Length	Miles	0.1	0.1	0.1	0.1	31.6	11.2	1.4	3.5
Greenfield Length	Miles	2.4	2.1	1.5	1.6	12.1	27.5	2.9	-
Total Length	Miles	2.5	2.2	1.6	1.7	43.7	38.7	4.3	3.5
Human Settlement and Population									
Counties	Number	1	1	1	1	2	2	1	1
Cities	Number	-	-	-	-	1	3	1	1
Population within 750-foot-wide route width	Number	26	26	26	26	880	1,122	194	209
Average Median Home Value within 750-foot-wide route width	Dollars	$176,650	$176,650	$176,650	$176,650	$161,400	$167,456	$171,400	$171,400
Houses within 750-foot-wide route width	Number	1	-	-	1	21	87	1	1
Structures within 750-foot-wide route width	Number	-	-	-	-	-	3	-	-
Airports within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Center Pivot Irrigation within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Schools within 750-foot-wide route width	Number	-	-	-	-	-	1	-	-
Churches within 750-foot-wide route width	Number	-	-	-	-	-	1	-	-
Cemeteries within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Wind Turbines within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Communication Towers within 750-foot-wide route width	Number	-	-	-	-	2	-	-	-
Railroads	Number	-	-	-	-	1	3	1	1
Streets	Number	1	1	1	1	34	83	6	7
Land Ownership and Management									
NCED Conservation Easements	Miles	-	-	-	-	-	-	-	-
Tribal Reservations	Miles	-	-	-	-	-	9.4	-	-
Federal Lands	Miles	-	-	-	-	-	9.4	-	-
MDNR Administered Lands	Miles	-	-	-	0.5	3.5	4.9	0.6	0.5
ND Game and Fish lands	Miles	-	-	-	-	-	-	-	-
IA DNR lands	Miles	-	-	-	-	-	-	-	-
IL DNR lands	Miles	-	-	-	-	-	-	-	-
WI DNR Lands	Miles	-	-	-	-	-	-	-	-
Other Lands (Private, County, etc.)	Miles	2.5	2.2	1.6	1.2	40.2	24.4	3.8	3.0
Soils and Geology									
Prime Farmland	Miles	-	-	-	-	5.8	0.7	-	-
Farmland of State Importance	Miles	-	-	-	-	11.7	10.9	1.9	1.0
Prime Farmland if drained, irrigated or protected	Miles	-	-	-	-	4.7	4.1	0.1	-
Fractured Bicarbonate	Number	-	-	-	-	-	-	-	-
Karst	Miles	-	-	-	-	-	-	-	-
Bedrock Total:	Miles	2.5	2.2	1.6	1.7	43.7	38.7	4.3	3.5
Paleozoic	*Miles*	-	-	-	-	-	-	-	-
Precambrian	*Miles*	2.5	2.2	1.6	1.7	43.7	38.7	4.3	3.5
Mesozoic	*Miles*	-	-	-	-	-	-	-	-
Bedrock Less Than 10 Feet From Surface	Miles	-	-	-	-	3.0	0.5	1.3	2.3
Relief/Changes in Topography, Deeply Incised River Valleys, Steep Slopes									
0-1%	*Miles*	0.9	0.9	0.5	0.8	6.9	10.7	0.4	0.8
1%-5%	*Miles*	1.4	1.1	0.9	0.8	25.3	21.2	2.2	1.8
>5%	*Miles*	0.2	0.2	0.2	0.1	11.5	6.7	1.6	0.9
Land Use and Land Cover									
USGS GAP Agricultural Land	Miles	0.2	0.1	-	-	3.6	4.9	0.6	0.3
USGS GAP Developed Land	Miles	<0.1	-	<0.1	-	0.2	0.2	<0.1	<0.1
USGS GAP Forest Land	Miles	1.8	1.2	1.2	1.1	29.9	20.9	3.3	1.8
USGS GAP Open Land	Miles	<0.1	<0.1	<0.1	<0.1	1.1	1.0	0.1	0.2
USGS GAP Wetland and Open Water	Miles	0.5	0.9	0.3	0.6	8.2	11.0	0.2	1.1
USDA Cropland	Miles	-	0.2	-	0.3	0.1	0.2	-	-
GAP Status 1-3 Protected Area Lands Total:	Miles	0.0	0.0	0.0	0.5	1.0	6.8	0.0	0.0
Lands Managed for Biodiversity (GAP Status 1 and 2)	*Miles*	-	-	-	*0.5*	*0.3*	-	-	-
GAP Status 3 Lands	*Miles*	-	-	-	-	*0.8*	*6.8*	-	-
USGS Prairie Pothole Regions	Miles	-	-	-	-	-	-	-	-
MDNR Species Aggregations within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Forest Stand - Timber Status Total:	Miles	-	-	-	0.5	2.5	2.7	-	-
Normal Harvest Allowed	*Miles*	-	-	-	*0.5*	*2.4*	*2.7*	-	-
Restricted Timber Harvesting	*Miles*	-	-	-	-	*0.1*	-	-	-

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-34-L3		RSA-35-L3		RSA-37-L3		RSA-42-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
No Timber Harvesting Allowed	*Miles*	-	-	-	-	*0.1*	-	-	-
Extended Rotation Forest	*Miles*	-	-	-	-	-	-	-	-
Designated Old Growth	*Miles*	-	-	-	-	-	-	-	-
Potentially Contaminated Sites that are Federally Listed (EPA)	Number	2	-	2	-	20	14	-	-
State listed sites (CERCLA/RCRA/Superfund, What's In My Neighborhood)	Number	-	-	-	-	11	5	-	-
Active Mines and Mineral Plants	Number	-	-	-	-	-	1	-	-
MN Gravel Pits	Number	-	-	-	-	-	2	-	-
MN Active Mineral Leases	Miles	-	-	-	-	-	4.9	-	-
Waterbodies and Wetlands									
Watershed Health Assessment Scale Total [d]:	Miles	2.5	2.2	1.6	1.7	18.5	30.1	1.5	1.0
Exceptional Warm Water Habitat	*Miles*	-	-	-	-	-	-	-	-
Modified Warm Water Habitat	*Miles*	-	-	-	-	-	-	-	-
General Warm Water Habitat	*Miles*	*2.5*	*2.2*	*1.6*	*1.7*	*11.7*	*23.2*	-	-
General Cold Water Habitat	*Miles*	-	-	-	-	*6.9*	*6.9*	*1.5*	*1.0*
USGS NHD Total:	Number	3	3	1	1	24	25	2	3
NHD Perennial	*Number*	-	-	-	*1*	*9*	*9*	*1*	*1*
NHD Intermittent	*Number*	*3*	*3*	*1*	-	*11*	*5*	*1*	-
NHD Canal/Ditch/Other	*Number*	-	-	-	-	*4*	*11*	-	*2*
USGS NHD - Intermittent and Perennial on PAD US Lands	Number	-	-	-	-	-	2	-	-
Fast Moving Water (Slopes >2%)	Number	-	-	-	-	-	-	-	-
MN PWI - Streams	Number	-	-	-	-	9	11	1	1
303(d) Listed Waters	Number	-	-	-	-	1	1	-	-
USFWS NWI Total:	Miles	0.4	1.0	0.3	1.1	13.0	16.4	1.3	2.2
NWI Riverine	*Miles*	*<0.1*	*<0.1*	*<0.1*	-	*0.1*	*0.1*	-	-
NWI Emergent	*Miles*	*0.1*	*0.1*	*<0.1*	*0.9*	*3.0*	*4.8*	-	*0.7*
NWI Forest Shrub	*Miles*	*0.3*	*1.0*	*0.3*	*0.2*	*9.9*	*11.0*	*1.3*	*1.5*
NWI Pond/Lake/Other	*Miles*	-	-	-	-	*0.1*	*0.5*	-	-
MN PWI - Wetlands	Miles	-	-	-	-	-	0.3	-	-
MN PWI - Basins	Miles	-	-	-	-	-	0.3	-	-
MN Shallow Lakes	Miles	-	-	-	-	-	0.2	-	-
Commercially Navigable Waterbodies	Number	-	-	-	-	-	-	-	-
Major River Crossings (1:2M)	Number	-	-	-	2	4	5	1	1
Floodplains	Number	-	-	-	-	-	-	-	-
Hydraulic Connectivity									
Hydraulically Connected Lakes crossed	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	-	*3*	*N/A*	*N/A*
First Downstream Hydraulically Connected Lakes	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*5*	*6*	*N/A*	*N/A*
Lakes with Hydrologic Connections via Wetland or Topography	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*7*	*5*	*N/A*	*N/A*
Lakes with Hydrologic Connections via Streams	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*6*	*15*	*N/A*	*N/A*
Lakes within Watershed but not Hydraulically Connected	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*5*	*17*	*N/A*	*N/A*
Aquifers and Water Use									
USGS Principal Aquifers Total:	Miles	2.5	2.2	1.6	1.7	11.7	8.6	4.3	3.5
Bedrock Aquifers	*Miles*	-	-	-	-	-	-	-	-
Glacial Aquifers	*Miles*	*2.5*	*2.2*	*1.6*	*1.7*	*11.7*	*8.6*	*4.3*	*3.5*
USGS Recharge Areas Total:	Miles	2.5	2.2	1.6	1.7	43.7	38.7	4.3	3.5
High (>8 in/yr)	*Miles*	*2.3*	*1.6*	*1.4*	*1.7*	*34.3*	*33.1*	*4.3*	*3.5*
Moderate (2-8 in/year)	*Miles*	*0.2*	*0.6*	*0.2*	-	*9.3*	*5.6*	-	-
Low (<2 in/year)	*Miles*	-	-	-	-	-	-	-	-
Susceptible Aquifers Total:	Number	3	3	2	2	44	39	5	4
Low	*Number*	-	-	-	-	*22*	*14*	*3*	*1*
Moderate	*Number*	-	-	*1*	*1*	*16*	*19*	-	-
High	*Number*	*2*	*1*	*1*	*1*	*2*	*6*	-	-
Unrated	*Number*	*1*	*2*	-	-	*4*	-	*2*	*3*
ND Wellhead Protection Areas	Miles	-	-	-	-	-	-	-	-
MN Wellhead Protection Areas	Miles	-	-	-	-	-	-	-	-
MN Drinking Water Supply Management Areas	Miles	-	-	-	-	-	-	-	-
MN Wells within 750-foot-wide route width	Number	2	2	1	-	7	30	2	2
MN Water Appropriations Permit Records within 750-foot-wide route width	Number	-	2	-	-	-	11	-	-
National Areas of Interest									
National Trails	Number	-	-	-	-	-	-	-	-
U.S Fish and Wildlife Service Land	Miles	-	-	-	-	-	-	-	-
U.S. Forest Service Land	Miles	-	-	-	-	-	-	-	-
National Park Service Land	Miles	-	-	-	-	-	-	-	-
National Rivers Inventory	Number	-	-	-	-	-	-	-	-

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-34-L3		RSA-35-L3		RSA-37-L3		RSA-42-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
State Areas of Interest									
State Parks and Recreation	Miles	-	-	-	-	-	-	-	-
State Forests	Miles	-	-	-	-	0.8	6.8	-	-
State Wildlife Management Areas	Miles	-	-	-	0.5	0.3	-	-	-
State Scientific and Natural Areas	Miles	-	-	-	-	-	-	-	-
MN Aquatic Management Areas and Fish Management Areas	Miles	-	-	-	-	-	0.3	-	-
MN Designated Wild and Scenic Rivers	Number	-	-	-	-	-	-	-	-
MN Canoe and Boating Routes	Number	-	-	-	-	-	-	-	-
State Water Access Sites	Number	-	-	-	-	-	1	-	-
State Scenic Byways	Number	-	-	-	-	-	-	-	-
State Trails	Number	-	-	-	-	1	1	1	1
State NHIS Element Occurrence Data	Number	1	1	1	1	17	2	1	1
MN Lakes of Significant Biodiversity	Miles	-	-	-	-	-	0.3	-	-
MN Sites of Biodiversity Significance Total:	Miles	0.0	0.6	0.0	0.0	18.6	4.2	0.4	0.1
Sites with Outstanding Biodiversity	*Miles*	-	-	-	-	-	-	-	-
Sites with High Biodiversity	*Miles*	-	-	-	-	*2.3*	*1.6*	-	-
Sites with Moderate Biodiversity	*Miles*	-	*0.6*	-	-	*13.9*	*2.6*	*0.4*	*0.1*
Sites Below Minimum Biodiversity Threshold	*Miles*	-	-	-	-	*2.4*	-	-	-
ND and IL High Quality Habitat Areas	Miles	-	-	-	-	-	-	-	-
MN MCBS Railroad and ROW Prairies	Number	-	-	-	-	-	-	-	-
MN Listed Calcareous Fens	Number	-	-	-	-	-	-	-	-
MN Native Prairie Complexes	Miles	-	-	-	-	-	-	-	-
State Trout Streams	Number	-	-	-	-	3	2	-	2
MN Wild Rice Waters									
MN Wild Rice Waters Crossed	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	-	*2*	*N/A*	*N/A*
MN Wild Rice Waters Connected First Downstream	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*3*	*6*	*N/A*	*N/A*
MN Wild Rice Waters with Hydrologic Connections via Wetland or Topography	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	-	-	*N/A*	*N/A*
MN Wild Rice Waters with Hydrological Connections via Streams but not First Downstream Wild Rice Waters	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*7*	*15*	*N/A*	*N/A*
MN Wild Rice Waters with No Hydrological Connections within Watershed and 1 Mile	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*1*	*4*	*N/A*	*N/A*
Lands of Historical, Archaeological, and Cultural Significance									
NRHP Public Dataset Sites within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
ND SHPO Sites within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
MN SHPO Sites within 750-foot-wide route width	Number	-	-	-	-	-	1	-	-
High Consequence Areas									
High Consequence Areas Total:	Number	-	-	-	-	10	14	8	6
Environmentally Sensitive Area Direct	*Number*	-	-	-	-	*1*	*1*	-	-
Environmentally Sensitive Area Indirect	*Number*	-	-	-	-	*1*	*1*	-	-
Drinking Water Direct	*Number*	-	-	-	-	-	-	-	-
Drinking Water Indirect	*Number*	-	-	-	-	-	-	-	-
Commercially Navigable Waterway Direct	*Number*	-	-	-	-	-	*4*	-	*1*
Commercially Navigable Waterway Indirect	*Number*	-	-	-	-	-	-	-	-
Other Populated Area Direct	*Number*	-	-	-	-	*4*	*4*	*4*	*1*
Other Populated Area Indirect	*Number*	-	-	-	-	*4*	*4*	*4*	*4*
High Population Area Direct	*Number*	-	-	-	-	-	-	-	-
High Population Area Indirect	*Number*	-	-	-	-	-	-	-	-
Daily Power Consumption and Emissions									
Daily Power Consumption	(GWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indirect Emissions:									
NO_x	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
SO_2	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
CO_2e	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Percent Increase in Emissions as Compared to Preferred Route	*Percent*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*

[a] Geographic Information System length data was compiled using the Albers Equal Area Conic Projection.
[b] The Preferred Route is the same route that the Minnesota Public Utilities Commission accepted for study as "Line 3 Applicant's Proposed Route" or "APR" in the December 2016 Final Scoping Decision Document in Docket No. PL9/PPL-15-137.
[c] Numbers represent mainline and facilities construction and engineering costs only.
[d] These are preliminary and recommended aquatic life use classifications. Most are preliminary and haven't gone through the full MPCA aquatic life use review process. The recommended classifications have been reviewed by the MPCA, but they have not gone through the require rule making. All of the Modified and Exceptional reaches will require a rule making before they can be designated. As a result, the assigned use is subject to change pending MPCA review and a public rule making process. Based upon analysis of MPCA's draft list, 12% of the data has some type of error.
Note: Sum totals may not add due to rounding.

Line 3 Replacement Project

Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-43-L3		RSA-44-L3		RSA-45-L3		RSA-46-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
Cost [c]	Dollars	$14,916,480	$12,864,935	$37,930,477	$52,354,372	$37,930,477	$38,443,363	$8,097,517	$8,097,517
Length									
Collocated Length	Miles	0.9	3.1	5.9	6.0	5.9	6.8	0.4	0.2
Greenfield Length	Miles	2.6	-	3.0	3.1	3.0	2.2	1.5	1.7
Total Length	Miles	3.5	3.1	8.9	9.1	8.9	9.0	1.9	1.9
Human Settlement and Population									
Counties	Number	1	1	1	1	1	1	1	1
Cities	Number	1	1	1	1	1	1	1	1
Population within 750-foot-wide route width	Number	175	145	466	458	466	399	82	82
Average Median Home Value within 750-foot-wide route width	Dollars	$171,400	$171,400	$193,100	$179,667	$193,100	$193,100	$171,400	$171,400
Houses within 750-foot-wide route width	Number	-	1	4	18	4	5	-	-
Structures within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Airports within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Center Pivot Irrigation within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Schools within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Churches within 750-foot-wide route width	Number	-	-	-	1	-	-	-	-
Cemeteries within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Wind Turbines within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Communication Towers within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Railroads	Number	1	1	1	1	1	1	1	1
Streets	Number	4	5	9	18	9	12	2	2
Land Ownership and Management									
NCED Conservation Easements	Miles	-	-	-	-	-	-	-	-
Tribal Reservations	Miles	-	-	-	-	-	-	-	-
Federal Lands	Miles	-	-	-	-	-	-	-	-
MDNR Administered Lands	Miles	0.4	1.7	0.6	5.8	0.6	4.1	0.4	0.4
ND Game and Fish lands	Miles	-	-	-	-	-	-	-	-
IA DNR lands	Miles	-	-	-	-	-	-	-	-
IL DNR lands	Miles	-	-	-	-	-	-	-	-
WI DNR Lands	Miles	-	-	-	-	-	-	-	-
Other Lands (Private, County, etc.)	Miles	3.1	1.4	8.3	3.3	8.3	4.9	1.5	1.5
Soils and Geology									
Prime Farmland	Miles	-	-	-	-	-	-	-	-
Farmland of State Importance	Miles	1.9	1.3	2.3	2.4	2.3	2.6	1.2	1.5
Prime Farmland if drained, irrigated or protected	Miles	0.1	-	0.1	0.2	0.1	-	0.1	0.1
Fractured Bicarbonate	Number	-	-	-	-	-	-	-	-
Karst	Miles	-	-	-	-	-	-	-	-
Bedrock Total:	Miles	3.5	3.1	8.9	9.1	8.9	9.0	1.9	1.9
Paleozoic	*Miles*	-	-	-	-	-	-	-	-
Precambrian	*Miles*	3.5	3.1	8.9	9.1	8.9	9.0	1.9	1.9
Mesozoic	*Miles*	-	-	-	-	-	-	-	-
Bedrock Less Than 10 Feet From Surface	Miles	0.6	0.7	1.5	3.6	1.5	2.2	-	-
Relief/Changes in Topography, Deeply Incised River Valleys, Steep Slopes									
0-1%	*Miles*	0.3	0.3	1.1	1.3	1.1	1.5	0.1	0.2
1%-5%	*Miles*	1.7	1.9	4.0	5.0	4.0	5.3	0.9	1.0
>5%	*Miles*	1.5	0.8	3.7	2.7	3.7	2.3	0.9	0.7
Land Use and Land Cover									
USGS GAP Agricultural Land	Miles	0.6	0.3	0.8	0.6	0.8	0.5	0.6	0.3
USGS GAP Developed Land	Miles	<0.1	<0.1	0.1	<0.1	0.1	0.1	-	-
USGS GAP Forest Land	Miles	2.5	2.2	5.6	6.8	5.6	6.4	1.1	1.4
USGS GAP Open Land	Miles	0.1	0.2	0.3	0.2	0.3	0.3	0.1	0.1
USGS GAP Wetland and Open Water	Miles	0.2	0.3	2.0	1.2	2.0	1.6	0.1	0.2
USDA Cropland	Miles	-	-	0.1	0.2	0.1	-	-	-
GAP Status 1-3 Protected Area Lands Total:	Miles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lands Managed for Biodiversity (GAP Status 1 and 2)	*Miles*	-	-	-	-	-	-	-	-
GAP Status 3 Lands	*Miles*	-	-	-	-	-	-	-	-
USGS Prairie Pothole Regions	Miles	-	-	-	-	-	-	-	-
MDNR Species Aggregations within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
Forest Stand - Timber Status Total:	Miles	-	-	0.2	-	0.2	-	-	-
Normal Harvest Allowed	*Miles*	-	-	*0.2*	-	*0.2*	-	-	-
Restricted Timber Harvesting	*Miles*	-	-	-	-	-	-	-	-

Line 3 Replacement Project
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Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-43-L3		RSA-44-L3		RSA-45-L3		RSA-46-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
No Timber Harvesting Allowed	*Miles*	-	-	-	-	-	-	-	-
Extended Rotation Forest	*Miles*	-	-	-	-	-	-	-	-
Designated Old Growth	*Miles*	-	-	-	-	-	-	-	-
Potentially Contaminated Sites that are Federally Listed (EPA)	Number	-	-	19	-	19	1	-	-
State listed sites (CERCLA/RCRA/Superfund, What's In My Neighborhood)	Number	-	1	11	1	11	1	-	-
Active Mines and Mineral Plants	Number	-	-	-	-	-	-	-	-
MN Gravel Pits	Number	-	-	-	3	-	1	-	-
MN Active Mineral Leases	Miles	-	-	-	-	-	-	-	-
Waterbodies and Wetlands									
Watershed Health Assessment Scale Total [d]:	Miles	1.5	1.0	6.9	6.6	6.9	7.0	0.4	0.6
Exceptional Warm Water Habitat	*Miles*	-	-	-	-	-	-	-	-
Modified Warm Water Habitat	*Miles*	-	-	-	-	-	-	-	-
General Warm Water Habitat	*Miles*	-	-	-	-	-	-	-	-
General Cold Water Habitat	*Miles*	*1.5*	*1.0*	*6.9*	*6.6*	*6.9*	*7.0*	*0.4*	*0.6*
USGS NHD Total:	Number	1	2	5	7	5	7	1	0
NHD Perennial	*Number*	-	-	*2*	*4*	*2*	*4*	-	-
NHD Intermittent	*Number*	*1*	*1*	*2*	*2*	*2*	*2*	*1*	-
NHD Canal/Ditch/Other	*Number*	-	*1*	*1*	*1*	*1*	*1*	-	-
USGS NHD - Intermittent and Perennial on PAD US Lands	Number	-	-	-	-	-	-	-	-
Fast Moving Water (Slopes >2%)	Number	-	-	-	-	-	-	-	-
MN PWI - Streams	Number	-	-	2	2	2	3	-	-
303(d) Listed Waters	Number	-	-	-	-	-	-	-	-
USFWS NWI Total:	Miles	0.9	1.0	2.9	3.6	2.9	3.4	0.3	0.6
NWI Riverine	*Miles*	-	-	*<0.1*	-	*<0.1*	-	-	-
NWI Emergent	*Miles*	-	-	-	*<0.1*	-	*0.3*	-	*<0.1*
NWI Forest Shrub	*Miles*	*0.9*	*1.0*	*2.9*	*3.5*	*2.9*	*3.1*	*0.3*	*0.6*
NWI Pond/Lake/Other	*Miles*	-	-	*0.1*	-	*0.1*	-	-	-
MN PWI - Wetlands	Miles	-	-	-	-	-	-	-	-
MN PWI - Basins	Miles	-	-	-	-	-	-	-	-
MN Shallow Lakes	Miles	-	-	-	-	-	-	-	-
Commercially Navigable Waterbodies	Number	-	-	-	-	-	-	-	-
Major River Crossings (1:2M)	Number	1	3	1	3	1	3	1	1
Floodplains	Number	-	-	-	-	-	-	-	-
Hydraulic Connectivity									
Hydraulically Connected Lakes crossed	*Number*	*N/A*	*N/A*	-	-	*N/A*	*N/A*	*N/A*	*N/A*
First Downstream Hydraulically Connected Lakes	*Number*	*N/A*	*N/A*	*2*	*2*	*N/A*	*N/A*	*N/A*	*N/A*
Lakes with Hydrologic Connections via Wetland or Topography	*Number*	*N/A*	*N/A*	*2*	*2*	*N/A*	*N/A*	*N/A*	*N/A*
Lakes with Hydrologic Connections via Streams	*Number*	*N/A*	*N/A*	*2*	*3*	*N/A*	*N/A*	*N/A*	*N/A*
Lakes within Watershed but not Hydraulically Connected	*Number*	*N/A*	*N/A*	*1*	-	*N/A*	*N/A*	*N/A*	*N/A*
Aquifers and Water Use									
USGS Principal Aquifers Total:	Miles	3.5	3.1	5.2	8.3	5.2	8.2	1.9	1.9
Bedrock Aquifers	*Miles*	-	-	-	-	-	-	-	-
Glacial Aquifers	*Miles*	*3.5*	*3.1*	*5.2*	*8.3*	*5.2*	*8.2*	*1.9*	*1.9*
USGS Recharge Areas Total:	Miles	3.5	3.1	8.9	9.1	8.8	9.0	1.9	1.9
High (>8 in/yr)	*Miles*	*3.5*	*3.1*	*8.9*	*9.1*	*8.8*	*9.0*	*1.9*	*1.9*
Moderate (2-8 in/year)	*Miles*	-	-	-	-	-	-	-	-
Low (<2 in/year)	*Miles*	-	-	-	-	-	-	-	-
Susceptible Aquifers Total:	Number	4	4	9	10	9	10	2	2
Low	*Number*	*3*	-	*4*	-	*4*	-	*2*	*2*
Moderate	*Number*	-	-	*3*	*4*	*3*	*2*	-	-
High	*Number*	-	-	-	-	-	-	-	-
Unrated	*Number*	*1*	*4*	*2*	*6*	*2*	*8*	-	-
ND Wellhead Protection Areas	Miles	-	-	-	-	-	-	-	-
MN Wellhead Protection Areas	Miles	-	-	-	-	-	-	-	-
MN Drinking Water Supply Management Areas	Miles	-	-	-	-	-	-	-	-
MN Wells within 750-foot-wide route width	Number	1	1	1	5	1	1	-	-
MN Water Appropriations Permit Records within 750-foot-wide route width	Number	-	-	-	4	-	4	-	-
National Areas of Interest									
National Trails	Number	-	-	-	-	-	-	-	-
U.S Fish and Wildlife Service Land	Miles	-	-	-	-	-	-	-	-
U.S. Forest Service Land	Miles	-	-	-	-	-	-	-	-
National Park Service Land	Miles	-	-	-	-	-	-	-	-
National Rivers Inventory	Number	-	-	-	-	-	-	-	-

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-43-L3		RSA-44-L3		RSA-45-L3		RSA-46-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
State Areas of Interest									
State Parks and Recreation	Miles	-	-	-	-	-	-	-	-
State Forests	Miles	-	-	-	-	-	-	-	-
State Wildlife Management Areas	Miles	-	-	-	-	-	-	-	-
State Scientific and Natural Areas	Miles	-	-	-	-	-	-	-	-
MN Aquatic Management Areas and Fish Management Areas	Miles	-	-	-	<0.1	-	-	-	-
MN Designated Wild and Scenic Rivers	Number	-	-	-	-	-	-	-	-
MN Canoe and Boating Routes	Number	-	-	-	-	-	-	-	-
State Water Access Sites	Number	-	-	-	-	-	-	-	-
State Scenic Byways	Number	-	-	-	-	-	-	-	-
State Trails	Number	1	1	1	1	1	1	1	1
State NHIS Element Occurrence Data	Number	1	1	6	2	6	3	-	-
MN Lakes of Significant Biodiversity	Miles	-	-	-	-	-	-	-	-
MN Sites of Biodiversity Significance Total:	Miles	0.4	0.1	4.1	1.0	4.1	2.5	0.0	0.0
Sites with Outstanding Biodiversity	*Miles*	-	-	-	-	-	-	-	-
Sites with High Biodiversity	*Miles*	-	-	-	-	-	-	-	-
Sites with Moderate Biodiversity	*Miles*	*0.4*	*0.1*	*4.0*	*1.0*	*4.0*	*2.5*	-	-
Sites Below Minimum Biodiversity Threshold	*Miles*	-	-	*0.1*	-	*0.1*	-	-	-
ND and IL High Quality Habitat Areas	Miles	-	-	-	-	-	-	-	-
MN MCBS Railroad and ROW Prairies	Number	-	-	-	-	-	-	-	-
MN Listed Calcareous Fens	Number	-	-	-	-	-	-	-	-
MN Native Prairie Complexes	Miles	-	-	-	-	-	-	-	-
State Trout Streams	Number	-	1	2	3	2	4	-	-
MN Wild Rice Waters									
MN Wild Rice Waters Crossed	*Number*	*N/A*	*N/A*	-	-	*N/A*	*N/A*	*N/A*	*N/A*
MN Wild Rice Waters Connected First Downstream	*Number*	*N/A*	*N/A*	-	-	*N/A*	*N/A*	*N/A*	*N/A*
MN Wild Rice Waters with Hydrologic Connections via Wetland or Topography	*Number*	*N/A*	*N/A*	-	-	*N/A*	*N/A*	*N/A*	*N/A*
MN Wild Rice Waters with Hydrological Connections via Streams but not First Downstream Wild Rice Waters	*Number*	*N/A*	*N/A*	*3*	*3*	*N/A*	*N/A*	*N/A*	*N/A*
MN Wild Rice Waters with No Hydrological Connections within Watershed and 1 Mile	*Number*	*N/A*	*N/A*	-	-	*N/A*	*N/A*	*N/A*	*N/A*
Lands of Historical, Archaeological, and Cultural Significance									
NRHP Public Dataset Sites within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
ND SHPO Sites within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
MN SHPO Sites within 750-foot-wide route width	Number	-	-	-	-	-	-	-	-
High Consequence Areas									
High Consequence Areas Total:	Number	6	6	6	4	6	6	4	4
Environmentally Sensitive Area Direct	*Number*	-	-	-	-	-	-	-	-
Environmentally Sensitive Area Indirect	*Number*	-	-	-	-	-	-	-	-
Drinking Water Direct	*Number*	-	-	-	-	-	-	-	-
Drinking Water Indirect	*Number*	-	-	-	-	-	-	-	-
Commercially Navigable Waterway Direct	*Number*	-	*1*	-	*1*	-	*1*	-	*1*
Commercially Navigable Waterway Indirect	*Number*	-	-	-	-	-	-	-	-
Other Populated Area Direct	*Number*	*3*	*1*	*3*	*1*	*3*	*1*	*2*	*1*
Other Populated Area Indirect	*Number*	*3*	*4*	*3*	*2*	*3*	*4*	*2*	*2*
High Population Area Direct	*Number*	-	-	-	-	-	-	-	-
High Population Area Indirect	*Number*	-	-	-	-	-	-	-	-
Daily Power Consumption and Emissions									
Daily Power Consumption	(GWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indirect Emissions:									
NO_x	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
SO_2	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
CO_2e	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Percent Increase in Emissions as Compared to Preferred Route	*Percent*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*

[a] Geographic Information System length data was compiled using the Albers Equal Area Conic Projection.
[b] The Preferred Route is the same route that the Minnesota Public Utilities Commission accepted for study as "Line 3 Applicant's Proposed Route" or "APR" in the December 2016 Final Scoping Decision Document in Docket No. PL9/PPL-15-137.
[c] Numbers represent mainline and facilities construction and engineering costs only.
[d] These are preliminary and recommended aquatic life use classifications. Most are preliminary and haven't gone through the full MPCA aquatic life use review process. The recommended classifications have been reviewed by the MPCA, but they have not gone through the require rule making. All of the Modified and Exceptional reaches will require a rule making before they can be designated. As a result, the assigned use is subject to change pending MPCA review and a public rule making process. Based upon analysis of MPCA's draft list, 12% of the data has some type of error.
Note: Sum totals may not add due to rounding.

Line 3 Replacement Project

Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-49-L3		RSA-51-L3		RSA-52-L3		RSA-53-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
Cost [c]	Dollars	$22,587,812	$26,178,014	$5,540,407	$6,053,293	$3,409,481	$3,409,481	N/A	$35,551,870
Length									
Collocated Length	Miles	4.9	3.6	1.2	0.2	0.8	0.2	N/A	6.2
Greenfield Length	Miles	0.4	2.4	0.1	1.2	-	0.6	N/A	-
Total Length	Miles	5.3	6.0	1.3	1.4	0.8	0.8	N/A	6.2
Human Settlement and Population									
Counties	Number	1	1	1	1	1	1	N/A	1
Cities	Number	-	-	-	-	-	-	N/A	-
Population within 750-foot-wide route width	Number	291	239	117	117	117	117	N/A	102
Average Median Home Value within 750-foot-wide route width	Dollars	$193,100	$193,100	$193,100	$193,100	$193,100	$193,100	N/A	$120,900
Houses within 750-foot-wide route width	Number	4	1	4	-	1	-	N/A	-
Structures within 750-foot-wide route width	Number	-	-	-	-	-	-	N/A	-
Airports within 750-foot-wide route width	Number	-	-	-	-	-	-	N/A	-
Center Pivot Irrigation within 750-foot-wide route width	Number	-	-	-	-	-	-	N/A	-
Schools within 750-foot-wide route width	Number	-	-	-	-	-	-	N/A	-
Churches within 750-foot-wide route width	Number	-	-	-	-	-	-	N/A	-
Cemeteries within 750-foot-wide route width	Number	-	-	-	-	-	-	N/A	-
Wind Turbines within 750-foot-wide route width	Number	-	-	-	-	-	-	N/A	-
Communication Towers within 750-foot-wide route width	Number	-	-	-	-	-	-	N/A	-
Railroads	Number	-	-	-	-	-	-	N/A	-
Streets	Number	5	3	4	2	2	1	N/A	6
Land Ownership and Management									
NCED Conservation Easements	Miles	-	-	-	-	-	-	N/A	-
Tribal Reservations	Miles	-	-	-	-	-	-	N/A	-
Federal Lands	Miles	-	-	-	-	-	-	N/A	-
MDNR Administered Lands	Miles	0.3	1.6	-	-	-	-	N/A	-
ND Game and Fish lands	Miles	-	-	-	-	-	-	N/A	-
IA DNR lands	Miles	-	-	-	-	-	-	N/A	-
IL DNR lands	Miles	-	-	-	-	-	-	N/A	-
WI DNR Lands	Miles	-	-	-	-	-	-	N/A	-
Other Lands (Private, County, etc.)	Miles	5.0	4.4	1.3	1.4	0.8	0.8	N/A	6.2
Soils and Geology									
Prime Farmland	Miles	-	-	-	-	-	-	N/A	-
Farmland of State Importance	Miles	0.5	0.3	0.1	-	0.1	-	N/A	0.6
Prime Farmland if drained, irrigated or protected	Miles	-	-	-	-	-	-	N/A	-
Fractured Bicarbonate	Number	-	-	-	-	-	-	N/A	-
Karst	Miles	-	-	-	-	-	-	N/A	-
Bedrock Total:	Miles	5.3	6.0	1.3	1.4	0.8	0.9	N/A	-
Paleozoic	*Miles*	-	-	-	-	-	-	N/A	-
Precambrian	*Miles*	5.3	6.0	1.3	1.4	0.8	0.9	N/A	-
Mesozoic	*Miles*	-	-	-	-	-	-	N/A	-
Bedrock Less Than 10 Feet From Surface	Miles	0.9	1.9	-	-	-	-	N/A	-
Relief/Changes in Topography, Deeply Incised River Valleys, Steep Slopes									
0-1%	*Miles*	0.8	1.4	0.1	0.2	<0.1	-	N/A	2.6
1%-5%	*Miles*	2.3	3.3	0.5	0.5	0.4	0.1	N/A	3.5
>5%	*Miles*	2.2	1.3	0.7	0.7	0.4	0.7	N/A	0.1
Land Use and Land Cover									
USGS GAP Agricultural Land	Miles	0.2	-	0.2	-	0.2	-	N/A	0.1
USGS GAP Developed Land	Miles	0.1	<0.1	0.1	-	0.1	-	N/A	<0.1
USGS GAP Forest Land	Miles	3.0	3.9	0.7	0.9	0.3	0.7	N/A	1.4
USGS GAP Open Land	Miles	0.2	0.1	0.2	-	0.2	<0.1	N/A	<0.1
USGS GAP Wetland and Open Water	Miles	1.8	2.0	0.1	0.5	0.1	0.1	N/A	4.5
USDA Cropland	Miles	0.1	-	0.1	-	0.1	-	N/A	<0.1
GAP Status 1-3 Protected Area Lands Total:	Miles	0.0	0.0	0.0	0.0	0.0	0.0	N/A	0.0
Lands Managed for Biodiversity (GAP Status 1 and 2)	*Miles*	-	-	-	-	-	-	*N/A*	-
GAP Status 3 Lands	*Miles*	-	-	-	-	-	-	*N/A*	-
USGS Prairie Pothole Regions	Miles	-	-	-	-	-	-	N/A	-
MDNR Species Aggregations within 750-foot-wide route width	Number	-	-	-	-	-	-	N/A	-
Forest Stand - Timber Status Total:	Miles	0.2	0.1	-	-	-	-	N/A	-
Normal Harvest Allowed	*Miles*	*0.2*	*0.1*	-	-	-	-	*N/A*	-
Restricted Timber Harvesting	*Miles*	-	-	-	-	-	-	*N/A*	-

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-49-L3		RSA-51-L3		RSA-52-L3		RSA-53-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
No Timber Harvesting Allowed	*Miles*	-	-	-	-	-	-	*N/A*	-
Extended Rotation Forest	*Miles*	-	-	-	-	-	-	*N/A*	-
Designated Old Growth	*Miles*	-	-	-	-	-	-	*N/A*	-
Potentially Contaminated Sites that are Federally Listed (EPA)	Number	19	-	-	-	-	-	N/A	-
State listed sites (CERCLA/RCRA/Superfund, What's In My Neighborhood)	Number	-	-	-	-	-	-	N/A	-
Active Mines and Mineral Plants	Number	-	-	-	-	-	-	N/A	-
MN Gravel Pits	Number	-	1	-	-	-	-	N/A	-
MN Active Mineral Leases	Miles	-	-	-	-	-	-	N/A	-
Waterbodies and Wetlands									
Watershed Health Assessment Scale Total [d]:	Miles	5.3	6.0	1.3	1.4	0.8	0.9	N/A	6.2
Exceptional Warm Water Habitat	*Miles*	-	-	-	-	-	-	*N/A*	
Modified Warm Water Habitat	*Miles*	-	-	-	-	-	-	*N/A*	*2.3*
General Warm Water Habitat	*Miles*	-	-	-	-	-	-	*N/A*	*3.8*
General Cold Water Habitat	*Miles*	*5.3*	*6.0*	*1.3*	*1.4*	*0.8*	*0.9*	*N/A*	
USGS NHD Total:	Number	4	8	1	3	1	1	N/A	5
NHD Perennial	*Number*	*2*	*7*	-	*3*	-	*1*	*N/A*	-
NHD Intermittent	*Number*	*1*	-	*1*	-	*1*	-	*N/A*	-
NHD Canal/Ditch/Other	*Number*	*1*	*1*	-	-	-	-	*N/A*	*5*
USGS NHD - Intermittent and Perennial on PAD US Lands	Number	-	-	-	-	-	-	N/A	-
Fast Moving Water (Slopes >2%)	Number	-	-	-	-	-	-	N/A	-
MN PWI - Streams	Number	2	5	-	2	-	-	N/A	1
303(d) Listed Waters	Number	-	-	-	-	-	-	N/A	-
USFWS NWI Total:	Miles	2.0	3.7	<0.1	0.7	<0.1	0.1	N/A	5.2
NWI Riverine	*Miles*	*<0.1*	-	-	-	-	-	*N/A*	*0.1*
NWI Emergent	*Miles*	-	*0.1*	-	-	-	-	*N/A*	*0.1*
NWI Forest Shrub	*Miles*	*1.9*	*3.5*	*<0.1*	*0.7*	*<0.1*	*0.1*	*N/A*	*5.0*
NWI Pond/Lake/Other	*Miles*	*0.1*	-	-	-	-	-	*N/A*	*<0.1*
MN PWI - Wetlands	Miles	-	-	-	-	-	-	N/A	-
MN PWI - Basins	Miles	-	-	-	-	-	-	N/A	-
MN Shallow Lakes	Miles	-	-	-	-	-	-	N/A	-
Commercially Navigable Waterbodies	Number	-	-	-	-	-	-	N/A	-
Major River Crossings (1:2M)	Number	-	-	-	-	-	-	N/A	1
Floodplains	Number	-	-	-	-	-	-	N/A	-
Hydraulic Connectivity									
Hydraulically Connected Lakes crossed	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	-
First Downstream Hydraulically Connected Lakes	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*1*
Lakes with Hydrologic Connections via Wetland or Topography	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	-
Lakes with Hydrologic Connections via Streams	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	-
Lakes within Watershed but not Hydraulically Connected	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*1*
Aquifers and Water Use									
USGS Principal Aquifers Total:	Miles	5.2	8.2	0.3	1.1	-	0.5	N/A	-
Bedrock Aquifers	*Miles*	-	-	-	-	-	-	*N/A*	-
Glacial Aquifers	*Miles*	*5.2*	*8.2*	*0.3*	*1.1*	-	*0.5*	*N/A*	-
USGS Recharge Areas Total:	Miles	8.9	9.0	1.3	1.4	0.8	0.9	N/A	6.2
High (>8 in/yr)	*Miles*	*8.9*	*9.0*	*1.3*	*1.4*	*0.8*	*0.9*	*N/A*	*6.2*
Moderate (2-8 in/year)	*Miles*	-	-	-	-	-	-	*N/A*	-
Low (<2 in/year)	*Miles*	-	-	-	-	-	-	*N/A*	-
Susceptible Aquifers Total:	Number	9	10	2	2	1	1	NA	171
Low	*Number*	*4*	-	*1*	-	-	-	*N/A*	*21*
Moderate	*Number*	*3*	*2*	-	*1*	-	*1*	*N/A*	*41*
High	*Number*	-	-	*1*	*1*	*1*	-	*N/A*	*91*
Unrated	*Number*	*2*	*8*	-	-	-	-	*N/A*	*18*
ND Wellhead Protection Areas	Miles	-	-	-	-	-	-	N/A	-
MN Wellhead Protection Areas	Miles	-	-	-	-	-	-	N/A	2.4
MN Drinking Water Supply Management Areas	Miles	-	-	-	-	-	-	N/A	-
MN Wells within 750-foot-wide route width	Number	1	1	-	-	-	-	N/A	-
MN Water Appropriations Permit Records within 750-foot-wide route width	Number	-	4	-	-	-	-	N/A	-
National Areas of Interest									
National Trails	Number	-	-	-	-	-	-	N/A	-
U.S Fish and Wildlife Service Land	Miles	-	-	-	-	-	-	N/A	-
U.S. Forest Service Land	Miles	-	-	-	-	-	-	N/A	-
National Park Service Land	Miles	-	-	-	-	-	-	N/A	-
National Rivers Inventory	Number	-	-	-	-	-	-	N/A	-

Line 3 Replacement Project
Appendix A - Human and Environmental Resources Summary Table

Resources Crossed By The Centerline (unless otherwise noted)	Centerline Unit [a]	RSA-49-L3		RSA-51-L3		RSA-52-L3		RSA-53-L3	
		Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative	Preferred Route [b]	Route Alternative
State Areas of Interest									
State Parks and Recreation	Miles	-	-	-	-	-	-	N/A	-
State Forests	Miles	-	-	-	-	-	-	N/A	-
State Wildlife Management Areas	Miles	-	-	-	-	-	-	N/A	-
State Scientific and Natural Areas	Miles	-	-	-	-	-	-	N/A	-
MN Aquatic Management Areas and Fish Management Areas	Miles	-	-	-	-	-	-	N/A	-
MN Designated Wild and Scenic Rivers	Number	-	-	-	-	-	-	N/A	-
MN Canoe and Boating Routes	Number	-	-	-	-	-	-	N/A	-
State Water Access Sites	Number	-	-	-	-	-	-	N/A	-
State Scenic Byways	Number	-	-	-	-	-	-	N/A	-
State Trails	Number	-	-	-	-	-	-	N/A	-
State NHIS Element Occurrence Data	Number	5	2	1	1	1	1	N/A	-
MN Lakes of Significant Biodiversity	Miles	-	-	-	-	-	-	N/A	-
MN Sites of Biodiversity Significance Total:	Miles	3.6	4.6	0.0	1.0	0.0	0.6	N/A	0.0
Sites with Outstanding Biodiversity	*Miles*	-	-	-	-	-	-	*N/A*	-
Sites with High Biodiversity	*Miles*	-	-	-	-	-	-	*N/A*	-
Sites with Moderate Biodiversity	*Miles*	*3.5*	*4.6*	*<0.1*	*1.0*	*<0.1*	*0.6*	*N/A*	-
Sites Below Minimum Biodiversity Threshold	*Miles*	*0.1*	-	-	-	-	-	*N/A*	-
ND and IL High Quality Habitat Areas	Miles	-	-	-	-	-	-	N/A	-
MN MCBS Railroad and ROW Prairies	Number	-	-	-	-	-	-	N/A	-
MN Listed Calcareous Fens	Number	-	-	-	-	-	-	N/A	-
MN Native Prairie Complexes	Miles	-	-	-	-	-	-	N/A	-
State Trout Streams	Number	2	5	-	2	-	-	N/A	-
MN Wild Rice Waters									
MN Wild Rice Waters Crossed	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	-
MN Wild Rice Waters Connected First Downstream	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*1*
MN Wild Rice Waters with Hydrologic Connections via Wetland or Topography	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	-
MN Wild Rice Waters with Hydrological Connections via Streams but not First Downstream Wild Rice Waters	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	-
MN Wild Rice Waters with No Hydrological Connections within Watershed and 1 Mile	*Number*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	-
Lands of Historical, Archaeological, and Cultural Significance									
NRHP Public Dataset Sites within 750-foot-wide route width	Number	-	-	-	-	-	-	N/A	-
ND SHPO Sites within 750-foot-wide route width	Number	-	-	-	-	-	-	N/A	-
MN SHPO Sites within 750-foot-wide route width	Number	-	-	-	-	-	-	N/A	-
High Consequence Areas									
High Consequence Areas Total:	Number	-	-	-	-	-	-	*NA*	-
Environmentally Sensitive Area Direct	*Number*	-	-	-	-	-	-	*NA*	-
Environmentally Sensitive Area Indirect	*Number*	-	-	-	-	-	-	*NA*	-
Drinking Water Direct	*Number*	-	-	-	-	-	-	*NA*	-
Drinking Water Indirect	*Number*	-	-	-	-	-	-	*NA*	-
Commercially Navigable Waterway Direct	*Number*	-	-	-	-	-	-	*NA*	-
Commercially Navigable Waterway Indirect	*Number*	-	-	-	-	-	-	*NA*	-
Other Populated Area Direct	*Number*	-	-	-	-	-	-	*NA*	-
Other Populated Area Indirect	*Number*	-	-	-	-	-	-	*NA*	-
High Population Area Direct	*Number*	-	-	-	-	-	-	*NA*	-
High Population Area Indirect	*Number*	-	-	-	-	-	-	*NA*	-
Daily Power Consumption and Emissions									
Daily Power Consumption	(GWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indirect Emissions:									
NO_x	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
SO_2	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
CO_2e	Ton/yr	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Percent Increase in Emissions as Compared to Preferred Route	*Percent*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*

[a] Geographic Information System length data was compiled using the Albers Equal Area Conic Projection.
[b] The Preferred Route is the same route that the Minnesota Public Utilities Commission accepted for study as "Line 3 Applicant's Proposed Route" or "APR" in the December 2016 Final Scoping Decision Document in Docket No. PL9/PPL-15-137.
[c] Numbers represent mainline and facilities construction and engineering costs only.
[d] These are preliminary and recommended aquatic life use classifications. Most are preliminary and haven't gone through the full MPCA aquatic life use review process. The recommended classifications have been reviewed by the MPCA, but they have not gone through the require rule making. All of the Modified and Exceptional reaches will require a rule making before they can be designated. As a result, the assigned use is subject to change pending MPCA review and a public rule making process. Based upon analysis of MPCA's draft list, 12% of the data has some type of error.
Note: Sum totals may not add due to rounding.