

## 7.0 ENVIRONMENTAL IMPACT OF PREFERRED ROUTE

### 7.1 INTRODUCTION

This section of the Route Permit application addresses potential construction- and operations-related human and environmental impacts of the Preferred Route. Enbridge contracted with Merjent, Inc. (Merjent), to gather, examine, and analyze data on the following resources (in order of discussion below): the human environment, transportation, noise, land use, public and designated lands, geology, soils, vegetation, wildlife, fisheries, threatened and endangered species, groundwater resources, wetlands, waterbodies, cultural resources, and air quality. Each resource section within Section 7.0 contains a description of the existing environment, a discussion of construction impacts and mitigation, and a discussion of normal operating impacts and mitigation.

As described in Section 4.0, the Project will be generally routed parallel to Enbridge's existing Line 67<sup>1</sup> (Alberta Clipper) west of the Enbridge Clearbrook Terminal. Line 67 is part of the Enbridge Mainline System that includes Lines 1, 2, 3, 4, 65, and 67. The portions of the Project that are located east of Clearbrook, Minnesota depart from the Enbridge Mainline System and extend south to follow an existing third-party pipeline from the Enbridge Clearbrook Terminal in Clearwater County to the southern portion of Hubbard County near Hubbard, Minnesota. From that point the Preferred Route turns east and generally parallels existing electrical transmission and transportation corridors across the counties of Wadena, Cass, Crow Wing, and Aitkin. The route then rejoins the Enbridge Mainline System in Carlton County and follows the Line 67 pipeline to the end point at the Wisconsin border.

The Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Natural Resources (MNDNR) have expressed concern with regard to the potential impacts of a catastrophic oil spill from the Project on environmental resources. An overall incident frequency was developed for the Keystone XL Project, which is also designed of x70 steel pipe. The overall

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<sup>1</sup> Line 67 (Alberta Clipper) is a 36-inch-diameter pipeline that was constructed in 2009 and 2010. Enbridge completed construction in 2010 and restoration activities in the fall of 2011.

frequency was developed by summing several root cause frequencies. These included; corrosion, excavation, material defects or construction deficiency, hydraulic events, ground movement or a washout event. As a result, the analysis estimated the comprehensive risk of spills to be 1.35 E-4 per mile per year for any one-mile segment or 4.5 E-2 per year for the entire length of pipe in Minnesota (337.3 miles).<sup>2</sup> Based on these statistics, it is highly unlikely that a spill or leak will occur along any given small section of the pipeline. Therefore potential impacts from a theoretical oil release are not identified in Section 7.0 due to the extremely low frequency and many assumptions that would first be necessary to adequately quantify how a leak would affect the environment. Enbridge will continue to work with the applicable agencies regarding leak prevention measures and emergency response.

Mitigation measures for oil spill prevention and emergency response described in Appendix B of the Certificate of Need Application (Minnesota Public Utilities Commission [MPUC] Docket No. PL-9/CN-14-916) should be considered to minimize the risk of spills and any potential impacts. In addition, there are numerous federal and state laws requiring the cleanup to be completed to the satisfaction of the applicable agency, compensation for any affected parties and the Natural Resource Damage Assessment rules requiring mitigation for affected environmental resources which were impacted.

Therefore the following operational impacts and mitigation descriptions only account for normal operating impacts due to pipeline maintenance and mowing activities. Enbridge is committed to continuing to work with all applicable regulatory agencies regarding oil spill prevention and response.

### **7.1.1 AGENCY CONSULTATIONS AND COMMITMENTS**

In addition to gathering, examining, and analyzing environmental data, Enbridge has communicated with federal, state, and local regulatory agencies regarding potential environmental impacts resulting from construction and operations of the Project on the Preferred Route. Some of these communications have occurred through public open houses and other means as described in Section 9.0. Table 7.1.1-1 outlines initial agency consultation letters

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<sup>2</sup> <http://keystonepipeline-xl.state.gov/documents/organization/205569.pdf>; last visited April 17, 2015.

sent to agencies with whom Enbridge typically consults (Appendix J) and in-person meetings with those agencies held since March 2014.<sup>3</sup>

<b>TABLE 7.1.1-1 Federal, State, and Local Regulatory Agency Consultations</b>		
<b>Agency Contacted</b>	<b>Date of Contact</b>	<b>Type of Contact</b>
<b>FEDERAL</b>		
United States Army Corp of Engineers (USACE) - St. Paul District	11/25/2014	Letter
United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) - MN	11/24/2014	Letter
USDA - Farm Service Agency (FSA) - MN	11/24/2014	Letter
United States Fish and Wildlife Service (USFWS) - Ecological Services - Region 3 Field Office	11/18/2014 11/24/2014	Meeting Letter
USFWS - Ecological Services - Region 6 Field Office	11/24/2014	Letter
USFWS - Devil's Lake Wetland Management District	11/24/2014	Letter
USFWS - Detroit Lakes Wetland Management District	11/24/2014	Letter
USFWS - Agassiz National Wildlife Refuge	11/24/2014	Letter
USFWS - Refuges - Region 3 and Region 6	11/24/2014	Letter
United States National Park Service (USNPS) Midwest Regional Office - Rivers, Trails, & Conservation Program	11/24/2014	Letter
USNPS Scenic Trails - North Country Trail	11/24/2014	Letter
Bureau of Land Management (BLM)	11/24/2014	Letter
Bureau of Reclamation (BOR)	11/24/2014 11/25/2014	Letter Letter
<b>STATE</b>		
Minnesota Department of Agriculture (MDA)	11/25/2014 12/5/2014	Letter Meeting
Minnesota Department of Health (MDH)/Drinking Water Supply Management Area (DWSMA)/Wellhead Protection Area (WPA)	4/25/2014 11/25/2014	Letter Letter
MDH/DWSMA/WPA - Sundruds Court	11/25/2014	Letter
MDH/DWSMA/WPA - City of Wrenshall	11/25/2014	Letter
MDH/DWSMA/WPA - Oklee	11/25/2014	Letter
Mississippi Headwaters Board (MHB)	4/25/2014 11/25/2014	Letter Letter
Minnesota Board of Water and Soil Resources (BWSR) - Brainerd	4/25/2014 11/25/2014	Letter Letter

<sup>3</sup> The Project was announced publicly on March 3, 2014.

<b>TABLE 7.1.1-1 Federal, State, and Local Regulatory Agency Consultations</b>		
<b>Agency Contacted</b>	<b>Date of Contact</b>	<b>Type of Contact</b>
Minnesota State Historic Preservation Office (SHPO)	11/25/2014	Letter
Minnesota Department of Natural Resources (MNDNR) - Division of Water and Ecological Resources	4/25/2014	Letter
	11/25/2014	Letter
	12/8/2014	Meeting
	1/20/2015	Letter
	2/20/2015	Meeting
	3/19/2015	Letter
MNDNR - Division of Lands and Minerals	3/25/2015	Meeting
	4/25/2014	Letter
	11/25/2014	Letter
	12/8/2014	Meeting
MNDNR - Natural Heritage Information System	3/19/2015	Letter
	3/25/2015	Meeting
	4/25/2014	Letter
	11/25/2014	Letter
Minnesota Pollution Control Agency (MPCA)	2/20/2015	Meeting
	3/25/2015	Meeting
	4/25/2014	Letter
	11/25/2014	Letter
MPCA - National Pollutant Discharge Elimination System (NPDES) Hydrotect/Trench Dewatering	12/15/2014	Meeting
	3/25/2015	Meeting
MPCA - NPDES Stormwater	11/25/2014	Letter
	12/15/2014	Meeting
MPCA - 401 Water Quality Certification (WQC)	11/25/2014	Letter
	12/15/2014	Meeting
	3/25/2015	Meeting
MPCA - Environment & Energy Section	11/25/2014	Letter
	12/15/2014	Meeting
Office of the Governor	4/10/2014	Letter
<b>LOCAL</b>		
Watershed Districts - Middle-Snake-Tamarac-Rivers	4/25/2014	Letter
	11/25/2014	Letter
Watershed District - Two Rivers	4/25/2014	Letter
	11/25/2014	Letter
Watershed District - Red Lake	4/25/2014	Letter
	11/25/2014	Letter
Watershed District - Wild Rice	4/25/2014	Letter
	11/25/2014	Letter
Wetland Conservation Act (WCA) Local Government Unit (LGU) - Marshall County	4/25/2014	Letter
	11/25/2014	Letter
WCA LGU - East Polk County	4/25/2014	Letter
	11/25/2014	Letter
WCA LGU - Red Lake County	4/25/2014	Letter
	11/25/2014	Letter

<b>TABLE 7.1.1-1            Federal, State, and Local Regulatory Agency Consultations</b>		
<b>Agency Contacted</b>	<b>Date of Contact</b>	<b>Type of Contact</b>
WCA LGU - Clearwater County	4/25/2014 11/25/2014	Letter Letter
WCA LGU - Hubbard County	4/25/2014 11/25/2014	Letter Letter
WCA LGU - Cass County	4/25/2014 11/25/2015	Letter Letter
WCA LGU - Aitkin County	4/25/2014 11/25/2014	Letter Letter
WCA LGU - Carlton County	4/25/2014 11/25/2014	Letter Letter
WCA LGU - Pennington County	4/25/2014 11/25/2014	Letter Letter
WCA LGU - Wadena County	4/25/2014 11/25/2014	Letter Letter
WCA LGU - Kittson County	4/25/2014 11/25/2014	Letter Letter
WCA LGU - Crow Wing County	4/25/2014 11/25/2014	Letter Letter

Section 7.0 includes references to consultations initiated by Enbridge and Enbridge affiliates (collectively referred to as “Enbridge” herein) to address commitments that apply east of Clearbrook where the Project and Sandpiper are co-located. Specifically, Section 7.0 addresses MNDNR and MPCA comments directed to Mr. Larry Hartman (in letters dated April 4, 2014, and May 30, 2014) as part of the MPUC proceeding for the Sandpiper Pipeline Routing Permit Application (Docket No. PL-6668/PPL-13-474). Enbridge’s responses to these comment letters are provided in Appendix K.

Many of Enbridge’s commitments resulting from these agency consultations are provided throughout Section 7.0, and highlighted by footnotes. Commitments that Enbridge made for Sandpiper will be upheld for this Project. Enbridge will continue to coordinate with agencies on items that arise from initial Project consultations as well as items that are ongoing as they pertain to the Project. These items include a commitment by Enbridge to work with applicable agencies to develop a comprehensive third-party monitoring program during Project construction. Enbridge will work with the agencies to define the role and qualifications of proposed third-party monitors to ensure they are experienced in the type of construction they will be observing and knowledgeable regarding the resources that may be impacted.

Enbridge is planning to adopt all relevant permit conditions issued for the Line 67 project in 2009, including those outlined in MPCA’s Section 401 Water Quality Certification (WQC) and MNDNR’s License to Cross Public Lands and License to Cross Public Waters. Enbridge will include WQC-specific commitments in its respective permit applications to the MPCA and MNDNR for the Project.<sup>4</sup>

### **7.1.2 FIELD SURVEYS**

Enbridge began conducting field surveys for several of the resources discussed in Section 7.0 in late 2013. Overall survey completion for the Project is anticipated in 2015. In all cases, Enbridge has coordinated with the appropriate agencies on development, review, and concurrence of survey protocols and reports. Enbridge will continue to coordinate with the appropriate agencies as data collection and reports are completed in 2015 (Table 7.1.2-1). Map 7.1.2-1 shows the survey status for wetlands/waterbodies and cultural resources, the two types of resources for which Enbridge conducted surveys along the entire Preferred Route. Enbridge conducted surveys for other resources (i.e., powerpole nests, flora, mussels, grasslands, and northern long-eared bats) at specific locations along the Preferred Route as determined by desktop analyses and agency consultations. Details on agency consultations, survey methods, and survey findings are provided in the relevant resource sections within Section 7.0.

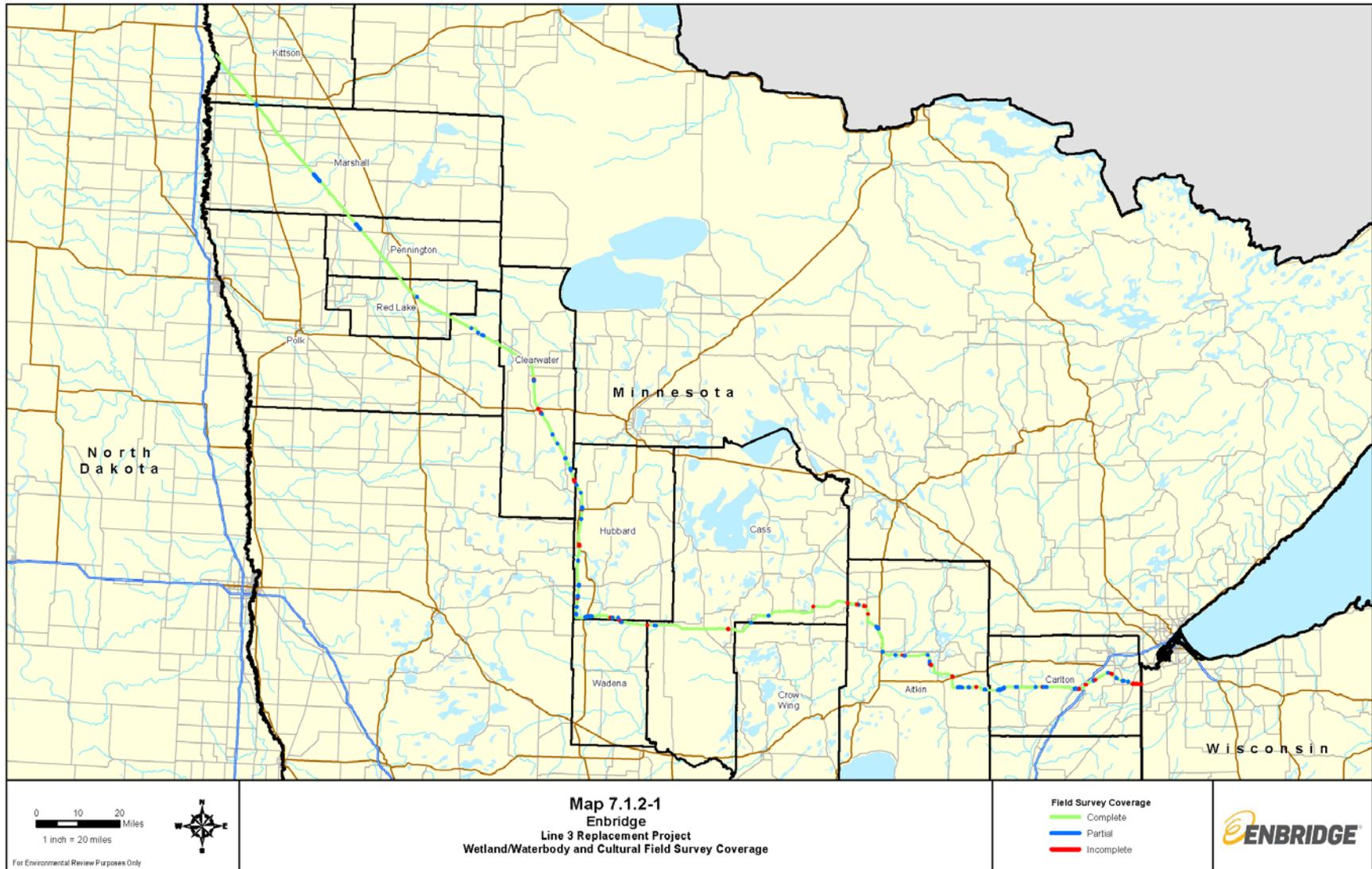
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<sup>4</sup> This Enbridge commitment addresses comments provided by MPCA on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

<b>TABLE 7.1.2-1 Status of Environmental Surveys</b>			
Survey Type	Tracts/Sites Requiring Survey	Completed Tracts/Sites	Survey Progress (as a % of tracts/sites requiring survey) <sup>a</sup>
Phase I Cultural	1,133	1,033	91% <sup>b</sup>
Phase II Cultural	7	3	43%
Cultural Geomorphological	10	6	60%
Wetland/Waterbody	1,202	1,133	94%
Powerpole Nest	49	49	100%
Protected Flora	187	176	94%
Protected Mussel	23	23	100%
Grassland Habitat Assessment	177	175	99%
Northern Long-eared Bat	303	303	100%
<b>Total</b>	<b>3,091</b>	<b>2,901</b>	<b>94%</b>
<sup>a</sup> Surveys completed as of October 1, 2014. <sup>b</sup> Percentage of surveys completed here differs from the 97 percent reported in Section 7.16, where the percentage is based on acreage within the Project construction workspace as defined for cultural resources.			



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### 7.1.3 IMPACT CALCULATIONS

Because much of the Project is co-located with other Enbridge pipelines and other existing rights-of-way (ROWs), a majority of the Project construction may occur in areas previously disturbed by construction and/or by operational ROW maintenance. For the purpose of assessing environmental impacts, Enbridge broke the impact calculations into three different types as presented in Table 7.1.3-1: west of Clearbrook, east of Clearbrook, and east of Clearbrook where Sandpiper is assumed to be constructed first. Impact calculations in Section 7.0 are presented by these three calculations types. Figures 7.1.3-1 through 7.1.3-3 illustrate how temporary (construction) and permanent (operations) impacts were calculated for these three types in both upland and wetland areas. Further details about resource-specific impacts are provided in Sections 7.5 (Land Use) and 7.14 (Wetlands). Temporary impacts may also result during Project operations from maintenance activities, such as excavation and mowing, however, the area of these impacts are not included in the calculations in Section 7.0.

TABLE 7.1.3-1

Summary of Impact Calculations

Calculation Type	Description	Figure	Total Construction Workspace <sup>a</sup>	Width of Existing Temporary (Construction) Impacts <sup>b</sup>	Width of New Temporary (Construction) Impacts <sup>b</sup>	Width of Existing Permanent (Operational) Impacts <sup>c</sup>	Width of New Permanent (Operational) Impacts
West of Clearbrook	Where the Project will be co-located with Line 67	7.1.3-1	120 feet (upland) 95 feet (wetland)	60 feet (upland) 30 feet (wetland)	10 feet (upland) 15 feet (wetland)	25 feet (upland) 25 feet (wetland)	25 feet (upland) 25 feet (wetland)
East of Clearbrook	Where the Project will be constructed along the Preferred Route	7.1.3-2	120 feet (upland) 95 feet (wetland)	0 feet (upland) 0 feet (wetland)	70 feet (upland) 45 feet (wetland)	0 feet (upland) 0 feet (wetland)	50 feet (upland) 50 feet (wetland)
East of Clearbrook	Assumes Sandpiper is constructed first	7.1.3-3	120 feet (upland) 95 feet (wetland)	60 feet (upland) 30 feet (wetland)	10 feet (upland) 15 feet (wetland)	25 feet (upland) 25 feet (wetland)	25 feet (upland) 25 feet (wetland)

<sup>a</sup> The construction workspace includes temporary workspaces (TWS) and additional temporary workspaces (ATWS) as described in Section 4.6.  
<sup>b</sup> These are typical widths and may vary along the Preferred Route.  
<sup>c</sup> Where co-located, half of the Project construction workspace maintained as permanent ROW would be located in areas that are already permanently maintained (for Line 67 west of Clearbrook or for Sandpiper east of Clearbrook if Sandpiper constructed first).

Milepost (MP) numbers are used for reference throughout Section 7.0 and may not reflect exact locations. Mileposts west of the Clearbrook Terminal are denoted with a “-W” after the number, and mileposts east of the Clearbrook Terminal are denoted with an “-E” after the number.



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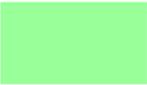
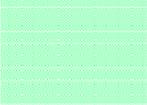
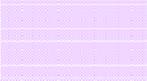
Legend	
	Represents existing, permanently maintained pipeline ROW that has been previously disturbed by earlier pipeline projects. This area is also referred to as the non-working side that will be used for topsoil and subsoil storage for this Project (see Appendix G to view typical ROW construction profiles).
	Represents existing, previously disturbed area that has been used as temporary workspace during construction work activities for an earlier pipeline project or a new area of disturbance where not co-located. Such area will be acquired and converted to new, permanently maintained pipeline ROW for this Project. This area is also referred to as the working side of the Project (see Appendix G to view typical ROW construction profiles).
	Represents existing, previously disturbed area that has been used as temporary workspace during construction work activities for an earlier pipeline project. Such area will be used again as a temporary workspace area for the construction of this Project. This area is also referred to as the working side of the Project that will be restored and allowed to return to its natural habitat (see Appendix G to view typical ROW construction profiles).
	Represents a new area of disturbance that will be used as a temporary workspace area during construction work activities of this Project. This area is also referred to as the working side of the Project that will be restored and allowed to return to its natural habitat (see Appendix G to view typical ROW construction profiles).

Figure 7.1.3-1a: West of Clearbrook Line 3 Construction and Operations Workspace in Uplands

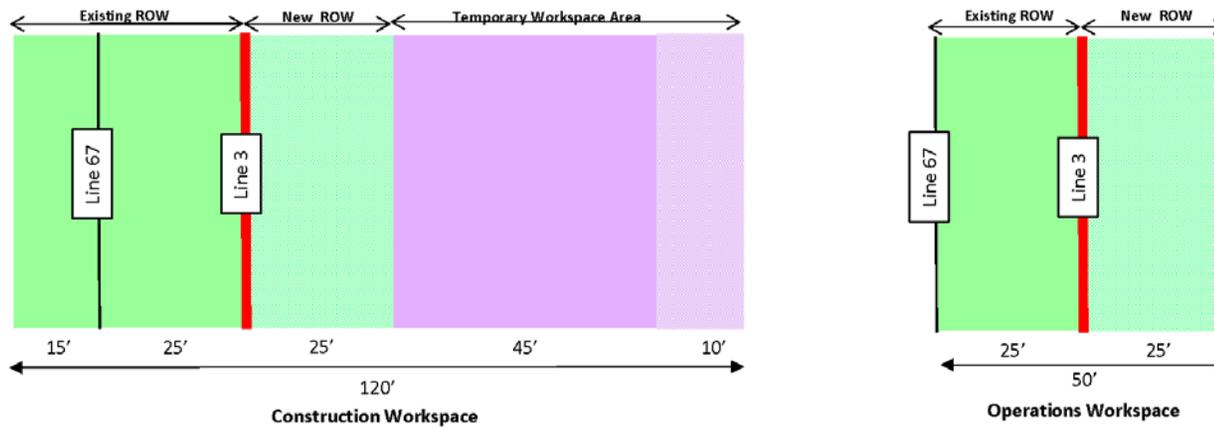


Figure 7.1.3-1b: West of Clearbrook Line 3 Construction and Operations Workspace in Wetlands

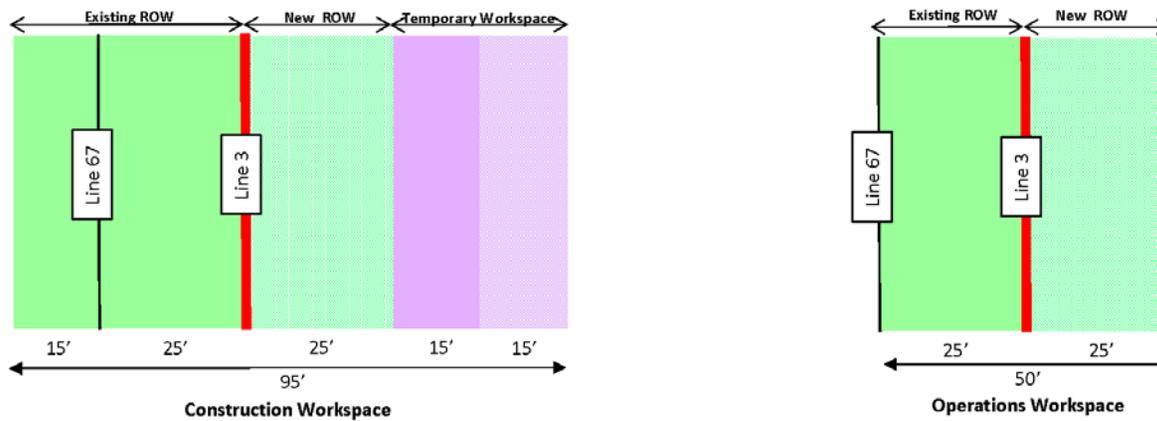


Figure 7.1.3-2a: East of Clearbrook Line 3 Construction and Operations Workspace in Uplands

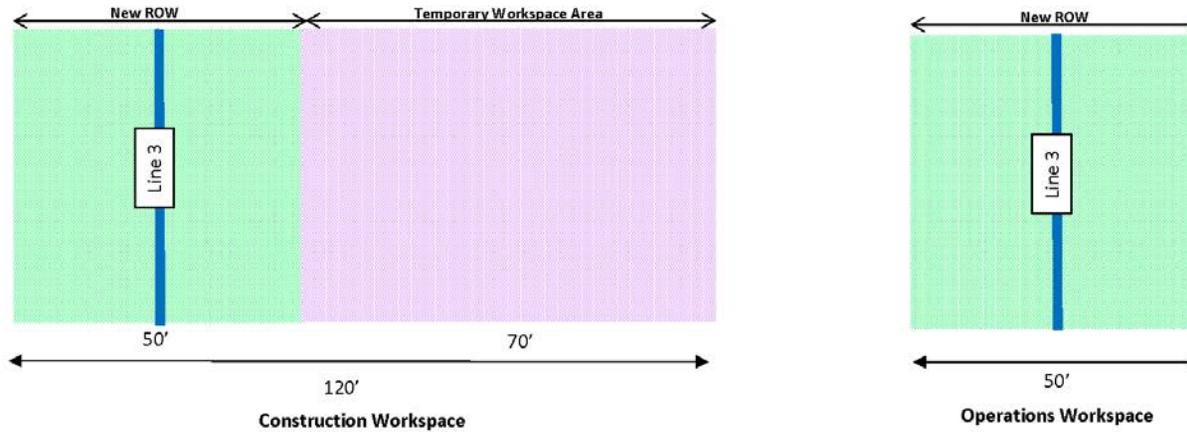


Figure 7.1.3-2b: East of Clearbrook Line 3 Construction and Operations Workspace in Wetlands

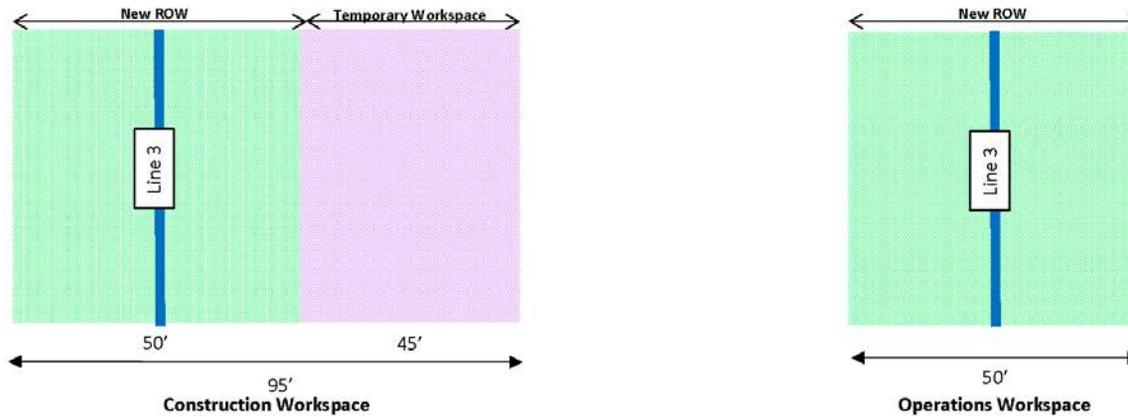


Figure 7.1.3-3a: East of Clearbrook Line 3 Construction and Operations Workspace in Uplands  
 (Assumes Sandpiper is Constructed First)

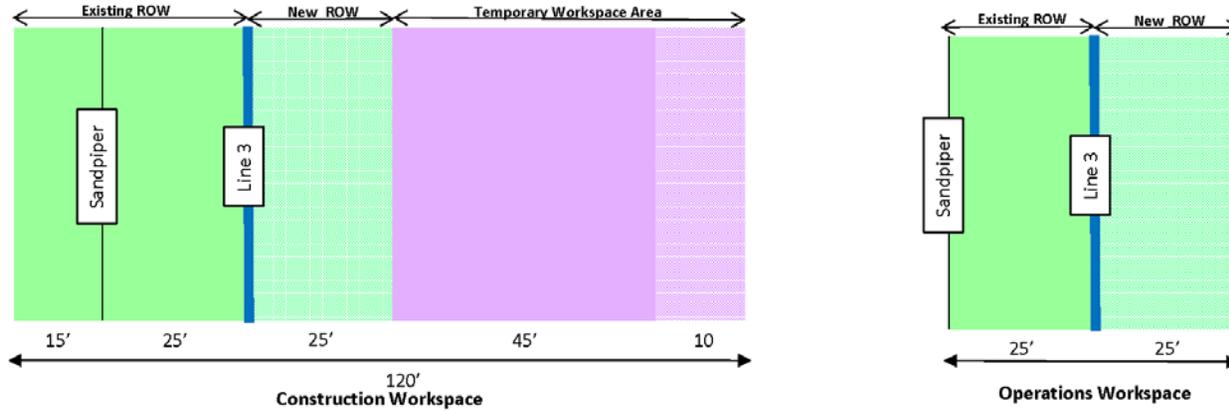
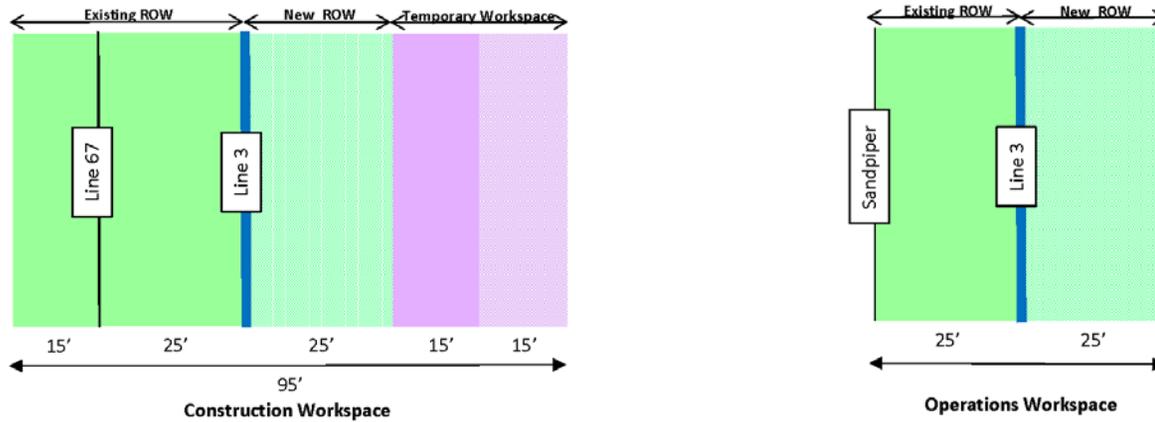


Figure 7.1.3-3b: East of Clearbrook Line 3 Construction and Operations Workspace in Wetlands  
 (Assumes Sandpiper is Constructed First)



**7.1.4 ASSOCIATED FACILITIES IMPACTS**

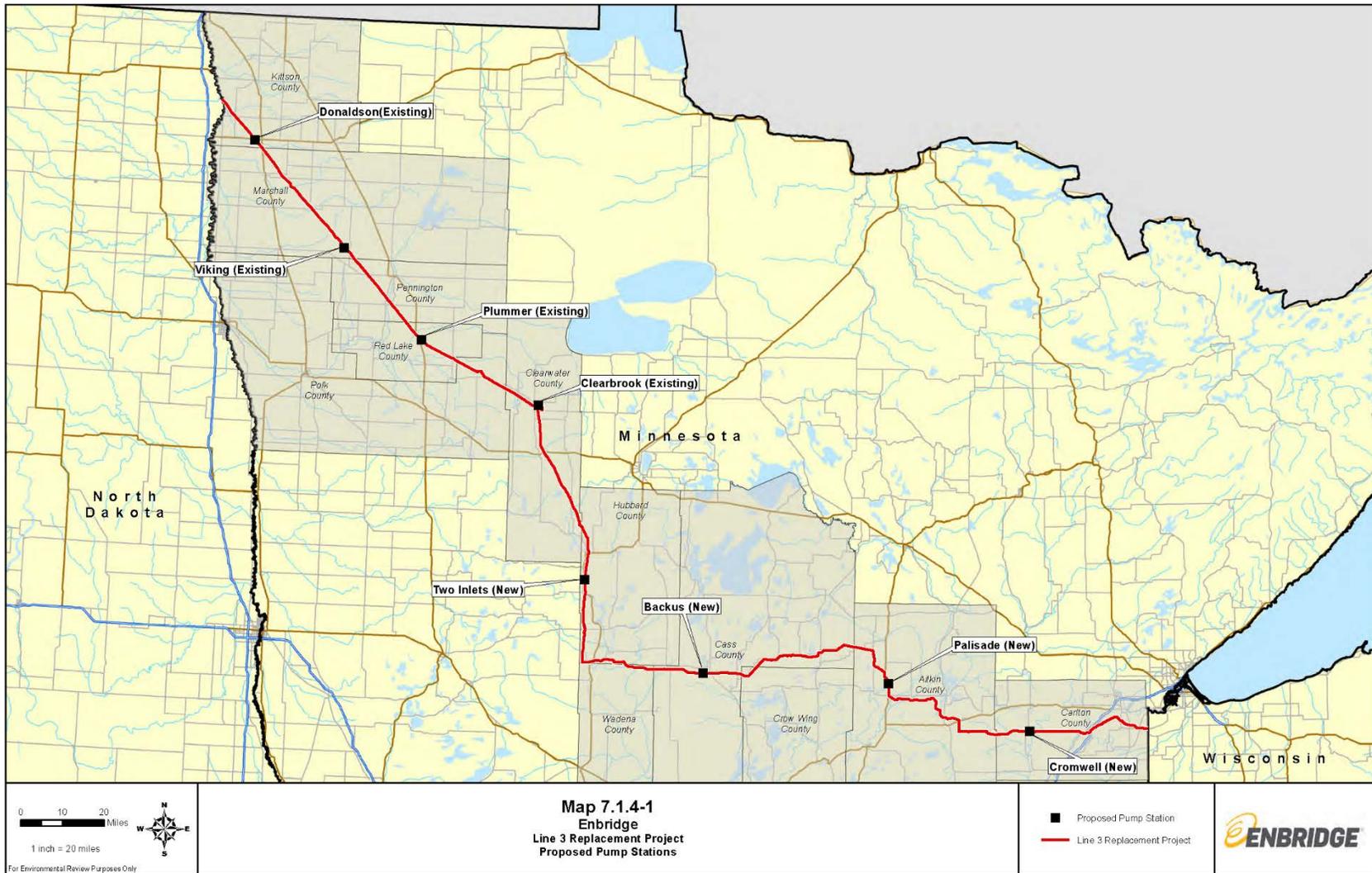
As described in Section 4.0, Enbridge plans to install eight pump stations (four adjacent to existing pump stations and four greenfield sites) and 27 mainline valves for the Project (Table 7.1.4-1). Four of the pump stations will be built at locations where construction is currently ongoing related to Line 67 pump stations (gray-shaded cells in Table 7.1.4-1; Map 7.1.4-1). Enbridge assessed environmental impacts at the four co-located pump stations based on the assumption that co-located pump stations will be in place prior to construction of the Project. Mainline valves will be placed per 49 C.F.R. Part 195, which includes near major waterbody crossings and other features along the Preferred Route. Further details about resource-specific impacts related to pump stations and valves are provided in Sections 7.5 (Land Use), 7.8 (Soils), 7.12 (Threatened and Endangered Species), and 7.14 (Wetlands).

TABLE 7.1.4-1 Proposed Associated Facilities for the Line 3 Replacement Project <sup>a</sup>			
County	Facility	Approximate Milepost	Approximate Acreage
Kittson	Donaldson Pump Station	25.1-W	6.8
Marshall	Viking Pump Station	59.4-W	7.3
Red Lake	Plummer Pump Station	88.3-W	7.3
Clearwater	Clearbrook Terminal	121.5-W	20.0
Hubbard	Two Inlets Pump Station	45.6-E	5.8
Cass	Backus Pump Station	96.1-E	7.4
Aitkin	Palisade Pump Station	150.8-E	6.0
Carlton	Cromwell Pump Station	195.5-E	5.8
Various	Valves	TBD	14.25 <sup>b</sup>
Various	Other Associated Facilities (e.g., densitometer/viscometer)	TBD	0.75

<sup>a</sup> Facility locations are preliminary and subject to change based on engineering design.  
<sup>b</sup> Based on a 1-acre footprint east of Clearbrook and a 0.25-acre footprint west of Clearbrook.



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## 7.2 HUMAN SETTLEMENT

### 7.2.1 EXISTING ENVIRONMENT

#### Human Population and Socioeconomics Conditions

This section provides a description of the existing human settlement and populated area conditions in the counties crossed by the Project. Comprehensive land use plans have been established in all 12 counties crossed by the Project: Kittson, Marshall, Pennington, Polk, Red Lake, Clearwater, Hubbard, Wadena, Cass, Crow Wing, Aitkin, and Carlton.

Enbridge reviewed 2010 and 2013 U.S. Census Bureau data and estimates, as well as 2014 Minnesota Department of Employment and Economic Development Local Area Unemployment Statistics, to gather information on existing population data in the 12 counties crossed by the Project. Table 7.2.1-1 presents information on current socioeconomic conditions.

State/County	Population Estimate <sup>a</sup>	Population Density (people per sq. mile) <sup>a</sup>	Per Capita Income <sup>a</sup>	Civilian Labor Force <sup>b</sup>	Unemployment Rate (percent) <sup>b</sup>	Major Employment Industries <sup>a</sup>							
						Educational, health, and social services	Retail trade	Manufacturing	Professional and technical services	Agriculture, forestry, fishing and hunting, and mining	Wholesale trade	Construction	Arts, entertainment, recreation, accommodation, and food services
Minnesota	5,422,060	66.6	\$30,913	2,985,228	3.7	X	X	X	X				
Kittson	4,503	4.1	\$26,927	2,735	4.2	X	X	X		X			
Marshall	9,425	5.3	\$26,834	5,875	7.3	X	X	X		X			
Pennington	14,118	22.6	\$24,554	10,004	5.7	X	X	X			X		
Polk	31,569	16.0	\$25,790	18,079	3.9	X	X	X					
Red Lake	4,057	9.5	\$23,257	2,350	5.3	X		X			X		
Clearwater	8,838	8.7	\$22,157	4,383	10.7	X	X						
Hubbard	20,658	22.1	\$24,880	9,009	7.1	X	X	X					
Wadena	13,804	25.8	\$20,329	6,228	6.6	X	X	X				X	
Cass	28,555	14.1	\$25,287	13,482	7.5	X	X						X
Crow Wing	63,208	62.6	\$26,527	31,946	5.9	X	X	X					X
Aitkin	15,742	8.9	\$24,939	7,166	6.3	X	X	X				X	X
Carlton	35,460	41.1	\$24,434	17,606	5.0	X	X	X					X

<sup>a</sup> U.S. Census Bureau, <http://quickfacts.census.gov>, 2013 (estimated population); 2010 (population density); 2009-2013 (per capita money income 2013 USD)

<sup>b</sup> Minnesota Department of Employment and Economic Development, LAUS Data, December 2014 [www.deed.state.mn.us](http://www.deed.state.mn.us)

Population densities in the counties affected by the Project average 20.1 people per square mile. All county-level population densities are lower than the Minnesota average of 66.6 people per square mile, reflecting the rural character of the Preferred Route.

County population levels within the Project area range from a low of 4,057 persons in Red Lake County to a high of 63,208 persons in Crow Wing County. Populations in Kittson, Red Lake, Wadena, and Aitkin Counties declined greater than 0.1 percent from 2010 to 2013, with Aitkin County experiencing the greatest overall loss at 2.6 percent.

In general, the Preferred Route avoids population centers. Thirteen municipalities are located within approximately one mile of the Preferred Route (Table 7.2.1-2), and three municipal boundaries will be crossed by the Preferred Route (gray-shaded cells in Table 7.2.1-2). All of the cities within one mile of the Preferred Route have populations of less than 1,400 persons. The largest community is Bagley in Clearwater County, with a population of 1,392 persons.

County/Municipality	Approximate Milepost	Population (2010) <sup>a</sup>
<b>Kittson</b>		
Donaldson (city)	26-W	42
<b>Marshall</b>		
Viking (city)	60-W	104
<b>Pennington</b>		
Saint Hilaire (city)	77-W	279
<b>Red Lake</b>		
Plummer (city)	87-W	292
Oklee (city)	98-W	435
<b>Polk</b>		
Trail (city)	106-W	46
Gully (city)	110-W	136
<b>Clearwater</b>		
Gonvick (city)	115-W	282
Clearbrook (city)	120-W	518
Bagley (city)	12-E	1,392
<b>Aitkin</b>		
Palisade (city)	159-E	167
McGregor (city)	172-E	391
<b>Carlton</b>		
Wrenshall (city)	222-E	399
<sup>a</sup> U.S. Census Bureau, <a href="http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml">http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml</a> ; 2010 Total Population		

The December 2014 unemployment rates in the Project area varied from 3.9 percent in Polk County to 10.7 percent in Clearwater County (compared to a statewide average of 3.7 percent) (see Table 7.2.1-1). Employment in the Project area is concentrated in the following sectors: education, health, and social services; retail trade; manufacturing; arts, entertainment, recreation, accommodation, and food services; agriculture, forestry, fishing and hunting, and mining; wholesale trade; and construction industries. The top employment industries in the counties crossed by the Preferred Route are education, health, and social services; retail trade; and manufacturing. Per capita income in 2013 ranged from \$20,329 in Wadena County to \$26,927 in Kittson County. In general, per capita income is lower in rural counties with low population densities and high unemployment rates, and per capita income is higher in urban counties with high population densities and low unemployment rates.

Economies along the Preferred Route include agriculture, forestry, mining operations, and recreation and tourism. No commercial or industrial operations are present along the Preferred Route. As discussed under Section 7.5, there are approximately 2,385.5 acres of forested land and 2,057.3 acres of agricultural land within the Project construction workspace. As discussed elsewhere, some of this land will already have been disturbed by previous Enbridge-affiliated projects.

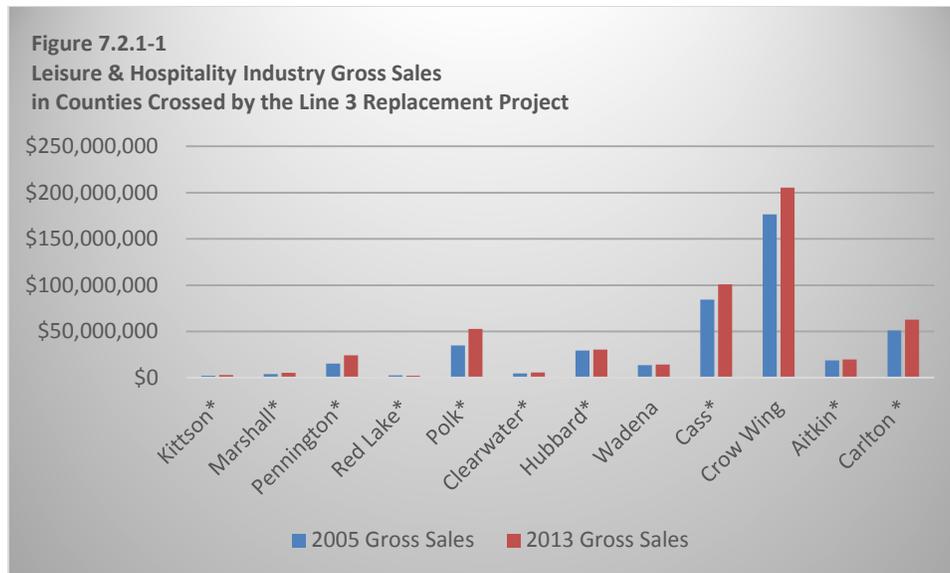
With respect to mining operations, Enbridge has identified 33 possible mining and mineral resources crossed by or within 1,500 feet of the construction workspace. This includes 25 gravel pits, one sand pit, and seven tracts associated with metallic mineral leases (see Section 7.7). Of the 25 possible gravel pits, two are crossed by the Preferred Route, and the other 23 are within 1,500 feet (see Table 7.7.1-2).

With respect to recreational economies, the Project will not cross any federal parks or state parks. As discussed in Section 7.6, the Project will cross the North Country Scenic Trail and three state-designated trails, namely the Paul Bunyan State Trail, the Willard Munger State Trail, and the Hunter Walking Trail system. The Project will also cross four canoe and boating routes. In addition, the Project will cross county-administered park land in Aitkin County, as well as county-administered lands, which may provide recreational opportunities, such as hunting and fishing, in Clearwater, Hubbard, Cass, Crow Wing, Aitkin, and Carlton counties. The Project will also cross the following designated scenic byways: Kings of Trails Scenic Byway; Lake County Scenic Byway; the Great River Road; and Veterans Evergreen Memorial Scenic Byway (see Section 7.6). Travel and tourism within the leisure and the hospitality sector in Minnesota generate the following figures (Explore Minnesota Tourism 2015).

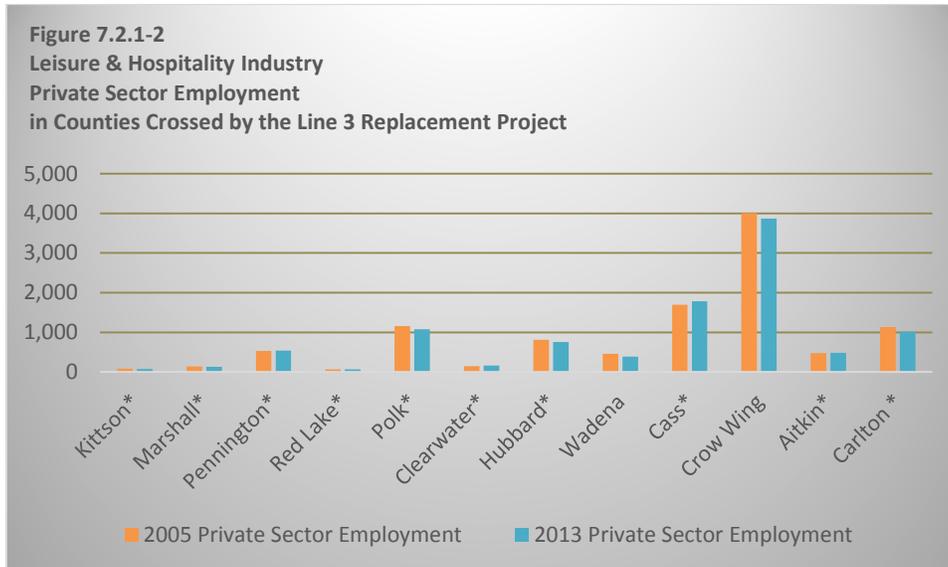
- \$13 billion in gross sales (more than \$35 million a day)

- 250,000 full- and part-time jobs (11% of total private sector employment)
- Almost \$4.5 billion in wages
- \$840 million in state sales tax (17% of state sales tax revenues)

Gross sales of leisure and hospitality for counties crossed by the Project are presented below (Figure 7.2.1-1). With the exception of Red Lake County, all counties experienced an increase in gross sales from 2005 to 2013. Counties denoted with an asterisk (\*) are also crossed by the existing Enbridge Mainline System.



Private sector employment numbers within the leisure and hospitality sector for counties crossed by the Project are presented below (Figure 7.2.1-2). Seven of the 12 counties experienced a decrease in private sector employment within the leisure and hospitality industry from 2005 to 2013. Counties denoted with an asterisk (\*) are also crossed by the existing Enbridge Mainline System.



## 7.2.2 CONSTRUCTION IMPACTS AND MITIGATION

### Human Populations

Enbridge has been working with private landowners and has initiated consultations with affected watershed districts, counties, and state land-managing agencies to ensure that the Project is designed and constructed in a manner that is consistent with the appropriate land use plans.

### Socioeconomics

Enbridge anticipates that construction of the Project will provide temporary beneficial impacts to local economies during construction. Enbridge, through construction contractors and subcontractors, will hire local workers where the local workforce possesses the required skills. Construction of the Project will benefit local economies through expenditures for wages, purchases of materials, and taxes.

Construction of the Project will temporarily impact agriculture in the areas crossed by the Preferred Route, because agricultural land in the construction workspace will generally be taken out of production for one growing season. Landowners will be compensated for crop losses and damages caused by construction activities.

Although construction of the Project will have temporary and permanent impacts on forested lands, Enbridge does not anticipate that the forestry industry will be impacted because the clearing of the ROW and workspaces areas will not appreciably reduce the lands available to forestry. As described in Sections 7.5 and 7.9, Enbridge will clear trees and woody shrubs from the permanent and temporary ROWs and additional temporary workspaces (ATWS). Woody

shrubs and trees will be allowed to regenerate naturally within the temporary construction workspace, however, Enbridge will maintain the 50-foot permanent ROW by removing woody shrubs and trimming branches overhanging the ROW approximately every five years. Landowners (including MNDNR; see Section 7.6) will be compensated for the value of any merchantable timber.

With respect to mining operations, construction would preclude operations within the construction workspace at the two possible gravel pits crossed by the Project, if actively mined (see Section 7.7). Compensation may be required for mining disruptions. The Project also crosses seven parcels where county metallic mineral leases have been granted to Kennecott Exploration Company (Kennecott) (see Section 7.7). Enbridge is not aware that Kennecott has engaged in any mineral extraction activities within the parcels crossed by the Project. Enbridge is presently working with Kennecott, Carlton County, and MNDNR to seek a resolution to routing in this area so that future mining activities will not be encumbered. Compensation may be required for resource encumbrances not avoided.

With respect to recreational economies and travel and tourism within the leisure and the hospitality sector, construction is expected to have localized, minor, and temporary impacts. Enbridge will maintain public access to recreational areas to the extent safe and practicable during construction. Access to areas within the construction workspace may be temporarily limited or restricted. In addition, public access and use of trails may be temporarily restricted during pipeline installation (see Section 7.6). The influx of temporary works will presumably have a positive impact on the local service and hospitality industry.

### **7.2.3 OPERATIONS IMPACTS AND MITIGATION**

#### Human Populations

No long-term effects on human settlements or populated areas are expected as a result of Project operations and maintenance. Enbridge will consult with local government units to ensure that areas impacted by the Project will be restored.

#### Socioeconomics

Operation of the Project will likely require Enbridge to hire additional employees. Long-term economic benefits associated with operation of the Project will include increased tax revenues at the state and county levels in the form of property and/or ad valorem taxes. Annual local tax revenues for counties crossed by the Project will depend on the number of pipeline miles within the county and the placement of associated facilities, such as pump stations.

Agricultural economies will not be permanently impacted by the Project. The Project is not expected to impact soil productivity, and access to crop land and livestock operations will be maintained during operations and maintenance activities.

The Project will not have permanent economic impacts on forestry because, other than the permanent ROW, the construction workspace will be allowed to regenerate naturally. The 991.5 acres of forested lands on the permanent ROW that will be maintained clear of trees and woody shrubs approximately every five years do not represent an appreciable reduction in lands available to the forestry industry.

Because recreational activities within the Preferred Route will not be permanently impacted by the Project, no permanent economic impacts are anticipated. Operation of the Project is not expected to impact travel and tourism. Continued growth in gross sales is expected for counties crossed by the Project (similar to the counties crossed by the Enbridge Mainline System).

The Project may impact future mining activities at the two possible gravel pits and seven parcels where county metallic mineral leases have been granted to Kennecott crossed by the Preferred Route, if actively mined (see Section 7.7). Because Enbridge is not aware of other potentially recoverable mineral resources within the Preferred Route, Enbridge does not currently anticipate that the operation of the Project will otherwise impact mining operations.

### 7.3 TRANSPORTATION

#### 7.3.1 EXISTING ENVIRONMENT

##### Roads

The Project will cross federal, state, county, city/township, and private/commercial roads. In total, the Preferred Route will cross an estimated 417 roads as summarized in Table 7.3.1-1; a complete list of the expected road crossings is included in Appendix L.

Segment	County	State or Federal	County/City	Private/Commercial
West of Clearbrook	Kittson	2	20	0
	Marshall	0	50	4
	Pennington	2	25	12
	Red Lake	1	15	2
	Polk	1	11	6
	Clearwater	0	8	1
<i>West Total</i>		<b>6</b>	<b>129</b>	<b>25</b>
East of Clearbrook	Clearwater	3	26	6
	Hubbard	4	31	28
	Wadena	0	4	3
	Cass	5	26	21
	Crow Wing	0	2	3
	Aitkin	3	25	24
	Carlton	5	29	9
<i>East Total</i>		<b>20</b>	<b>143</b>	<b>94</b>
<b>Project Total</b>		<b>26 (6.2%)</b>	<b>272 (65.2%)</b>	<b>119 (28.5%)</b>
<b>417</b>				

Railroads

The Project will cross railways at nine locations in Kittson, Marshall, Pennington, Red Lake, Polk, Clearwater, Hubbard, Aitkin, and Carlton counties as identified in Table 7.3.1-2.

TABLE 7.3.1-2 Railroads Crossed by the Line 3 Replacement Project					
County	Milepost	Description	Township	Range	Section
Kittson	27.7-W	BNSF	159	48	31
Marshall	57.7-W	Northern Plains	155	45	20
Pennington	75.1-W	Minnesota Northern Railroad, Inc.	153	43	29
Red Lake	87.0-W	Canadian Pacific Railway	151	42	9
Polk	107.9-W	Canadian Pacific Railway	150	39	28
Clearwater	12.2-E	BNSF	147	37	28
Hubbard	68.2-E	BNSF (Inactive)	139	35	34
Aitkin	175.3-E	BNSF	48	23	22
Carlton	226.6-E	BNSF	48	15	31

Airports

According to data from the Minnesota Department of Transportation (MNDOT), there are two airports located within one mile of the Preferred Route – the Bagley Municipal Airport in Clearwater County near MP 12.6-E and the McGregor – Isedor Iverson Airport in Aitkin County near MP 172.2-E. According to data from the Federal Aviation Administration (FAA), there is a third airport within one mile – Sky Manor Estates in Hubbard County near MP 49.0-E. No airports are crossed by the Preferred Route.

**7.3.2 CONSTRUCTION IMPACTS AND MITIGATION**

Roads

Construction activities could result in short-term impacts to transportation infrastructure and traffic. The traffic volume along roads close to the pipeline could increase due to the movement of construction equipment, material, and crew members. Temporary road closures also may be required; however, Enbridge will try to avoid road closures during peak-traffic periods. Impacts to local traffic levels during construction will be temporary and minor. Construction across any paved roads, highways, or roadways will be subject to the requirements of the necessary state and local permits. Enbridge will obtain these permits prior to the start of construction.

To minimize impacts to traffic, all paved roads and all active railroads will be crossed by boring underneath the road. Using this construction technique will prevent the need for road closures

and allow traffic to operate normally. Boring techniques will minimize direct impacts to the road; however, construction on the portions of the pipeline that parallel the road could result in increased traffic. These impacts will be temporary, occurring only during construction.

The open-cut construction method typically will be used for unpaved roads (approximately 82% of road crossings are unpaved roads). This construction method will require temporary closure and detours. If no reasonable detour is available, at least one traffic lane will be maintained, except for brief periods during installation of the pipe. Disturbances at each open-cut road crossing will typically be limited to one day and are not expected to have a substantial effect on local traffic patterns. All necessary safety measures such as detours, warnings, traffic control, and safety signs will be implemented as prescribed by federal, state, and local (county) departments of transportation. Enbridge will attempt to avoid road closures during peak-traffic periods.

Access to most of the construction workspace will be obtained using pre-existing public and private roads. Any damage to roads due to project construction-related activities will be repaired by Enbridge to the extent practicable.

#### Railroads

Enbridge plans to cross the eight active railroads using construction methods that will allow the railroads to remain operational during construction (see Table 7.3.1-2).

#### Airports

FAA requires that the potential to obstruct air traffic be evaluated for Projects located near regulated airports. FAA must receive prior notification regarding construction of a structure under 14 C.F.R. Part 77 and requires confirmation of impact avoidance with airport officials. Enbridge will consult with FAA and the MNDOT Office of Aeronautics regarding construction techniques and potential construction impacts during the permitting process.

### **7.3.3 OPERATIONS IMPACTS AND MITIGATION**

#### Roads

The function of roads will be restored after construction including, but not specifically limited to: vehicular traffic that may have been impeded during construction will resume normal flow, damage to the road surface caused by construction will be restored to pre-existing conditions, and access points installed to facilitate ingress/egress to the construction workspace will be removed and effected area restored. In addition, any temporary impacts resulting from Project maintenance activities that may require excavation will also be mitigated, and the function will be restored. No long-term effects are expected on roads crossed by the Preferred Route.

Railroads

The function of railroads will be maintained during construction and operations. No long-term effects are expected on railroads crossed by the Preferred Route.

Airports

The Project does not cross any airports; therefore, no long-term effects are expected on airports.

## **7.4 NOISE**

### **7.4.1 EXISTING ENVIRONMENT**

Four pump stations (Donaldson, Viking, Plummer, and Clearbrook) will be built at locations where there are existing pump stations. Enbridge recently conducted Noise Impact Analyses at the Donaldson (Appendix M.1), Viking (Appendix M.2), and Plummer (Appendix M.3) locations and will utilize these analyses for the Project. Although baseline Noise Impact Analyses have been conducted at these locations, Enbridge is currently constructing new pump stations for Line 67 at these locations. This means that a new baseline cannot be measured until those stations become operational. Therefore, the projected noise contribution from the units under construction will be added to the pre-construction baseline to develop a new proxy baseline to which the noise contributions of the new Project pump stations will be added. Although a Noise Impact Analysis was also recently conducted for the Line 67 pump station currently under construction at the Clearbrook Terminal, the location of that project was determined to be too far from the Project's Clearbrook Pump Station and therefore a new Noise Impact Analysis will be conducted at this location in the spring of 2015. Noise Impact Analyses will also be conducted at the four greenfield pump station locations (Two Inlets, Palisade, Backus, and Cromwell) in the spring of 2015. Enbridge conducts Noise Impact Analyses to ensure sound levels are consistent with local requirements, MPCA Standards (Appendix M.4), and Enbridge Design and Equipment Standards. If noise levels may exceed MPCA Standards, local regulations, or Enbridge Design and Equipment Standards, noise mitigation measures will be added to the pump station design.

### **7.4.2 CONSTRUCTION IMPACTS AND MITIGATION**

The heavy equipment needed to construct the Project will have a short-term impact on noise levels in the vicinity of the construction workspace. Typical pipeline construction equipment (including bulldozers, loaders, backhoes, and sideboom tractors) generate from 80 to 90 A-weighted decibels (dBA) within 50 feet of the equipment. The equipment noise will be limited to the period of construction. Because the Preferred Route crosses primarily rural and undeveloped areas, the general public should experience limited nuisance noises. Noise levels in such areas are expected to range from 30-40 dBA, with higher baseline levels in more developed sections. Equipment noise would be expected to decay to levels within state daytime residential standards (<60 dBA) within 500 to 1500 feet depending on initial source level. In the vicinity of residential areas, the contractor will take all reasonable measures to control construction-related noise.

### 7.4.3 OPERATIONS IMPACTS AND MITIGATION

Following completion of construction, noise will not be generated by the pipeline during normal operations. Maintenance activities on the permanent ROW, such as excavation or mowing, may generate temporary and intermittent noise emissions.

Additional operational noise will be generated by the expansion of the four pump stations and the greenfield pump stations. Field measurements of baseline sound levels will be taken at the nearest receptors (residences, churches, schools, hospitals, and other places of human occupancy) prior to installation of all new pumping stations. Enbridge has completed Noise Impact Analyses for three pump stations (Appendices M.1, M.2, and M.3), and will complete Noise Impact Analyses on the remaining five pump stations in the spring of 2015. Using the baseline sound level data, the future sound levels will be projected by adding the sound profile of the new equipment. A predicted future sound level will be determined, and this is evaluated to determine what (if any) additional sound attenuation measures should be included in the design. Enbridge's standards, which exceed Minnesota Rules 7030.0040, restrict the noise levels around neighboring dwellings and industrial facilities to 40 decibels, measured at a distance of 50 feet from the affected structure. Noise control is incorporated into the design if these levels are exceeded. Since the pumps and motors for the new station will be located inside a building, this is often sufficient to mitigate noise. Additional noise mitigation measures may include insulation, acoustic louvers, and acoustic silencers. The status of sound measurement and reporting at each of the eight pump stations is summarized below.

#### Donaldson

The latest Noise Impact Study Report was issued on January 7, 2014 (Appendix M.1). Sound measurements were performed on November 1, 2013, to establish a baseline, and projected sound levels were calculated to represent operating conditions after the Line 67 station is built. That report will be the basis, and the projected sound sources from Project station equipment will be added to the projected levels in that report to determine what (if any) additional sound attenuation measures should be included in the design in order to meet MPCA and any local noise regulations. A new Noise Impact Analysis Report will be developed.

#### Viking

The latest Noise Impact Study Report was issued on May 15, 2013 (Appendix M.2). Sound measurements were performed on April 23, 2013, to establish a baseline, and projected sound levels were calculated to represent operating conditions after the Line 67 unit addition is built. That report will be the basis, and the projected sound sources from Project station equipment will be added to the projected levels in that report to determine what (if any) additional sound

attenuation measures should be included in the design in order to meet MPCA and any local noise regulations. A new Noise Impact Analysis Report will be developed.

#### Plummer

The latest Noise Impact Study Report was issued on January 10, 2014 (Appendix M.3). Sound measurements were performed on October 31, 2013, to establish a baseline, and projected sound levels were calculated to represent operating conditions after the Line 67 station is built. That report will be the basis, and the projected sound sources from Project station equipment will be added to the projected levels in that report to determine what (if any) additional sound attenuation measures should be included in the design in order to meet MPCA and any local noise regulations. A new Noise Impact Analysis Report will be developed.

#### Clearbrook

The latest Noise Impact Study Report was issued on May 16, 2013. Sound measurement were performed on April 23, 2013, to establish a baseline, and projected sound levels were calculated to represent operating conditions after the Line 67 unit additions are built. Due to the significant distance from the baseline sound measurements on April 23, 2013, this report will not be used as the basis for the projected sound sources from the new Project station equipment. A new baseline sound measurement study will be performed, and projected levels will be added in that report to determine what (if any) additional sound attenuation measures should be included in the design in order to meet MPCA and any local noise regulations. A new Noise Impact Analysis Report will be developed.

#### Two Inlets, Palisade, Backus, and Cromwell

These four stations will be constructed on greenfield sites. There are no existing Noise Impact Reports. In the spring of 2015, field sound measurements will be taken at the nearest receptors to establish a baseline, and projected sound levels from Project station equipment will be added to the measured levels to determine what (if any) additional sound attenuation measures should be included in the design in order to meet MPCA and any local noise regulations. Noise Impact Analysis Reports will be developed for each site.

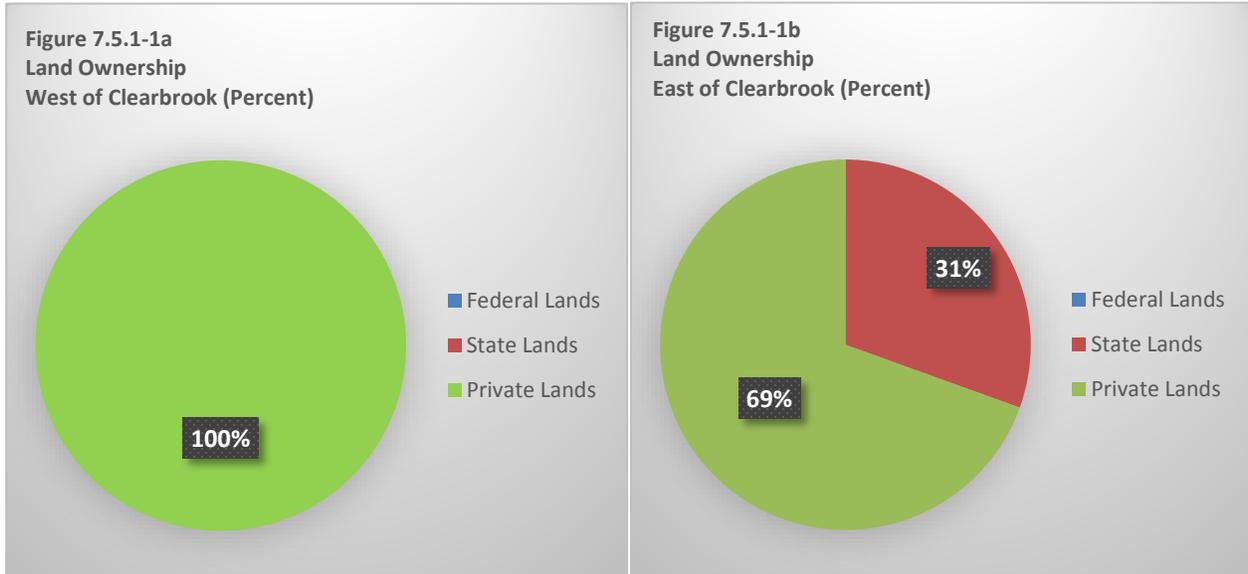
## 7.5 LAND USE

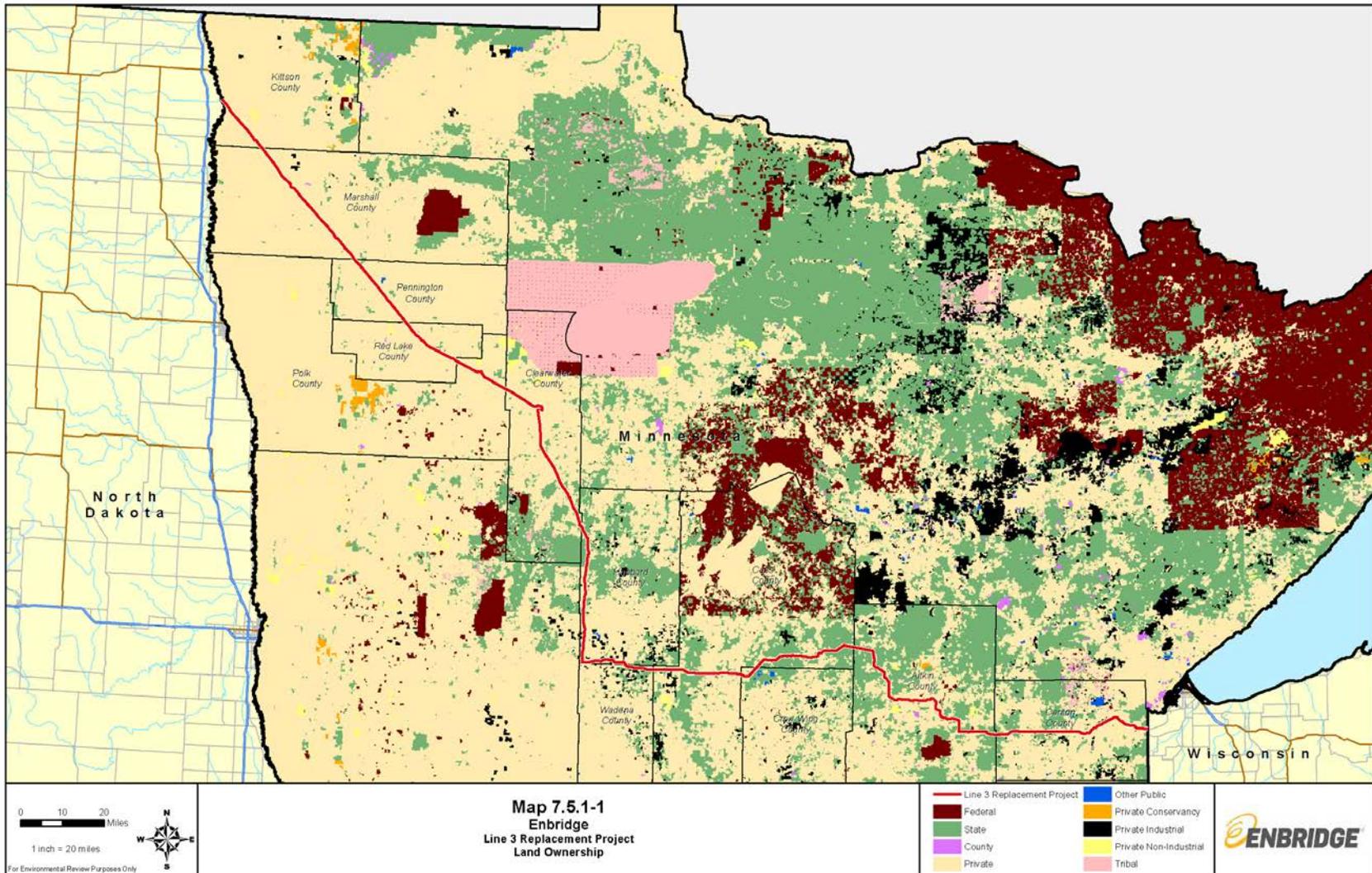
### 7.5.1 EXISTING ENVIRONMENT

#### Land Ownership

As shown in Table 7.5.1-1, Figure 7.5.1-1, and Map 7.5.1-1, the Preferred Route predominantly crosses private lands located outside of municipal areas (268.1 miles or approximately 79.5 percent of the Preferred Route). The Preferred Route also crosses state lands owned and managed by various state agencies (25.4 miles or 7.5 percent), and lands owned by the state but administered by the county (tax-forfeit lands) (43.8 miles or 13.0 percent). Public and designated lands are described in more detail in Section 7.6. The Preferred Route does not any cross tribally owned lands.

Ownership <sup>a</sup>	West of Clearbrook	East of Clearbrook	Project Total
Federal Lands	0	0 <sup>b</sup>	0 <sup>b</sup>
State Lands	0	25.4 (state-administered) 43.8 (county-administered)	25.4 (state-administered) 43.8 (county-administered)
Private Lands	110.5	157.6	268.1
<b>Total</b>	<b>110.5</b>	<b>226.8</b>	<b>337.3</b>
<sup>a</sup> Source: MNDNR 2008a GAP Stewardship dataset available on MNDNR's Data Deli. The GAP dataset has overlapping features, causing some crossings to be over-represented. Enbridge continues to consult with private landowners, counties, and state and federal agencies regarding the ownership of lands crossed by the Preferred Route.			
<sup>b</sup> The GAP Stewardship dataset (MNDNR 2008a) indicates that the Preferred Route impacts 0.5 miles of Federal Lands owned by the Federal Housing Administration and the U.S. Army Corps of Engineers (USACE) east of Clearbrook; however, title research indicates that this land is privately owned.			





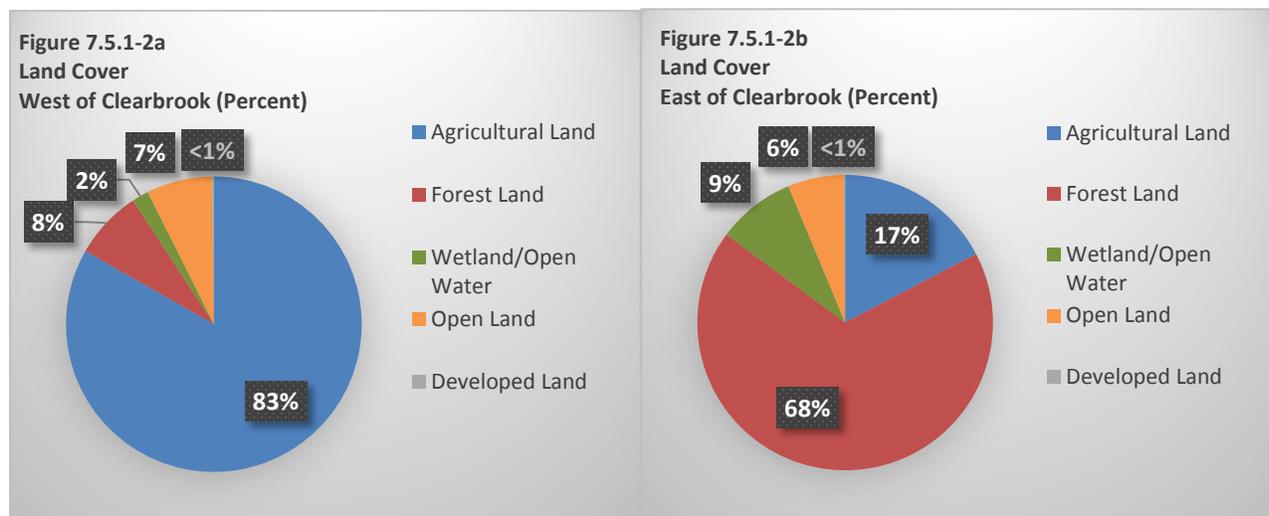
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Land Cover

Approximately 5,098.7 acres of land comprise the Project’s construction workspace as it crosses approximately 337.2 miles across Minnesota (Map 7.5.1-2). Land cover along the Preferred Route was classified using USGS Gap Analysis Program (GAP) digital data (USGS 2011). This data set includes detailed vegetation and land use patterns for the continental United States. The data set incorporates the Ecological Classification System developed by NatureServe to represent natural and semi-natural land cover (see also Section 7.9). For the Project, the land use classes in the data set were combined into the following five general categories based on prevalent land use and vegetation cover types: agricultural land, forest land, wetland/open water, open land, and developed land.

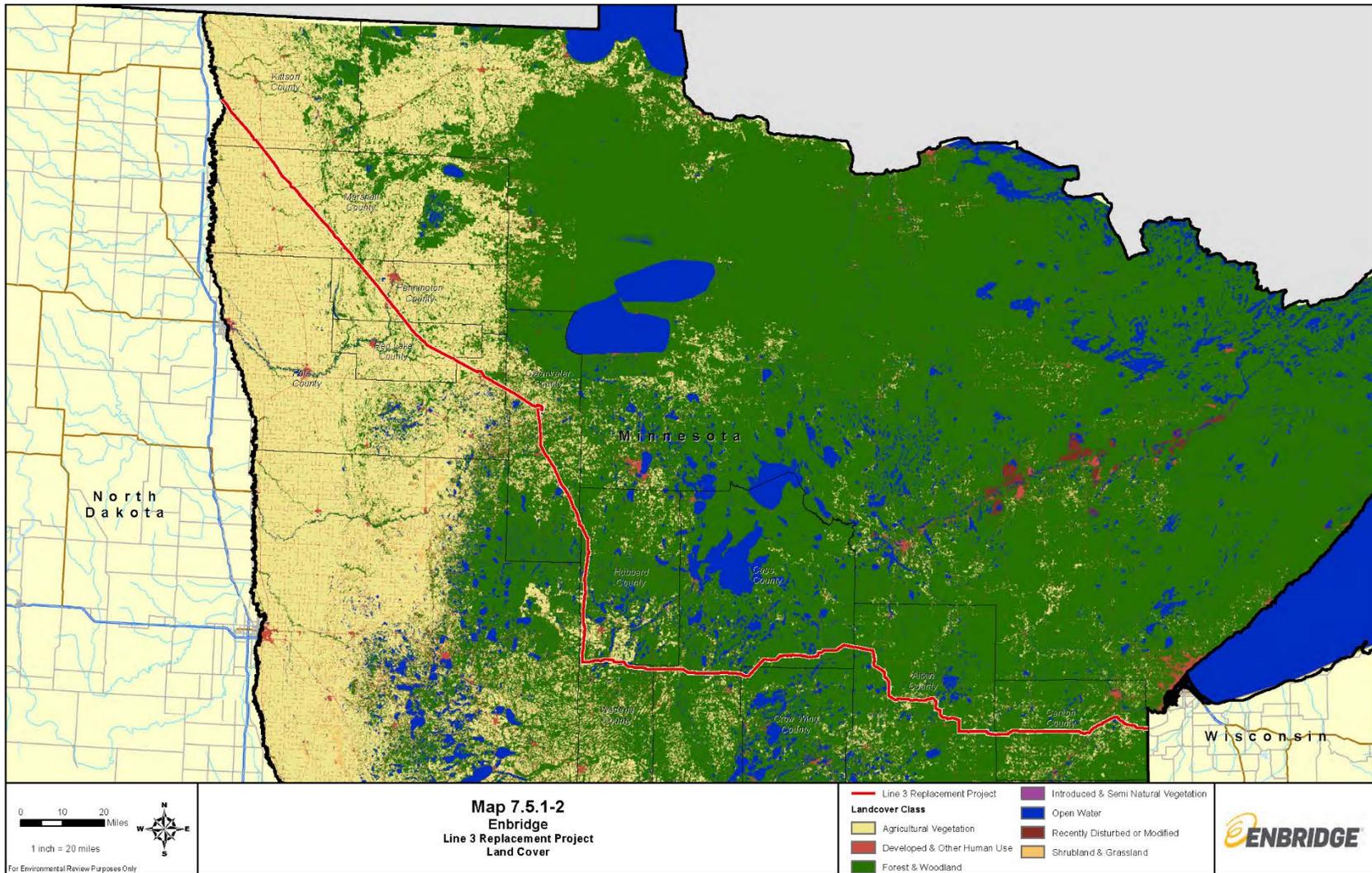
Agriculture	Forest	Wetland/Open Water	Open Land	Developed
<ul style="list-style-type: none"> <li>• Cultivated Cropland</li> <li>• Pasture/Hay</li> </ul>	<ul style="list-style-type: none"> <li>• Boreal Acidic Peatland Systems</li> <li>• Boreal Aspen-Birch Forest</li> <li>• Boreal Jack Pine-Black Spruce Forest</li> <li>• Boreal White Spruce-Fir-Hardwood Forest</li> <li>• Eastern Great Plains Tallgrass Aspen Parkland</li> <li>• Laurentian Pine-Oak Barrens</li> <li>• Laurentian-Acadian Northern Hardwoods Forest</li> <li>• Laurentian-Acadian Northern Pine-(Oak) Forest</li> <li>• Managed Tree Plantation</li> <li>• North-Central Interior Dry-Mesic Oak Forest and Woodland</li> <li>• North-Central Interior Maple-Basswood Forest</li> <li>• North-Central Interior Oak Savanna</li> </ul>	<ul style="list-style-type: none"> <li>• Central Interior and Appalachian Floodplain Systems</li> <li>• Central Interior and Appalachian Shrub-Herbaceous Wetland Systems</li> <li>• Central Interior and Appalachian Swamp Systems</li> <li>• Eastern Boreal Floodplain</li> <li>• Eastern Great Plains Floodplain Systems</li> <li>• Eastern Great Plains Wet Meadow, Prairie, and Marsh</li> <li>• Great Plains Prairie Pothole</li> <li>• Laurentian-Acadian Floodplain Systems</li> <li>• Laurentian-Acadian Swamp Systems</li> <li>• Open Water (Fresh)</li> <li>• Western Great Plains Depressional Wetland Systems</li> </ul>	<ul style="list-style-type: none"> <li>• Developed, Open Space</li> <li>• Harvested Forest - Grass/Forb Regeneration</li> <li>• Introduced Upland Vegetation - Perennial Grassland and Forbland</li> <li>• North-Central Interior Sand and Gravel Tallgrass Prairie</li> <li>• Northern Tallgrass Prairie</li> <li>• Recently Burned Shrubland</li> <li>• Recently Burned Shrubland</li> </ul>	<ul style="list-style-type: none"> <li>• Developed, High Intensity</li> <li>• Developed, Low Intensity</li> </ul>

Figure 7.5.1-2 shows the breakdown of land cover types for west and east of Clearbrook.





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Forest land is the predominant land use identified within the overall Project construction workspace, covering approximately 2,385.5 acres (or 46.8 percent).

Agricultural land comprises approximately 2,057.3 acres (or 40.3 percent) within the overall Project construction workspace.

Wetland/open water accounts for approximately 316.1 acres (or 6.2 percent) of the overall Project construction workspace.

Open land consists of approximately 332.3 acres (or 6.5 percent) within the overall Project construction workspace.

Developed land comprises approximately 7.5 acres (or 0.1 percent) of developed land within the overall Project construction workspace.

The land use impacts presented below under Construction Impacts and Mitigation and under Operations Impacts and Mitigation are based on USGS GAP digital data only (USGS 2011) and do not reflect information gathered from desktop assessments or field surveys. Project impacts based on field-verified survey data are covered below under resource-specific sections including Threatened and Endangered Species (Section 7.12), Wetlands (Section 7.14), Waterbodies (Section 7.15), and Cultural Resources (Section 7.16).

## **7.5.2 CONSTRUCTION IMPACTS AND MITIGATION**

### Land Ownership

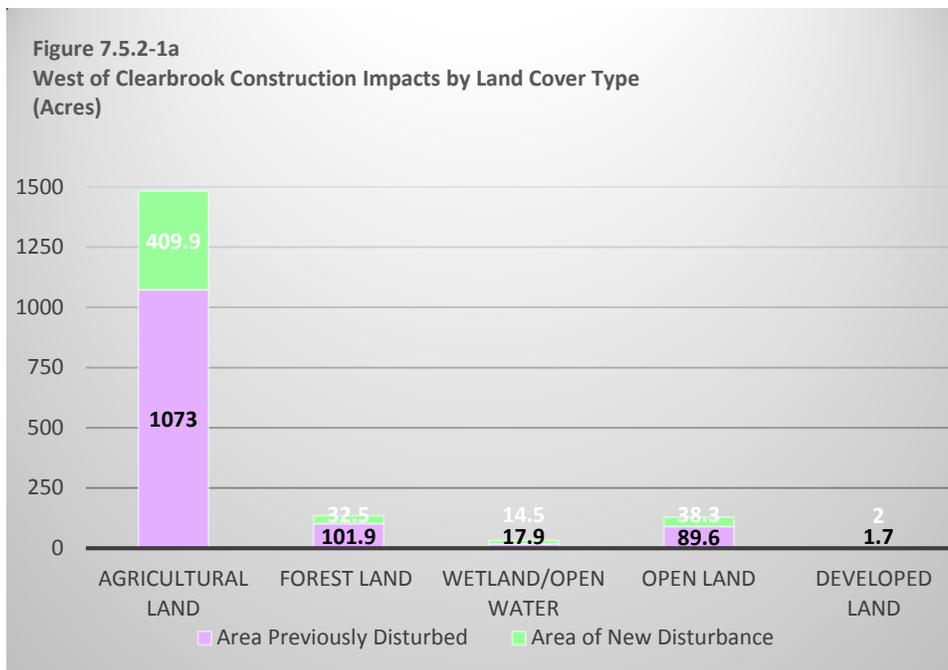
Enbridge has been working with private landowners and the appropriate county, state, and federal land-managing agencies to ensure that the Project is designed and constructed in a manner that is consistent with the necessary easements, permits, or licenses to cross these lands. As of April 13, 2015, easements had been acquired on 75 percent of the Preferred Route, including 92 percent of private tracts. As described in Section 7.1, public land-managing agencies were notified of the Project in November 2014. Communications with private landowners are described in Section 9.0.

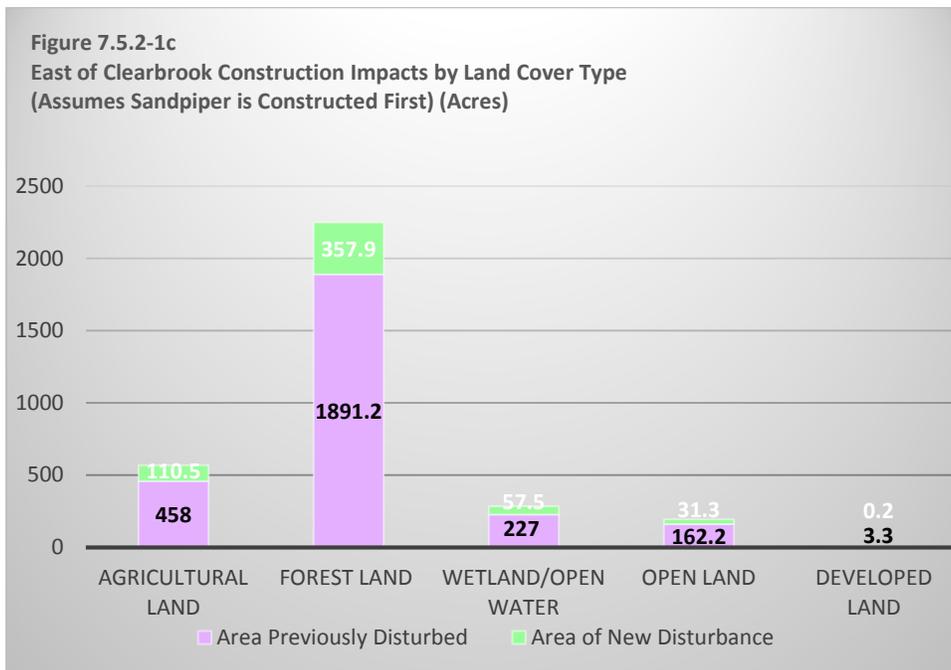
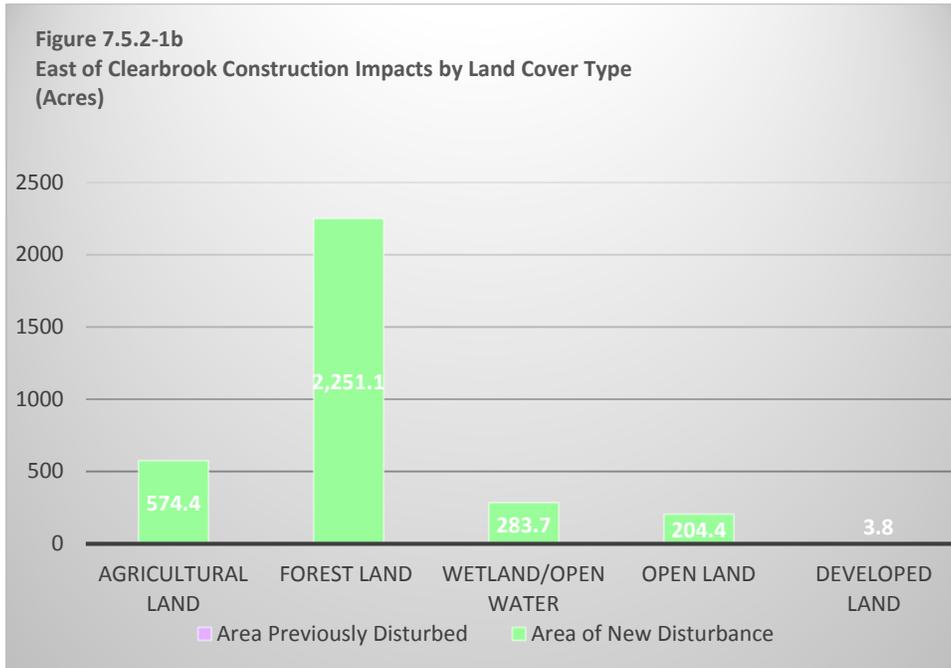
### Land Cover

Table 7.5.2-1 and Figure 7.5.2-1 summarize the breakdown by land use category of the potential construction impacts of the Project. Appendix N.1 provides a detailed breakdown by land use and county of the Project's potential construction impacts in Minnesota.

TABLE 7.5.2-1 Line 3 Replacement Project Construction Impacts by Land Cover Type							
Land Cover Type	West of Clearbrook		East of Clearbrook <sup>c</sup> New Disturbance (acres)	East of Clearbrook (Assumes Sandpiper is Constructed First)		Project Total <sup>d</sup> (West + East)	Project Total <sup>e</sup> (West + East Assumes Sandpiper is Constructed First)
	Area of Previous Disturbance (acres) <sup>a</sup>	Area of New Disturbance (acres)		Area of Previous Disturbance (acres) <sup>a</sup>	Area of New Disturbance (acres)		
	Total <sup>b</sup>			Total <sup>b</sup>			
Agricultural Land	1,073.0	409.9	574.4	458.0	110.5	2,057.3	2,051.4
	1,482.9			568.5			
Forest Land	101.9	32.5	2,251.1	1,891.2	357.9	2,385.5	2,383.5
	134.4			2,249.1			
Wetland/ Open Water	17.9	14.5	283.7	227.0	57.5	316.1	316.8
	32.4			284.4			
Open Land	89.6	38.3	204.4	162.2	31.3	332.3	321.4
	127.9			193.5			
Developed Land	1.7	2.0	3.8	3.3	0.2	7.5	7.2
	3.7			3.5			
<b>TOTAL<sup>f</sup></b>	<b>1,284.1</b>	<b>497.2</b>	<b>3,317.3</b>	<b>2,741.6</b>	<b>557.4</b>	<b>5,098.7</b>	<b>5,080.3</b>
	<b>1,781.3</b>			<b>3,299.0</b>			

<sup>a</sup> Area previously disturbed by construction of Enbridge's existing Line 67 or by Sandpiper (see Appendix N.1, Table N.1-1 and Table N.1-3).  
<sup>b</sup> 120-foot-wide typical area of impact where the Project is co-located with Line 67 or Sandpiper (see Appendix N.1, Table N.1-1 and N.1-3).  
<sup>c</sup> 120-foot-wide typical area of impact (see Appendix N.1, Table N.1-2). Assumes Line 3 is constructed first.  
<sup>d</sup> Total area of temporary construction impact east and west of Clearbrook. Assumes Line 3 is constructed first.  
<sup>e</sup> Total area of temporary construction impact east and west of Clearbrook if co-located with Sandpiper and Sandpiper is constructed first.  
<sup>f</sup> Numbers may not total consistently due to rounding. Calculations in this table are based on USGS GAP digital data (USGS 2011) only and do not reflect information gathered from desktop assessments or field surveys.





### **Agricultural Land**

The Project will result in 984.3 acres of new temporary disturbance within the 2,057.3 acres of total construction impacts on agricultural land in Minnesota (see Table 7.5.2-1). Construction within areas previously disturbed by Line 67 will impact 1,073.0 acres (see Table 7.5.2-1). Construction activities will temporarily utilize active cropland within construction work areas. Construction activities may also coincide with planting or harvesting, depending on the construction season. Following final restoration, agricultural activities may resume across the permanent ROW.

Enbridge will maintain access to fields, storage areas, structures, and other agricultural facilities during construction and will maintain irrigation and drainage systems that cross the construction workspace. If temporary access cannot be maintained, Enbridge will coordinate compensation with the landowner. Impacted drainage systems will be repaired in accordance with Enbridge's Agricultural Protection Plan (APP) (Appendix H). The APP was developed by Enbridge through consultation with the Minnesota Department of Agriculture (MDA) according to Minn. Statute 216B.243 Subd.7 (b). The APP is intended to identify measures that Enbridge will implement to avoid, mitigate, or provide compensation for negative agricultural impacts that may result from pipeline construction. The APP is not final; mitigation measures may change and/or need to be modified pending further consultation with MDA. Agricultural land in the construction workspace will generally be taken out of production for one growing season and restored to previous uses following construction. Landowners will be compensated for crop losses and other damages caused by construction activities.

Based on a review of publicly available information, including aerial photos along the Preferred Route and field review, Enbridge estimates that nine center-pivot irrigation systems will be crossed by the Project. Construction activities may interrupt the center-pivot irrigation systems, depending on the construction season. Irrigation systems that could be interrupted and result in crop damage or loss will be identified, and appropriate measures will be taken in accordance with the APP (Appendix H). Landowners will be paid 250 percent of the estimated one-year damage (construction-year average yield for the field that adjoins/abuts Enbridge's ROW and paid at said year current market prices). The 250 percent payment assumes loss of productivity on the following schedule: Year One = 100 percent; Year Two = 75 percent; Year Three = 50 percent; and Year Four = 25 percent.

To prevent soil compaction, drainage alteration, and damage to crops, operation of equipment on agricultural lands will be limited to access routes agreed upon with landowners. Enbridge will implement measures to avoid, minimize, or mitigate potential impacts on soil productivity in accordance with the APP (Appendix H). These measures include erosion control, topsoil segregation, rock removal, and measures to avoid compaction or loosen compacted soils.

During construction, Enbridge will work with landowners to ensure safety of livestock. Enbridge may erect temporary fences or other exclusionary techniques as needed before construction to limit livestock access to the ROW and after construction to promote effective restoration. The exclusionary techniques will minimize livestock impacts to impaired waterbody crossings (as described under Section 7.15) and help ensure effective restoration<sup>5</sup>. Enbridge is unable to require landowners to exclude livestock from their property upon completion of restoration.

Enbridge identified organic farms through consultation with MDA and public outreach activities. As of February 27, 2015, Enbridge had identified two organic farms along the Preferred Route (both east of Clearbrook, and both landowners have signed easement agreements). Appendix A of the APP (Appendix H) sets forth mitigation measures that will be applied specifically to Organic Agricultural Lands, such as Organic Certified farms or farms that are in active transition to becoming Organic Certified, to address the unique management and certification requirements of these operations. Enbridge will continue to work with affected landowners to identify organic farms that have not been identified to date and will implement mitigation measures accordingly.

### **Forest Land**

Construction of the Project will result in approximately 2,283.6 acres of new temporary impact within the 2,385.5 acres of total construction impacts on forest land in Minnesota (see Table 7.5.2-1). Construction within areas previously disturbed by Line 67 will impact 101.9 acres (see Table 7.5.2-1). After construction, tree regeneration will be permitted to occur naturally in the cleared forest land in the temporary construction workspace (approximately 1,394 acres).

Localized short- and long-term impacts will result from construction of the Project through forested areas. Trees and brush will be removed from the construction workspace. Overlapping the construction workspace with the existing permanent ROW and areas previously disturbed by construction to the greatest extent possible minimizes impacts on forest land. Forest impacts are discussed further in Sections 7.9 and 7.10.

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<sup>5</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

Enbridge will compensate MNDNR for any merchantable timber loss on state-managed forest lands. Compensation for merchantable timber on private lands is agreed upon between Enbridge and the landowner during easement acquisition. The value of merchantable timber is determined through discussions with the landowner and appraisals as needed. The construction and operation of the pipeline will prevent future use of the permanent ROW to produce merchantable timber; however, landowners (including the state) will be compensated for the value of the land within the permanent easement.<sup>6</sup>

### **Wetlands and Open Water**

The Project will result in approximately 298.2 acres of new temporary impact within the total 316.1 acres of wetlands and open water during construction in Minnesota (see Table 7.5.2-1). Construction within areas previously disturbed by Line 67 will impact 17.9 acres (see Table 7.5.2-1). Enbridge has reduced the construction workspace width to 95 feet when crossing wetlands and waterbodies to reduce impacts. Construction impacts associated with wetland and waterbody crossings are discussed in Sections 7.14 and 7.15.

### **Open Land**

Construction of the Project will result in approximately 242.7 acres of new temporary impact within the 332.3 acres of total construction impacts on open land in Minnesota (see Table 7.5.2-1). Construction within areas previously disturbed by Line 67 will impact 89.6 acres (see Table 7.5.2-1). After final construction clean-up, the open land in upland areas will be restored. Restoration and revegetation measures are outlined in Section 5.9.

### **Developed Land**

The Project will result in approximately 5.8 acres of new temporary impact within the total 7.5 acres of developed land in Minnesota (see Table 7.5.2-1). Construction within areas previously disturbed by Line 67 will impact 1.7 acres (see Table 7.5.2-1).

Based on examination of aerial photographs, there is one residence within 50 feet of the construction workspace and 180 residences within 500 feet of the construction workspace (Table

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<sup>6</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

7.5.2-2). Three of the 38 residences west of Clearbrook will be newly affected by the Project (i.e., not previously affected by construction of Line 67).

<b>TABLE 7.5.2-2 Residences within 50 and 500 Feet of the Construction Right-of-Way</b>				
County	West of Clearbrook		East of Clearbrook	
	500 Feet	50 Feet	500 Feet	50 Feet
Kittson	0	0	N/A	N/A
Marshall	5	0	N/A	N/A
Pennington	13	0	N/A	N/A
Red Lake	1	0	N/A	N/A
Polk	10	0	N/A	N/A
Clearwater	9	0	20	0
Hubbard	N/A	N/A	26	0
Wadena	N/A	N/A	1	0
Cass	N/A	N/A	16	0
Crow Wing	N/A	N/A	3	0
Aitkin	N/A	N/A	30	1
Carlton	N/A	N/A	46	0
<b>Total</b>	<b>38</b>	<b>0</b>	<b>142</b>	<b>1</b>

During construction, residences in proximity to construction activities may be exposed to short-term increases in construction-related noise and dust. Construction-related dust emissions will generally be of short duration and dependent on soil type, weather conditions, and the extent of ground disturbance. Some minor dust emission is inevitable on any construction project; however, the construction workspace and access roads near residential areas will be sprayed with water as needed to control dust during active construction. During periods of high winds, work may be temporarily suspended if control measures are ineffective and if dust is excessive for the area. After construction is completed, measures to stabilize and revegetate the ROW will prevent ongoing dust emissions.

The heavy construction equipment needed to construct the Project will generate unavoidable short-term increases in ambient noise levels. Typical bulldozers, trackhoes, and sideboom tractors used to install large-diameter pipelines generate 80 to 90 decibels within 50 feet of the equipment. Increases in ambient noise levels due to heavy equipment operation will be limited to the construction period. Construction activities will generally be limited to daylight hours.

#### Associated Facilities

Aboveground facilities associated with the Project, such as pump stations, will impact a total of approximately 71.2 acres during construction. Table 7.5.2-3 summarizes the breakdown by land

use category of the potential associated facility impacts of the Project. Valves proposed for the Project are located within the construction workspace; therefore, temporary impacts are included in Table 7.5.2-1 and Appendix N.1.

County	Facility <sup>b</sup>	Total Temporary Impact (acres) <sup>c</sup>	Agricultural (acres)	Forested (acres)	Wetland/ Open Water (acres)	Open Land (acres)	Developed Land (acres)
Kittson	Donaldson Pump Station	7.6	7.0	0.0	0.0	0.4	0.2
Marshall	Viking Pump Station	8.6	7.4	0.0	0.0	1.2	0.0
Red Lake	Plummer Pump Station	9.5	6.1	1.4	0.0	1.7	0.3
Clearwater	Clearbrook Terminal	20.0	9.5	2.1	1.7	6.4	0.3
Hubbard	Two Inlets Pump Station	5.8	3.4	1.7	0.0	0.7	0.0
Cass	Backus Pump Station	7.4	6.8	0.0	0.0	0.7	0.0
Aitkin	Palisade Pump Station	6.0	1.6	1.1	2.5	0.8	0.0
Carlton	Cromwell Pump Station	6.3	0.0	1.7	3.0	1.7	0.0
<b>TOTAL <sup>d</sup></b>		<b>71.2</b>	<b>41.8</b>	<b>8.0</b>	<b>7.2</b>	<b>13.6</b>	<b>0.8</b>

<sup>a</sup> Facility locations are preliminary and subject to change based on engineering design.

<sup>b</sup> Valves will be located entirely within the construction workspace; therefore, are not included in temporary impact calculations (see Table 7.5.2-1 and Appendix N.1).

<sup>c</sup> Areas with temporary impacts will be allowed to revert to pre-construction conditions after completion of the facility. Temporary impact calculations shown above include all impacts for construction of the facility including the area of permanent impact (see Table 7.5.3-2).

<sup>d</sup> Numbers may not total consistently due to rounding. Calculations in this table are based on USGS GAP digital data (USGS 2011) only and do not reflect information gathered from desktop assessments or field surveys.

### **7.5.3 OPERATIONS IMPACTS AND MITIGATION**

#### Land Ownership

In general, land ownership will not change, but Enbridge will acquire the easements necessary to construct and operate the Project. In some locations, Enbridge will acquire parcels in fee, such as for pump stations and valve sites.

#### Land Cover

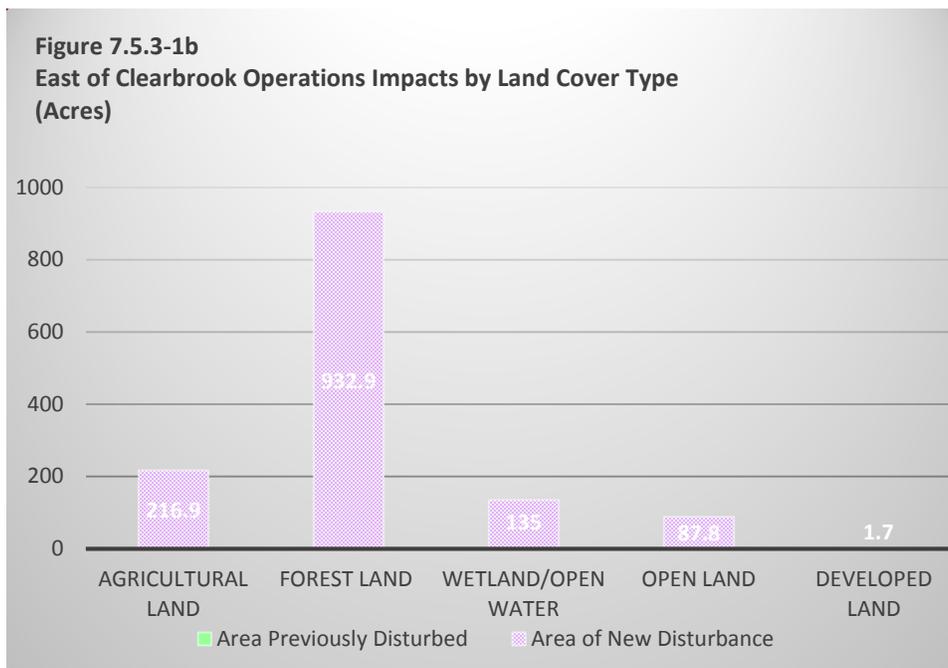
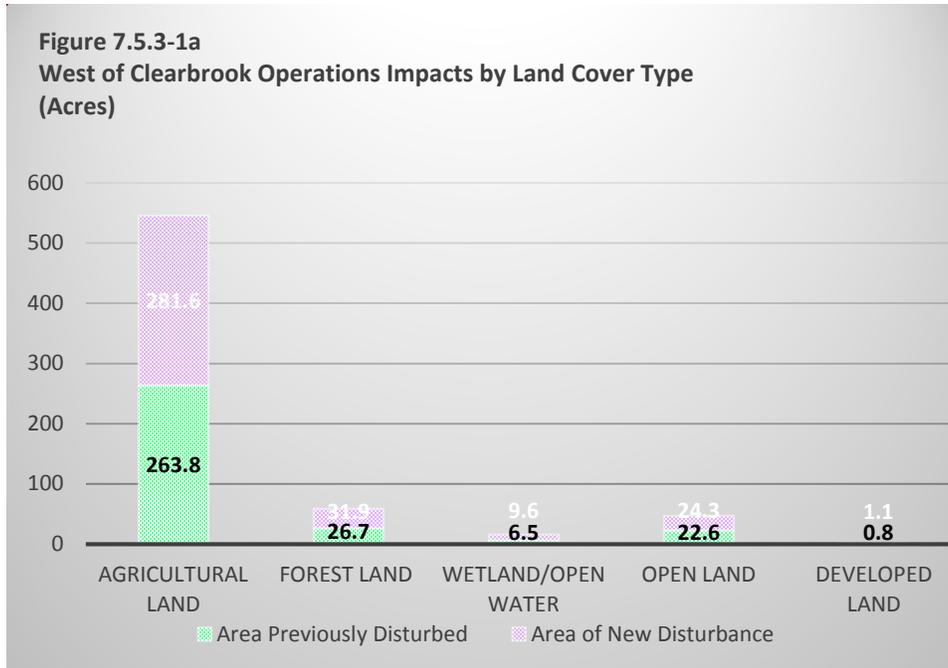
Operation of the Project will require that approximately 2,043.2 acres of land be permanently maintained in an herbaceous state (Table 7.5.3-1, Figure 7.5.3-1, Appendix N.2). The predominant land use within the permanent ROW is forest land, which covers 991.5 acres (or 48.5 percent). Agricultural land accounts for 762.4 acres (or 37.3 percent) of the total permanent ROW. Other land uses in the permanent ROW are wetland/open water (151.1 acres or 7.4 percent), open land (134.7 acres or 6.7 percent), and developed land (3.6 acres or 0.2 percent).

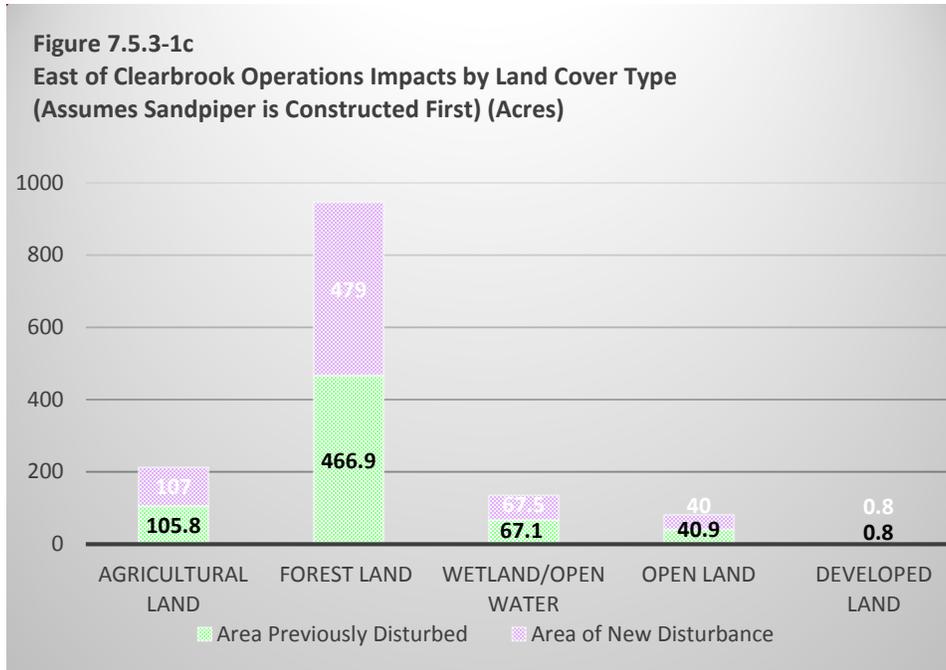
Line 67 will maintain 320.4 co-located acres of the 2,043.2 acres of total permanent ROW. The Project will result in approximately 1,722.3 acres of additional impacts associated with maintaining the permanent ROW during operations. Temporary land cover impacts may also result from Project maintenance activities that require excavation. Access to crop land, livestock operations, forested areas, private land, and lands administered by MNDNR (see Section 7.6) will be maintained during operations and maintenance activities. Impacts to forest land and other vegetation types are discussed in Sections 7.9 and 7.10. Wetland and waterbody impacts are addressed in Sections 7.14 and 7.15.

**TABLE 7.5.3-1  
Line 3 Replacement Project Operations Impacts by Land Cover Type**

Land Cover Type	West of Clearbrook		East of Clearbrook <sup>c</sup> New Permanent ROW (acres)	East of Clearbrook (Assumes Sandpiper is Constructed First)		Project Total <sup>d</sup> (West + East)	Project Total <sup>e</sup> (West + East Assumes Sandpiper is Constructed First)
	Existing Permanent ROW <sup>a</sup>	New Permanent ROW <sup>b</sup>		Existing Permanent ROW <sup>a</sup>	New Permanent ROW <sup>b</sup>		
	Total			Total			
Agricultural Land	263.8	281.6	216.9	105.8	107.0	762.3	758.2
	<b>545.4</b>			<b>212.8</b>			
Forest Land	26.7	31.9	932.9	466.9	479.0	991.5	1,004.5
	<b>58.6</b>			<b>945.9</b>			
Wetland/ Open Water	6.5	9.6	135.0	67.1	67.5	151.1	150.7
	<b>16.1</b>			<b>134.6</b>			
Open Land	22.6	24.3	87.8	40.9	40.0	134.7	127.8
	<b>46.9</b>			<b>80.9</b>			
Developed Land	0.8	1.1	1.7	0.8	0.8	3.6	3.5
	<b>1.9</b>			<b>1.6</b>			
<b>TOTAL <sup>f</sup></b>	<b>320.4</b>	<b>348.5</b>	<b>1,374.3</b>	<b>681.5</b>	<b>694.3</b>	<b>2,043.2</b>	<b>2,044.7</b>
	<b>668.9</b>			<b>1,375.8</b>			

<sup>a</sup> Area affected by operations within Enbridge's existing Line 67 or proposed Sandpiper permanent easement which is permanently maintained by periodic clearing activities (see Appendix N.2, Table N.2-1 and N.2-3).  
<sup>b</sup> Area affected by operations where the new Line 3 permanent easement will be permanently maintained by periodic clearing activities (see Appendix N.2, Table N.2-1 and N.2-3)).  
<sup>c</sup> Area affected by operations east of Clearbrook where the new Line 3 permanent easement will be permanently maintained by periodic clearing activities (see Appendix N.2, Table N.2-2).  
<sup>d</sup> Total area affected by operations (including areas permanently maintained by Line 67).  
<sup>e</sup> Total area affected by operations (including areas permanently maintained by Line 67 and Sandpiper). If co-located with Sandpiper and Sandpiper is constructed first.  
<sup>f</sup> Numbers may not total consistently due to rounding. Calculations in this table are based on USGS GAP digital data (USGS 2011) only and do not reflect information gathered from desktop assessments or field surveys.





Associated Facilities

Aboveground pump stations associated with the Project will permanently impact approximately 66.4 acres. Table 7.5.3-2 summarizes the breakdown by land use category of the potential associated facility impacts of the Project.

**TABLE 7.5.3-2**  
**Line 3 Replacement Project Proposed Pump Stations Operations Impacts by Land Cover Type <sup>a</sup>**

County	Facility <sup>b</sup>	Total Permanent Impact (acres) <sup>c</sup>	Agricultural (acres)	Forested (acres)	Wetland/ Open Water (acres)	Open Land (acres)	Developed Land (acres)
Kittson	Donaldson Pump Station	6.8	6.5	0.0	0.0	0.2	0.0
Marshall	Viking Pump Station	7.3	6.2	0.0	0.0	1.1	0.0
Red Lake	Plummer Pump Station	7.3	5.0	1.3	0.0	1.0	0.0
Clearwater	Clearbrook Terminal	20.0	9.5	2.1	1.7	6.4	0.3
Hubbard	Two Inlets Pump Station	5.8	3.4	1.7	0.0	0.7	0.0
Cass	Backus Pump Station	7.4	6.8	0.0	0.0	0.7	0.0
Aitkin	Palisade Pump Station	6.0	1.6	1.1	2.5	0.8	0.0
Carlton	Cromwell Pump Station	5.8	0.0	1.3	2.9	1.6	0.0
<b>TOTAL <sup>b</sup></b>		<b>66.4</b>	<b>39.0</b>	<b>7.5</b>	<b>7.1</b>	<b>12.5</b>	<b>0.3</b>

<sup>a</sup> Facility locations are preliminary and subject to change based on engineering design.  
<sup>b</sup> Numbers may not total consistently due to rounding. Calculations in this table are based on USGS GAP digital data (USGS 2011) only and do not reflect information gathered from desktop assessments or field surveys.

## 7.6 PUBLIC AND DESIGNATED LANDS

Enbridge initiated Project consultations with the U.S. National Park Service (USNPS) and MNDNR on November 25, 2014 (Appendix J). Enbridge will continue to communicate with USNPS, MNDNR, and other permitting agencies on items that arise from the initial Project consultations as well as items that are ongoing from previous correspondence between the agencies and Enbridge.

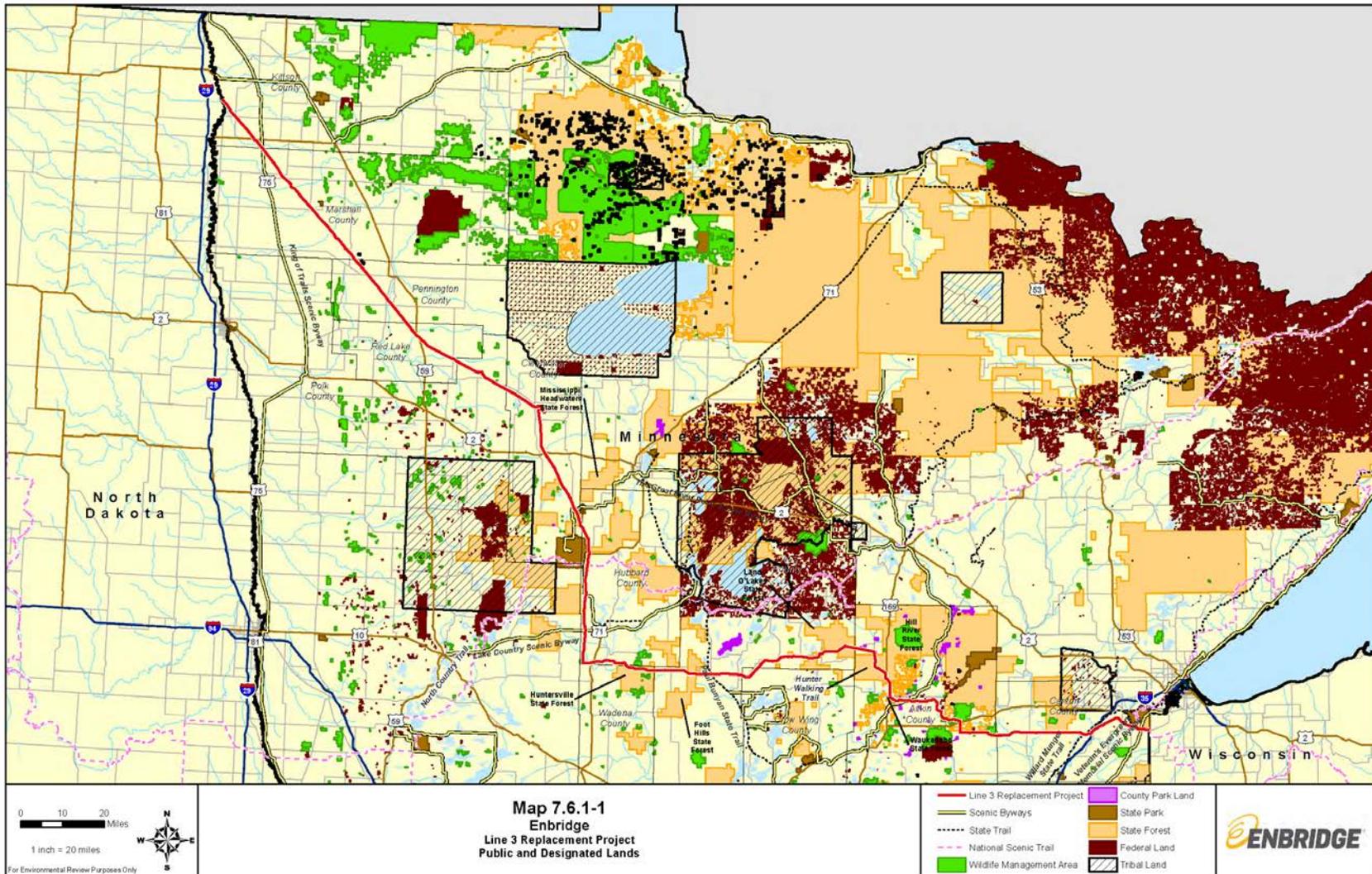
### 7.6.1 EXISTING ENVIRONMENT

#### Federally Designated Recreational Areas and Trails

The Preferred Route will not cross national parks, national natural landmarks, national wilderness areas, national wildlife refuges, national forests, or national waterfowl production areas. The Preferred Route will cross the North Country National Scenic Trail at MP 41.7-E in Hubbard County (Map 7.6.1-1). In addition to its consultation with USNPS, Enbridge initiated consultation with the North Country Trail Association regarding this crossing. Because the trail is on county-administered land, Enbridge will also consult with Hubbard County to minimize impacts to the trail.

Pursuant to Section 5(d) of the National Wild and Scenic Rivers Act, USNPS maintains the National Rivers Inventory (NRI), a listing of more than 3,400 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance. The NRI includes river segments that potentially qualify as national wild, scenic, or recreational river areas. Under a 1979 Presidential Directive and related Council on Environmental Quality regulations, all federal agencies must seek to avoid or mitigate actions that will adversely affect NRI segments. NRI waterbodies are to be taken into consideration by each federal agency in its normal planning and environmental review process. Impacts need either to be avoided or mitigated to prevent adverse effects on the river. In addition, federal agencies need to consult with USNPS prior to review of actions that may adversely affect a river listed on the NRI.

Streams listed on the NRI that the Project will cross are the Red Lake, Clearwater, Moose, Shell, Crow Wing, Middle, and Willow Rivers (USNPS 2015). The Project will not cross any river segments which are listed on the NRI as designated or potentially designated National Wild and Scenic Rivers. Enbridge has initiated consultation with USNPS regarding these river crossings and will adopt measures to mitigate any impacts. In addition, Enbridge will coordinate with MNDNR regarding these river crossings, as they are all Public Waters (see Section 7.15).



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State-Designated Recreational Areas

**State Parks and Forest Lands**

The Project will not cross any state park land. The Project will cross approximately 31.6 miles of state forest land administered by MNDNR as presented in Map 7.6.1-1 and Table 7.6.1-1, including MNDNR Division of Forestry-administered consolidated conservation and school trust lands. Through its consultation with MNDNR regarding state land crossings, Enbridge understands routes passing through school trust lands must allow maximum long-term economic return for the trust. Enbridge will continue to work with MNDNR to acquire a permit for any crossings of state lands.

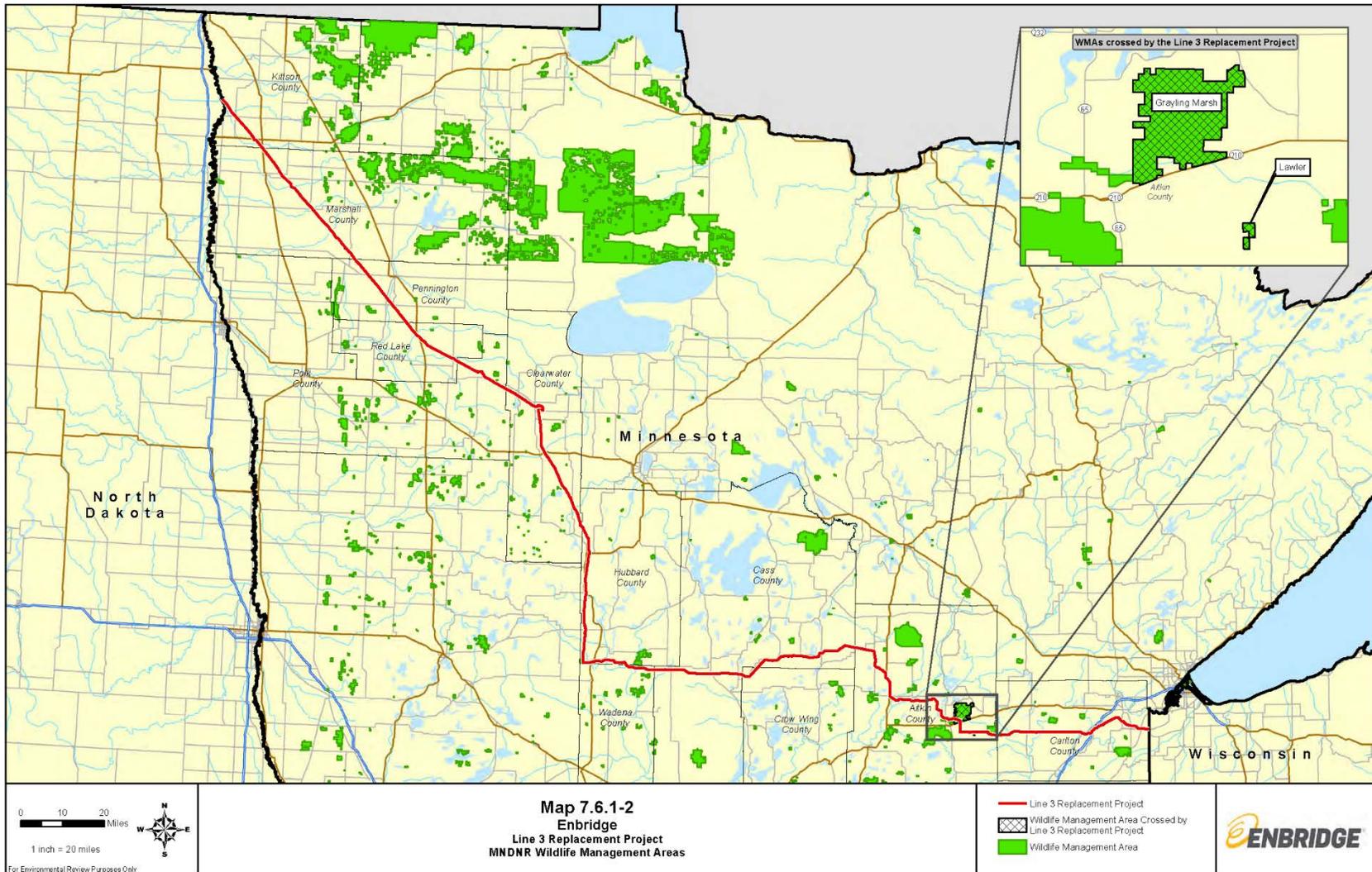
TABLE 7.6.1-1 State Forests Crossed by the Line 3 Replacement Project		
County	Milepost Range	Crossing Length (miles)
Clearwater		
Mississippi Headwaters State Forest	28.1-E – 29.9-E	1.8
Hubbard		
Huntersville State Forest	76.8-E – 83.9-E	7.1
Cass		
Foot Hills State Forest	92.1-E – 95.2-E	3.1
Land O' Lakes State Forest	123.7-E – 125.7-E	2.1
	128.7-E – 136.3-E	7.5
Aitkin		
Hill River State Forest	141.6-E – 149.6-E	8.0
Waukenabo State Forest	150.0-E – 150.5-E	0.5
	154.4-E – 155.3-E	0.9
Savanna State Forest	176.5-E – 177.2-E	0.8
Total		31.6

**State Wildlife Management Areas, Aquatic Management Areas, and Scientific and Natural Areas**

Wildlife Management Areas (WMAs) are state lands that are actively managed for wildlife production and provide habitat for many wildlife species. WMAs are open to the public for recreational activities such as bird and wildlife watching, hunting, and trapping. WMAs generally are closed to motorized vehicles and horses. The Project will cross Grayling Marsh WMA from MP 173.5-E to 174.6-E and Lawler WMA from MP 181.0-E to 181.5-E, both in Aitkin County (Map 7.6.1-2). MNDNR has indicated, through consultations, that the Lawler WMA receives federal funding through the U.S. Fish and Wildlife Service (USFWS). Enbridge continues to work with MNDNR and USFWS to understand both the state utility license permitting requirements and any associated federal requirements that would be associated with a crossing.



Aquatic Management Areas (AMAs) are state lands that have been established to protect, develop, and manage lands critical for fish and other aquatic life, for water quality, and for their biological and recreational value. The Project will cross the La Salle Creek AMA near MP 32.5-E and will be co-located with an existing pipeline ROW at this crossing.



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Enbridge is currently conducting civil, environmental, geotechnical, and cultural surveys in an expanded survey area located to the south and downstream of the Spire Valley Hatchery AMA and state land. Although the Preferred Route does not cross the Spire Valley Hatchery AMA, these surveys are being conducted to address MNDNR's concerns regarding the Project's potential effect on hydrology and associated possible impacts on the hatchery located within the AMA. Consultation with MNDNR regarding construction near the Spire Valley Hatchery AMA is ongoing.<sup>7</sup>

The Project will not cross any Scientific and Natural Areas (SNA) or designated State Recreational Areas. Enbridge will continue to work with MNDNR regarding crossings of WMAs, AMAs, and any other state lands.

#### **State-Designated Trails**

The Project will cross three state-designated trails (Map 7.6.1-1), including the Paul Bunyan State Trail at MP 98.0-E in Cass County and the Willard Munger State Trail at MP 208.3-E in Carlton County. The state forest designated Hunter Walking Trail system will be crossed twice by the Project at MP 145.2-E and MP 145.4-E in the Hill River State Forest in Aitkin County.

#### **State-Designated Rivers**

The Minnesota State Wild and Scenic Rivers Program was established in 1973 to protect rivers which have outstanding natural, scenic, geographic, historic, cultural, and recreational values. Six rivers in Minnesota, including the Mississippi and Kettle Rivers, have segments that are designated as wild, scenic, or recreational under the state program, and each segment has a management plan which outlines the rules and goals for that waterway. None of the segments of the Mississippi and Kettle Rivers that are crossed by the Project has been designated as a Minnesota State Wild and Scenic River. Enbridge will coordinate with MNDNR regarding these and all jurisdictional waterbody crossings as discussed under Section 7.15.

#### **State-Designated Canoe and Boating Routes**

The Project will cross four canoe and boating routes: the Red Lake River (MP 75.6-W), Crow Wing River (MP 79.6-E), Pine River (MP 103.6-E), and the Mississippi River twice (MP 27.7-E and MP

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<sup>7</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

159.1-E). Generally, these are north-south running features and would be difficult to avoid with a west-east pipeline across the state. Enbridge will coordinate with MNDNR regarding these and all jurisdictional waterbody crossings as discussed under Section 7.15.

#### County-Designated Recreational Areas

##### **County Parks and Forest Lands**

The Project will cross county-administered park land in Aitkin County in two places (from approximate MP 141.1-E to 141.4-E and from MP 179.8-E to 180.1-E) (Map 7.6.1-1). The Project will also cross approximately 43.8 miles of county-administered land (see Table 7.5.1-1). These lands are identified as forested or miscellaneous use tax-forfeited parcels but may be managed for various natural resource components in addition to providing recreational opportunities, such as hunting and fishing. County-administered lands along the Preferred Route are located in Clearwater, Hubbard, Cass, Crow Wing, Aitkin, and Carlton counties. Enbridge has initiated consultation with each county to minimize impacts on these lands.

#### Designated Scenic Byways

Designated scenic byways are transportation corridors that are of particular statewide interest. They are representative of a region's scenic, recreational, cultural, natural, historic, or archaeological significance. The Preferred Route will cross four designated scenic byways (Map 7.6.1-1).

##### **King of Trails Scenic Byway**

The King of Trails Scenic Byway (Minnesota Highway 75) stretches along 414 miles of Minnesota's western border. Scenery along the byway includes prairies and farmlands. The Project will cross Minnesota State Highway 75 at approximate MP 27.8-W.

##### **Lake Country Scenic Byway**

The Lake Country Scenic Byway is an 88-mile-long Minnesota Scenic Byway designated in 1999. A 67-mile stretch follows Minnesota State Highway 34 between Detroit Lakes and Walker and includes a 21-mile spur on US Highway 71 stretching from Park Rapids to Itasca State Park. The Project will cross Minnesota State Highway 34 in two locations at approximate MP 48.9-E and MP 57.8-E.

##### **The Great River Road**

The Great River Road in Minnesota has two components: a federally designated 430-mile National Route and a 755-mile state-designated alternate route. Combined, the routes provide 1,185 miles of scenic, historic, and recreational opportunities for travelers. The Project will cross

the Great River Road at approximate MP 27.5-E in Clearwater County and approximate MP 159.0-E in Aitkin County.

### **Veterans Evergreen Memorial Scenic Byway**

This designated Minnesota Scenic Byway occurs along a 50-mile stretch of State Highway 23 that runs from Banning State Park to New Duluth. The Project will cross Minnesota State Highway 23 at approximate MP 224.5-E.

### Other Public Lands

A variety of conservation easements is present in Minnesota, residing with various state and federal agencies such as the Minnesota Board of Water and Soil Resources (BWSR), MNDNR, and USFWS. Easements can also reside with non-profit conservation groups such as Minnesota Land Trust (MLT) and The Nature Conservancy (TNC), though Enbridge has not identified any TNC lands crossed by the Project. Additionally, easements that protect wetland mitigation sites are found throughout the state. Enbridge is engaged in identifying and avoiding conservation easements to the extent possible.

## **7.6.2 CONSTRUCTION IMPACTS AND MITIGATION**

### Recreational Areas

Construction is expected to have minor and temporary impacts on state- and county-designated recreational lands. When crossing WMAs, Enbridge attempted to co-locate the Project with other ROWs as much as possible unless doing so would result in greater impacts on wetlands or other known sensitive resources or present significant constructability concerns. As described in Section 4.6, co-location of much of the Preferred Route with existing the Enbridge Mainline System or existing third-party ROWs will minimize potential impacts on public lands and recreational areas. Impacts on recreational use of public land areas will involve temporary inconveniences and localized disturbances, including noise, dust, and visual intrusions associated with construction activities that occur near recreational areas. Site-specific plans for the La Salle Creek AMA crossing are discussed in Section 7.15.

Enbridge will maintain public access to state- and county-designated recreational areas to the extent safe and practicable during construction. Access to state- and county-designated lands in the immediate construction areas may be limited or restricted at times such as during excavation and pipeline installation activities. Potential impacts on recreational activities due to restricted access will be minimal and dependent on the timing of construction, the season in which the recreational activity occurs, and the construction methods used. Temporary closures of some areas may be necessary during construction. Enbridge will post signs as needed to notify the public of construction and will install safety fencing around trenches at crossings during periods

of inactive construction. After construction is complete, public lands will be restored to allow previous uses and recreational activities to continue. Enbridge will consult with the appropriate state and county land management agencies to avoid and minimize impacts on recreational areas.

### Trails

Public access and use of trails for recreational opportunities may be temporarily restricted depending upon the time of season that Enbridge begins construction. Enbridge will work with MNDNR during hunting seasons (Special Youth Firearm Deer Season, Firearm Deer Season, and Muzzleloader) to maintain access to the Hunter Walking Trail system in the Hill River State Forest for hunters and MNDNR personnel if Enbridge's construction schedule aligns with hunting seasons. Use of the Willard Munger and Paul Bunyan state trails and other MNDNR trails may be interrupted for a short time for pipeline installation. Enbridge will be preparing site-specific crossing plans for these trails as critical elements of its License to Cross Public Lands. Enbridge will also provide site-specific crossing and mitigation plans to USNPS for the North Country National Scenic Trail for approval prior to construction. Enbridge will include detailed information in the License to Cross Public Lands application describing the rationale for selecting the proposed crossing method, and plan to account for inclement weather and unanticipated delays during construction. If the boring method is used at trail crossings, there will generally be less impact on trail users. If the open-cut method is used, Enbridge will conduct excavation and pipeline installation activities across the trails within a 48-hour period to limit impacts. Enbridge will post signs as needed to notify the public of construction and will install safety fencing around trenches at trail crossings during periods of inactive construction. After the pipeline is installed across a trail, Enbridge will temporarily restore the disturbed trail area to allow passage of both trail users and pipeline construction equipment. During final restoration, Enbridge will restore the trail surface and adjacent areas to pre-construction conditions. Installation of the pipeline will not preclude landowners from establishing permitted trails over or along the pipeline ROW, as long as any requests are coordinated with Enbridge in advance.<sup>8</sup>

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<sup>8</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

### Canoe and Boating Routes

Boating and recreational use of the waterbodies crossed by the Project, including designated canoe routes, may be temporarily affected during construction. Depending on the crossing method used, impacts on recreational users may include temporary access restrictions, construction noise, downstream turbidity, or temporary obstructions such as sediment curtains or construction equipment at the crossing location. Enbridge has initiated consultation with MNDNR and Mississippi Headwaters Board to minimize impacts on users of designated canoe routes. Each of these waterbodies will have a site-specific crossing plan as part of the License to Cross Public Waters.

Public use and access to the Crow Wing River and Pine River will be interrupted for a short time to allow installation of the pipeline. Public use and access to the Red Lake River and Mississippi River will not be interrupted as these rivers are proposed to be crossed utilizing the horizontal directional drill (HDD) technique (Table 7.15.2-1). Enbridge will post signs upstream and downstream of the crossings to notify the public of pipeline construction activities and will work with MNDNR to arrange for other appropriate user notifications. After the pipeline is installed, river users may be allowed to cross the construction area.<sup>9</sup> Enbridge will develop site-specific crossing plans for these waterbodies and submit them to MNDNR for review and approval as part of the public water permit application process. Enbridge plans to conduct work within the banks of the rivers in accordance with Section 2.5 of Enbridge's Environmental Protection Plan (EPP) (Appendix E), and MNDNR public water work permit conditions to limit impacts, in addition to the U.S. Army Corps of Engineers (USACE) and MPCA permit requirements.

### Designated Scenic Byways

Enbridge will consult with the appropriate counties and MNDOT regarding construction crossing techniques, restoration, and rerouting of traffic to area roadways during construction that impacts designated scenic byways.

## **7.6.3 OPERATIONS IMPACTS AND MITIGATION**

Impacts on public and designated land areas during operations will involve localized disturbances, including operational noise from terminals, temporary impacts associated with

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<sup>9</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

maintenance activities that require excavation, mowing, and visual intrusions associated with pump stations, operations and maintenance buildings, and new access roads.

#### Recreational Areas

Vegetation maintenance in the permanent ROW, as discussed in Section 7.9, may have visual impacts on public lands that are forested. Access to public recreational lands and recreational activities will not be restricted or impacted as a result of Project operations and maintenance.

Following final restoration after construction, Enbridge will allow permanent access across the pipeline for MNDNR vehicles and forest logging equipment for timber management as long as crossings do not pose a risk to the safe operation of the pipeline. These crossings are expected to be existing roads that will be agreed upon by MNDNR and Enbridge.

Enbridge is coordinating with MNDNR regarding placement of barriers to address recreational motor vehicle use on public land and the role of barriers as a special condition in the License to Cross Public Lands. Enbridge will consider incorporating barriers on the permanent ROW on private land, pending landowner approval. The potential for barriers to restrict access to the permanent ROW and impede maintenance and emergency response activities will need to be evaluated. Enbridge will continue coordinating with MNDNR to address the balance between resource impacts, landowner needs, and maintenance and safety considerations.<sup>10</sup>

#### Trails

Project aboveground facilities and operations and maintenance activities will not permanently restrict access or use of federally or state-designated trails.

#### Canoe and Boating Routes

Access and use of boating areas, including state- and county-designated canoe routes, and other recreational uses of waterbodies crossed by the Project will not be affected during Project operations.

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<sup>10</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

Designated Scenic Byways

Project aboveground facilities and operations and maintenance activities will not permanently restrict access or use of designated scenic byways.

## 7.7 GEOLOGY

### 7.7.1 EXISTING ENVIRONMENT

#### Bedrock and Surface Geology

The Project primarily traverses the Interior Plain Physiographic Province, crossing into the Laurentian Upland Province – Superior Upland in the eastern portion of the Preferred Route in Minnesota (USGS 2004). The geologic terrain of both of these provinces is characterized by ancient pre-Cambrian igneous and metamorphic rocks that have been uplifted and eroded to a relatively low-relief plain, forming the stable geologic core of the North American continent known as the craton. The North American craton has been tectonically stable for more than 500 million years. The Superior Upland is a southern extension of the Laurentian Upland Province. The basement rocks of this province are associated with the 2.5 billion-year-old Kenoran Orogeny, a mountain-building event, and are part of the Canadian Shield. Basement rocks of the Interior Plains Physiographic Province were generally formed from the tectonic collision of smaller continental plates over one billion years ago that resulted in continental accretion and expansion of the North American craton.

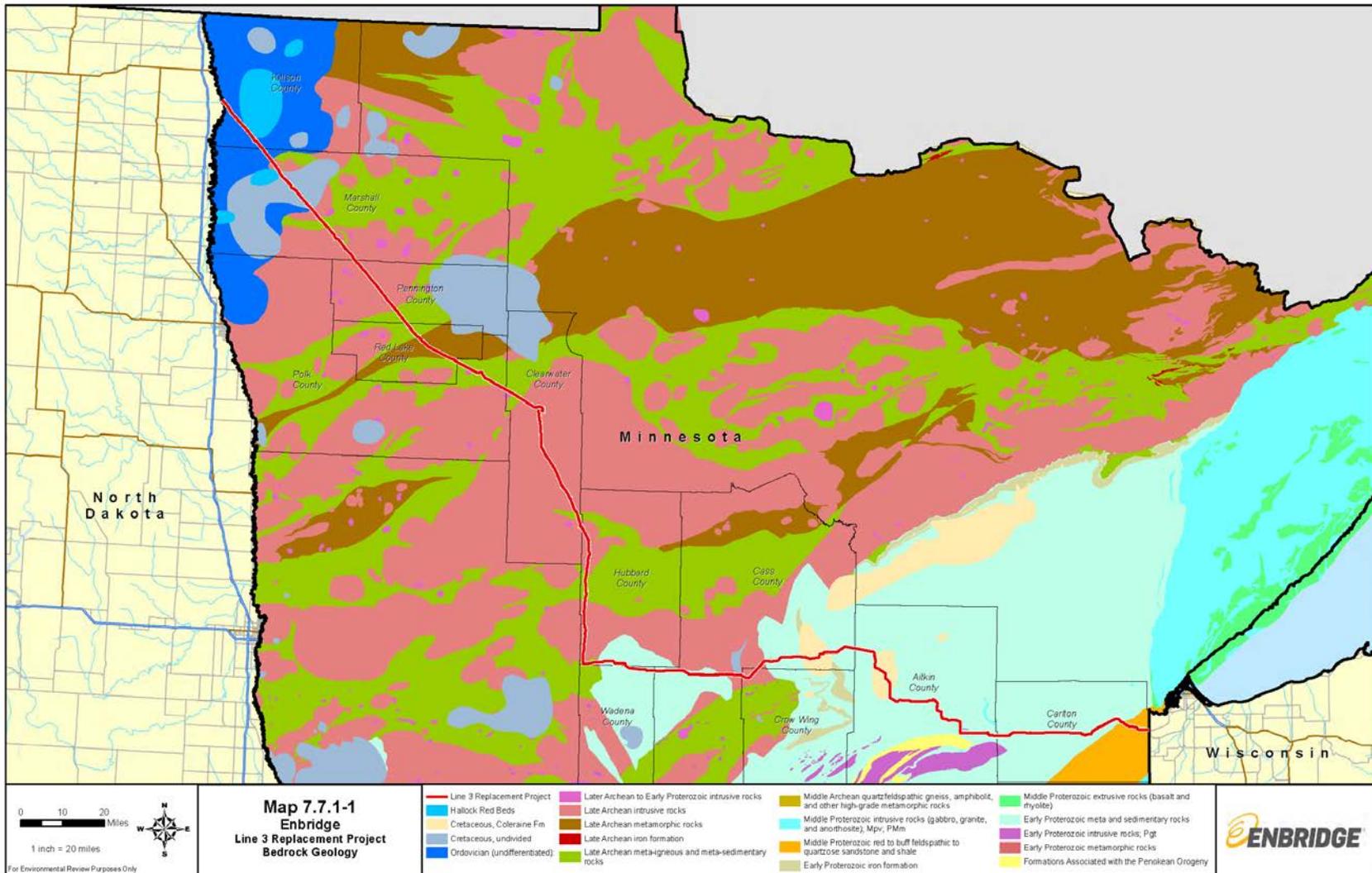
The bedrock geology underlying the Preferred Route is illustrated in Map 7.7.1-1 (based on Jirsa et al. 2011). Very limited occurrences of Paleozoic and Mesozoic sedimentary bedrock units lie randomly over the pre-Cambrian basement rocks across northern Minnesota. Short segments of the Preferred Route (total length approximately 31.1 miles) cross Ordovician, Jurassic, and Cretaceous sedimentary bedrock in Kittson and Marshall counties. These sediments were deposited 65 million to 485 million years ago and consist of shale, mudstone, limestone, dolomite, and sandstone. The Preferred Route also crosses short segments (total length approximately 18.5 miles) of Cretaceous sedimentary bedrock in Aitkin and Cass counties. These sediments were deposited 65 million to 136 million years ago and consist of sandstone lenses near the base of predominantly gray, soft, argillaceous shale (solidified mud and clay) sections.

Surficial geology along the Preferred Route is characterized by unconsolidated deposits from Pleistocene continental glaciation. In the Project area, these sediments were deposited primarily during four major episodes of glaciation of variable provenance. The sediments are composed of both ground and end moraine, outwash deposits, ice-contact stratified drift (e.g., kames and eskers), and lacustrine sediments, including lake bottom and beach ridge deposits. Additionally, there are more recent deposits of alluvium in river channels and peat in the pothole depressions that are characteristic of the interrupted drainage of glaciated terrain. Map 7.7.1-2 is a simplified map (based on Hobbs and Goebel 1982) of the quaternary geology in relation to the Preferred Route.

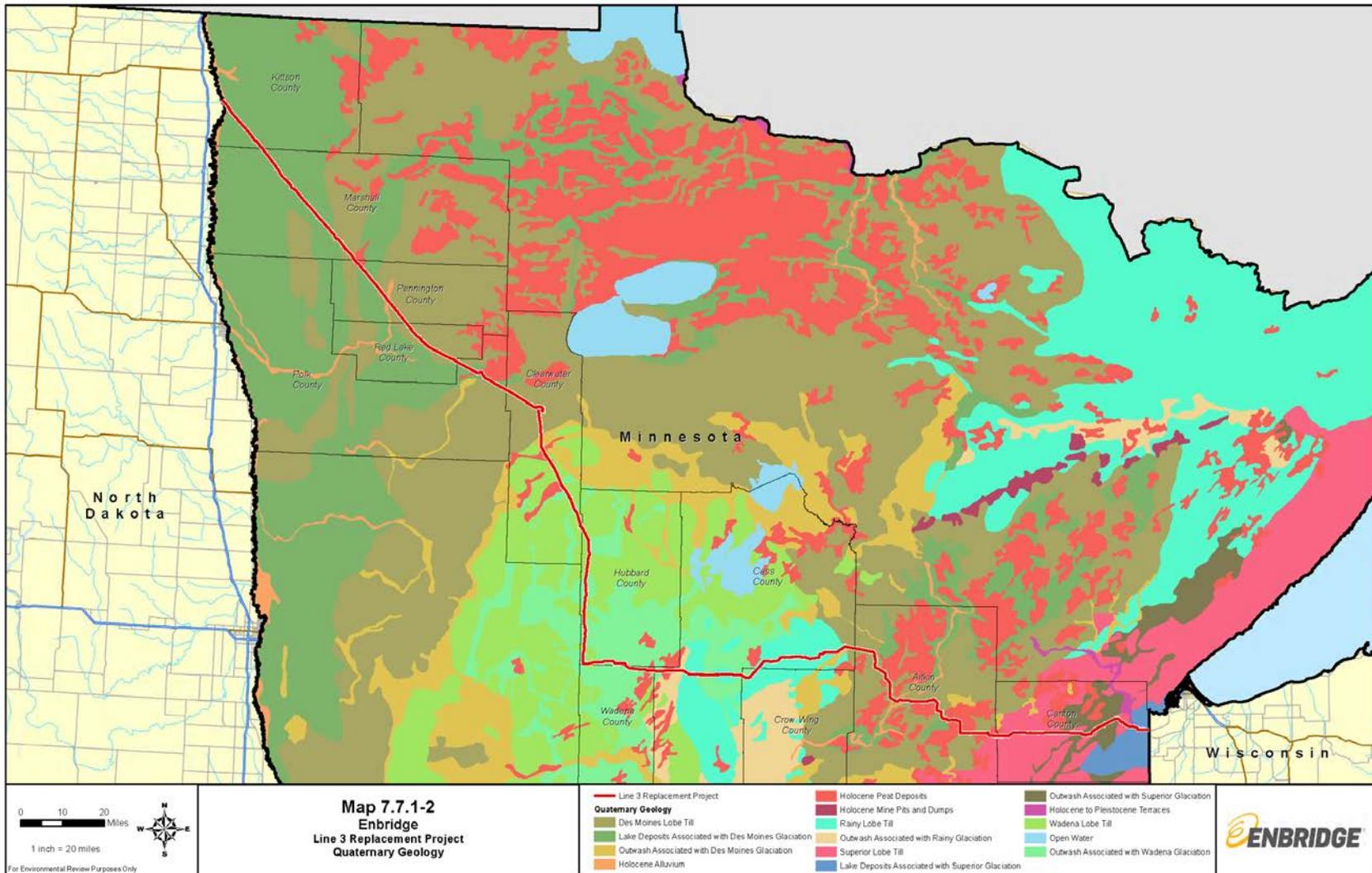
Topography across the Preferred Route varies widely given the variable nature of glacial deposition. The interrupted drainage of glacial terrain can be of low relief and include wetlands, lakes, and gently rolling to undulating hills and ridges, as well as hummocky areas of high relief with steep hills and ridges associated with glacial end moraine deposits. Additionally, glacial erosion can remove unconsolidated deposits and scour bedrock, and glacial meltwater can incise significant valleys into bedrock (MNDNR 1997). Elevations in the Project area range from approximately 760 to 1,679 feet above mean sea level (Table 7.7.1-1).



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Table 7.7.1-1 Elevation within the Line 3 Replacement Project Area			
County	Elevation Above Mean Sea Level (feet)		
	Lowest	Average	Highest
Kittson	760	803	825
Marshall	825	931	1,073
Polk	1,150	1,214	1,338
Pennington	1,073	1,107	1,136
Clearwater	1,267	1,415	1,618
Red Lake	1,104	1,135	1,155
Cass	1,274	1,385	1,518
Hubbard	1,363	1,472	1,679
Aitkin	1,203	1,263	1,375
Wadena	1,360	1,389	1,401
Crow Wing	1,335	1,374	1,417
Carlton	909	1,197	1,321
<b>Project Total</b>	<b>760</b>	<b>1,238</b>	<b>1,679</b>

Regional maps of depth-to-bedrock coverage generally lack sufficient resolution to identify areas where bedrock occurs at specific depths. Accordingly, the depth to bedrock in a specific location is difficult to determine without sampling. Generally, depth to bedrock along the Preferred Route can exceed 450 feet; however, using digital coverage of depth-to-bedrock (Olsen and Mossler 1982), the Preferred Route was found to cross a 2.5-mile-long area of more or less continuous bedrock exposure from approximate MP 206.4-E to 208.9-E. This area of shallow bedrock is located in Carlton County, and the bedrock geology is dominated by graywackes, slates, and metasediments. In areas where the pipeline is installed using HDD techniques, bedrock could be at a depth where it may be encountered during construction. These areas will be identified from geotechnical borings at the HDD crossings and will be factored into the design of the crossings. Geotechnical borings will occur prior to construction where needed at HDD locations (planned to occur in 2015). Geotechnical borings are not currently anticipated to be needed at the valve sites.

As stated previously, the area crossed by the Project has been tectonically stable for more than 500 million years. Therefore, there is a low probability of an earthquake of significant intensity or other seismic event in the Project area (National Atlas of the United States 2013).

Mineral Resources

Mineral resources in Minnesota include industrial (e.g., sand, gravel, and crushed stone) and metallic (e.g., iron ore, copper, nickel, and titanium) minerals. Enbridge used USGS topographic maps, recent aerial photography, and MNDNR spatial data for mineral leases on state lands (as

of January 2009 and December 2014) to identify surface features associated with mining or mineral resources.

Table 7.7.1-2 identifies possible mining and mineral resource areas crossed by and within 1,500 feet of the construction workspace. Enbridge determined that 1,500 feet was a reasonable area to evaluate for mineral resources that could potentially be impacted by the Project, based on consideration of the potential for expansion of existing resources. Of the localities listed, 26 sites are possibly associated with non-metallic resources (25 gravel pits and one sand pit) and seven are tracts in Carlton County associated with metallic mineral leases.

<b>County</b>	<b>Milepost</b>	<b>Operation</b>	<b>Distance and Direction from ROW</b>	<b>Source</b>
Marshall	56.9-W	Gravel Pit	882 feet NE	Aerial Photos & MNDOT 2014
Marshall	57.6-W	Gravel Pit	414 feet SW	Aerial Photos
Pennington	64.5-W	Gravel Pit	378 feet NE	Aerial Photos
Pennington	64.6-W	Gravel Pit	1,346 feet SW	Topo Maps
Pennington	64.7-W	Gravel Pit	42 feet NE	Topo Maps
Pennington	67.7-W	Gravel Pit	1,358 feet NE	Aerial Photos & MNDOT 2014
Clearwater	119.7-W	Gravel Pit	584 feet NE	Topo Maps
Clearwater	119.7-W	Gravel Pit	889 feet NE	Aerial Photos & Topo Maps
Clearwater	7.8-E	Gravel Pit	910 feet W	Aerial Photos & Topo Maps
Clearwater	10.3-E	Gravel Pit	1,450 feet W	Aerial Photos & Topo Maps
Hubbard	35.6-E	Gravel Pit	750 feet E	Aerial Photos
Cass	104.2-E	Gravel Pit	500 feet N	Aerial Photos & Topo Maps
Cass	122.1-E	Gravel Pit	200 feet N	Aerial Photos & Topo Maps
Cass	125.1-E	Gravel Pit	1,400 feet N	Topo Maps
Aitkin	140.5-E	Gravel Pit	100 feet N	Aerial Photos
Aitkin	148.8-E	Gravel Pit	1,350 feet SW	Topo Maps
Aitkin	153.1-E	Sand Pit	250 feet W	Topo Maps
Aitkin	154.2-E	Gravel Pit	185 feet NE	Topo Maps
Aitkin	156.5-E	Gravel Pit	Crossed	Topo Maps
Aitkin	156.7-E	Gravel Pit	700 feet S	Aerial Photos
Carlton	189.6-E	Metallic Mineral Exploration Lease <sup>a</sup>	Crossed	MNDNR 2009
Carlton	187.3-E	Metallic Mineral Exploration Lease <sup>a</sup>	Crossed	MNDNR 2009
Carlton	188.1-E	Metallic Mineral Exploration Lease <sup>a</sup>	Crossed	MNDNR 2009

County	Milepost	Operation	Distance and Direction from ROW	Source
Carlton	187.8-E	Metallic Mineral Exploration Lease <sup>a</sup>	Crossed	MNDNR 2009
Carlton	187.6-E	Metallic Mineral Exploration Lease <sup>a</sup>	Crossed	MNDNR 2009
Carlton	188.6-E	Metallic Mineral Exploration Lease <sup>a</sup>	Crossed	MNDNR 2009
Carlton	188.3-E	Metallic Mineral Exploration Lease <sup>a</sup>	Crossed	MNDNR 2009
Carlton	190.7-E	Gravel Pit	100 feet S	Aerial Photos
Carlton	206.9-E	Gravel Pit	900 feet N	Topo Maps
Carlton	213.5-E	Gravel Pit	1,160 feet N	Aerial Photos
Carlton	213.9-E	Gravel Pit	Crossed	Aerial Photos
Carlton	218.6-E	Gravel Pit	1,000 feet E	Aerial Photos
Carlton	219.6-E	Gravel Pit	710 feet E	Aerial Photos & Topo Maps

<sup>a</sup> Parcels with active county metallic mineral leases held by Kennecott Exploration Company.

Of the 33 mineral resource locations presented in Table 7.7.1-2, the Project will cross seven metallic mineral exploration tracts totaling 1.8 miles. Mineral rights on all seven tracts are leased by MNDNR to Kennecott; although Carlton County administers the surface rights, the State of Minnesota administers the sub-surface mineral rights (Table 7.7.1-3). Enbridge is not aware of any other county- or state-owned metallic mineral rights crossed by the Project that are actively leased to exploration or production companies.

Township / Range / Section	Beginning Milepost	End Milepost	Length (Miles) <sup>a</sup>	Land Class
47N / 21W / 4	189.5-E	189.7-E	0.2	Carlton County Tax Land
47N / 21W / 7	187.1-E	187.5-E	0.3	Carlton County Tax Land
47N / 21W / 7	187.5-E	187.7-E	0.3	Carlton County Tax Land
47N / 21W / 7	187.7-E	188.0-E	0.2	Carlton County Tax Land
47N / 21W / 7	188.0-E	188.2-E	0.3	Carlton County Tax Land
47N / 21W / 8	188.2-E	188.5-E	0.3	Carlton County Tax Land
47N / 21W / 8	188.5-E	188.7-E	0.3	Carlton County Tax Land
		<b>TOTAL</b>	<b>1.8</b>	

<sup>a</sup> Discrepancies between mileposts, crossing lengths, and the total are due to rounding.

In addition, the Preferred Route will cross some of the bedrock greenstone belt terrain in the western portion of Minnesota (MNDNR 2013b). Greenstone belt terrain is characterized by variably metamorphic rock that has undergone a change in existing rock structure or composition

induced by location, chemicals, or temperature. Greenstone belt terrains have the potential to contain gold mineralizations.

Enbridge initiated Project consultations with MNDNR regarding early coordination review of the Project on November 25, 2014 (Appendix J). Enbridge expects that this consultation will, among other things, identify any additional crossings of Public Lands and/or Public Waters that will need further encumbrance determinations for metallic, aggregate, and/or peat resources. Enbridge will continue to coordinate with MNDNR on items that arise from the initial Project consultations as well as items that are ongoing as they pertain to the Project.

#### Paleontology

Based on the thickness of the unconsolidated glacial material in the Project area, significant paleontological resources are not likely to be encountered during construction. Despite the fact that glacial deposits in Minnesota are of Pleistocene age, megafauna fossils tend to be scarce where glacial ice was present (Mather 2009, Sloan 2005). Enbridge consulted with the Minnesota Geological Survey and confirmed that paleontological finds are not common in the northern half of Minnesota.

### **7.7.2 CONSTRUCTION IMPACTS AND MITIGATION**

#### Bedrock and Surface Geology

No unique geological features that have received state or federal protection will be disturbed by the Project. Construction of the Project will result in minor impacts on topography and geology. Primary impacts will consist of temporary alteration of slopes on the construction workspace due to grading and trenching operations. These disturbances will be necessary to create a level and safe construction area.

After the pipe is installed, Enbridge will backfill the trench with native material and return surface contours to pre-construction conditions except where steep slopes need to be maintained at a more stable angle of repose on a permanent basis. Where the pipeline is installed in bedrock, it will be impossible for Enbridge to return the ground surrounding the pipe to its original consolidated condition. Instead, Enbridge will surround the pipe with padding material (e.g., sand or other suitable non-rocky material) before returning the fractured native bedrock to the top of the trench.

After the trench is backfilled, Enbridge will implement erosion control measures (e.g., installation of slope breakers, temporary sediment barriers, and permanent trench breakers, as well as the revegetation and mulching of the construction workspace). Refer to Sections 1.9, 1.17, and 7.0 of the EPP (Appendix E) for additional information on erosion control measures.

In some cases, surface geology can affect how a pipeline is installed. For example, about 2.5 miles of the Preferred Route (206.4-E to 208.9-E) will cross bedrock outcrops. Based on a preliminary review of bedrock crossed by the Preferred Route, Enbridge does not anticipate any blasting will be required. If blasting is required, Enbridge will conduct all blasting activities in accordance with applicable federal, state, and local regulations, including, as relevant, those regulations related to safety, use, storage and transportation of explosives (e.g., Title 27 C.F.R. 181 – Commerce in explosives; Title 29 C.F.R. 1910.109 – Explosives and blasting agents; Title 29 C.F.R. 1926.901 – Blaster qualifications; Title 29 C.F.R. 1926.902 – Surface transportation of explosives; Title 29 C.F.R. 1926.903 – Underground transportation of explosives; Title 29 C.F.R. 1926.904 – Storage of explosives and blasting agents; Title 29 C.F.R. 1926.905 – Loading of explosives or blasting agents; Title 29 C.F.R. 1926.906 – Initiation of explosive charges-electric blasting; Title 29 C.F.R. 1926.907 – Use of safety fuse; Title 29 C.F.R. 1926.908 – Use of detonating cord; Title 29 C.F.R. 1926.909 – Firing the blast; Title 29 C.F.R. 1926.910 – Inspection after blasting; Title 29 C.F.R. 1926.911 – Misfires; Title 29 C.F.R. 1926.912 – Underwater blasting; Title 29 C.F.R. 1926.913 – Blasting in excavation work under compressed air; and Title 49 C.F.R. 177 – Carriage by public highway).

Surface geology can affect the location, design, and success of an HDD. During drilling it is possible to encounter weak areas in the ground where pressurized drilling mud can escape into the surrounding matrix. Unconsolidated gravel, coarse sand, and fractured bedrock all present circumstances that can result in the release of mud as it follows the path of least resistance. Other circumstances can also result in abandoning the drill hole, such as refusal of the drill bit by a boulder or collapse of the drill hole in sandy soil. Typically HDD is not feasible in areas of glacial till or outwash interspersed with boulders and cobbles, fractured bedrock, or non-cohesive coarse sands and gravels.

Enbridge minimizes the risks of an HDD in unsuitable areas, such as those described above, by choosing sites that are geologically suitable for the method. Enbridge also develops contingency plans to address the unintended release of drilling mud to the environment and the inability to complete the crossing using HDD. Enbridge typically has a geotechnical assessment completed at each drill site to confirm that the HDD is in favorable material for drilling. The assessment considers soil fracture mechanics to provide an estimate on the potential for releases or failure. The soil fracturing software is strictly a modeling tool and does not perfectly reflect actual conditions during drilling.

To address MNDNR concerns with HDDs at Public Water Inventory (PWI) features, Enbridge will prepare a geotechnical analysis and surficial geology summary of each PWI crossing site and upon request provide those documents to MNDNR for review. Additional details regarding HDD at PWI features and other waterbodies are provided in Section 7.15.

### Mineral Resources

Based on USGS topographic maps, recent aerial photography, and MNDNR mineral lease spatial data, the Preferred Route crosses two possible gravel pits and is located within 1,500 feet of 24 additional possible gravel or sand pits. Construction will preclude pit operations within the construction workspace at the two possible gravel pits crossed by the Project, if actively mined. Compensation may be required for disruption of mining. The Project also crosses seven parcels where county metallic mineral leases have been granted to Kennecott (see Table 7.7.1-3). Enbridge is not aware that Kennecott has engaged in any mineral extraction activities within the parcels crossed by the Project. Enbridge is presently working with Kennecott, Carlton County, and MNDNR to seek a resolution to routing in this area so that future mining activities will not be encumbered by the pipeline.<sup>11</sup> Compensation may be required for resource encumbrances not avoided.

The greenstone belt terrains crossed by the Project do not contain any known gold mineralizations or high gold potential zones and are currently unexplored due to immensely thick overlaying glacial materials. Therefore, construction is not anticipated to affect exploration or mining of greenstone minerals.

### Paleontology

Construction of the pipeline will not likely affect any significant paleontological resources because megafauna fossils tend to be scarce where glacial ice was present, and paleontological finds are not common in the northern half of Minnesota. However, any unique resources exposed or excavated during construction will be recovered and studied for the scientific record.

## **7.7.3 OPERATIONS IMPACTS AND MITIGATION**

### Bedrock and Surface Geology

Operational impacts to bedrock or surface geology are limited to temporary impacts associated with maintenance activities that may require excavation. Due to the limited potential for large, seismically induced ground movements, there is minimal risk of earthquake-related impacts on

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<sup>11</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

the pipeline. No additional mitigation beyond designing the pipeline to currently accepted industry specifications will be required.

#### Mineral Resources

Location of the pipeline across or near potentially recoverable mineral deposits might affect future mining activities along the Preferred Route, particularly at the two possible gravel pits crossed by the Preferred Route. The pipeline will require a permanent ROW that might restrict access to, or otherwise potentially affect, future mining activities. Other than the two possible gravel pits crossed by the Preferred Route, it is currently speculative to guess where future mining activities might occur. The locations of other potentially recoverable mineral resources in these unknown areas are not sufficiently defined to plan for avoidance of such resources.

The greenstone belt terrains crossed by the Project are currently unexplored due to immensely thick overlying glacial materials. However, these areas may attract mineral exploration activities in the future. There is a potential that future extraction of some of the sand and gravel or mineral resources might be affected where the pipeline is installed across these resources. Enbridge will continue to work with MNDNR Division of Lands and Minerals staff related to license conditions for its Utility License across DNR-administered lands to address long-term maintenance.<sup>12</sup>

#### Paleontology

Operation of the pipeline will not likely affect any significant paleontological resources because any ground disturbance associated with future maintenance activities likely will be within the footprint of original construction, and because megafauna fossils tend to be scarce in the Project area.

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<sup>12</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

## 7.8 SOILS

### 7.8.1 EXISTING ENVIRONMENT

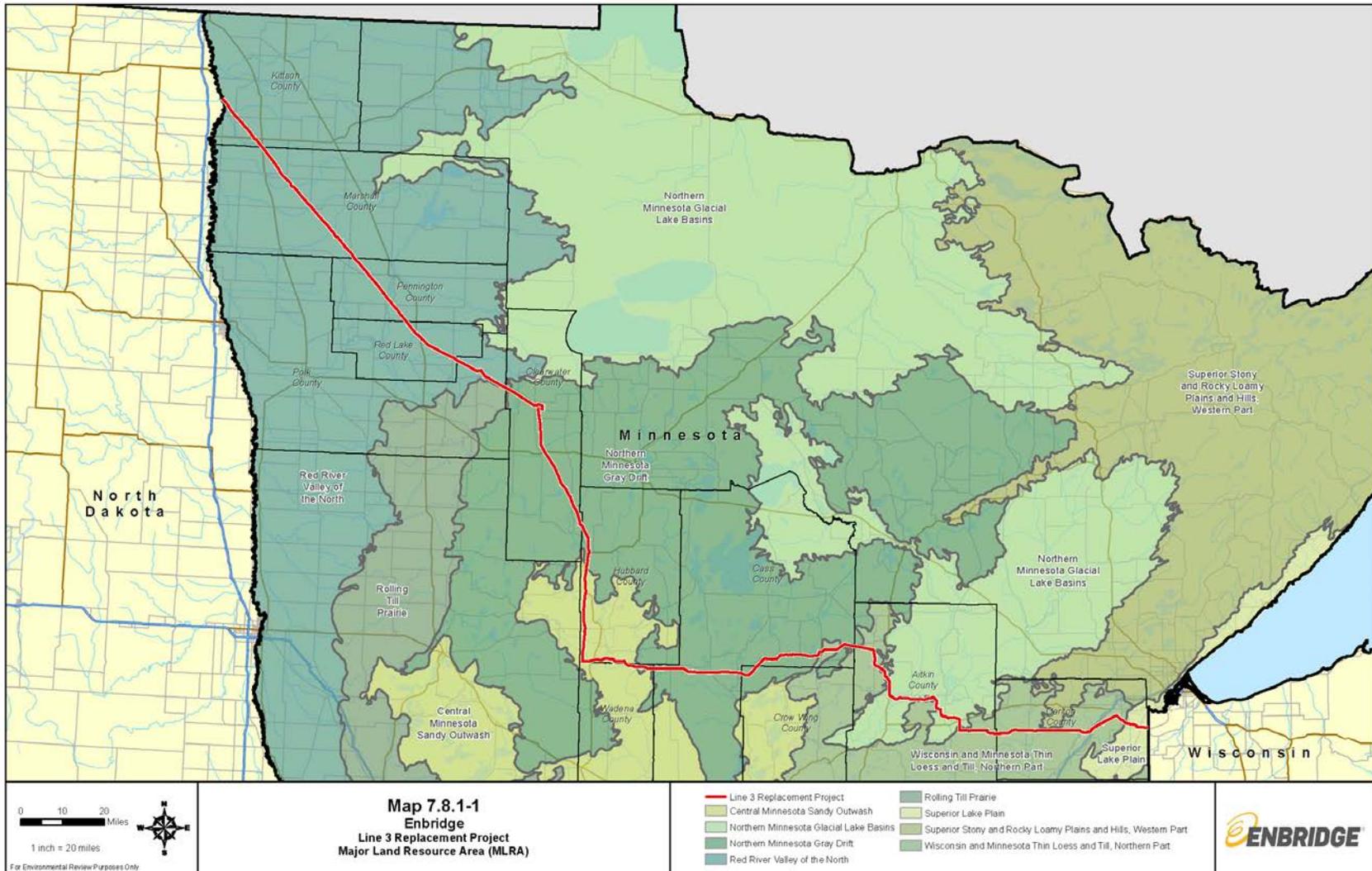
Enbridge initiated Project consultations with MDA, the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), and the USDA Farm Service Agency (FSA) on November 25, 2014 (Appendix J). Enbridge will continue to coordinate with these agencies on items that arise from the initial Project consultations as well as items that are ongoing as they pertain to the Project.

#### General Soil Composition

The Project will cross the following Major Land Resource Areas (MLRA): Red River Valley of the North; Northern Minnesota Gray Drift; Rolling Till Prairie; Northern Minnesota Glacial Lake Basins; Superior Lake Plain; Central Minnesota Sandy Outwash; and Wisconsin and Minnesota Thin Loess and Till, Northern part (Table 7.8.1-1, Map 7.8.1-1).

MLRA Name	Landscape Description	Dominant Soil Types
Red River Valley of the North	A nearly level glacial lake plain that is bordered on the east by outwash plains, gravelly beaches, and dunes.	Mollisols and Vertisols
Northern Minnesota Gray Drift	A complex pattern of moraines, outwash plains, drumlins, lake plains, and drainages.	Alfisols, Entisols, and Histosols, with some Mollisols
Rolling Till Prairie	Stagnation moraines, end moraines, glacial outwash plains, terraces, and flood plains, and is mostly dominated by till-covered moraines.	Mollisols
Northern Minnesota Glacial Lake Basins	Glacial lake plains with remnants of gravelly beaches, strandlines, deltas, and sandbars.	Alfisols, Entisols, and Histosols
Superior Lake Plain	Till plains mixed with lake plains, lake terraces, beaches, flood plains, swamps, and marshes. This MLRA is also characterized by some rocky knobs, hills, and low mountains.	Alfisols, Spodosols, Inceptisols, and Entisols
Central Minnesota Sandy Outwash	Large outwash plains and stream terraces.	Mollisols and Histosols
Wisconsin and Minnesota Thin Loess and Till, Northern part	Gently undulating to rolling, loess-mantled till plains, drumlin fields, and end moraines mixed with outwash plains associated with major glacial drainage ways, swamps, and bogs.	Alfisols, Entisols, Histosols, and Spodosols

The above-mentioned MLRAs generally range from somewhat poorly drained soils with sandy to clayey textures to well or excessively drained soils and have a frigid temperature regime; an aquic or udic soil moisture regime; and mixed, smectic, or isotic mineralogy (USDA NRCS 2006).



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## Identification of Soil Conditions

### **Background and Methodology**

Enbridge identified and assessed detailed soil characteristics along the majority of the Preferred Route using the Soil Survey Geographic (SSURGO) database (USDA NRCS 2014d). The SSURGO database is a digital version of the original county soil surveys developed by NRCS for use with Geographic Information Systems (GIS). It provides the most detailed level of soils information for natural resource planning and management. The majority of the details were gathered at a scale of 1:12,000. Soil maps are linked in the SSURGO database to information about the component soils and their properties (USDA NRCS 2014c).

SSURGO data were unavailable for Crow Wing County; therefore data from the NRCS State Soil Geographic Database 2 (STATSGO2) were used instead. STATSGO2 was created by generalizing more detailed soil survey maps. Where more detailed soil survey maps were not available, information on geology, topography, vegetation, and climate was assembled and related to satellite images. Soils of similar areas were studied and the probable classification and extent of the soils was determined (USDA NRCS 2014a).

SSURGO and STATSGO2 attribute data consist of physical properties, chemical properties, and interpretive groupings. Attribute data apply to the whole soil (e.g., listed hydric, prime farmland soils, or slope class), as well as to layer data for soil horizons (e.g., texture or permeability). The soil attribute data can be used in conjunction with spatial data to describe the soils in a particular area.

### **Soil Characteristics and Assessments**

Enbridge digitized and overlaid the Preferred Route and ATWS onto SSURGO/STATSGO2 database data to identify soil mapping units within the Project construction workspace. Based on that analysis, Enbridge identified soil characteristics that could affect or be affected by Project construction. These characteristics include highly erodible soils, prime farmland and hydric soils, compaction-prone soils, presence of stones and shallow bedrock, droughty soils, depth of topsoil, and percent slope.

Tables 7.8.1-2 and 7.8.1-3 provide a summary of significant soil characteristics identified along the Preferred Route by county according to the SSURGO and STATSGO2 databases. Table 7.8.1-4 lists topsoil depths for prime farmland crossed by the Preferred Route. Individual soil characteristics are discussed separately in the following sections. Enbridge has also identified areas of steep topography that may require ATWS through preliminary engineering and design,

and additional stormwater Best Management Practices (BMPs) in its MNDNR License to Cross Public Lands application.<sup>13</sup>

<b>Table 7.8.1-2 Soil Characteristics within the Line 3 Replacement Project Construction Workspace</b>										
County	Total Acres in County <sup>a</sup>	Prime Farmland <sup>b</sup>	Farmland of Statewide Importance	Hydric Soils	Compact Prone	Highly Erodible		Droughty	Stony/Rocky	Shallow to Bedrock <sup>c</sup>
						Water	Wind			
Acres										
Kittson	265.3	260.0	3.8	228.8	123.2	0.0	0.0	0.0	0.0	0.0
Marshall	576.5	409.9	96.5	244.0	128.0	3.3	354.6	21.5	0.0	0.0
Pennington	317.3	214.1	50.1	315.5	32.3	6.9	144.7	57.6	1.5	0.0
Red Lake	244.8	214.2	24.1	244.8	0.0	0.0	80.8	34.9	0.0	0.0
Polk	211.4	80.9	23.1	112.5	45.1	37.2	186.0	36.0	0.0	0.0
Clearwater	643.5	377.6	163.8	151.1	76.3	121.0	257.1	130.3	0.0	0.0
Hubbard	688.9	47.9	328.1	171.4	41.8	218.6	650.1	491.6	0.0	0.0
Wadena	105.9	1.8	0.3	19.1	12.0	6.7	104.6	1.8	0.0	0.0
Cass	708.3	183.6	180.0	116.2	69.0	149.0	623.1	167.9	0.0	0.0
Crow Wing	74.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aitkin	696.5	274.3	46.6	391.2	285.5	50.3	545.9	93.7	0.0	0.0
Carlton	565.8	93.1	214.3	127.9	195.2	81.0	279.2	122.1	10.9	0.0
<b>Total</b>	<b>5,098.4</b>	<b>2,157.4</b>	<b>1,135.0</b>	<b>2,122.4</b>	<b>1,008.5</b>	<b>674.0</b>	<b>3,226.2</b>	<b>1,157.5</b>	<b>12.3</b>	<b>0.0</b>
N/A	Data not available for Crow Wing County.									
<sup>a</sup>	Acreage is based on the construction workspace dimensions as discussed in Table 7.1.3-1 and Figures 7.1.3-1 through 7.1.3-3.									
<sup>b</sup>	Includes prime farmland soils and soils considered prime farmland if limiting factors are mitigated.									
<sup>c</sup>	As stated in Section 7.7, the Preferred Route will cross 2.5 miles of shallow bedrock in Carlton County based on regional digital data. This information was not reflected in NRCS soils data.									
<sup>d</sup>	There is a minor discrepancy in the total acreage here compared to the actual Project construction workspace. The SSURGO dataset has overlapping features, causing some areas to be over-represented.									

Topsoil thickness is the result of factors such as wetness, topography, climate, and the predominant vegetation present when the soil was being formed. Other factors being equal, grassland soils have more topsoil than forest soils, and wet soils have more topsoil than dry soils. According to data presented in Tables 7.8.1-3 and 7.8.1-4, topsoil depths for about half of the soils along the Preferred Route are generally less than six inches but are thicker in some areas.

<sup>13</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

County	Total Acres in County <sup>a</sup>	Topsoil Depth (inches) in Acres				Slope Class (percent) in Acres				
		0-6	>6-12	>12-18	>18	0-5	>5-8	>8-15	>15-30	>30
Kittson	265.3	0.1	232.2	0.0	32.9	265.3	0.0	0.0	0.0	0.0
Marshall	576.5	1.0	447.4	124.4	3.7	576.5	0.0	0.0	0.0	0.0
Pennington	317.3	9.4	277.8	30.1	0.0	317.3	0.0	0.0	0.0	0.0
Red Lake	244.8	0.0	238.6	0.0	6.2	244.8	0.0	0.0	0.0	0.0
Polk	211.4	0.0	157.6	42.4	11.4	174.2	11.9	0.0	25.3	0.0
Clearwater	643.5	562.3	78.4	2.0	0.8	522.5	31.0	73.8	16.2	0.0
Hubbard	688.9	670.1	10.1	3.5	5.1	470.3	77.3	83.6	54.6	3.2
Wadena	105.9	101.8	1.8	2.3	0.0	99.2	0.0	6.1	0.6	0.0
Cass	708.3	660.8	20.8	23.7	3.0	559.3	0.0	88.3	60.7	0.0
Crow Wing	74.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aitkin	696.5	557.6	110.2	27.9	0.7	625.6	48.4	2.7	19.8	0.0
Carlton	565.8	482.0	41.9	0.0	41.9	308.7	205.9	0.0	48.8	2.4
<b>Total <sup>b</sup></b>	<b>5,098.4</b>	<b>3,045.1</b>	<b>1,616.9</b>	<b>256.3</b>	<b>105.7</b>	<b>4,163.6</b>	<b>374.4</b>	<b>254.4</b>	<b>226.0</b>	<b>5.6</b>

N/A Data not available for Crow Wing County.  
<sup>a</sup> Acreage is based on the construction workspace dimensions as discussed in Table 7.1.3-1 and Figures 7.1.3-1 through 7.1.3-3.  
<sup>b</sup> There is a minor discrepancy in the total acreage here compared to the actual Project construction workspace acreage. The SSURGO dataset has overlapping features, causing some areas to be over-represented.

County	Total Prime Farmland Acres in County <sup>a, b</sup>	Topsoil Depth in Acres			
		0-6 inches	>6-12 inches	>12-18 inches	>18 inches
Kittson	260.0	0.0	227.1	0.0	32.9
Marshall	409.9	0.0	285.5	124.4	0.0
Pennington	214.1	0.0	214.1	0.0	0.0
Red Lake	214.2	0.0	214.2	0.0	0.0
Polk	80.9	0.0	55.2	25.7	0.0
Clearwater	377.6	334.8	42.9	0.0	0.0
Hubbard	47.9	47.9	0.0	0.0	0.0
Wadena	1.8	1.8	0.0	0.0	0.0
Cass	183.6	183.6	0.0	0.0	0.0
Crow Wing	N/A	N/A	N/A	N/A	N/A
Aitkin	274.3	274.3	0.0	0.0	0.0
Carlton	93.1	93.1	0.0	0.0	0.0
<b>Total</b>	<b>2,157.4</b>	<b>935.5</b>	<b>1,038.8</b>	<b>150.1</b>	<b>32.9</b>

N/A Data not available for Crow Wing County.  
<sup>a</sup> Acreage is based on the construction workspace dimensions as discussed in Table 7.1.3-1 and Figures 7.1.3-1 through 7.1.3-3, but does not include additional temporary workspace or access roads.  
<sup>b</sup> Includes land listed by NRCS as potential prime farmland if a limiting factor is mitigated (e.g., artificial drainage).

## 7.8.2 CONSTRUCTION IMPACTS AND MITIGATION

### Prime Farmland

USDA defines prime farmland as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses. It has the soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods. In general, prime farmland has an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, few or no rocks, and is permeable to water and air. Prime farmland is not excessively eroded or saturated with water for long periods of time, and it either does not flood frequently during the growing season or is protected from flooding (USDA NRCS 2014b). Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by controlling soil moisture conditions through artificial drainage). Overall, 42.3 percent of the Preferred Route will cross prime farmland soils (Table 7.8.1-2). Approximately 19.0 percent of the Preferred Route will cross prime farmland soils with no limiting factor and an additional 23.3 percent of the soils crossed are considered prime farmland if limiting factors are mitigated.

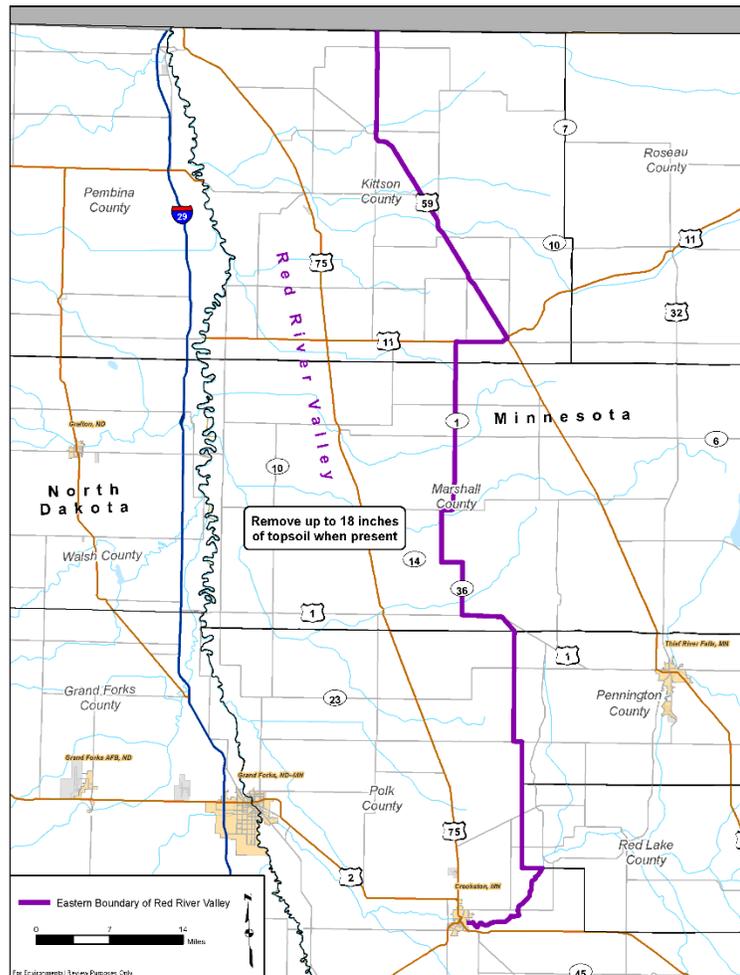
Additionally, 22.3 percent of the Preferred Route will cross soils on farmland of statewide importance (Table 7.8.1-2). Farmland of statewide importance is land other than prime or unique farmland that is of statewide or local importance for the production of food, feed, fiber, forage, or oilseed crops. The appropriate state or local government determines statewide important farmland with concurrence from the State Conservationist. Generally, these farmlands produce high yields of crops when treated and managed according to acceptable farming methods. In some states or localities, farmlands of statewide importance may include tracts of land that have been designated for agriculture by state law or local ordinance.

Impacts on prime farmland from construction of the Project could include temporary interference with agricultural drainage (if present), mixing of topsoil and subsoil, and compaction and rutting of soil. These impacts could result from workspace clearing, trench excavation and backfilling, and vehicular traffic within the construction workspace. With the implementation of the mitigation measures specified in the APP (Appendix H) (including topsoil segregation, compaction alleviation, removal of excess rock, and restoration of agricultural drainage systems and existing erosion control structures), impacts to prime farmland soils described above will be temporary and will not result in a permanent decrease in soil productivity.

### Topsoil Segregation

To minimize topsoil disturbance and topsoil/subsoil mixing associated with construction, Enbridge will remove and segregate topsoil in cropland, hay fields, pasture, residential areas, and other areas as requested by the landowner. The maximum depth of topsoil stripping will be 12 inches, except in the Red River Valley in Minnesota (depicted at right and on page 6 of the APP [Appendix H]). In the Red Lake Valley up to 18 inches of topsoil may be stripped when present, unless otherwise agreed to with MDA. Eighteen inches is the maximum depth of segregation as farm equipment generally operates at depths less than 18 inches.

If less-than-specified maximum depths of topsoil are present, the topsoil will be segregated to the depth that is present. Enbridge will work closely with the Agricultural Inspector as dictated by site-specific conditions (e.g., wet or frozen conditions) to ensure every effort is made to segregate topsoil. The Agricultural Inspector and/or the designated third-party monitor will observe topsoil operations so that appropriate depths are removed. The segregated topsoil and subsoil will be stockpiled separately and replaced in the proper order during backfilling and final grading of the construction workspace.



Implementation of proper topsoil segregation, as detailed in the APP (Appendix H),<sup>14</sup> will minimize the loss of crop productivity, ensure successful post-construction revegetation, and minimize the potential for long-term erosion problems.

#### Soil Compaction and Rutting

Soil compaction modifies the structure and reduces the porosity and moisture-holding capacity of soils. Construction equipment traveling over wet soils could disrupt the soil structure, reduce pore space, increase runoff potential, and cause rutting. The degree of compaction depends on moisture content and soil texture. Fine-textured soils with poor internal drainage that are moist or saturated during construction are the most susceptible to compaction and rutting. Approximately 19.8 percent of the Preferred Route is underlain by soils that are prone to compaction (see Table 7.8.1-2).

Enbridge will minimize compaction and rutting impacts by temporarily suspending certain construction activities on susceptible soils during wet conditions, constructing from timber mats, or using low-ground-weight equipment in wetlands. On agricultural land, compaction impacts may be mitigated through the use of deep tillage operations during restoration activities. If subsequent construction and cleanup activities result in further compaction, additional measures will be undertaken to reduce soil compaction. See the APP (Appendix H) and Section 1.18 of the EPP (Appendix E) for additional information on compaction minimization techniques.

#### Erosion by Wind and Water

Erosion is a continuing natural process that can be accelerated by human activity. Factors that influence the degree of erosion include soil texture, soil structure, length and percent of slope, vegetative cover, and rainfall or wind intensity. Soils most susceptible to erosion by water are typified by bare or sparse vegetative cover, non-cohesive soil particles with low infiltration rates, and moderate to steep slopes. Wind erosion processes are less affected by slope length or steepness. Clearing, grading, and equipment movement could accelerate the erosion process and, without adequate protection, result in discharge of sediment to adjacent waterbodies and wetlands.

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<sup>14</sup> This Enbridge commitment addresses comments provided by MPCA on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

The majority of the Preferred Route (greater than 85 percent) is underlain by soils that are not likely to be susceptible to water erosion (see Table 7.8.1-2); these soils are generally found on terrain with slopes that are less than or equal to five percent. Approximately 63.3 percent of the soils along the Preferred Route are considered susceptible to wind erosion.

Enbridge will implement erosion control measures to minimize erosion both during and after construction activities. These measures may include construction of silt fences, installation of slope breakers, temporary sediment barriers, and permanent trench breakers, as well as revegetation and mulching of the construction workspace. Erosion and sedimentation controls will be inspected and maintained as necessary until final stabilization is achieved. Enbridge also will implement dust mitigation measures, including the use of water trucks to moisten the ROW, as needed, to reduce impacts from wind erosion.

#### Droughty Soils

Droughty, or dry, soils were identified on the basis of surface texture and drainage class. Well-drained to excessively drained soils with a coarse surface texture (i.e., fine sand or coarser) may be difficult to revegetate. Drier soils contain less water to aid in the germination and eventual establishment of new vegetation. Coarser textured soils also have a lower water holding capacity, which could result in moisture deficiencies in the root zone, creating unfavorable conditions for many plants. Approximately 22.7 percent of the Preferred Route will cross soils classified by USGS as droughty soils (see Table 7.8.1-2).

Enbridge will minimize the impacts of construction on droughty, non-cultivated soils by timely reseeded using species tolerant of dry conditions and by applying mulch to conserve soil moisture. Enbridge will work with MDA, NRCS, and FSA to review seed mixes proposed in the EPP (Appendix E), and seeding dates adapted to the Project area, including droughty soil areas.

#### Stony/Rocky Soils and Shallow Bedrock Soils

Trenching or grading can bring stones or rocks to the soil surface where they can damage farm equipment and interfere with planting. Similarly, backfilling shallow bedrock can redistribute rock to an overlying soil horizon, which may reduce soil moisture-holding capacity. Less than one percent of the Preferred Route will cross stony or rocky soils (see Table 7.8.1-2).

Based on the analysis of the SSURGO/STATSGO2 soils data, no soils crossed by the Preferred Route are indicated to contain shallow bedrock (i.e., bedrock within five feet of the surface). However, other sources of geological data presented in Section 7.7 suggest that there is an area of more or less continuous bedrock exposure from approximate MP 206.4-E to 208.9-E. If bedrock is encountered within the trench, Enbridge will only backfill with this rock to the depth of the original bedrock layer. During cleanup, Enbridge will use rock pickers or other rock removal

equipment to remove rocks of a greater size and density on the ROW than undisturbed areas adjacent to the ROW.

#### Associated Facilities

Aboveground pump stations associated with the Project will impact a total of approximately 71.2 acres. Table 7.8.1-5 summarizes the breakdown of the potential associated facility impacts of the Project on soils. Valves proposed for the Project are located within the construction workspace; therefore, temporary impacts are accounted for in Tables 7.8.1-2, 7.8.1-3, and 7.8.1-4.

<b>TABLE 7.8.1-5 Line 3 Replacement Project Proposed Associated Facilities Construction Impacts on Soils <sup>a</sup></b>											
County	Facility <sup>b</sup>	Temporary Impact (acres) <sup>c</sup>	Prime Farmland <sup>d</sup>	Farmland of Statewide Importance	Hydric Soils	Compact Prone	Highly Erodible		Droughty	Stony/Rocky	Shallow to Bedrock
							Water	Wind			
Acres											
Kittson	Donaldson Pump Station	7.6	7.6	0.0	7.6	0.0	0.0	0.0	0.0	0.0	0.0
Marshall	Viking Pump Station	8.6	3.9	4.7	0.6	0.0	0.0	5.3	0.0	0.0	0.0
Red Lake	Plummer Pump Station	9.5	9.5	0.0	9.5	0.0	0.0	2.2	2.2	0.0	0.0
Clearwater	Clearbrook Terminal	20.0	13.2	2.3	17.7	4.5	0.0	6.8	0.0	0.0	0.0
Hubbard	Two Inlets Pump Station	5.8	0.0	5.3	0.0	0.0	0.4	5.8	5.8	0.0	0.0
Cass	Backus Pump Station	7.4	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Aitkin	Palisade Pump Station	6.0	0.0	0.0	6.0	2.7	0.0	6.0	0.0	0.0	0.0
Carlton	Cromwell Pump Station	6.3	0.3	6.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
<b>TOTAL <sup>e</sup></b>		<b>71.2</b>	<b>34.6</b>	<b>18.4</b>	<b>41.5</b>	<b>7.2</b>	<b>0.4</b>	<b>26.4</b>	<b>8.0</b>	<b>0.0</b>	<b>0.0</b>
<sup>a</sup> Facility locations are preliminary and subject to change based on engineering design. <sup>b</sup> Valves will be located entirely within the construction workspace; therefore, are not included in temporary impact calculations (see Tables 7.8.1-2, 7.8.1-3, and 7.8.1-4). <sup>c</sup> Areas of temporary impacts will be allowed to revert to pre-construction conditions after completion of the facility. Temporary impact calculations shown above include all impacts for construction of the facility including the area of permanent impact (see Table 7.8.3-1). <sup>d</sup> Includes prime farmland soils and soils considered prime farmland if limiting factors are mitigated. <sup>e</sup> Numbers may not total consistently due to rounding.											

### 7.8.3 OPERATIONS IMPACTS AND MITIGATION

Operations impacts to soils are limited to temporary disturbance during maintenance activities in discrete locations. If excavation is required for maintenance, soils are restored to pre-maintenance conditions as soon as is reasonable following maintenance completion. Mowing activities performed during maintenance activities have a very low potential to compact soils due to the small size of the equipment and minimal passes across a given area. Certain aspects of grading, trench excavation, and backfilling in the ROW may lead to the mixing of topsoil and subsoil, the introduction of excavated rocks from the fracturing of bedrock, and/or the excavation of rock and/or gravel into the soil surface; these effects may, in turn, result in a future increase in operation labor, decrease in long-term agricultural productivity, and potential

damage to agricultural field equipment. Soil contamination from equipment spills and/or leakage of fuels, lubricants, and coolants may also impact soils. Practices outlined in the APP (Appendix H) and EPP (Appendix E) will help avoid or minimize operational impacts on soils.

Associated Facilities

Aboveground pump stations associated with the Project will permanently impact approximately 66.4 acres. Table 7.8.3-1 summarizes the breakdown of the potential associated facility impacts of the Project on soils.

<b>TABLE 7.8.3-1 Line 3 Replacement Project Proposed Associated Facilities Operations Impacts on Soils <sup>a</sup></b>											
County	Facility	Permanent Impact (acres)	Prime Farmland <sup>b</sup>	Farmland of Statewide Importance	Hydric Soils	Compact Prone	Highly Erodible		Droughty	Stony/Rocky	Shallow to Bedrock
							Water	Wind			
Acres											
Kittson	Donaldson Pump Station	6.8	6.8	0.0	6.8	0.0	0.0	0.0	0.0	0.0	0.0
Marshall	Viking Pump Station	7.3	3.1	4.2	0.6	0.0	0.0	4.8	0.0	0.0	0.0
Red Lake	Plummer Pump Station	7.3	7.3	0.0	7.3	0.0	0.0	1.6	1.6	0.0	0.0
Clearwater	Clearbrook Terminal	20.0	13.2	2.3	17.7	4.5	0.0	6.8	0.0	0.0	0.0
Hubbard	Two Inlets Pump Station	5.8	0.0	5.3	0.0	0.0	0.4	5.8	5.8	0.0	0.0
Cass	Backus Pump Station	7.4	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Aitkin	Palisade Pump Station	6.0	0.0	0.0	6.0	2.7	0.0	6.0	0.0	0.0	0.0
Carlton	Cromwell Pump Station	5.8	0.3	5.5	0.0	0.0	0.0	0.3	0.0	0.0	0.0
<b>TOTAL <sup>c</sup></b>		<b>66.4</b>	<b>30.8</b>	<b>17.4</b>	<b>38.4</b>	<b>7.2</b>	<b>0.4</b>	<b>25.2</b>	<b>7.3</b>	<b>0.0</b>	<b>0.0</b>
<sup>a</sup> Facility locations are preliminary and subject to change based on engineering design. <sup>b</sup> Includes prime farmland soils and soils considered prime farmland if limiting factors are mitigated. <sup>c</sup> Numbers may not total consistently due to rounding.											

## 7.9 VEGETATION

### 7.9.1 EXISTING ENVIRONMENT

#### Cover Types

As described in Section 7.5, approximately 40.3 percent (2,057.3 acres) of the area affected by the construction workspace will be agricultural land. This land consists of pastures or hay fields and cultivated crops such as corn, soybeans, wheat, oats, wild rice, and dry edible beans. Potatoes, sugar beets, vegetables, sod, and Christmas trees are also common crops in the counties crossed by the Project (USDA 2012). Approximately 46.8 percent (2,385.5 acres) of the area affected by the construction workspace will involve forest land consisting of deciduous, evergreen, and mixed forests. The construction workspace will also affect 316.1 acres of wetlands/open water (approximately 6.2 percent), 332.3 acres of open land (approximately 6.5 percent), and 7.5 acres of developed land (less than one percent). The wetlands include emergent herbaceous wetlands, woody wetlands, and open water; the open land consists of maintained ROWs, shrub/scrub areas, grasslands, developed open space, and barren land (see Figure 7.5.1-2 and Map 7.5.1-2).

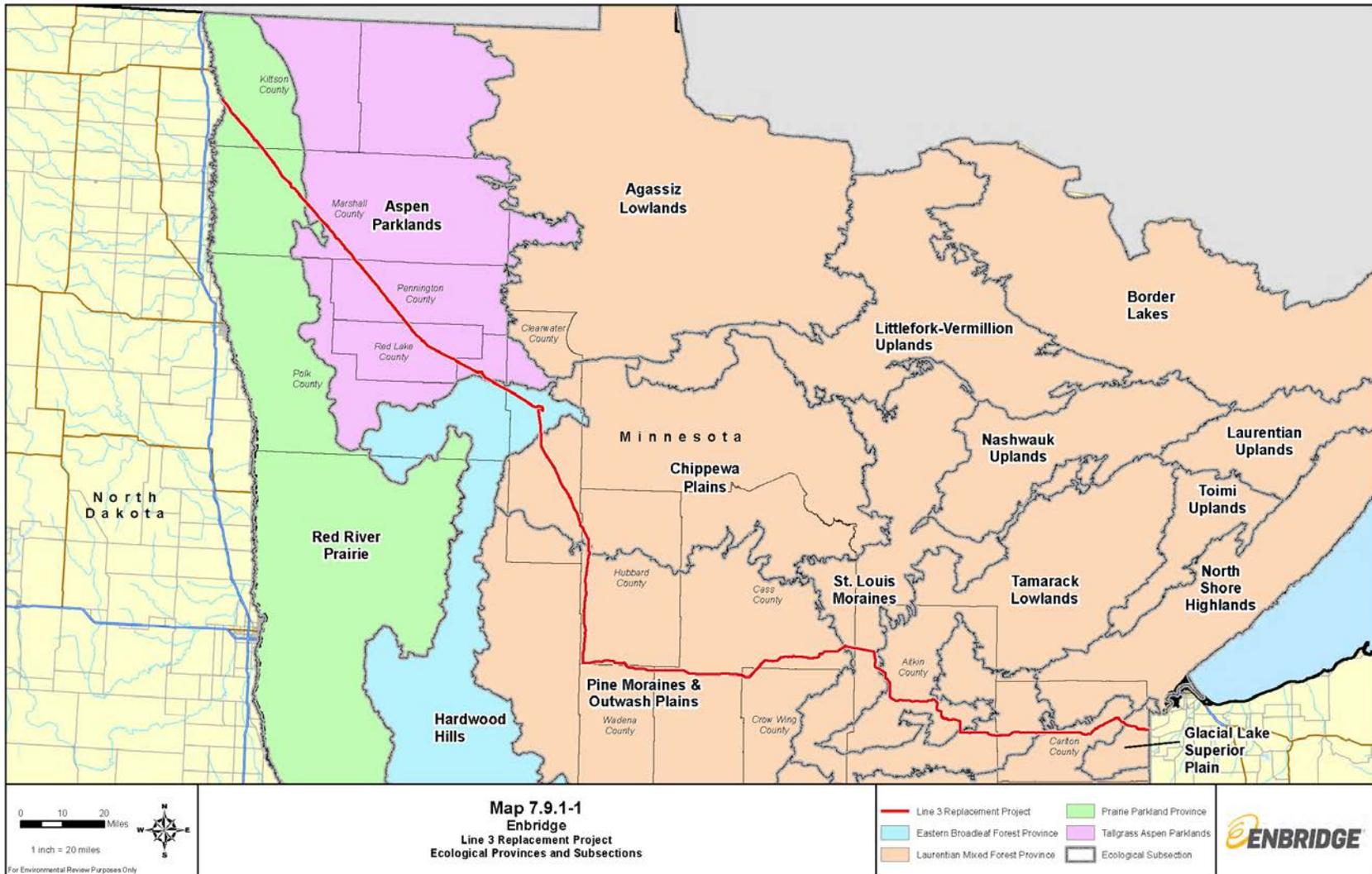
#### Ecological Classifications

Based on Minnesota's Ecological Classification System (MNDNR 2013a), the majority of the Project is located in the Laurentian Mixed Forest Province. The Project also will cross small portions of the Prairie Parkland, Tallgrass Aspen Parklands, and Eastern Broadleaf Forest Provinces (MNDNR 1999) (Map 7.9.1-1). The Ecological Classification System uses a combination of biotic and abiotic factors (including climate, geology, topography, soils, hydrology, and vegetation) to identify, describe, and map progressively smaller areas of land with increasingly uniform ecological features (MNDNR 2013a). This system provides a framework for understanding the potential ecological impacts of the Project.

#### **Laurentian Mixed Forest Province**

The Preferred Route will cross several sections and subsections within the Laurentian Mixed Forest Province between approximate MP 7.0-E and 226.6-E, as summarized in Table 7.9.1-1 and Map 7.9.1-1. Throughout this province, the most important land uses today are forestry, recreation, tourism, and (in some areas) agriculture.

<b>TABLE 7.9.1-1</b>		
<b>Ecological Sections and Subsections of the Laurentian Mixed Forest Province Crossed by the Line 3 Replacement Project</b>		
Section	Subsection	Description
Northern Minnesota Drift & Lake Plains	Chippewa Plains (MP 7.0-E to 37.2-E and 38.1-E to 39.1-E)	Characterized by three large, heavily used lakes and level to gently rolling plains. Conifers once dominated the sandier portions of the subsection. Aspen is now the most common tree species, found in pure stands and also mixed with birch, maple, oak, white spruce, jack pine, and red pine.
	Pine Moraines & Outwash Plains (MP 37.2-E to 38.1-E and 39.1-E to 133.0-E)	Lakes are very common, found on end moraines and outwash plains. Till plains are also present. White and red pine formerly dominated on end moraines and till plains, while jack pine barrens and jack pine woodlands were common on well-drained outwash plains. Black spruce, tamarack, white cedar, and black ash predominated on poorly drained sites.
	St. Louis Moraines (MP 133.0-E to 141.4-E, 142.2-E to 146.7-E, and 177.2-E to 198.9-E)	Characterized by rolling to steep slopes, with end moraines the dominant landform. Northern hardwood forests were common in the southern portion, while white pine, sugar maple, basswood, and balsam fir characterized the north. Today, quaking aspen is the primary species harvested.
	Tamarack Lowlands (MP 141.4-E to 142.2-E and 146.7-E to 177.2-E)	Defined by a glacial lake plain that lacks the well-defined beach ridges of better-known Glacial Lake Agassiz in western Minnesota. Lowland hardwoods (black ash) and lowland conifers (black spruce, tamarack, and white cedar) were originally the most common forest communities. Sedge meadows were extensive, and uplands were largely occupied by aspen-birch forests. Today much of the land is publicly owned.
Western Superior Uplands	Mille Lacs Uplands (MP 198.9-E to 219.5-E)	Characterized by gently rolling till plains and drumlin fields. Dominant feature is Mille Lacs Lake. The original vegetation was a mix of maple-basswood forests in the south; conifer, hardwood, and mixed conifer-hardwood forests elsewhere; and peatland areas inhabited by sedge-fen, black spruce-sphagnum, or white cedar-black ash communities.
Southern Superior Uplands	Glacial Lake Superior Plain (MP 219.5-E to 226.6-E)	A small subsection that extends into Wisconsin, coinciding with the basin of Glacial Lake Superior. Topography is level to gently rolling, except where water has cut deep valleys. Pre-settlement vegetation consisted of forests dominated by white spruce, white pine, and aspen-birch.



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### **Prairie Parkland Province**

The Preferred Route will cross the Red River Prairie subsection of the Prairie Parkland Province between approximate MP 12.4-W and 44.9-W (Map 7.9.1-1). The majority of this subsection is a glacial lake plain originally dominated by tallgrass prairie and wet prairie, mixed with wetlands, meandering waterways, and old beach ridges. Much of this area has been converted to agriculture and is intensively ditched.

### **Tallgrass Aspen Parklands Province**

The Preferred Route will cross the Aspen Parklands subsection of the Tallgrass Aspen Parklands Province between approximate MP 44.9-W and 108.0-W (Map 7.9.1-1). This subsection is part of a low, level lake plain originally occupied by extensive forested peatlands to the east and tallgrass prairie to the west. Agriculture is the dominant land use in the southern half of the subsection, though more recently extensive areas have also been cleared for farming in the northern half. There are more and larger blocks of pre-settlement vegetation in this subsection than in others where agriculture is widespread.

### **Eastern Broadleaf Forest Province**

The Preferred Route will cross the Hardwood Hills subsection within the Eastern Broadleaf Forest Province, between approximate MP 108.0-W and 122.8-W west of Clearbrook and MP 0.0-E and 7.0-E south and east of Clearbrook (Map 7.9.1-1). The subsection is characterized by steep slopes, high hills, and lakes and wetlands formed in glacial end moraines and outwash plains. Pre-settlement vegetation included prairies, aspen-oak lands, oak savannas, and mixed forests of oaks, sugar maple, basswood, and other hardwoods. Much of this subsection is now farmed.

### Sensitive Plant Communities

#### **Native Plant Communities**

Enbridge evaluated the occurrence of sensitive plant communities along the Preferred Route using publicly available data layers from MNDNR, including Native Plant Communities (NPCs), Minnesota Biological Survey (MBS) data, designated Calcareous Fens, and Railroad ROWs Prairies. MBS data included a combination of publicly available Sites of Biodiversity Significance (SOBS) data and draft SOBS data provided directly to Enbridge by MNDNR. Enbridge also used interpretation of aerial photography by professional plant surveyors approved by MNDNR to identify sensitive plant communities. NPCs crossed by the Preferred Route or adjacent to it (i.e., NPC polygons that are already bisected by other ROWs) are presented in Table 7.9.1-2. Because all the NPCs along the Preferred Route are also designated as SOBS sites, Table 7.9.1-2 includes SOBS site names and rankings; SOBS sites are discussed more broadly below.

TABLE 7.9.1-2 Native Plant Communities Crossed by the Line 3 Replacement Project					
NPC Code	NPC Class <sup>a</sup>	NPC Type/Subtype <sup>a</sup>	Conservation Status Rank <sup>b</sup>	SOBS Rank <sup>c</sup>	County (Site Name)
MRn83	Northern Mixed Cattail Marsh	N/A	N/A	Outstanding	Pennington (Norden 18)
SEW_CX	Seepage Wetland Complex	unclassified	N/A	Moderate	Polk (Gully 30)
FDw44	Northwestern Wet-Mesic Aspen Woodland	N/A	N/A	Moderate	Polk (Gully 29)
APn81a	Northern Poor Conifer Swamp	Poor Black Spruce Swamp	S5	High	Carlton (Automba 1)
APn81b	Northern Poor Conifer Swamp	Spruce Swamp Poor Tamarack-Black	S4	High	Carlton (Automba 1)
FpN73a	Northern Rich Alder Swamp	Alder (Maple-Loosestrife) Swamp	S5	High	Carlton (Automba 1)
FpN82	Northern Rich Tamarack Swamp (Western Basin)	N/A	N/A	High	Carlton (Automba 1)
FpN82a	Northern Rich Tamarack Swamp (Western Basin)	Rich Tamarack (Alder) Swamp	S5	High	Carlton (Automba 1)
MHn35	Northern Mesic Hardwood Forest	N/A	N/A	High	Carlton (Automba 1)
MHn35a	Northern Mesic Hardwood Forest	Aspen-Birch-Basswood Forest	S4	High	Carlton (Automba 1)
WFn64	Northern Very Wet Ash Swamp	N/A	N/A	High	Carlton (Automba 1)
<sup>a</sup> NPC classifications were obtained from <a href="http://files.dnr.state.mn.us/natural_resources/npc/table.pdf">http://files.dnr.state.mn.us/natural_resources/npc/table.pdf</a> , dated January 2005. "N/A" means a Type/Subtype is not available for that NPC Class. <sup>b</sup> Conservation status ranks were obtained from <a href="http://files.dnr.state.mn.us/natural_resources/npc/s_ranks_npc_types_&amp;_subtypes.pdf">http://files.dnr.state.mn.us/natural_resources/npc/s_ranks_npc_types_&amp;_subtypes.pdf</a> , dated August 2009. S4 = apparently secure; uncommon but not rare; S5 = secure, common, widespread, and abundant; "N/A" means a rank is not available for that classification level. <sup>c</sup> SOBS ranks are described at <a href="http://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html">http://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html</a> . "Outstanding" sites contain the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most ecologically intact or functional landscapes. "High" sites contain very good quality occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes. "Moderate" sites contain occurrences of rare species, moderately disturbed native plant communities, and/or landscapes that have strong potential for recovery of native plant communities and characteristic ecological processes.					

### Sites of Biodiversity Significance

Through the MBS program, MNDNR systematically collects, interprets, and delivers baseline data on the distribution and ecology of rare plants, rare animals, native plant communities, and functional landscapes to guide decision making. To date, MNDNR has completed MBS work in 82 of Minnesota's 87 counties, including all of the Project counties except Clearwater (which was in progress during the 2014 field season). SOBS rankings are based on MBS data, which MNDNR reviews before finalizing and making the data public. Analysis of SOBS data for the Project included final, publicly available MNDNR data for Kittson, Marshall, Pennington, Red Lake, Polk, and Carlton counties and MNDNR draft data provided to Enbridge by MNDNR for Clearwater, Hubbard, Wadena, Cass, and Aitkin counties (Table 7.9.1-3).

TABLE 7.9.1-3 Sites of Biodiversity Significance Crossed by the Line 3 Replacement Project					
Site Name	Source			SOBS Rank	County
	MNDNR Final (publicly available)	MNDNR 2013 Draft	MNDNR 2014 Draft		
Norden 18	X			Outstanding	Pennington
Norden 28	X			Below	Pennington
Norden 34	X			Below	Pennington
Sanders 3	X			Below	Pennington
Emardville 23	X			Below	Red Lake
Emardville 24	X			Below	Red Lake
Gully 30	X			Moderate	Polk
Gully 29	X			Moderate	Polk
Unnamed		X	X	High	Clearwater
Unnamed		X	X	High	Clearwater
Unnamed		X	X	High	Clearwater
La Salle Creek <sup>a</sup>		X	X	High	Clearwater
Unnamed <sup>a</sup>		X	X	High	Clearwater
Unnamed		X	X	Moderate	Clearwater
Unnamed		X	X	Moderate	Clearwater
Unnamed		X	X	Moderate	Clearwater
Unnamed		X	X	Moderate	Clearwater
Unnamed		X	X	Moderate	Clearwater
Unnamed		X	X	Moderate	Clearwater
La Salle Creek <sup>a</sup>		X	X	High	Hubbard
Unnamed <sup>a</sup>		X	X	High	Hubbard
Argo 16 <sup>b</sup>			X	Moderate	Hubbard
Straight River 5 <sup>c</sup>			X	Moderate	Hubbard
Argo 21		X		Preliminarily Moderate	Hubbard
Straight River 6 <sup>c</sup>		X		Preliminarily Moderate	Hubbard
Unnamed		X		Preliminarily Moderate	Hubbard
Argo 31 <sup>b</sup>		X	X	Preliminarily Moderate (2013); Moderate 2014	Hubbard
Clover 3		X	X	Preliminarily Moderate (2013); Moderate 2014	Hubbard
Clover 28		X	X	Preliminarily Moderate (2013); Moderate 2014	Hubbard
Hubbard 34 <sup>e</sup>		X	X	Preliminarily Moderate	Hubbard

Site Name	Source			SOBS Rank	County
	MNDNR Final (publicly available)	MNDNR 2013 Draft	MNDNR 2014 Draft		
				(2013); Moderate 2014	
Straight River 19 <sup>d</sup>		X	X	Preliminarily Moderate (2013); Moderate 2014	Hubbard
Unnamed			X	High	Wadena
Unnamed			X	Moderate	Wadena
Unnamed			X	Moderate	Cass
Unnamed			X	Moderate	Cass
Unnamed			X	Moderate	Cass
Unnamed <sup>f</sup>		X	X	Below, Moderate	Cass
Unnamed		X	X	Moderate	Aitkin
Unnamed		X	X	Moderate	Aitkin
Unnamed		X	X	Moderate	Aitkin
Unnamed		X	X	Moderate	Aitkin
Beaver 24		X	X	Moderate	Aitkin
Automba 1	X			High	Carlton
Automba 7	X			Moderate	Carlton
Atkinson 36	X			Moderate	Carlton
Twin Lakes 20	X			Below	Carlton
Twin Lakes 21	X			Moderate	Carlton
Venoah Lake	X			Moderate	Carlton
Kalevala 4	X			Below	Carlton
Twin Lakes 21	X			Below	Carlton
Venoah Lake Below	X			Below	Carlton

<sup>a</sup> In 2013, this SOBS site was one general area in Clearwater and Hubbard counties. In 2014, portions of the site in both counties were separated into several polygons, mostly within the 2013 boundary; some areas were removed between 2013 draft and 2014 draft data. Those areas surrounding La Salle Creek were named La Salle.

<sup>b</sup> Argo 16 overlaps Argo 21; the boundaries have been refined and the SOBS rank changed from preliminarily moderate to moderate between the 2013 draft and 2014 draft versions.

<sup>c</sup> Straight River 6 overlaps Straight River 5; the boundaries have been refined and the SOBS rank changed from preliminarily moderate to moderate between the 2013 draft and 2014 draft versions.

<sup>d</sup> In 2013, this SOBS was one general polygon. In 2014, portions of this site were separated into several polygons, all within the 2013 boundary; some areas were removed between 2013 draft and 2014 draft data.

<sup>e</sup> In 2013, this SOBS was one general polygon. In 2014, the boundary of this site was redefined, and some areas were removed between 2013 draft and 2014 draft data.

<sup>f</sup> The 2014 SOBS covers a large area and is made up of several polygons which rank below and moderate. Only a small portion of this SOBS contains overlapping 2013 data.

MNDNR uses the following ranks for final SOBS sites.

- **Outstanding:** Sites contain the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most ecologically intact or functional landscapes.
- **High:** Sites contain very good quality occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes.
- **Moderate:** Sites contain occurrences of rare species moderately disturbed native plant communities, and/or landscapes that have strong potential for recovery of native plant communities and characteristic ecological processes.
- **Below:** Sites lack occurrences of rare species and natural features or do not meet MBS standards for outstanding, high, or moderate rank. These sites may include areas of conservation value at the local level, such as habitat for native plants and animals, corridors for animal movement, buffers surrounding higher-quality areas, areas with potential for restoration of native habitat, or open space.

Enbridge used NPCs, SOBS, and other data to identify sites for rare plant field surveys in 2013 and 2014 along the Preferred Route both west and east of Clearbrook. The field protocol for these surveys was developed in consultation with MNDNR. See Section 7.12 for a full description of the rare plant surveys. The bulleted list that follows here provides descriptions of the rare plant survey efforts and findings as they relate to final SOBS sites with a ranking of Moderate, High, or Outstanding along the Preferred Route. All surveys were conducted by professional plant surveyors approved by MNDNR.

- **Norden 18:** The Project overlaps this SOBS site for 0.25 mile. The Project crosses this SOBS site at one of its narrowest points. This segment was surveyed for rare plants in 2014. Surveyors did not find any rare plants where the Project overlaps Norden 18.
- **Gully 30:** The Project overlaps this SOBS site for 0.17 mile. This segment was surveyed for rare plants in 2014. Surveyors found Beaked Spike-rush (*Eleocharis rostellata*), a threatened species in Minnesota, within the SOBS boundaries. Surveyors noted that the plants were growing in a low-lying depression along an existing corridor, in a graminoid-dominated and fully vegetated calcareous fen system. This fen is discussed in Section 7.14.

- Gully 29: The Project overlaps this SOBS site for 0.53 mile. This segment was surveyed for rare plants in 2014. Surveyors did not find any rare plants where the Project overlaps Gully 29.
- Automba 7: The Project overlaps this SOBS site for 1.9 miles. The entire area overlap was surveyed for rare plants in 2014. Surveyors did not find any rare plants in the area of overlap.
- Automba 1: The Project overlaps with this SOBS site in two locations. At the first location, the Project overlaps with the NPC “Aspen-Birch-Basswood Forest” for less than 0.1 mile at the western tip of the SOBS site; Enbridge included this site in its 2014 rare plant surveys. At the second location, the Project overlaps with the remaining NPCs listed in Table 7.9.1-2 for about 2.7 miles across the northern portion of the SOBS site. The entire 2.7-mile segment was surveyed for rare plants in 2013 and 2014. Surveyors observed six patches of Pale Manna Grass (*Torreyochloa pallida*), a species of special concern in Minnesota, growing along the edge of a 5-foot-wide ditch through an alder swamp community at the eastern end of the segment.
- Atkinson 36: The Project overlaps with this SOBS site for 1.3 miles. The entire area of overlap was surveyed for rare plants in 2014. Surveyors did not find any rare plants in the area of overlap.
- Twin Lakes 20 and 21: The Project overlaps with these SOBS site for 3.4 miles. The entire area of overlap was surveyed for rare plants in 2013 and 2014. Surveyors made two observations of Lanceleaf Grapefern (*Botrychium lanceolatum* ssp. *angustisegmentum*), a threatened species in Minnesota, growing in a mesic hardwood community under ferns.
- Venoah Lake: The Project overlaps with this SOBS in two locations for a total of 0.63 mile. The entire area of overlap was surveyed for rare plants in 2013 and 2014. Surveyors did not find any rare plants in the area of overlap.

It is possible that the draft SOBS sites will be refined in terms of rank and/or extent while under MNDNR review. Upon finalization by MNDNR, some sites may be refined so as not to intersect the Preferred Route. Enbridge will continue to coordinate with MNDNR on SOBS sites.

#### Sensitive Forest Resources

Enbridge is coordinating with MNDNR on avoidance of sensitive forest resources. Specially designated forest resources that the MNDNR generally recommends avoiding include Old Growth

forest stands; Old Growth Special Management Zones, which extend 330 feet around the Old Growth perimeter; Ecologically Important Lowland Conifers; Representative Sample Areas; and High Conservation Value Forests. In addition, Enbridge has worked with the MNDNR to minimize impacts on an area designated as Old Forest Management Complex within the Hill River State Forest. Enbridge will continue to consult with MNDNR to reduce or avoid impacts to sensitive forest resources.<sup>15</sup> Forest fragmentation outside specially designated areas is discussed in Section 7.10.

#### Other Sensitive Communities

Peatland SNAs are unique areas identified by an underlying substrate of peat organic soils that support spruce, tamarack, and sedge fens and wetlands of important state significance. The Project will not cross any Peatland SNAs or other SNAs, as discussed in Section 7.6. Calcareous fens are further discussed in Section 7.14.

### **7.9.2 CONSTRUCTION IMPACTS AND MITIGATION**

#### Herbaceous Areas

Clearing of herbaceous vegetation during construction will result in a short-term impact on vegetation. Active revegetation measures and rapid colonization by annual and perennial herbaceous species in the disturbed areas will restore most vegetative cover within the first growing season.

Upon completion of construction, Enbridge will revegetate disturbed areas in accordance with Section 7.0 of the EPP (Appendix E) unless otherwise directed by landowners or land managing agencies. To the extent it is practicable to vegetate immediately after pipe placement, Enbridge will do so. However, this may not be feasible if Enbridge constructs in the winter (frozen conditions) or if the ROW is too wet to replace topsoil. Per Section 7.15 of the EPP, Enbridge will delay seeding during frozen ground conditions until the applicable spring seeding period or will complete dormant seeding where conditions allow (i.e., no snow cover).<sup>16</sup> Timely restoration of the construction workspace and reseeding with an appropriate seed mix will minimize the

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<sup>15</sup> This Enbridge commitment addresses comments provided by MNDNR and MPCA on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

<sup>16</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

duration of disturbance to herbaceous areas. Impacts on vegetation adjacent to the construction workspace will be minimized through adherence to soil erosion control specifications and by confining clearing activities to the approved ROW and extra workspaces.

#### Forested Areas

Clearing of woody shrubs and trees will be the primary long-term impact on vegetation associated with the Project. Woody shrubs and trees will be allowed to recolonize the temporary construction workspace. However, recolonization of disturbed areas by woody shrubs and trees will be slower than recolonization by herbaceous species. As natural succession is allowed to proceed in these areas, it is anticipated that forested communities will eventually reestablish.

Tree clearing may affect undisturbed forest vegetation growing along the edges of the cleared areas. By exposing some edge trees to elevated levels of sunlight and wind, evaporation rates and the probability of tree knockdown may increase. Where increased light levels penetrate the previously shaded interior, shade-intolerant species may be able to grow, and the species composition of the newly created forest edge may change. Clearing may also temporarily reduce local competition for available soil moisture and light and may allow some early successional species to become established and persist on the edge of the undisturbed areas adjacent to the site. To prevent damage to adjacent trees, Enbridge will fell trees toward the cleared ROW.

#### Noxious Weeds and Invasive Plant Species

Noxious weeds are defined in MN Statutes 18.75-18.91 as annual, biennial, or perennial plants that the Commissioner of Agriculture designates to be injurious to public health, the environment, public roads, crops, livestock or other property. Federal noxious weeds are listed in 7 C.F.R. 360.200. MNDNR maintains a list of Minnesota and Federal Prohibited and Noxious Plants.<sup>17</sup> MNDNR defines invasive plants as those species that are not native to Minnesota and cause economic or environmental harm or harm to human health.<sup>18</sup>

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<sup>17</sup> <http://files.dnr.state.mn.us/eco/invasives/weedlist.pdf>, updated May 15, 2014.

<sup>18</sup> <http://www.dnr.state.mn.us/invasives/terrestrial/index.html>

Enbridge will minimize the time between final grading and permanent seeding, clean construction equipment, and prepare a seeding supplement to prevent the spread of noxious weeds and invasive plants. Section 1.6 of Enbridge’s EPP (Appendix E) describes these measures in more detail. This section of the EPP also explains topsoil segregation and conservation practices, which play a role in preventing the spread of noxious weeds and invasive plants.<sup>19</sup> Finally, Enbridge plans to conduct surveys for terrestrial noxious weeds and invasive plant species in advance of construction activities, which will provide background information to assist in implementing mitigation measures.

### **7.9.3 OPERATIONS IMPACTS AND MITIGATION**

Revegetation will take place following restoration, and seed mixes will be selected in accordance with Section 7.1 of Enbridge’s EPP (Appendix E). Use of native species and high-quality revegetation methods will help disturbed ground to blend in with the surrounding landscape.

Enbridge will maintain the 50-foot permanent ROW in an herbaceous state by removing woody shrubs and trimming branches overhanging the ROW approximately every five years. Vegetation that grows so that it obscures the visibility of the ROW for federally required surface condition inspections will be mechanically removed. Herbicides (if used) will be coordinated with the necessary regulatory and landowner approvals. Additional temporary impacts to vegetation may result from maintenance activities that require excavation. Approximately 991.5 acres of forest land (based on only 25 feet of permanent ROW west of Clearbrook not already maintained for Line 67 [see Figure 7.1.3-1]) will be maintained clear of trees for operational purposes, including facilitating aerial inspections, preserving pipeline integrity, and providing access for maintenance or emergency work in compliance with federal regulations.<sup>20</sup>

Forest fragmentation is discussed in Section 7.10.

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<sup>19</sup> This Enbridge commitment addresses comments provided by MPCA on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

<sup>20</sup> 49 C.F.R. 195.412 (a) states that “each operator shall, at intervals not exceeding 3 weeks, but at least 26 times each calendar year, inspect the surface conditions on or adjacent to each pipeline ROW. Methods of inspection include walking, driving, flying, or other appropriate means of traversing the ROW.” Enbridge prefers to perform these required inspections aerially, which requires that the ROW be adequately cleared for identification of abnormal surface conditions.

## 7.10 WILDLIFE

### 7.10.1 EXISTING ENVIRONMENT

#### Species and Habitats

As described in Section 7.9, the Project will be constructed through several ecosystems, including deciduous forest, coniferous forest, wetland, and prairie. Wildlife habitats within these ecosystems are diverse. Existing wildlife resources along the Preferred Route are described below.

In addition to the legal protection afforded to threatened and endangered wildlife as discussed in Section 7.12, the federal Migratory Bird Treaty Act, as amended, prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, or nests unless authorized under a USFWS permit. Enbridge is consulting with USFWS on this and other matters (see Section 7.12).

#### **Agricultural Areas**

The Project will cross land that has been altered for use as hayfields, pastures, and row crop production. These agricultural fields provide habitat for common mammalian species, including white-tailed deer, woodchucks, striped skunks, raccoons, weasels, Virginia opossum, and various mice and voles, which use these areas for feeding and cover. Common bird species, such as European starlings, American crows, eastern meadowlarks, and house sparrows, are also typically found in agricultural fields. Common invertebrates that may occupy agricultural areas include bees, grasshoppers, and butterflies.

#### **Open Lands**

Open lands affected by the Project consist primarily of shrub/scrub areas, grasslands, developed open space, and barren land. The undeveloped, vegetated open lands likely support several species of birds, numerous small rodents, and several species of snakes. Species such as coyote, red fox, and a variety of raptors typically hunt open areas for the varied prey. Other common wildlife species that may use open areas include thirteen-lined ground squirrels, eastern cottontail rabbits, and white-tailed jackrabbits. Common invertebrates that may occupy open areas include bees, grasshoppers, and butterflies.

#### **Forested Areas**

Forested areas affected by the Project are found primarily along the eastern portion of the Preferred Route. Mammalian species typical of Minnesota's deciduous forests include eastern chipmunks, black bears, snowshoe hares, gray squirrels, gray fox, porcupines, pine martens, and several species of bats. Some of these species also inhabit northern Minnesota's coniferous

forests, while others, such as least chipmunks, snowshoe hares, and red squirrels, are more unique to evergreen forests. The structural diversity of forests provides a variety of habitats that can support a large number of avian species, including songbirds, game birds, and raptors.

### **Wetland and Riparian Areas**

Wetlands affected by the Project consist primarily of emergent herbaceous wetlands, woody wetlands, and open water. There is also forested and brush habitat along river and creek corridors. The emergent wetlands and open water provide habitat for a variety of aquatic wildlife, including muskrats, beavers, mink, river otters, waterfowl, wading birds, and numerous species of reptiles and amphibians. The woody wetlands and riparian areas provide additional habitat for terrestrial wildlife, such as white-tailed deer, moose, gray wolves, black bears, and a variety of small mammals and songbirds.

### Sensitive Wildlife Areas

#### **WMAs**

As described in Section 7.6, the Project will cross two state-designated WMAs (see Map 7.6.1-2). WMAs represent areas with high potential for wildlife production, public hunting, trapping, fishing, and other compatible recreational uses. The type of wildlife habitat in each WMA crossed by the Project is described below.

- The Grayling Marsh WMA includes uplands dominated by aspen, low areas that are primarily brush and grass, and a wetland impoundment. There are good opportunities for viewing waterfowl, nesting sandhill cranes, ruffed grouse, woodcock, sharp-tailed grouse, swamp sparrows, gray catbirds, deer, bear, and wolves.
- The Lawler WMA is dominated by marsh and low brushy areas; the upland area is limited to a small grass field. Trapping and hunting opportunities include deer and waterfowl. Beaver, mink, deer, common yellowthroats, swamp sparrows, and alder flycatchers may be seen.

Enbridge has been coordinating with MNDNR on sensitive wildlife habitats, including aspen reserved patches within Grayling Marsh WMA.<sup>21</sup> Enbridge will continue to coordinate with MNDNR regarding these patches.

### **Large Block Habitats**

Enbridge conducted an analysis of large contiguous blocks of habitat for 40 or more acres (Large Block Habitats or LBH). In this analysis, Enbridge identified contiguous blocks of grassland/herbaceous, wetland, and/or forested land that were 40 acres or larger and that were within one mile on either side of the Preferred Route. Contiguous areas included SOBS and NPCs (as described in Section 7.9) and land cover types from USGS GAP digital data (USGS 2011) (as described in Section 7.5).<sup>22</sup> Enbridge then used GIS and interpretation of aerial photography to determine where the contiguous areas overlapped with the Preferred Route and which segments of overlap were co-located with existing third-party ROWs. Enbridge included the existing road network in its GIS analysis to show areas of LBH fragmentation that are not consistently incorporated with land cover data.

Enbridge determined that the Project crosses approximately 10.5 miles of LBH (out of a total of approximately 110.5 miles) for the portion of the Preferred Route that is west of Clearbrook. Of those 10.5 miles, 9.8 miles are co-located with Line 67. The remaining 0.7 mile is located near the Clearbrook Terminal, where it parallels other existing ROWs so as to avoid new fragmentation of otherwise contiguous areas. East of Clearbrook, the Project crosses approximately 173.0 miles of LBH (out of a total of approximately 226.7 miles). Of these 173.0 miles, approximately 127.0 miles parallel existing ROWs. Based on the analysis, there is the potential for approximately 46.0 miles of LBH crossings to be newly fragmented along the Preferred Route. Habitat quality and

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<sup>21</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

<sup>22</sup> The LBH analysis included the following macrogroups from the U.S. National Vegetation Classification: Central Mesophytic Hardwood Forest; Central Oak-Hardwood & Pine Forest; Eastern & Central North American Boreal Conifer & Hardwood Forest; Eastern North American Wet Meadow & Marsh; Great Plains Tallgrass Prairie & Shrubland; Great Plains Wet Meadow, Wet Prairie & Marsh; North American Boreal Flooded Forest; North American Boreal Swamp Forest; Northern & Central Floodplain Forest & Scrub; Northern & Central Swamp Forest; Northern & Eastern Pine - Oak Forest, Woodland & Barrens; Northern Great Plains Woodland; Northern Mesic Hardwood & Conifer Forest; Open Water; and Southern Floodplain Hardwood Forest.

perimeter-to-area ratios, both of which affect the potential for impacts to wildlife in these areas of potential LBH fragmentation, were not included in the analysis.<sup>23</sup>

### **Forest Fragmentation**

Because forested areas within the new permanent ROW will be maintained in an herbaceous state after construction, Enbridge conducted a refined analysis on blocks of forested habitat. This analysis was similar to the LBH analysis except that Enbridge analyzed forested areas alone, independent of block size.<sup>24</sup> The forest fragmentation analysis was conducted separately from the impact calculations described in Section 7.5; for land cover purposes in Section 7.5, calculations were based on area of land affected by Project construction or operations rather than miles of habitat crossed by the completed Project.

Enbridge determined that the Project crosses 5.0 miles of forest habitat west of Clearbrook. Of those 5.0 miles, 4.7 miles are co-located with Line 67; the remaining 0.3 mile is located near the Clearbrook Terminal. As described above for the LBH analysis, this 0.3 mile parallels other existing ROWs so as to avoid new fragmentation of otherwise contiguous areas. East of Clearbrook, the Project crosses approximately 139.3 miles of forest habitat. Of these 139.3 miles, approximately 104.4 miles parallel existing ROWs. Based on the analysis, there is the potential for approximately 34.9 miles of forest crossings, independent of block size, to be newly fragmented along the Preferred Route. Habitat quality and perimeter-to-area ratios, both of which affect the potential for impacts to wildlife in these areas of potential forest fragmentation, were not included in the analysis.<sup>25</sup>

### **Key Habitats**

Key Habitats, defined by MNDNR in its State Wildlife Action Plan as the habitats most important to the greatest number of Minnesota's Species of Greatest Conservation Need, are specific to individual ecological subsections. Many of the Key Habitats along the Preferred Route overlap with the NPCs and SOBS described in Section 7.9 and with the Large Block Habitats described

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<sup>23</sup> This Enbridge commitment addresses comments provided by MNDNR on the Sandpiper MPUC application (see Appendix K).

<sup>24</sup> The forest fragmentation analysis included the following macrogroups from the U.S. National Vegetation Classification: Central Mesophytic Hardwood Forest; Central Oak-Hardwood & Pine Forest; Eastern & Central North American Boreal Conifer & Hardwood Forest; Northern & Eastern Pine - Oak Forest, Woodland & Barrens; Northern Great Plains Woodland; and Northern Mesic Hardwood & Conifer Forest.

<sup>25</sup> This Enbridge commitment addresses comments provided by MNDNR on the Sandpiper MPUC application (see Appendix K).

above. Enbridge plans to consult with MNDNR regarding minimization of impacts to Key Habitats as well as Large Block Habitats.

### **Audubon Important Bird Areas**

The Project will cross one Minnesota Audubon designated Important Bird Area (IBA). IBAs provide essential habitat for one or more breeding, wintering, and/or migrating bird species. The IBA program is designed to be proactive, voluntary, participatory, science-based, and works to identify, monitor and conserve bird habitat (Audubon Minnesota 2013). The Project crosses 4.0 miles of the McGregor IBA in Aitkin County. The Project crosses the northern part of the IBA and is associated with Grayling Marsh WMA (described above and in Section 7.6).

### **7.10.2 CONSTRUCTION IMPACTS AND MITIGATION**

As described in Section 7.9, construction will involve temporary removal of vegetative cover in the construction workspace. The clearing activities will cause temporary displacement of wildlife species along the Preferred Route. The construction workspace will remain relatively clear of vegetation until the Project is completed. Some smaller and less mobile animals such as amphibians, reptiles, and small mammals may experience direct mortality during clearing and grading activities. Larger and more mobile animals will disperse from the Project ROW during construction. Displaced individuals may temporarily occupy adjacent, undisturbed areas, possibly causing increased competition with other individuals in those areas. Some individuals may return to their previously occupied habitats after construction has been completed and suitable habitat has become reestablished. The intensity of construction-related disturbances will depend on the particular species and the time of year during construction.

#### Species and Habitats

##### **Agricultural Areas and Open Lands**

Clearing of agricultural areas in the construction workspace will have similar impacts as the clearing of other vegetation in terms of the potential for direct mortality and temporary displacement of wildlife species. Agricultural fields are repeatedly disturbed by large machinery from routine agricultural activities and plowed on a seasonal basis. Disturbance to wildlife in agricultural areas is not expected to add substantially to routine impacts.

Clearing of herbaceous and shrub communities in upland areas of the construction workspace will cause short-term impacts due to the relatively quick recolonization of the plant species that comprise these communities. Herbaceous cover will be seeded on disturbed areas following the completion of pipeline construction, and it is expected that pre-existing herbaceous and shrub habitats will quickly become reestablished. It is expected that the wildlife species that use these habitats will also return relatively soon after construction. Enbridge will employ BMPs to limit the

introduction or spread of noxious weeds and invasive plant species, which can degrade habitat quality (see Section 1.6 of the EPP (Appendix E) and also Section 7.9).

### **Forested Areas**

Clearing of trees in the construction workspace will have similar impacts as the clearing of other vegetation in terms of the potential for direct mortality and temporary displacement of wildlife species. Tree clearing will also have longer-term impacts than the temporary removal of herbaceous and shrub species because recolonization of disturbed areas by trees will be slower than recolonization by other vegetation. As natural succession is allowed to proceed in these areas, it is expected that forested communities will eventually reestablish. As described in Section 7.9, however, recolonization may have long-term effects on forested areas along the Preferred Route by triggering changes in forest structure and species composition. The ability of wildlife to reoccupy the forested areas will depend on the characteristics of the reestablished forests and the specific habitat requirements of wildlife species.

### **Wetland and Riparian Areas**

Construction-related wetland and waterbody impacts are discussed in Sections 7.14 and 7.15. As described above for wildlife that occupy other habitats, smaller and less mobile animals may experience direct mortality during construction activities in wetland areas, and larger and more mobile animals will disperse from the Project ROW during construction.

As described above for upland areas, clearing of herbaceous and shrub communities in wetland areas of the construction workspace will cause a short-term impact to wildlife until vegetation is reestablished. Enbridge will employ BMPs (e.g., cleaning construction equipment) to limit the introduction or spread of noxious weeds and invasive plant species, which can degrade habitat quality (see also Section 7.9).

Enbridge will minimize impacts on riparian habitats by employing BMPs as described in Section 2.5 of its EPP (Appendix E), such as maintaining vegetative buffers on each stream bank during wet trench, dam and pump, and flume stream crossing methods. Stream banks and riparian vegetation are not normally disturbed for waterbodies crossed using the directional drilling/guided bore method (with exception to extremely limited hand clearing of woody vegetation as required to facilitate guide wire placement), which reduces the potential for erosion and sedimentation at the stream crossing. In addition, clearing of forested and brushy areas for ATWS will be avoided as much as possible. Woody vegetation in wetlands and riparian areas will typically not be cleared for the purpose of ATWS unless approved by appropriate regulatory agencies as stipulated in permits issued for the Project. By maintaining vegetative

buffers along river and creek corridors, Enbridge will help reduce exposure of prey species to predators and provide shade that maintains cooler stream temperatures during construction.<sup>26</sup>

### **7.10.3 OPERATIONS IMPACTS AND MITIGATION**

#### Species and Habitats

##### **Agricultural Areas and Open Lands**

The construction workspace will be permanently revegetated through post-construction seeding in non-active agricultural areas with herbaceous species, and the introduction or spread of noxious weeds and invasive plant species will be limited by BMPs during construction, as described above. These measures are expected to minimize impacts on wildlife species in agricultural areas and in herbaceous and shrub habitats during Project operations. Maintenance activities such as mowing in the permanent ROW and activities that require excavation may cause intermittent, temporary impacts on wildlife such as direct mortality or displacement.

##### **Forested Areas**

The Project will maintain 991.5 acres of forest land as new permanent ROW as described in Section 7.5 (see Table 7.5.3-1). The remaining areas of forest land impacted by construction of the Project are expected to return to forest habitat through recolonization. As described above, medium- to long-term impacts on forest wildlife species may occur as a result of the time required for trees to recolonize an area after construction and the changes to forest structure and species composition that may occur during recolonization.

The permanent maintenance of approximately 991.5 acres of forest land within the 50-foot permanent ROW will result in permanent impacts on forest wildlife, because this area will be converted to non-forested habitat for the life of the Project. The nature of the impacts will depend on the characteristics of the forest land that is cleared; for example, any trees cleared within the existing, permanently maintained Enbridge Mainline System may represent low-quality forest habitat because of previous clearing activities. The nature of the impacts will also depend on species-specific habitat requirements.

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<sup>26</sup> This Enbridge commitment addresses comments provided by MNDNR and MPCA on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

As described in Section 4.6, co-location of much of the Preferred Route with the existing Enbridge Mainline System or other third-party ROWs minimizes the overall amount of tree clearing needed for the Project and thus reduces impacts on forest wildlife species. There is the potential for LBH fragmentation, which may include forest fragmentation, to occur along up to 20 percent of the Preferred Route east of Clearbrook.

### **Wetland and Riparian Areas**

Operation-related wetland and waterbody impacts are discussed in Sections 7.14 and 7.15. Because of wetland revegetation practices and measures taken to minimize impacts on riparian habitats as described above, Project operations are not expected to impact wildlife that occupy wetland and riparian areas. By maintaining vegetative buffers along river and creek corridors, Enbridge will help reduce exposure of prey species to predators and provide shade that maintains cooler stream temperatures during operations and maintenance activities.<sup>27</sup>

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<sup>27</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

## 7.11 FISHERIES

### 7.11.1 EXISTING ENVIRONMENT

#### Species and Habitats

#### **Representative Fish Species**

As described in Section 7.15, the Project will cross 247 waterbodies, including 80 perennial, 131 intermittent, and 36 ephemeral streams (see Table 7.15.1-2). Most of these waterbodies contain warm-water fisheries, though some cold-water fisheries are also present in the area. Game fish species found in waterbodies in the vicinity of the Project are listed in Table 7.11.1-1 (MNDNR 2013h).

<b>TABLE 7.11.1-1</b>	
<b>Game Fish Species in the Line 3 Replacement Project Area</b>	
<b>Warm-Water Game Fish</b>	<b>Cold-Water Game Fish</b>
Bass (largemouth, rock, smallmouth)	Brook trout
Bullhead (black, brown, yellow)	Rainbow trout
Catfish (channel)	Brown trout <sup>28</sup>
Crappie (black)	
Muskellunge	
Perch (yellow)	
Pike (northern)	
Sunfish (bluegill, green, hybrid, pumpkinseed)	
Walleye	

#### Sensitive Fisheries Areas

#### **Designated Trout Streams**

The Preferred Route will cross six <sup>29</sup>MNDNR designated trout streams (Table 7.11.1-2).

<sup>28</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

<sup>29</sup> Total includes a Public Waters Inventory stream at MP 212.5-E, however, Enbridge did not identify a waterbody at this location during field surveys.

TABLE 7.11.1-2 Trout Streams Crossed by the Line 3 Replacement Project		
County	Waterbody Name	Approximate Milepost
Hubbard	La Salle Creek	32.5-E
	Straight River	60.5-E
Cass	Spring Brook	127.6-E
Carlton	King Creek	204.5-E
	Blackhoof River	212.3-E
	Tributary of Blackhoof River <sup>a</sup>	212.5-E

<sup>a</sup> This stream is included as a MNDNR designated trout stream; however, Enbridge did not identify a waterbody at this location during field surveys.

### Aquatic Management Areas

As described in Section 7.6, the Project will cross the La Salle Creek AMA. MNDNR considers La Salle Creek, at the outlet of La Salle Lake and part of the La Salle Lake State Recreation Area, to be a high-value trout stream. La Salle Lake supports walleye, northern pike, largemouth bass, black crappie, and bluegill sunfish populations.

### 7.11.2 CONSTRUCTION IMPACTS AND MITIGATION

#### Temporary Disturbances and Sediment Loads

Installation of the pipeline across streams may temporarily impact movement of fish upstream and downstream of crossing sites due to disturbances associated with construction. The physical disturbance of the streambed may temporarily displace adult fish and may dislodge other aquatic organisms. Some mortality of less mobile organisms, such as small fish and invertebrates, may occur within the trenching area. Aquatic plants, woody debris, and boulders that provide in-stream fish habitat will also be removed during trenching. Noise disturbances upstream and downstream of the sites will temporarily deter fish that may otherwise inhabit the area.

Sediment loads may temporarily increase downstream during open-cut stream crossings. These increased loads may temporarily affect the more sensitive fish eggs, fish fry, and invertebrates inhabiting the downstream area. In a review of 27 case studies of open-cut pipeline water crossings, Reid and Anderson (1999) found that adverse effects on fish and fish habitat were not consistently documented. Where adverse effects did occur, the effects were short-term, and recovery generally occurred within a year of construction. To minimize impacts, Enbridge will complete the crossings as quickly as possible, and the suspended sediment levels will return to pre-construction levels after in-stream work is completed.

To minimize the potential for adverse impacts on the fisheries at river and stream crossings, Enbridge will implement erosion and sediment control measures and limit the duration of

construction in these waterbodies. Section 1.9 of the EPP (Appendix E) includes discussion of temporary erosion controls, including temporary stabilization, erosion control blankets, mulch, cat tracking, and temporary slope breakers. Additionally, Enbridge will comply with in-water work exclusion dates of September 1 through April 15 or September 15 through April 30 for coldwater fisheries (trout) stream crossings and March 15 to June 15 or April 1 to June 30 for cool/warm water fisheries stream crossings, per MNDNR guidance.<sup>30</sup>

As discussed in Section 7.15, additional requirements will apply at impaired waters crossed by the Project and will be outlined in Enbridge's National Pollutant Discharge Elimination System (NPDES) permit from MPCA.

### Sensitive Fisheries Areas

The Project will cross the trout streams listed below (with proposed crossing method indicated in parentheses):

- La Salle Creek (Open Cut)
- Straight River (HDD)
- Spring Brook (Open Cut)
- King Creek (Open Cut)
- Blackhoof River (Open Cut)
- Tributary of Blackhoof River (Open Cut)<sup>31</sup>

Enbridge and MNDNR discussed past difficulties with construction methods and alignment at La Salle Creek, including the unanticipated release of drilling fluid used during HDDs (i.e., frac-outs) and steep slopes. The construction method and alignment at this crossing have been modified for the Project as a result of the MNDNR's concerns. Upon conducting a geotechnical investigation at La Salle Creek, subsurface conditions were deemed unsuitable for an HDD

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<sup>30</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

<sup>31</sup> This stream is included as a MNDNR designated trout stream; however, Enbridge did not identify a waterbody at this location during field surveys.

crossing and demonstrated an elevated risk of frac-outs. As a result, Enbridge has committed to a dry crossing method at La Salle Creek for the Project. In addition, Enbridge will prepare a site-specific plan for this crossing to include with its License to Cross Public Waters application. Refer to Section 7.15 and Enbridge's EPP (Appendix E) for more detailed information on waterbody crossing construction methods.

In addition, Enbridge will work with MNDNR to plan appropriate crossing techniques and mitigate MNDNR's concerns for sensitive fisheries resources within Sandy, Moose, and Willow Rivers and White Elk Creek.<sup>32</sup>

Enbridge has been working with MNDNR to refine the list of waterbodies that will require site-specific plans. On September 17, 2014, Enbridge provided correspondence with MNDNR confirming that it will prepare a site-specific plan at all waterbody crossings where MNDNR had requested such a plan, in addition to a number of other waterbodies. Enbridge is committed to preparing site-specific plans at these waterbody crossings. Enbridge will coordinate with MNDNR to determine which waterbodies west of Clearbrook will require a site-specific plan.<sup>33</sup>

### **Riparian Habitats**

As described in Section 7.10, Enbridge's BMPs minimize impacts on riparian habitats. These practices include minimizing clearing of forested and brush habitat along river and creek corridors, which helps provide shade that maintains cooler stream temperatures. In addition, Enbridge will replant suitable woody species that achieve heights of up to 15 feet and that are characteristic of the ecological zone of the waterbody crossing, pending landowner approval.

### **7.11.3 OPERATIONS IMPACTS AND MITIGATION**

During operations, Enbridge will maintain the 50-foot permanent ROW by removing woody shrubs and trimming branches overhanging the ROW approximately every five years. Additional temporary impacts to woody shrubs and branches overhanging the ROW may result from maintenance activities that require excavation. Changes in the light and temperature

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<sup>32</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

<sup>33</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

characteristics of some streams caused by this removal of vegetation may affect the behavioral patterns of fish, including spawning and feeding activities, at crossing locations. However, due to the limited width of the maintained stream banks, this clearing is not expected to impact general temperature or light conditions of the streams crossed by this Project.

## 7.12 THREATENED AND ENDANGERED SPECIES

In November 2014, Enbridge initiated Project consultations with USFWS and MNDNR (Appendix J). Enbridge will continue to coordinate with these agencies on protected species issues.

The sections below summarize federally protected and state-protected species and then describe relevant regulations, geographic ranges, biological and habitat characteristics, primary threats, agency consultation status, and survey findings for the federally protected, state-endangered, and state-threatened species. Enbridge has conducted surveys for certain species (as described below) in 2013 and 2014 in areas along the Preferred Route and has submitted reports to the appropriate agencies. Additional surveys are anticipated for certain species in 2015 and 2016.

### 7.12.1 FEDERALLY LISTED SPECIES

Enbridge identified federally listed, proposed, and candidate species under the federal Endangered Species Act (ESA) that may occur within counties crossed by the Project by researching USFWS county-specific species lists (USFWS 2014e) (Table 7.12.1-1). One endangered species, four threatened species, one proposed endangered species, and one candidate species have the potential to occur in the Project area. Proposed critical habitat for the Poweshiek skipperling (*Oarisma poweshiek*) and Dakota skipper (*Hesperia dacotae*) also occurs in counties crossed by the Project (Table 7.12.1-1). Further information on all of the species in Table 7.12.1-1 is provided in the sections below.

In addition to species protected by the ESA, bald and golden eagles are federally protected under the Bald and Golden Eagle Protection Act (BGEPA).

Enbridge met with USFWS staff on November 18, 2014, to discuss the Project and to discuss distribution and survey requirements for federally protected species that may occur along the Preferred Route. During this meeting, USFWS confirmed that the species list provided in Table 7.12.1-1 was complete. The gray wolf (*Canis lupus*) was subsequently added to the table because of its reinstatement as threatened in Minnesota under the ESA effective December 19, 2014. The reinstatement occurred as the result of a federal judge's decision, and future developments in the gray wolf's reinstatement status cannot be predicted at this time. Enbridge will continue to monitor changes in ESA status for all species that may be affected by the Project.

<b>Species Name</b>	<b>Federal Status</b>	<b>State Status</b>	<b>Habitat</b>	<b>Listed Counties</b>
Northern Long-eared Bat ( <i>Myotis septentrionalis</i> )	Threatened	Special Concern	Caves and mines during hibernation; forested areas during active season	Kittson, Marshall, Pennington, Red Lake, Polk, Clearwater, Hubbard, Wadena, Crow Wing, Cass, Aitkin, Carlton
Canada Lynx ( <i>Lynx canadensis</i> )	Threatened	Special Concern	Northern forest	Marshall, Clearwater, Cass, Aitkin, Carlton
Gray Wolf ( <i>Canis lupus</i> ) – Western Great Lakes Distinct Population Segment	Threatened	None	Northern forests and areas with a matrix of forest and agriculture	Kittson, Marshall, Pennington, Red Lake, Polk, Clearwater, Hubbard, Wadena, Crow Wing, Cass, Aitkin, Carlton
Sprague’s Pipit ( <i>Anthus spragueii</i> )	Candidate	Endangered	Large (>69 hectare) native or non-native grassland	Polk
Dakota Skipper ( <i>Hesperia dacotae</i> )	Threatened	Endangered	Native prairie	Kittson, Polk
Dakota Skipper	Proposed Critical Habitat	N/A	Native prairie	Kittson, Polk
Poweshiek Skipperling ( <i>Oarisma poweshiek</i> )	Endangered	Endangered	Native prairie	Kittson, Marshall, Pennington, Red Lake, Polk
Poweshiek Skipperling	Proposed Critical Habitat	N/A	Native prairie	Kittson, Polk
Western Prairie Fringed Orchid ( <i>Platanthera praeclara</i> )	Threatened	Endangered	Wet prairies and sedge meadows	Kittson, Pennington, Red Lake, Polk

### 7.12.2 STATE-LISTED SPECIES

Enbridge conducted a review of Minnesota Natural Heritage Information System (NHIS) data provided by MNDNR in September 2013. Table 7.12.2-1 presents NHIS Element Occurrences (EO) within one mile on either side of the Preferred Route. Minnesota's Endangered Species Statute and the associated Rules impose a variety of restrictions, a permit program, and several exemptions pertaining to species designated as endangered or threatened. Species of special concern are not protected by Minnesota's Endangered Species Statute or the associated Rules.

Further information on all of the threatened and endangered species in Table 7.12.2-1 is provided in the sections below. The state status of all species reflects updates published by MNDNR on August 19, 2013 (MNDNR 2013c), rather than the statuses in MNDNR’s Rare Species Guide (MNDNR 2014a-i), which may not reflect the 2013 updates.

TABLE 7.12.2-1 Element Occurrences in Minnesota's Natural Heritage Information System within One Mile on Either Side of the Preferred Route		
ZOOLOGICAL RECORD		
Species <sup>a</sup>	State Status	County (Last Observed)
Henslow's Sparrow ( <i>Ammodramus henslowii</i> )	Endangered	Hubbard (1988)
Blanding's Turtle ( <i>Emydoidea blandingii</i> )	Threatened	Cass (2011), Crow Wing (2011)
Fluted-shell ( <i>Lasmigona costata</i> )	Threatened	Pennington/Red Lake (2007)
Pugnose Shiner ( <i>Notropis anogenus</i> )	Threatened	Wadena (2010)
Black Sandshell ( <i>Ligumia recta</i> )	Special Concern	Aitkin (2007), Hubbard (2003), Pennington (2007), Red Lake (2008), Wadena (2003)
Creek Heelsplitter ( <i>Lasmigona compressa</i> )	Special Concern	Clearwater (2004), Hubbard (2004), Pennington (2007), Polk (2008), Red Lake (2008), Wadena (2003)
Four-toed Salamander ( <i>Hemidactylium scutatum</i> )	Special Concern	Aitkin (2001)
Greater Prairie-chicken ( <i>Tympanuchus cupido</i> )	Special Concern	Cass (2001), Hubbard (2000), Polk (2001), Wadena (1989)
Lake Sturgeon ( <i>Acipenser fulvescens</i> )	Special Concern	Aitkin (1990)
Least Darter ( <i>Etheostoma microperca</i> )	Special Concern	Hubbard (1984), Wadena (2000)
Marbled Godwit ( <i>Limosa fedoa</i> )	Special Concern	Marshall (1992), Pennington (1992), Red Lake (1992)
Mudpuppy ( <i>Necturus maculosus</i> )	Special Concern	Pennington (2013)
Nelson's Sparrow ( <i>Ammodramus nelsoni</i> )	Special Concern	Aitkin (1977), Pennington (1992)
Prairie Vole ( <i>Microtus ochrogaster</i> )	Special Concern	Cass (1994)
Red-shouldered Hawk ( <i>Buteo lineatus</i> )	Special Concern	Hubbard (2005), Clearwater (2005)
Short-eared Owl ( <i>Asio flammeus</i> )	Special Concern	Aitkin (1995), Red Lake (1992)
Trumpeter Swan ( <i>Cygnus buccinator</i> )	Special Concern	Cass (2008), Clearwater (2008), others <sup>b</sup>
Yellow Rail ( <i>Coturnicops noveboracensis</i> )	Special Concern	Pennington (1992)
BOTANICAL RECORDS		
Bog Adder's Mouth ( <i>Malaxis paludosa</i> )	Endangered	Hubbard (1984)
Butternut ( <i>Juglans cinerea</i> )	Endangered	Cass (1994)
Gray Ragwort ( <i>Packera cana</i> )	Endangered	Marshall (1991)
Handsome Sedge ( <i>Carex formosa</i> )	Endangered	Clearwater (2008)
Oakes' Pondweed ( <i>Potamogeton oakesianus</i> )	Endangered	Cass (2010)
Beaked Spikerush ( <i>Eleocharis rostellata</i> )	Threatened	Polk (2011)
Clinton's Bulrush ( <i>Trichophorum clintonii</i> )	Threatened	Clearwater (1939), Hubbard (1939)

Hair-like Beakrush ( <i>Rhynchospora capillacea</i> )	Threatened	Polk (2011)
Narrow Triangle Moonwort ( <i>Botrychium lanceolatum</i> ssp. <i>angustisegmentum</i> )	Threatened	Carlton (2008)
Red Saltwort ( <i>Salicornia rubra</i> )	Threatened	Kittson (2007)
Sterile Sedge ( <i>Carex sterilis</i> )	Threatened	Marshall (2008), Pennington (2007), Polk (2011)
Whorled Nut-rush ( <i>Scleria verticillata</i> )	Threatened	Polk (2011)
Blunt Sedge ( <i>Carex obtusata</i> )	Special Concern	Marshall (1992)
Discoid Beggarticks ( <i>Bidens discoidea</i> )	Special Concern	Cass (2010)
Few-flowered Spikerush ( <i>Eleocharis quinqueflora</i> )	Special Concern	Cass (2008), Pennington (2011), Polk (2011)
Northern Spikespike Sedge ( <i>Carex scirpoidea</i> )	Special Concern	Marshall (2008), Pennington (1984)
Slender Naiad ( <i>Najas gracillima</i> )	Special Concern	Aitkin (1998), Cass (2010)
Small White Lady’s Slipper ( <i>Cypripedium candidum</i> )	Special Concern	Marshall (2007), Pennington (2007)
Southern Naiad ( <i>Najas guadalupensis</i> ssp. <i>olivacea</i> )	Special Concern	Cass (2010)
Torrey’s Mannagrass ( <i>Torreyochloa pallida</i> var. <i>fernaldii</i> )	Special Concern	Aitkin (2009)
Twig Rush ( <i>Cladium mariscoides</i> )	Special Concern	Cass (2008), Polk (2011)
White Adder’s Mouth ( <i>Malaxis monophyllus</i> var. <i>brachypoda</i> )	Special Concern	Aitkin (1991), Hubbard (1935)
<sup>a</sup> Species are included in the table if any portion of the NHIS EO is within one mile on either side of the Preferred Route. Common names are based on MNDNR (2013c). <sup>b</sup> The NHIS records for this species refer to a group of observations made between 1987 and 2008; not all counties are named in the records that fall within one mile on either side of the Preferred Route.		

### 7.12.3 NORTHERN LONG-EARED BAT

#### Existing Environment

The northern long-eared bat (NLEB) (*Myotis septentrionalis*) will be listed as threatened under ESA on May 4, 2015. The USFWS has also issued an interim special 4(d) rule to eliminate unnecessary regulatory requirements for landowners, land managers, government agencies and others located within the range of the NLEB. This interim rule exempts “take” resulting from forest management practices, maintenance and limited expansion of transportation and utility ROWs, removal of trees and brush to maintain prairie habitat, and limited tree-removal projects,

as long as these activities do not impact known maternity roosts and hibernation caves. The public comment period on this interim rule is open until July 1, 2015 (USFWS 2015).

The NLEB is listed as special concern in Minnesota. According to USFWS county-level lists, the species may occur in all counties crossed by the Project: Kittson, Marshall, Pennington, Polk, Red Lake, Clearwater, Hubbard, Wadena, Cass, Crow Wing, Aitkin, and Carlton counties (USFWS 2014e). MNDNR (2014a) indicates only one county (Carlton) along the Preferred Route where the NLEB may occur. There are no NHIS records of the NLEB within one mile on either side of the Preferred Route.

The NLEB is a medium-sized bat of the Vespertilionidae family. Approximately 3.0-3.7 inches in length with a wingspan of 9-10 inches, the species derives its name from oversized ears relative to other members of the genus *Myotis*. Ranging throughout much of the eastern and north-central U.S. including Minnesota and most of the Upper Midwest, the species overwinters in small crevices or cracks in hibernacula, such as caves and mines. In summer, the species roosts either singly or in colonies under loose bark or in crevices and hollows in both live trees and snags. A habitat generalist, roost tree selection appears also to be opportunistic; the species uses a variety of tree sizes and species. Migration to summer habitat occurs between mid-March and mid-May (USFWS 2014a, 2014f).

Suitable NLEB habitat includes forest stands in riparian areas, forested ponds, and woodlots made up of potential roosts (i.e., snags and/or live trees  $\geq 3$  inches diameter at breast height with exfoliating bark, cracks, crevices, and/or cavities). Wooded corridors and other linear features, (such as fencerows) and non-forested habitats (including emergent wetlands and adjacent edges of agricultural fields and pastures) are also used for foraging and hunting (USFWS 2014f).

The primary threat to NLEB populations is white-nose syndrome, a fungus associated with extremely high rates of mortality. NLEB numbers have declined substantially in the northeastern U.S.; NLEB populations have experienced an approximately 99 percent decline at 54 hibernacula that had mortality from white-nose syndrome for at least two years. It is considered to be one of the species most heavily impacted by the disease (USFWS 2013b).

NLEB consultations with USFWS are ongoing. USFWS provided the Northern Long-Eared Bat Interim Conference and Planning Guidance (USFWS 2014f) as well as the 2014 Range-wide Indiana Bat Summer Survey Guidelines (USFWS 2014a) to assist with survey planning, impact analysis, and mitigation development. Per NLEB survey protocol, Enbridge used desktop analysis to identify areas of potentially suitable NLEB habitat along the Preferred Route both west and east of Clearbrook. The data from this analysis were then used to select survey target sites, which were reviewed and approved by USFWS prior to survey. Enbridge conducted presence/absence acoustic surveys, mist-net surveys, telemetry surveys, and exit counts during the species' window

of activity, May 15 to August 15, 2014. Enbridge documented NLEB acoustic positives and captured NLEB individuals through mist-netting in Aitkin, Carlton, Cass, Crow Wing, and Hubbard counties. Telemetry surveys documented a total of 35 NLEB maternity roost trees along the Preferred Route within these same counties. An NLEB Acoustic Survey Summary Report and an NLEB Mist-net and Telemetry Survey Summary Report documenting the results of the 2014 field surveys were provided to USFWS for review on October 7, 2014, and October 14, 2014, respectively. Enbridge will continue to consult with USFWS with regard to the need for additional NLEB surveys prior to construction.

#### Construction Impacts and Mitigation

Potential impacts on NLEB may occur if clearing of forested habitat for construction workspace takes place at locations where individuals are breeding, foraging, or raising pups. Bats may be injured or killed if occupied trees are cleared during this active window. NLEB may be disturbed during clearing or construction activities due to noise or human presence. Potential mitigation measures may include preserving maternity roost trees and a 100-foot buffer and limiting tree clearing to the winter months when the species is in hibernation. Enbridge will continue to evaluate potential impacts and develop appropriate conservation measure and will continue to work with USFWS as new species guidance is issued.

#### Operations Impacts and Mitigation

During operations, Enbridge will maintain the permanent ROW by removing woody shrubs and trimming branches overhanging the ROW approximately every five years. Through routine clearing, Enbridge will prevent woody vegetation from growing, thus preventing NLEB occupation within the maintained ROW. By preventing NLEB from occupying the ROW, the species will not be affected by excavation or maintenance activities. The total impact on potentially suitable NLEB habitat within the Project's 50-foot-wide permanent easement, including Enbridge's existing 25-foot-wide cleared ROW, is approximately 991.5 acres of the total 2,385.5 forested acres impacted by construction. These values account for less than 0.1 percent of available forested habitat in Minnesota according to land use/land cover data.

### **7.12.4 CANADA LYNX**

#### Existing Environment

The Canada lynx (*Lynx canadensis*) is a federally threatened species and a species of special concern in Minnesota. According to USFWS county-level lists, the species may occur in the following counties crossed by the Project: Marshall, Clearwater, Cass, Aitkin, and Carlton (USFWS 2014e).

Canada lynx are widely distributed across North America from eastern Canada to Alaska (McCord and Cardoza 1982). The species is very strongly associated with boreal forest habitat, and its range closely overlaps that of its primary prey, the snowshoe hare (*Lepus americanus*) (Bittner and Rongstad 1982, Aubry et al. 2000, Mowat et al. 2000). Canada lynx dependence upon snowshoe hare for survival is evident in the cyclical nature of lynx population dynamics. Significant shifts in population size occur in 8- to 11-year intervals and follow hare population cycles by one to two years (Mowat et al. 2000). When hares are abundant, lynx populations grow rapidly. When hare numbers fall, large numbers of lynx disperse in search of food, sometimes traveling great distances to areas where ideal lynx habitat is not present (Gunderson 1978, Mowat et al. 2000, Moen et al. 2008a). In Minnesota, lynx are found in areas that provide suitable snowshoe hare habitat, such as mixed conifer, regenerating forest, and upland and lowland conifer cover (Moen et al. 2008a, 2008b).

In the southern portion of its range, the Canada lynx is found at naturally lower densities than elsewhere due to the decreased availability of snowshoe hares (Wolff 1980, Buehler and Keith 1982, Koehler 1990, Koehler and Aubry 1994, Aubry et al. 2000, Ruggiero et al. 2000). Although these low densities are normal, the species is more vulnerable to risk factors affecting population stability when their densities are low. Threats to the species in the United States include anthropogenic development, mining, silvicultural management practices, grazing, trapping, predator control, roads, climate change, and habitat loss and fragmentation (Ruediger et al. 2000, USFWS 2013c).

During a meeting with USFWS on January 28, 2014, Enbridge proposed to avoid impacts on Canada lynx through conservation measures (see Section 7.12.4) such that surveys for the species will not be necessary. The USFWS Minnesota-Wisconsin Ecological Services Field Office concurred with this approach on February 24, 2014. Enbridge is committing to these conservation measures for the Project.

#### Construction Impacts and Mitigation

Construction activities may affect Canada lynx by potentially diverting individuals from the workspace area due to noise emissions or presence of humans and equipment involved in construction activities. Due to the extensive range of the Canada lynx and extensive habitat in the vicinity of the Preferred Route, disturbance is expected to be temporary and localized. Construction activities may also impact Canada lynx habitat, which in turn may affect individual lynx foraging and sheltering behaviors. Due to the abundance of habitat in the vicinity of the Preferred Route, these potential impacts are expected to be localized.

Enbridge will minimize potential impacts on Canada lynx individuals and habitat through general Project-based conservation and mitigation measures. For example, Enbridge has minimized

impacts on the species due to habitat fragmentation by co-location of the Project with the existing Enbridge Mainline System, third-party utilities, and road ROWs. In addition to these general Project-based conservation and mitigation measures, Enbridge will implement the following species-specific conservation measures, as appropriate. If a Canada lynx is sighted by Enbridge's contractor or Environmental Inspector within the construction workspace, or if USFWS notifies Enbridge of a Canada lynx sighting within one mile of the construction workspace, Enbridge will cease construction activities until the individual(s) have left the area. Contractors and inspectors will be trained to identify and immediately report sightings of Canada lynx to USFWS and MNDNR.

#### Operations Impacts and Mitigation

During operations, Enbridge will maintain the permanent ROW by removing woody shrubs and trimming branches overhanging the ROW approximately every five years. Other maintenance activities may occur as necessary. Noise emissions and presence of humans and equipment during operations activities may divert Canada lynx from the ROW; however, impacts are expected to be temporary and localized. Enbridge will not remove additional lynx habitat during operations. Thus, no impacts on Canada lynx habitat are anticipated during Project operations.

### **7.12.5 GRAY WOLF**

#### Existing Environment

The Western Great Lakes Distinct Population Segment (DPS) of the gray wolf is federally threatened; the gray wolf has no state-level special status in Minnesota (USFWS 2014d). The threatened status for the gray wolf in the Western Great Lakes DPS was reinstated under the ESA on December 19, 2014. According to USFWS county-level lists, the species may occur in all counties crossed by the Project: Kittson, Marshall, Pennington, Polk, Red Lake, Clearwater, Hubbard, Wadena, Cass, Crow Wing, Aitkin, and Carlton counties (USFWS 2014e).

The Western Great Lakes DPS is defined as wolves that may occur throughout the states of Minnesota, Wisconsin, and Michigan, and in portions of Ohio, Indiana, Illinois, Iowa, North Dakota, and South Dakota (USFWS 2012). Based on 2012-2013 population estimates, approximately 2,200 gray wolves occur in Minnesota (Erb and Sampson 2013). Habitat for the gray wolf in the Western Great Lakes DPS largely consists of northern forests; however, the species has also expanded its distribution in Minnesota to areas that are a matrix of forest and agricultural lands (USFWS 2011b). Primary prey species for the wolf are white-tailed deer (*Odocoileus virginianus*), beavers (*Castor canadensis*), moose (*Alces alces*), and snowshoe hares (USFWS 2011b).

The gray wolf population in the Western Great Lakes was historically threatened due to the depletion of wild prey populations and widespread predator control programs (USFWS 2011c). Shooting, poisoning, and trapping in conjunction with bounties were promoted by government agencies to combat increasing livestock depredation by wolves throughout the 19<sup>th</sup> and 20<sup>th</sup> centuries (Mech and Boitani 2010, USFWS 2014c). Current threats to the species include human-caused mortality (e.g., illegal shooting, competition with humans over livestock) (Mech and Boitani 2010).

Due to the recent reinstatement of the species' threatened status on December 19, 2014, Enbridge has not yet consulted with USFWS regarding the Western Great Lakes DPS of the gray wolf. However, based on recent experience and consultations with USFWS on other projects, Enbridge expects that surveys for the species will not be necessary and that potential impacts can be avoided through conservation measures. Enbridge will include the Western Great Lakes DPS of the gray wolf in future consultations with USFWS.

#### Construction Impacts and Mitigation

Construction activities may affect the gray wolf by potentially diverting individuals from the workspace area due to noise emissions or presence of humans and equipment involved in construction activities. Due to the range of the gray wolf and extensive habitat in the vicinity of the Preferred Route, disturbance is expected to be temporary and localized.

Enbridge will minimize potential impacts on gray wolves through general Project-based conservation and mitigation measures. In addition to these general Project-based conservation and mitigation measures, Enbridge will implement the following species-specific conservation measures, as appropriate. If a gray wolf is sighted by Enbridge's contractor or Environmental Inspector within the construction workspace, or if USFWS notifies Enbridge of a gray wolf sighting within one mile of the construction workspace, Enbridge will cease construction activities until the individual(s) have left the area. Contractors and inspectors will be trained to identify and immediately report sightings of gray wolves to USFWS.

#### Operations Impacts and Mitigation

During operations, Enbridge will maintain the permanent ROW by removing woody shrubs and trimming branches overhanging the ROW approximately every five years. Other maintenance activities may occur as necessary. Noise emissions and presence of humans and equipment during operations activities may divert gray wolves from the ROW; however, impacts are expected to be temporary and localized.

## 7.12.6 BALD AND GOLDEN EAGLES

### Existing Environment

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are not listed under the ESA or in Minnesota. The BGEPA, however, protects and conserves bald and golden eagles from intentional take of an individual bird, chick, egg, or nest, including alternate and inactive nests (USFWS 2007). BGEPA prohibits disturbance that may lead to biologically significant impacts, such as interference with feeding, sheltering, roosting, and breeding or abandonment of a nest (USFWS 2007). The breeding season for bald eagles in Minnesota is February 1 to July 31 (K. Herrington, USFWS, pers. comm., July 24, 2014). The disturbance distance for active bald eagle nests in Minnesota is 0.125 mile (USFWS 2007).

Bald eagles may be present and nest throughout Minnesota in areas with suitable habitat (Buehler 2000). Bald eagles commonly nest in trees but may also nest in other tall structures, such as rocky outcrops, cliffs, utility poles, and communication towers. They typically nest near bodies of water. Bald eagle breeding pairs may have more than one nest and may alternate use of these nests from year to year. Bald eagles may roost communally during migration, winter, and summer (USFWS 2007).

Golden eagles typically nest on cliffs but may also nest in large trees or on the ground (DeLong 2004). Golden eagles typically do not breed within the survey area in Minnesota. They may winter in the survey area and may migrate through portions of the survey area in the spring and fall (Kochert et al. 2002).

Aerial surveys were conducted for bald eagle nests according to the 2014 Bald and Golden Eagle Nest Survey Protocol; the USFWS Minnesota-Wisconsin Ecological Services Field Office reviewed and concurred with this protocol on February 24, 2014. Nest surveys were conducted in mid-March 2014 and 2015 within 0.25 mile of either side of the Preferred Route. There were two inactive bald eagle nests: one inactive bald eagle nest within the proposed Project workspace in Hubbard County and one inactive bald eagle nest outside the proposed Project workspace in Carlton County. Enbridge submitted the 2014 Eagle Nest Survey Report documenting the results of the 2014 field surveys to USFWS on July 18, 2014, and will submit the results of the 2015 surveys in early summer 2015. At USFWS's recommendation, Enbridge plans to conduct additional aerial surveys along the Preferred Route for eagle nests in the year(s) of construction.

### Construction Impacts and Mitigation

Enbridge has been consulting with USFWS regarding mitigation options for the inactive bald eagle nest in the construction workspace in Hubbard County. Future eagle nest surveys may identify additional active or inactive nests along the Preferred Route. Enbridge will continue consulting

with USFWS as necessary based on existing and future survey results to ensure the Project is in compliance with the BGEPA.<sup>34</sup>

#### Operations Impacts and Mitigation

Enbridge is consulting with USFWS as appropriate regarding the agency's recommendations for mitigation of eagles and active eagle nests during operations. Enbridge also plans to continue to consult with MNDNR on any permit requirements that may relate to active or inactive eagle nests.

#### **7.12.7 SPRAGUE'S PIPIT**

##### Existing Environment

The Sprague's pipit (*Anthus spragueii*) is a candidate species under the federal ESA and a state-endangered species in Minnesota. According to USFWS county-level lists, the species may occur in Polk County, which is crossed by the Project (USFWS 2014e). MNDNR (2014b) indicates only one county (Polk) along the Preferred Route where Sprague's pipits may occur. There are no NHIS records of Sprague's pipits within one mile on either side of the Preferred Route.

Sprague's pipits are grassland native birds that breed in the Northern Great Plains, migrate through the Central Great Plains, and winter in the south-central portion of North America. Breeding Sprague's pipits prefer dry, mixed-grass habitats dominated by native vegetation of sparse or intermediate density (Robbins and Dale 1999, Dechant et al. 2003). They have also been observed performing territorial displays in non-native grasslands and nesting in non-native hayfields in part of their range (Jones 2010, USFWS 2013d). Vegetation structure appears to be an important predictor of species occurrence (USFWS 2013d). Key structural features include moderate litter cover, scarcity or absence of woody vegetation and other visual obstructions, and grass-to-forb ratios that appear to vary geographically. Although Sprague's pipit abundance is highest in idle grasslands, Sprague's pipits can tolerate some levels of grazing, mowing, and prescribed burning (Robbins and Dale 1999, Dechant et al. 2003). Davis (2004) found that the probability of observing Sprague's pipits increased with grassland patch size in southern

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<sup>34</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

Saskatchewan; the smallest grassland in which males were observed singing was 171 acres (Davis 2004).

The primary threat to Sprague's pipit is habitat loss and conversion related to land conversion, primarily from native prairie to agricultural uses; management practices, such as fire suppression; and fragmentation of breeding habitat. Habitat fragmentation is problematic for Sprague's pipits due to their preference for large patch size and their avoidance of habitat edges (USFWS 2013d). Suitable habitat remains in 15-18 percent of the Sprague's pipit's historical breeding range in the United States (USFWS 2011a).

Enbridge conducted a desktop analysis and field survey in 2014 to assess Sprague's pipit suitable habitat along the Preferred Route in Polk County. Enbridge conducted the desktop analysis and field survey according to Enbridge's 2014 Grassland Habitat Assessment Protocol. Enbridge defined suitable habitat for the Sprague's pipit as grasslands that were at least 171 acres in size with an absence of trees and a low proportion of shrubs and bare ground (Davis 2004, USFWS 2013d). Enbridge documented 12 grassland parcels along the Preferred Route in Polk County that met the criteria for Sprague's pipit suitable habitat. Enbridge plans to conduct additional desktop analysis and field survey for Sprague's pipit suitable habitat in 2015 as necessary if there are changes to the Preferred Route.

#### Construction Impacts and Mitigation

Potential impacts on the Sprague's pipit may include temporary displacement due to construction activities and temporary loss of ground cover in native and planted grassland areas. Enbridge will use survey data to evaluate potential impacts and to develop appropriate conservation measures, as necessary, in future discussions with USFWS and MNDNR.

#### Operations Impacts and Mitigation

Potential impacts on the Sprague's pipit may include temporary displacement due to ROW maintenance. Enbridge will develop appropriate conservation measures, as necessary, in future discussions with USFWS and MNDNR. As such, long term impacts to the Sprague's pipit population are not expected as a result of the Project.

### 7.12.8 HENSLOW'S SPARROW

#### Existing Environment

The Henslow's sparrow (*Ammodramus henslowii*) is a state-endangered species in Minnesota. Its range extends across the northeastern U.S. from northwestern Minnesota to New York and south to Oklahoma and North Carolina. The U.S. population of Henslow's sparrows declined overall between the mid-1960s and the late 1980s and has been increasing since the early 1990s, though populations can be highly localized and variable on a regional scale. The Preferred Route crosses two counties where the species may occur according to MNDNR: Hubbard and Aitkin counties (MNDNR 2014c). There is one EO for the Henslow's sparrow within one mile on either side of the Preferred Route in Hubbard County (see Table 7.12.2-1).

The Henslow's sparrow is a migratory species that is believed to overwinter in Florida, Georgia, Louisiana, and Texas. Individuals most often form small breeding colonies and build their nests at the base of grass clumps. Up to two broods can be raised per season, and both the male and female feed their young. In Minnesota, it can be difficult to predict where Henslow's sparrows will breed, even where suitable habitat exists, due to several factors such as annual variation in use of breeding sites (MNDNR 2014c).

Henslow's sparrows historically bred in native prairie but now breed in other types of grasslands that have the following characteristics: a well-developed litter layer; tall, dense vegetation dominated by grasses; a relatively high proportion of standing dead vegetation for use as song perches; and low woody stem densities (Herkert 1998). These habitat characteristics require grasslands to be undisturbed long enough to develop a substantial litter layer but disturbed frequently enough to exclude woody vegetation. Most sources cite a minimum patch size of 75 acres, though Henslow's sparrows reportedly breed in smaller patches. They may be utilizing less preferred habitat as their population has started a modest, gradual rebound in recent years (Cooper 2007), thus making habitat criteria difficult to define.

The Preferred Route crosses one subsection, the Red River Prairie Ecological Subsection (see Map 7.9.1-1), that contains Henslow's sparrow Key Habitat as outlined by Minnesota's State Wildlife Action Plan (MNDNR 2005). Enbridge examined NHIS records of NPCs and determined that none of the NPCs that correspond to Key Habitat for the Henslow's sparrow within the Red River Prairie subsection occurs along the Preferred Route. In addition, there is no overlap between Key Habitats and the Henslow's sparrow EO. This EO is located on the northern edge of the distribution of Henslow's sparrow EO records in Minnesota, and the NPC data indicate a lack of suitable habitat along the Preferred Route for this species. Enbridge plans to consult with MNDNR to verify that no additional analysis for this species is required.

#### Construction Impacts and Mitigation

Potential impacts on the Henslow's sparrow may include temporary displacement due to construction activities. Based on desktop analysis, there is no suitable habitat for Henslow's sparrow along the Preferred Route; therefore, Enbridge will have no impact to suitable habitat during construction.

#### Operations Impacts and Mitigation

Potential impacts on the Henslow's sparrow may include temporary displacement due to ROW maintenance. Based on desktop analysis, there is no suitable habitat for Henslow's sparrow located within the permanent ROW; therefore, Enbridge will have no impact to suitable habitat during operations. Enbridge will develop appropriate conservation measures, as necessary, in future discussions with MNDNR.

### **7.12.9 DAKOTA SKIPPER**

#### Existing Environment

The Dakota skipper butterfly is listed as endangered in Minnesota. As of November 23, 2014, it is also listed as threatened under the ESA (USFWS 2014b). According to USFWS county-level lists and MNDNR (2014d), the Dakota skipper is known to occur in Kittson and Polk counties in Minnesota. There are no NHIS records of Dakota skippers within one mile on either side of the Preferred Route. Critical habitat is proposed for the Dakota skipper in Kittson and Polk counties. The nearest critical habitat unit in Kittson County is approximately 17.5 miles from the Project Preferred Route, and the nearest critical habitat unit in Polk County is approximately 22.0 miles from the Project Preferred Route.

Dakota skippers have four basic life stages: egg, larva, pupa, and adult. During the brief adult period in June and July, females lay eggs on the underside of leaves one to two inches above the ground. Eggs take about 10 days to hatch into larvae (caterpillars). After hatching, larvae build shelters at or below the ground surface and emerge at night to feed on grass leaves. This continues until fall when larvae become dormant. They overwinter in shelters at or just below ground level, usually in the base of native bunchgrasses (USFWS 2013a). The following spring, larvae emerge to continue developing. Pupation takes about 10 days and usually happens in June. Adult males emerge about five days before females, and the adults live for three weeks at most. This brief period is the only time that Dakota skippers can reproduce. If a female Dakota skipper lives for the full three weeks and adequate flowers for nectar are available, she may lay up to 250 eggs. Nectar provides Dakota skippers with both water and food and is crucial for the survival of both sexes during the adult flight period (USFWS 2013a).

The Dakota skipper is an obligate of high-quality prairie habitat that is dominated by native species and is untilled. The species utilizes dry-mesic mixed grass and wet-mesic tallgrass prairie remnants characterized by alkaline and composite soils (McCabe 1981, Royer and Marrone 1992). Soil conditions appear to be important elements in skipper habitat suitability. Soil moisture, humidity, pH, surface temperature, near-surface humidity, and compaction are important influences on larvae survival (Cochrane and Delphey 2002).

The species composition of wet-mesic tallgrass and dry-mesic mixed grass habitats for the Dakota skipper differs. In wet-mesic sites, bluestem (*Andropogon gerardii* and *Schizachyrium scoparium*) predominates. These habitat patches also typically contain three nectar plants that bloom synchronously with the adult skipper flight period: wood lily (*Lilium philadelphicum*), harebell (*Campanula rotundifolia*), and alkali grass (*Zigadensus elegans*). In these areas, the end of the adult flight period corresponds with the end of the *Z. elegans* blooming period. Dry-mesic upland sites are typically found in rolling terrain and are characterized by the presence of bluestems and needle grasses. *L. philadelphicum* and *C. rotundifolia* are found in these areas as well, but *Z. elegans* is typically absent. Purple coneflower (*Echinacea angustifolia*) is often abundant in both dry-mesic and wet-mesic prairie, as are other nectar-producing aster family species (e.g., *Ratibida columnifera* and *Gaillardia* spp.) (Biodiversity Conservation Alliance et al. 2003). Adult skipper flight periods may be tied to the *E. angustifolia* blooming period in prairie habitat where this species is present (Royer and Marrone 1992).

Dakota skipper populations declined historically due to conversion of their native prairie habitat to agriculture and other human developments (from 85-99 percent of original tallgrass prairie habitat in the United States and Canada). They may persist on ranches where grazing is not too intense but do not tolerate plowing or herbicide use. Remaining Dakota skipper habitat consists of small, isolated patches of native prairie, and they only survive on some of these prairie remnants (USFWS 2013a).

Enbridge conducted a Grassland Habitat Assessment along the Preferred Route west of Clearbrook. One objective of the grassland habitat assessment was to identify and quantify potentially suitable habitat for the Dakota skipper. Enbridge assessed suitable habitat along the Preferred Route in Polk and Kittson counties.

As part of the habitat assessment, Enbridge conducted a desktop analysis that identified and determined the acreage of grasslands along the Preferred Route. Enbridge then conducted a field-based habitat assessment of the grasslands identified during the desktop analysis. Through the field-based habitat assessment, Enbridge further evaluated and confirmed the grasslands identified during the desktop analysis as well as determined habitat characteristics and suitability for the Dakota skipper.

Surveyors documented suitable Dakota skipper habitat at one area along the Preferred Route in Polk County. Enbridge plans to conduct presence/absence surveys for the Dakota skipper at this suitable habitat area during the flight period in 2015.

#### Construction Impacts and Mitigation

Potential impacts on the Dakota skipper may occur if construction takes place in occupied habitat at any time of the year. Eggs, larvae, pupae, and/or adults could be destroyed if construction occurs within occupied habitat. Enbridge will avoid occupied areas by utilizing HDD, boring, or other construction techniques. By avoiding these areas of occupied suitable habitat, Enbridge will avoid most potential impacts on the species and its suitable habitat.

Other conservation measures may be implemented to ensure that construction activities in areas surrounding the occupied habitat do not impact individuals and habitat. Enbridge will continue to work with USFWS to evaluate potential impacts and develop appropriate conservation measures.

#### Operations Impacts and Mitigation

Enbridge will avoid impacts on Dakota skippers during operations and maintenance by not using aerial application of herbicides or pesticides within one mile of occupied suitable habitat. Enbridge will continue to work with USFWS to evaluate potential impacts and develop appropriate conservation measures for operations and maintenance activities.

### **7.12.10 POWESHIEK SKIPPERLING**

#### Existing Environment

The Poweshiek skipperling butterfly is listed as endangered in the state of Minnesota. As of November 23, 2014, it is also listed as endangered under the ESA (USFWS 2014g). According to USFWS county-level lists, the Poweshiek skipperling is known to occur in Kittson, Marshall, Pennington, Polk, and Red Lake counties. According to MNDNR (2014e), the Poweshiek skipperling may occur in two counties that are crossed by the Preferred Route: Polk and Kittson. There are no NHIS records of Poweshiek skipperlings within one mile on either side of the Preferred Route. The Poweshiek historically occurred as far north as Canada along the western border of Minnesota (A. Horton, USFWS, pers. comm., June 14, 2013). Critical habitat is proposed for the Poweshiek skipperling in Kittson and Polk counties. The nearest critical habitat unit in Kittson County is approximately 17.5 miles from the Preferred Route, and the nearest critical habitat unit in Polk County is approximately 26.0 miles from the Preferred Route.

The Poweshiek skipperling has four basic life stages: egg, larva, pupa, and adult. Adults have a short lifespan of only one to two weeks and can be seen between mid-June and mid-July. During

that time, they mate and lay eggs near the tips of leaf blades. Eggs take approximately nine days to hatch into larvae (caterpillars) during late summer; they feed and develop through early fall and then overwinter on the blades of grasses and on the stem near the base of the plant to continue development until the following spring (USFWS 2014b, 2014g). They then emerge in spring and early summer to continue developing until they pupate and emerge as adult butterflies.

Threats to the Poweshiek skipperling include habitat loss and degradation of native prairies and prairie fens resulting from: human conversions and development, invasive and noxious species, past and present fire, haying, grazing management, flooding, groundwater depletion, alteration, and contamination (USFWS 2014b).

Habitat preferences of the Poweshiek skipperling include untilled prairie fens, grassy lake and stream margins, moist meadows, and wet-mesic to dry tallgrass prairie. The species relies on a variety of nectar plants for feeding. Purple coneflower, smooth ex-eye (*Heliopsis helianthoides*), stiff tickseed (*Coreopsis palmate*), black-eyed susan (*Rudbeckia hirta*), and palespike lobelia (*Lobelia spicata*) are common food sources, but preferred plants vary across the species' range. In Minnesota, the butterfly utilizes both high, dry tallgrass and low, wet prairie remnants. In drier habitats, skipperlings are likely to use purple coneflowers almost exclusively, and adult emergence is closely tied to the coneflower lifecycle (USFWS 2014b).

Enbridge conducted a Grassland Habitat Assessment along the Preferred Route west of Clearbrook. One objective of the grassland habitat assessment was to identify and quantify potentially suitable habitat for the Poweshiek skipperling. Enbridge assessed suitable habitat along the Preferred Route in Kittson, Marshall, Pennington, Polk, and Red Lake counties.

As part of the habitat assessment, Enbridge conducted a desktop analysis that identified and determined the acreage of grasslands along the Preferred Route. Enbridge conducted a field-based habitat assessment of the grasslands identified during the desktop analysis. Through the field-based habitat assessment, Enbridge further evaluated and confirmed the grasslands identified during the desktop analysis as well as determined habitat characteristics and suitability for the Poweshiek skipperling.

Surveyors documented suitable Poweshiek skipperling habitat at three areas along the Preferred Route in Polk and Pennington counties. Enbridge plans to conduct presence/absence surveys for the Poweshiek skipperling at these three areas during the flight period in 2015.

#### Construction Impacts and Mitigation

Potential impacts on the Poweshiek skipperling may occur if construction takes place in occupied habitat at any time of the year. Eggs, larvae, pupae, and/or adults could be destroyed if

construction occurs within occupied habitat. Enbridge will avoid occupied areas by utilizing HDD, boring, or other construction techniques. By avoiding these areas of occupied suitable habitat, Enbridge will avoid most potential impacts on the species and its suitable habitat.

Other conservation measures will be implemented to ensure that construction activities in areas surrounding the occupied habitat do not impact individuals and habitat. Enbridge will continue to work with USFWS to evaluate potential impacts and develop appropriate conservation measures.

#### Operations Impacts and Mitigation

Enbridge will avoid impacts on Poweshiek skipperlings during operations and maintenance by not using aerial application of herbicides or pesticides within one mile of occupied suitable habitat. Enbridge will continue to work with USFWS to evaluate potential impacts and develop appropriate conservation measures for operations and maintenance activities.

### **7.12.11 BLANDING'S TURTLE**

#### Existing Environment

The Blanding's turtle (*Emydoidea blandingii*) is a threatened species in Minnesota. According to MNDNR (2014f), the Blanding's turtle occurs in six counties crossed by the Project: Hubbard, Wadena, Cass, Crow Wing, Aitkin, and Carlton. There are two NHIS EOs for Blanding's turtles within one mile on either side of the Preferred Route in Cass and Crow Wing counties (see Table 7.12.2-1).

The Blanding's turtle is a long-lived turtle averaging 6-10 inches in length (MNDNR 2014f). Blanding's turtles spend the winter burrowed into the bottom sediments of wetlands or waterbodies (MNDNR 2008b). They emerge from overwintering sites between late March and early April to bask on warm, sunny days, which triggers egg development in females. Blanding's turtles typically nest in Minnesota in June and July, laying eggs in open sandy areas that can be a mile from wetlands. Hatchlings emerge between mid-August and early October, and individuals typically return to overwintering sites in November (MNDNR 2008b).

Blanding's turtles move between wetland and upland areas during their annual cycle. In general they prefer calm, shallow, and/or slow-moving waterbodies with abundant aquatic vegetation, such as Type 1-3 wetlands and marshes adjacent to rivers (MNDNR 2008b). For overwintering, they use the muddy bottoms of deep marshes, deep ponds, and other waterbodies where bottom sediments are protected from freezing. They use small, temporary wetlands in spring and early summer for basking, mating, and feeding. Nesting occurs in grassy or brushy uplands (MNDNR 2008b).

Threats to Blanding's turtles include loss of wetland habitat through drainage or flooding; loss of upland habitat through development or conversion to agriculture; human disturbance, including road kills during seasonal movements; and increases in populations of predators, such as skunks and raccoons, which prey on nests and young (MNDNR 2008b). Their delayed maturation, low reproductive rate, high egg and juvenile mortality rate, and seasonal movements between wetlands and uplands make them especially vulnerable to these threats (MNDNR 2014f).

In a meeting regarding NHIS data, MNDNR indicated there were no areas of statewide importance to the Blanding's turtle that occur east of Clearbrook. MNDNR also indicated that Blanding's turtle habitat would generally not be impacted and that the agency would not be requesting field surveys for Blanding's turtles east of Clearbrook. Enbridge does not anticipate any potential impacts to Blanding's turtles west of Clearbrook because this portion of the Preferred Route does not cross any counties where the Blanding's turtle occurs (MNDNR 2014f).

#### Construction Impacts and Mitigation

On October 17, 2014, Enbridge sent a letter to MNDNR outlining its plan to avoid and minimize impacts on Blanding's turtles during and immediately after construction east of Clearbrook. The plan is based on MNDNR's recommendations for avoiding and minimizing impacts to areas inhabited by Blanding's turtles (MNDNR 2008b). Enbridge is awaiting a response to this proposed plan from MNDNR.<sup>35</sup>

Enbridge proposed that if construction occurs at wetland or waterbody crossings in the vicinity of the two Blanding's turtle NHIS EOs between March 15 and November 15 (i.e., the period when Blanding's turtles are not overwintering), BMPs will be implemented to avoid and minimize impacts to Blanding's turtles at this location. These BMPs include environmental signage at appropriate wetland features; training of contractors on practices such as checking trenches prior to backfilling and moving Blanding's turtles that are in imminent danger; temporary erosion and sediment controls; temporary equipment bridges; and minimizing construction of access roads. In addition, Type 2 or Type 3 wetlands will not be converted to stormwater retention basins.

Post-construction BMPs that apply to avoidance and minimization of impacts to Blanding's turtles at this location include restoration of natural contours and permanent revegetation of affected

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<sup>35</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

wetlands or waterbodies. Enbridge's proposal to MNDNR also included contractor training on the importance of removing silt fencing after revegetation. Permanent roads will not be constructed over streams.

Enbridge will work with MNDNR as well as the USACE on other factors that may affect Blanding's turtles in the vicinity of the two Blanding's turtle NHIS EOs. These factors include minimizing the dredging, deepening, and filling of Type 2 and Type 3 wetlands and the specifications of culverts that may be placed between wetland areas or between wetland areas and nesting areas.

#### Operations Impacts and Mitigation

In the letter to MNDNR October 17, 2014, Enbridge addressed potential impacts during operations to Blanding's turtles in the vicinity of the two Blanding's turtle NHIS EOs where the Project is co-located. According to MNDNR (2008b), chemical vegetation management in infrequently mowed areas between June 1 and October 1 has the potential to affect Blanding's turtles traveling in upland areas. Enbridge will maintain the permanent ROW in an herbaceous state and will mechanically remove vegetation that grows so that it obscures the visibility of the ROW for federally required surface condition inspections. Herbicides (if used) will be coordinated with the necessary regulatory and landowner approvals.

### **7.12.12 PUGNOSE SHINER**

#### Existing Environment

The pugnose shiner (*Notropis anogenus*) is a state-threatened fish species in Minnesota. According to MNDNR (2014g), this species can be found in central Minnesota, including the following counties crossed by the Project: Hubbard, Wadena, Cass, Crow Wing, and Aitkin, though it is rare throughout this range. There is one NHIS EO for the pugnose shiner within one mile on either side of the Preferred Route in Wadena County (see Table 7.12.2-1).

The pugnose shiner is a short-lived (maximum three years), small minnow species that swims in schools of 15-35 individuals. It is a secretive species that will immediately seek cover when disturbed or threatened. Its diet consists of plants, such as filamentous algae, and possibly microcrustaceans. There is limited information on the life history of this species, and breeding habitats are generally unknown. The species is thought to spawn between May and July, utilizing submergent vegetation as spawning substrate (MNDNR 2014g).

Pugnose shiners are found in glacial lakes and streams that have an abundance of submerged vegetation, such as pondweed (*Potamogeton* spp.), native watermilfoil (*Myriophyllum* spp.), elodea (*Elodea* spp.), eelgrass (*Verbasicum blattaria*), coontail (*Ceratophyllum* spp.), bulrush (*Scirpus* spp.), muskgrass (*Chara* spp.), and filamentous algae. It prefers low-velocity waters with

a substrate of sand, mud, or gravel. In warm months, the shiner occupies shallow waters, and it occupies deeper waters in the winter months (MNDNR 2014g).

The pugnose shiner is intolerant to turbidity and siltation, therefore activities that increase turbidity, such as the removal of littoral vegetation from lakes, and eutrophication from nutrient enrichment (e.g., introduction of fertilizers) pose threats to this species. The invasion and spread of Eurasian watermilfoil (*Myriophyllum spicatum*) is also considered a possible threat to this species (MNDNR 2014g).

Enbridge plans to coordinate with MNDNR regarding potential impacts, proposed BMPs, and mitigation measures for this species.

#### Construction Impacts and Mitigation

Certain waterbody crossing methods have the potential to impact pugnose shiners living in streams or rivers downstream of the crossing by causing increased turbidity and sedimentation. Enbridge will consult with MNDNR regarding the appropriate avoidance and mitigation measures prior to construction at any waterbody crossings.

#### Operations Impacts and Mitigation

Enbridge does not anticipate any effects of Project operations on the pugnose shiner.

### **7.12.13 STATE-PROTECTED MUSSELS**

#### Existing Environment

The fluted-shell mussel (*Lasmigona costata*) is a state-threatened species in Minnesota. According to MNDNR (2014h), the fluted-shell occurs in six counties crossed by the Project: Pennington, Polk, Red Lake, Clearwater, Aitkin, and Carlton. There is one NHIS EO for the fluted-shell within one mile on either side of the Preferred Route, overlapping Pennington and Red Lake counties (see Table 7.12.2-1). There are also NHIS records of two mussel species of special concern, the black sandshell (*Ligumia recta*) and the creek heelsplitter (*Lasmigona compressa*), occurring within one mile of the Preferred Route (see Table 7.12.2-1).

The fluted-shell and other mussels are long-lived, generally sedentary organisms with a complex life cycle (MNDNR 2014h). Their life cycle involves the attachment of larvae to individuals of one or more fish species (or to mudpuppy salamanders [*Necturus maculosus*], in the case of one mussel species). Once the larvae have developed into juveniles, they detach from the host's gills and become free-living mussels on the stream or river bed.

Threats to the fluted-shell and other mussels include declines in the quality of river and stream habitat caused by dams, channelization, dredging, and non-point source water pollution (MNDNR 2014h). These human activities increase sediment loads in the water and alter the composition of bottom sediments where mussels spend most of their lives. Navigational alterations to waterbodies also block the movement of host species.

MNDNR requested that a desktop assessment be conducted for habitat for the fluted-shell and other protected mussels along the Preferred Route. In its Protected Mussel Desktop Habitat Assessment, Enbridge evaluated all proposed waterbody crossings along the Preferred Route east of Clearbrook. Enbridge used NHIS EOs, data from the Minnesota Statewide Mussel Survey, and data from Enbridge waterbody field surveys performed in 2013 to assess the presence or absence of habitat indicators for six threatened or endangered species that had the potential to occur at proposed waterbody crossings based on known occurrences of those species in watersheds crossed by the Preferred Route. The habitat indicators included river/stream size; the presence of pools, runs, or riffles; qualitative descriptions of bottom substrates; and/or depth, velocity, and quantified substrate criteria. The two state-endangered species included in the assessment were the purple wartyback (*Cyclonaias tuberculata*) and the salamander mussel (*Simpsonaias ambigua*). The three state-threatened species included in the assessment besides the fluted-shell were the elktoe (*Alasmodonta marginata*), the mucket (*Actinonaias ligamentina*), and the spike (*Elliptio dilatata*). Enbridge submitted its Protected Mussel Desktop Habitat Assessment Report to MNDNR for review on January 24, 2014. On May 19, 2014, MNDNR provided feedback on the assessment and requested that seven of the proposed waterbody crossings along the Preferred Route east of Clearbrook be surveyed in the field.

Subsequent to its Protected Mussel Desktop Habitat Assessment, Enbridge used MNDNR feedback to evaluate all proposed waterbody crossings west of Clearbrook. In total, Enbridge identified 14 crossings along the entire Preferred Route to be surveyed in the field. Enbridge submitted its Protected Mussel Field Survey Protocol to MNDNR for review on July 23, 2014, and MNDNR provided concurrence with the protocol on August 5, 2014.

Enbridge visited all 14 crossings between August 20 and 28, 2014. Enbridge did not survey one crossing due to unsafe conditions and lack of suitable habitat. MNDNR concurred on October 15, 2014, that surveys were not warranted at that crossing.

Enbridge observed mussels at 11 of the 13 surveyed sites, with eight of the 11 sites including live individuals. Enbridge identified a total of 11 species, including the black sandshell and the creek heelsplitter. The other nine species were the threeridge (*Amblema plicata*), cylindrical papershell (*Anodontoides ferussacianus*), Wabash pigtoe (*Fusconaia flava*), plain pocketbook (*Lampsilis cardium*), fatmucket (*Lampsilis siliquoidea*), white heelsplitter (*Lasmigona complanata complanata*), pink heelsplitter (*Potamilus alatus*), giant floater (*Pyganodon grandis*), and creeper

(*Strophitus undulatus*). Enbridge did not find any state or federally threatened or endangered species. Enbridge submitted its Protected Mussel Field Survey Report to MNDNR for review and concurrence on March 11, 2015.

#### Construction Impacts and Mitigation

Certain waterbody crossing methods have the potential to impact mussels living in the stream or river bed within or downstream of the crossing. Enbridge will continue to consult with MNDNR regarding the appropriate avoidance and mitigation measures prior to construction at any waterbody crossings.

#### Operations Impacts and Mitigation

Enbridge does not anticipate any effects of Project operations on state-protected mussels.

### **7.12.14 WESTERN PRAIRIE FRINGED ORCHID**

#### Existing Environment

The western prairie fringed orchid (WPFO) (*Platanthera praeclara*) is a federally threatened species and a state-endangered species in Minnesota. According to USFWS county-level lists, the species may occur in the following counties crossed by the Project: Kittson, Pennington, Polk, and Red Lake (USFWS 2014e). The USFWS has not designated critical habitat for the western prairie fringed orchid (USFWS 2014e). According to MNDNR (2014i), the WPFO may occur in these same four counties that are crossed by the Preferred Route. There are no NHIS records of WPFOs within one mile on either side of the Preferred Route.

The WPFO is a terrestrial orchid native to prairie habitats in the central United States and south-central Canada. The species is native to the tallgrass prairie, most often occurring in wet prairies, sedge meadows, and similar moist habitats, especially in the northern part of its range (MNDNR undated, USFWS 2003). Individuals of the species have also been observed in old fields, roadside ditches, and other disturbed areas. The species prefers sites with direct sunlight and fertile sandy loam soils that are moist and neutral to slightly alkaline (North Dakota Parks & Recreation Department undated). Where the WPFO occurs in northern Minnesota, vegetative growth typically emerges from the soil in May, and flowering typically occurs over a 3-week period in early to mid-July (MNDNR undated; USFWS 1996, 2003). The species is dependent on mycorrhizal fungi for energy and nutritional support, especially during seed germination and in preparation for photosynthesis (Sharma et al. 2002).

The WPFO is threatened by conversion of habitat to cropland, overgrazing, intensive hay mowing, drainage, lack of management (succession), actions that directly or indirectly lower water levels,

invasive species, inter-seeding of non-native species, and collection of plants from small populations (USFWS 1989, 1996, 2009).

Enbridge submitted the WPFO Habitat Assessment Protocol to USFWS on July 15, 2013; the protocol reflected USFWS recommendations and Section 7 survey guidelines for the species. The USFWS Minnesota-Wisconsin Ecological Services Field Office provided concurrence on the protocol on January 27, 2014. Based on the protocol, Enbridge conducted a desktop analysis to determine presence of WPFO suitable habitat and individuals along the Preferred Route in Kittson, Pennington, Red Lake, and Polk counties. In Minnesota, the distribution of extant populations of the species corresponds well with that of certain land type associations (LTA) (USFWS 2014h). Enbridge identified NPCs that represent potentially suitable WPFO habitat and then used NHIS records to determine where these NPCs occurred along the Preferred Route within the appropriate LTAs. The Preferred Route overlapped one appropriate LTA: the Beach Ridges LTA (USFWS 2014h). Enbridge surveyed all potential habitat where the Preferred Route and Beach Ridges LTA overlapped and did not identify suitable habitat for the species. Enbridge plans to submit the 2014 WPFO Field Survey Report to the USFWS Minnesota-Wisconsin Ecological Services Field Office in April 2015. Enbridge will conduct additional desktop analysis and field surveys for WPFOs in 2015 as necessary if there are changes to the Preferred Route.

#### Construction Impacts and Mitigation

Because no WPFO individuals nor any suitable habitat were documented along the Preferred Route, the Project will not impact WPFO suitable habitat or individuals during construction. Additional desktop analysis and surveys will be conducted as necessary, pending future re-routes.

#### Operations Impacts and Mitigation

Because no WPFO habitat was documented along the Preferred Route, Enbridge will have no impact on WPFO suitable habitat or individuals during operations.

### **7.12.15 STATE-PROTECTED FLORA**

#### Existing Environment

Several state-threatened or state-endangered plant species occur within one mile of the Preferred Route (see Table 7.12.2-1). MNDNR requested that a desktop habitat assessment and field surveys be conducted for protected flora along the Preferred Route. The species included in the assessment are listed in Table 7.12.15-1. These species occupy a variety of habitat types within Minnesota's wetland, open water, prairie, savanna, and forest communities. They also vary in terms of life history and geographic distribution. Table 7.12.15-1 summarizes their biological characteristics, preferred habitats, and the counties along the Preferred Route that are

part of each species' known range in Minnesota. Threats to these species include degradation or conversion of habitat to agriculture, urban development, and other land uses.

Enbridge conducted a desktop habitat assessment for protected flora using NHIS EOs, draft SOBS data provided by MNDNR, publicly available data obtained from the MNDNR Data Deli (final SOBS, NPCs, Calcareous Fens, and Railroad ROWs Prairies), and interpretation of aerial photography by professional MNDNR-approved plant surveyors. Enbridge revised the desktop habitat assessment as changes were made to the Preferred Route, ultimately identifying 61 survey sites along the Preferred Route as targets for field surveys. Enbridge submitted updated field survey protocols, which included desktop habitat assessment summaries, and revised survey sites to MNDNR in July 2013, August 2013, and June 2014.

Enbridge conducted protected flora field surveys at 60 sites between June 12 and October 5, 2013, and between June 18 and October 14, 2014. Enbridge could not survey one site due to lack of access. Enbridge documented all threatened and endangered species, as well as species of special concern and species on a watch list provided by MNDNR, at survey sites when observed. Enbridge reported 2,405 records of 34 species at 32 of the 60 surveyed sites along the Preferred Route and did not find any endangered, threatened, special-concern, or watch-list species at the other 28 sites.

**TABLE 7.12.15-1  
State-Threatened and State-Endangered Plant Species with Potential to Occur within the Line 3 Replacement Project Area**

<b>Common Name <sup>a</sup></b>	<b>Scientific Name</b>	<b>State Status</b>	<b>Life History <sup>b</sup></b>	<b>Habitat <sup>b</sup></b>	<b>Counties <sup>b</sup></b>
Bog Adder's Mouth	<i>Malaxis paludosa</i>	E	Perennial forb	Forested Rich Peatland	Clearwater, Hubbard, Cass
Butternut	<i>Juglans cinerea</i>	E	Perennial tree	Mesic Hardwood Forest	Cass, Crow Wing, Aitkin
Eastern Hemlock <sup>c</sup>	<i>Tsuga canadensis</i>	E	Perennial tree	Fire Dependent Forest, Mesic Hardwood Forest	Carlton
Gray Ragwort	<i>Packera cana</i>	E	Perennial forb	Upland Prairie	Marshall, Polk
Handsome Sedge	<i>Carex formosa</i>	E	Perennial graminoid	Mesic Hardwood Forest	Clearwater
Oakes' Pondweed	<i>Potamogeton oakesianus</i>	E	Perennial forb <sup>f</sup>	Shores and bays of small to medium size lakes <sup>f</sup>	Central and northeastern Minnesota <sup>f</sup>
Purple-flowered Bladderwort <sup>c</sup>	<i>Utricularia purpurea</i>	E	Carnivorous forb	Littoral Zone of Lake	Cass, Crow Wing
Western Jacob's Ladder <sup>c,d</sup>	<i>Polemonium occidentale</i>	E	Perennial forb	Forested Rich Peatland	None
Western Prairie Fringed Orchid <sup>c,e</sup>	<i>Platanthera praeclara</i>	E	Perennial forb	Lowland Prairie	Kittson, Pennington, Polk, Red Lake
Beaked Spikerush	<i>Eleocharis rostellata</i>	T	Perennial graminoid	Non-forested Rich Peatland	Polk, Clearwater
Blunt-lobed Grapefern <sup>c</sup>	<i>Botrychium oneidense</i>	T	Perennial forb	Mesic Hardwood Forest	Cass, Crow Wing, Aitkin, Carlton
Clinton's Bulrush	<i>Trichophorum clintonii</i>	T	Perennial graminoid	Lowland Prairie, Savanna	Clearwater, Hubbard

Common Name <sup>a</sup>	Scientific Name	State Status	Life History <sup>b</sup>	Habitat <sup>b</sup>	Counties <sup>b</sup>
Goblin Fern <sup>c</sup>	<i>Botrychium mormo</i>	T	Perennial forb	Mesic Hardwood Forest	Polk, Clearwater, Cass, Crow Wing, Aitkin
Hair-like Beak Rush	<i>Rhynchospora capillacea</i>	T	Annual graminoid	Non-forested Rich Peatland	Marshall, Pennington, Polk, Clearwater
Narrow Triangle Moonwort	<i>Botrychium lanceolatum</i> ssp. <i>angustisegmentum</i>	T	Perennial forb	Mesic Hardwood Forest	Cass, Crow Wing, Aitkin, Carlton
Ram's Head Orchid <sup>c</sup>	<i>Cypripedium arietinum</i>	T	Perennial forb	Fire Dependent Forest, Forested Rich Peatland	Polk, Clearwater, Hubbard, Wadena, Cass, Aitkin, Carlton
Red Saltwort	<i>Salicornia rubra</i>	T	Annual forb	Salt flats, alkaline depressions, exposed shores of alkaline lakes, and saline swales	Kittson
Small White Waterlily <sup>c,d</sup>	<i>Nymphaea leibergii</i>	T	Perennial forb	Small Rivers and Streams, Medium Rivers and Streams, Littoral Zone of Lake	None
Sterile Sedge	<i>Carex sterilis</i>	T	Perennial graminoid	Non-forested Rich Peatland	Polk, Clearwater
Whorled Nutrush	<i>Scleria verticillata</i>	T	Annual graminoid	Non-forested Rich Peatland	Polk

<sup>a</sup> Common names are based on MNDNR (2013).  
<sup>b</sup> Life form, longevity, habitat, and counties of distribution were obtained from MNDNR Rare Species Guide (<http://www.dnr.state.mn.us/rsg/index.html>, accessed 11/17/2014), unless otherwise noted.  
<sup>c</sup> Although there were no NHIS records of this species within one mile on either side of the Preferred Route, it is included because it is known to occur in nearby areas.  
<sup>d</sup> Although this species is not known to occur in counties along the Preferred Route according to the MNDNR Rare Species Guide, it is included because it is known to occur in nearby areas.  
<sup>e</sup> This species is also threatened at the federal level, and according to USFWS county-level lists it may occur in Kittson, Pennington, Red Lake, and Polk counties (see Section 7.12.14).  
<sup>f</sup> Data were extracted from the "Proposed Amendment of Minnesota Rules, Chapter 6134: Endangered and Threatened Species Statement of Need and Reasonableness: August 10, 2012" ([http://files.dnr.state.mn.us/input/rules/ets/SONAR\\_plants.pdf](http://files.dnr.state.mn.us/input/rules/ets/SONAR_plants.pdf), accessed 09/18/2013).

Enbridge observed 31 species of vascular plants:

- 3 state-endangered species (*Carex formosa*, *Juglans cinerea*, and *Utricularia purpurea*);
- 7 state-threatened species (*Botrychium lanceolatum* ssp. *angustisegmentum*, *Carex sterilis*, *Eleocharis rostellata*, *Rhynchospora capillacea*, *Salicornia rubra*, *Scleria verticillata*, and *Trichophorum clintonii*);
- 13 species of MNDNR special concern (*Botrychium pallidum*, *Botrychium simplex* [including var. *tenebrosum*], *Carex obtusata*, *Carex scirpoidea*, *Cladium mariscoides*, *Drosera anglica*, *Eleocharis quinqueflora*, *Gaillardia aristata*, *Limosella aquatica*, *Najas gracillima*, *Salix maccalliana*, *Salix pseudomonticola*, and *Torreyochloa pallida*);

- 1 species that was previously listed as special concern but delisted in 2013 and now considered a watch-list species (*Sparganium glomeratum*); and
- 7 species on the MNDNR watch list (*Actaea pachypoda*, *Carex capillaris*, *Carex lurida*, *Persicaria arifolia*, *Puccinellia nuttalliana*, *Ranunculus gmelinii*, and *Triglochin palustris*).

Enbridge also observed two species of nonvascular plants:

- 1 lichen (*Lobaria quercizans*) that was previously listed as special concern but delisted in 2013; and
- 1 liverwort (*Trichocolea tomentella*), a state-threatened species.

Enbridge submitted its Protected Flora Field Survey Report to MNDNR for review and concurrence on March 11, 2015.

#### Construction Impacts and Mitigation

Enbridge has been working throughout Project design to avoid construction in areas where state-threatened or -endangered plant species are known to occur. Enbridge will continue to consult with MNDNR regarding the development of a Protected Flora Avoidance Plan. If state-threatened or state-endangered plants are unavoidable, Enbridge will apply for an incidental take permit.

#### Operations Impacts and Mitigation

Enbridge does not anticipate any effects of Project operations on state-protected flora.

### **7.12.16 ASSOCIATED FACILITIES**

#### Construction Impacts and Mitigation

Based on field surveys as of 2014, there will be no impacts on threatened or endangered species at the associated facilities associated with the Project.

#### Operations Impacts and Mitigation

Enbridge does not anticipate any effects at associated facility operations on threatened or endangered species.

## 7.13 GROUNDWATER RESOURCES

The primary source of water for private, public, commercial, and industrial uses near the Project is groundwater pumped from wells. Most lakes, rivers, and many wetlands near the Project are hydraulically connected with the water table and are typically a surface expression of the water table. The Project traverses glaciated terrain dominated by thick glacial drift deposits of glacial till and outwash, overlying primarily Precambrian crystalline bedrock. Although groundwater is present in both the glacial drift and underlying bedrock, the glacial drift tends to be most used for water production in the Project area due to its greater accessibility and the presence of permeable sediments. Well productivity and groundwater quality varies greatly throughout the Project area owing to the wide variability seen in surface geology (see Section 7.7).

### 7.13.1 EXISTING ENVIRONMENT

#### Aquifers

An aquifer is a geologic unit (or a combination of geologic units) that is capable of yielding usable quantities of water. Aquifers are typically composed of thick, laterally continuous deposits of permeable sand, gravel, or bedrock that is composed of permeable sandstone, limestone, or is highly fractured. Portions of geologic units that are not capable of yielding usable quantities of water generally are termed “aquitards” and are either too thin to accommodate wells or are composed of low-permeability materials, such as silt, clay, or crystalline bedrock. Unlike geologic units, aquifers and aquitards are not typically given formal names, but they are often referenced by the geologic units that comprise them.

#### **Glacial Aquifers**

Unconsolidated permeable glacial deposits and recent alluvial deposits are the most important groundwater source in the Project area. These deposits consist primarily of glacial sand and/or gravel outwash, ice-contact deposits, or sand and gravel alluvium that was deposited along existing streams. Most glacial aquifers are classified as “surficial aquifers” because the water table is located in these deposits. The surficial glacial aquifers vary in thickness from a few feet to over 300 feet and can produce water up to 3,000 gallons per minute or more, depending on the thickness and extent of the saturated deposits.

Surficial glacial aquifers receive recharge by infiltrating precipitation and snow melt. Perched wetland deposits may also provide some minor additional recharge. Groundwater in the surficial glacial aquifers generally flows from upland areas (e.g., topographic highs) to lakes and streams. Many lakes and streams near the Project are in direct hydraulic connection with the surficial glacial aquifers and the open water of these features are typically at the same elevation as the

water table. Groundwater from surficial aquifers discharges to lakes, where some water evaporates, and rivers. Evapotranspiration from plants is also a mechanism of discharge.

In some locales near the Project, there may be “buried” glacial aquifers. Buried glacial aquifers are unconsolidated, permeable sand and gravel deposits that are separated from the ground surface or from overlying surficial glacial aquifers by a laterally continuous layer of lower permeability silt and/or clay that functions as an aquitard. Buried glacial aquifers are typically “confined” (i.e., the water pressure is above the aquitard base), and in some cases wells that are installed in buried glacial aquifers flow freely without pumping. Flowing wells are most commonly encountered where a buried glacial aquifer is near a river because the ground surface is at a lower elevation near rivers. Buried glacial aquifers are recharged primarily by downward leakage through the aquitard and discharge from these aquifers takes place by upward leakage in the vicinity of rivers.

Surficial aquifers are an important source of groundwater throughout the Project area and can provide adequate water volumes to supply municipalities and irrigation systems. Surficial aquifers generally yield good quality water. However, there may be naturally occurring constituents, such as iron and manganese, at concentrations above secondary drinking water standards (i.e., levels that affect taste, color, and odor but not human health). In some areas, there may also be naturally high levels of constituents such as arsenic.

Glacial aquifers, and particularly surficial glacial aquifers, can be affected by surface activities, including industrial and agricultural land use, due to the relatively shallow depth of the water table and the relatively coarse texture of the material in the overlying unsaturated zone. The most common anthropogenic contaminant in glacial aquifers near the Project is nitrate, which originates as fertilizer applied to agricultural fields and leaches into the groundwater system. Nitrate and other agriculturally derived contaminants are classified as “non-point source pollutants” because of their widespread use near portions of the Project area. Nitrate persists in glacial aquifers for a long time because of the naturally low levels of organic material or sulfides that would otherwise “denitrify” nitrate.

### **Cretaceous Aquifers**

Fine sandstone and shale of Cretaceous age are present in two areas that are traversed by the Project in Cass and Aitkin counties. These rocks, which are likely the stratigraphic equivalent of the Dakota Sandstone (present in southwestern Minnesota), are typically 200-350 feet below ground surface and are overlain by glacial deposits. Because they are thin and of relatively low permeability, the Cretaceous aquifer near the Project yields only domestic quantities of water (i.e., 10-25 gallons per minute) and is used only in a few rural locations. The water quality of the

Cretaceous aquifer is typically poor compared to glacial aquifers and has naturally elevated levels of arsenic in many parts of Minnesota.

### **Precambrian Aquifers**

The Preferred Route is located over Precambrian aquifers comprised of undifferentiated granite, greenstone, and slate from central Minnesota to the northwest and Proterozoic metasediments from central to eastern Minnesota. These aquifers can yield limited supplies of water to rural domestic and livestock wells where fractures, faults, and weatherized zones provide porosity and permeability. Wells in these aquifers are generally completed at depths ranging from 30- to 400-feet and generally yield between one and 25 gallons per minute (Adolphson et al. 1981).

### Wells

#### **Water Supply Wells**

The Minnesota County Well Index (CWI) is the most complete record of well construction and location in Minnesota and is kept up-to-date and maintained by the Minnesota Geological Survey, in cooperation with the Minnesota Department of Health (MDH). A review of the CWI database identified 12 drilling records within 200 feet of the Preferred Route (Table 7.13.1-1). Enbridge will work with the landowner and develop site-specific plans for wells that could be impacted by construction and/or request variance from MDH. Enbridge continues to consult with affected landowners regarding known cased wells in the vicinity of the ROW. If such wells are identified, the locations of these wells will be noted.

Unique Well Number	County	Milepost	Distance from Pipeline Centerline (feet)	Direction from Pipeline Centerline	Use
527501	Marshall	39.1-W	92	West	Monitoring
548028	Marshall	39.1-W	139	East	Monitoring
714983	Marshall	59.2-W	128	West	Monitoring
714986	Marshall	59.3-W	130	West	Monitoring
101877	Clearwater	121.1-W	20	Northeast	Domestic
535569	Clearwater	116.0-W	40	East	Monitoring
428418	Hubbard	36.5-E	55	East	Domestic
764345	Hubbard	46.5-E	56	East	Domestic
742992	Hubbard	55.6-E	59	East	Domestic
406036	Hubbard	61.8-E	37	East	Domestic
471978	Hubbard	73.4-E	185	Northeast	Irrigation
673690	Carlton	221.9-E	114	North	Domestic

### **Public Water Supply Wells**

The Project will not cross any Environmental Protection Agency (EPA)-designated sole-source aquifers. The only EPA-designated sole-source aquifer in Minnesota is the Mille Lacs Aquifer, located south of the Preferred Route.

The Project will not encounter any surface water intakes for drinking water.

Public and non-public community water supply source-water protection in Minnesota is administered by MDH through the Wellhead Protection program. Wellhead Protection Areas (WHPA) for public and community water-supply wells are delineated on the basis of a zone of capture for 10-year groundwater time-of-travel to the well. A Drinking Water Supply Management Area (DWSMA) is delineated around the WHPAs using geographically definable boundaries, such as roads, section lines, etc. Within the DWSMA, the water-supply provider conducts an inventory of potential contamination sources and develops management practices and monitoring strategies to mitigate well contamination. The Preferred Route will cross approximately 0.6 mile of a DWSMA for Oklee in Red Lake County and 0.6 mile of a DWSMA for Sundsrud's Court in the vicinity of Park Rapids in Hubbard County (MDH 2014). MDH rates the sensitivity of the aquifer that supplies the wells for the Oklee water supply as "low" and the sensitivity of the aquifer that supplies the well for Sundsrud's Court as "high."

In addition, the Project crosses approximately 0.6 mile of the Wrenshall DWSMA in Carlton County. The Wrenshall 1 WHPA within the DWSMA also will be crossed for a distance of 433 feet (MDH 2014). The Project is co-located with the Enbridge Mainline System as it crosses this DWSMA and WHPA.

### **Contaminated Groundwater**

The MPCA database was assessed to identify sites with known or potential contamination within 0.5 mile of the Project (MPCA 2014). This database included federal regulatory listings, such as the National Priority List (or federal Superfund); Comprehensive Environmental Response, Compensation, and Liability Information System, (or potential National Priority List sites); No Further Response Action Planned; Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal; and RCRA hazardous waste generators. State listings included the: Permanent List of Priorities (PLP", or state-equivalent Superfund); Delisted PLP; Voluntary Investigation and Cleanup; Permitted Solid Waste Facilities; Unpermitted Dumps; Closed Landfill Program; and the State Assessment Program.

The following types of sites/facilities listed in the database were eliminated from further consideration: sites permitted for construction or industrial stormwater discharge, feedlots, waste water dischargers, and small to minimal hazardous waste generators regulated under

RCRA. Additionally, tank sites (active and inactive) with no reported releases were eliminated from further review. These sites were not included in this review because the presence of tanks alone is not indicative of a release. Table 7.13.1-2 summarizes the sites that were identified with potential contamination located within 0.5 mile of the Project. Based on this information, 38 sites were identified along the Preferred Route. Of these sites, 34 sites were determined to be more than 500 feet from the Preferred Route centerline and therefore are not anticipated to impact or be impacted by the Project. Because inaccuracies are inherent to the database, it will be necessary to evaluate facilities on a site-by-site basis. Enbridge will consult with the appropriate regulatory agencies to confirm the Project will not encounter contamination from the site. In addition, Enbridge will develop a Contaminated Site Management Plan, which will outline procedures if impacted soil or groundwater is encountered during pipeline construction to protect worker safety and implement proper notification and contaminated material handling procedures. If necessary, appropriate avoidance or mitigation measures will be developed and implemented in accordance with applicable state and federal regulations.

<b>TABLE 7.13.1-2<sup>36</sup> Potentially Contaminated Sites within 0.5 Mile of the Line 3 Replacement Project</b>					
<b>COUNTY</b>	<b>CITY</b>	<b>Site/Facility Name</b>	<b>Milepost</b>	<b>Distance from Centerline (feet)</b>	<b>Listing Type</b>
Aitkin	Palisade	Robinson Store & Ab Service	158.3-E	1,360	Multiple Activities (Tank Site, Leak Site)
Carlton	Wrenshall	Conoco Inc. Lakehead Tank Farm	221.8-E	2,213	CERCLIS Site
Carlton	Wrenshall	Former Conoco Lakehead Pipeline Terminal	221.7-E	286	Leak Site
Carlton	Wrenshall	Wrenshall Dump	220.2-E	1,703	Multiple Activities (State Assessment Site, Unpermitted Dump Site)
Carlton	Wrenshall	Wrenshall Public School PBR	220.3-E	1,410	Solid Waste, Permit By Rule
Cass	Backus	Grinning Bear Demolition Landfill	102.1-E	1,499	Landfill, Open
Cass	Outing	Crooked Lake Dump	126.4-E	947	Multiple Activities (State Assessment Site, Unpermitted Dump Site)
Clearwater	Bagley	Friberg Residence	8.2-E	2,194	Leak Site

<sup>36</sup> This Enbridge commitment addresses comments provided by MPCA on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

<b>TABLE 7.13.1-2<sup>36</sup> Potentially Contaminated Sites within 0.5 Mile of the Line 3 Replacement Project</b>					
<b>COUNTY</b>	<b>CITY</b>	<b>Site/Facility Name</b>	<b>Milepost</b>	<b>Distance from Centerline (feet)</b>	<b>Listing Type</b>
Clearwater	Bagley	Clearwater County Demolition Debris Land Disposal	10.4-E	1,705	Multiple Activities (Landfill, Open, Hazardous Waste, Small to Minimal QG)
Clearwater	Clearbrook	Clearbrook Post Office	120.5-W	1,436	Leak Site
Clearwater	Clearbrook	Former Clearbrook Above-ground Storage Tank Site	120.7-W	2,054	Leak Site
Clearwater	Clearbrook	Community Oil Co Bulk Plant	120.6-W	2,164	Multiple Activities (Tank Site, Leak Site)
Clearwater	Clearbrook	Lakehead Pipeline Co Inc	121.1-W	814	Multiple Activities (Tank Site, Leak Site)
Clearwater	Clearbrook	Koch Pipeline Co LP - Clearbrook	121.0-W	1,638	Multiple Activities (Tank Site, Leak Site, Hazardous Waste, LQG, Air Permit)
Clearwater	Clearbrook	AC Oil Station	121.1-W	1,666	Multiple Activities (Tank Site, Leak Site)
Clearwater	Gonvick	Gonvick Dump	124.8-W	1,099	Multiple Activities (State Assessment Site, Unpermitted Dump Site)
Hubbard	Lake Alice Township	Lake Alice Township Dump	37.0-E	2,326	Multiple Activities (State Assessment Site, Unpermitted Dump Site)
Hubbard	Park Rapids	Headwaters Country Club Dump	55.3-E	1,785	Multiple Activities (State Assessment Site, Unpermitted Dump Site)
Pennington	Norden Township	Unnamed Dump - Norden Township	65.9-W	236	Multiple Activities (State Assessment Site, Unpermitted Dump Site)
Pennington	Thief River Falls	Scott Olson	69.2-W	468	Contaminated Soil Treatment Facility
Pennington	Thief River Falls	Scott Olson	69.3-W	1,409	Contaminated Soil Treatment Facility
Polk	Gully	Trail Dump	108.9-W	1,887	Multiple Activities (State Assessment Site, Unpermitted Dump Site)
Polk	Gully	Gully Dump	109.5-W	1,275	Multiple Activities (State Assessment Site, Unpermitted Dump Site)
Polk	Trail	Jacks Salvage, PBR	107.2-W	878	Solid Waste, Permit By Rule
Red Lake	Oklee	Red Lake County Demo Landfill Oklee Site	107.0-W	92	Landfill, Open
Red Lake	Oklee	Oklee Bus Garage	97.1-W	1,835	Leak Site
Red Lake	Oklee	Red Lake County Coop Inc	97.6-W	1,780	Leak Site
Red Lake	Oklee	Bobs Napa Service Bulk Site	97.3-W	989	Leak Site
Red Lake	Oklee	Standard Oil	97.7-W	729	Leak Site

<b>TABLE 7.13.1-2<sup>36</sup> Potentially Contaminated Sites within 0.5 Mile of the Line 3 Replacement Project</b>					
<b>COUNTY</b>	<b>CITY</b>	<b>Site/Facility Name</b>	<b>Milepost</b>	<b>Distance from Centerline (feet)</b>	<b>Listing Type</b>
Red Lake	Oklee	Bobs Napa Service Station	97.4-W	1,133	Leak Site
Red Lake	Oklee	Cenex Harvest States	97.4-W	810	Leak Site
Red Lake	Oklee	Oklee Public School	97.4-W	1,792	Leak Site
Red Lake	Plummer	Plummer Municipal Well No. 1	88.3-W	2,071	Leak Site
Red Lake	Plummer	Zimpel Construction	87.5-W	1,787	Leak Site
Red Lake	Plummer	Senior Citizens Center	87.5-W	2,147	Leak Site
Red Lake	Plummer	Skjerven Station	87.5-W	1,691	Leak Site
Red Lake	Plummer	Plummer Bulk Plant	87.5-W	1,736	Leak Site
Red Lake	Plummer	Hess Oil	87.4-W	2,045	Leak Site

### **7.13.2 CONSTRUCTION IMPACTS AND MITIGATION**

Construction of the Project is not expected to have long-term impacts on groundwater resources. Ground disturbance associated with pipeline construction is primarily limited to the upper 10 feet, which is above the water table of most regional aquifers. Construction activities, such as trenching, backfilling, and dewatering, that encounter shallow surficial aquifers may result in minor short-term and very localized fluctuations in groundwater levels within the aquifer. Once the construction activity is complete, the groundwater levels typically recover quickly.

HDD methods are planned for some water crossings. Horizontal drilling will likely penetrate below the water table. Drilling will not affect groundwater levels or groundwater flow directions.

During construction, blasting may be required in locations where shallow bedrock is present; however, based on a preliminary review of bedrock crossed by the Preferred Route, Enbridge does not anticipate any blasting will be required. Less than one percent of the proposed route crosses areas with the potential for shallow bedrock (bedrock within five feet of the ground surface). If blasting is required, Enbridge will conduct all blasting activities in accordance with applicable federal, state, and local regulations, as described under Section 7.7. Because blasting is not currently anticipated for the Project, it is not anticipated to affect bedrock aquifers.

The introduction of contaminants into groundwater due to accidental release of construction related chemicals, fuels, or hydraulic fluid during construction could have an adverse effect on groundwater quality, most notably near shallow water wells. Spill-related impacts from pipeline construction are primarily associated with fuel storage, equipment refueling, and equipment maintenance. Section 10.1 of Enbridge’s EPP (Appendix E) outlines measures that will be

implemented to prevent accidental releases of fuels and other hazardous substances. Sections 10.7 and 10.8 of the EPP also describe response, containment, and cleanup procedures. By implementing the protective measures set forth in the EPP, long-term contamination due to construction activities is not anticipated.

Buried glacial aquifers are known, or suspected, to exist near the areas of the Spire Valley, Hay Creek, and La Salle Creek crossing locations. The buried aquifers are confined aquifers under artesian conditions or flowing artesian conditions. Pipeline construction activities performed at elevations above the confining layer and/or above the base of the confining layer should not impact buried aquifers or affect artesian conditions if the confining layer is not penetrated or compromised. Enbridge conducted a geotechnical investigation along the Preferred Route at Spire Valley in October/November 2014 to better understand subsurface conditions and the potential for artesian well conditions. The results of the investigation indicate that no overt evidence of pressurized groundwater conditions were observed in either test boring, such as drilling mud thinning or excess mud volumes during advancement by mud rotary. This information will be used to design construction methods in this area.

Well logs in the CWI database were examined to evaluate the potential depth and thickness of the confining layers in the vicinity of the stream crossings. No well records or borehole logs were listed in the CWI at any of the crossing locations. The nearest records were approximately 0.4 mile to the Hay Creek location, 0.8 mile to the Spire Valley location, and 1.1 miles to the La Salle Creek location.

The surficial geology at each of these locations consists of ground and/or end moraine glacial deposits that are over 250 feet thick. Buried aquifers in these settings may or may not be laterally continuous, and the elevations and thickness of confining units can vary over distance. Geologic descriptions in the well records indicate that clay layers are variable in thickness and depth at each of the locations. However, there are general consistencies in the geology.

A surficial layer of sandy material was observed in many of the well boreholes, and especially in wells nearest to the crossing locations. The thickness of the surficial sand generally ranged from 15 to 30 feet over a clay layer. In areas without a surficial sand layer, a thick layer of clayey material was present. The depth to the bottom of the uppermost clay layer ranged from 30 to over 200 feet, and was generally greater than 40 feet below ground surface.

Therefore construction activities conducted at depths less than 25 feet should not affect artesian conditions in buried aquifers. Site specific data will be collected at these locations to evaluate the geologic conditions at the construction location. Soil borings will be advanced to the design depth of the pipeline at the crossing locations to determine if a confining layer may be breached.

### **7.13.3 OPERATIONS IMPACTS AND MITIGATION**

Routine operations and maintenance is not expected to affect groundwater resources. During operations, potential minor short-term groundwater quality degradation is possible from maintenance equipment and vehicle spills and maintenance activities that may require excavation. Although there is potential for dewatering of shallow groundwater aquifers and potential changes in groundwater quality (such as increases in TSS concentrations) during trenching, excavation, and backfilling maintenance activities, these changes are expected to be temporary. Shallow groundwater aquifers generally recharge quickly because they are receptive to recharge from precipitation and surface water flow.

## 7.14 WETLANDS

### 7.14.1 EXISTING ENVIRONMENT

The major drainage basins and watershed districts crossed by the Project are described in Section 7.15.

In Minnesota, wetland crossings are regulated by USACE through Section 404 of the Clean Water Act. Wetlands are also regulated by BWSR and local governmental units through the Wetland Conservation Act (WCA), and Public Waters are regulated by MNDNR. Enbridge initiated Project consultations on November 25, 2014, with USACE, MNDNR, BWSR, and WCA local governmental units (Appendix J). Enbridge will continue to coordinate with these agencies throughout the Project, including investigation of known wetland mitigation easements in the Project area, on items that arise from the initial Project consultations, as well as items that are ongoing as they pertain to the Project.

#### Wetlands

Wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of wetland vegetation typically adapted for life in saturated soil conditions (Cowardin et al. 1979). Wetlands provide a variety of environmental benefits, including water quality, flood storage, wildlife habitat, nutrient sequestration, and recreation.

Wetlands in Minnesota are diverse in terms of their hydrologic regime, plant communities, and soils. Wetland hydrology includes a wide range of conditions. It can be limited to surface saturation during the early portions of the growing season, as in seasonally flooded basins. At the other end of the spectrum, wetlands can have up to 6.5 feet of standing water, as in deep marshes. Hydrology is often driven by groundwater as a wetland acts as a discharge point, but it can also be driven by surface runoff, as occurs in floodplain forests. A variety of plant communities occur in wetlands, including grasses, sedges, wildflowers, shrubs, and trees. A wide variety of soils occurs in wetlands, including sand, silt, clay, and organic soils such as peats.

Palustrine emergent (PEM) wetlands consist of sedge- and rush-dominated wetlands adjacent to waterbodies, sedge meadows along existing pipeline ROWs, and shallow marsh communities dominated by cattails and reed canary grass. Widely scattered small, ephemeral pools support a variety of emergent hydrophytes. Common plant species in PEM wetlands include broad-leaved cattail (*Typha latifolia*), reed canary grass (*Phalaris arundinacea*), lake sedge (*Carex lacustris*), and water sedge (*Carex aquatilis*). Much of the emergent wetland is along existing utility ROWs, which is maintained free of woody vegetation.

Palustrine scrub-shrub (PSS) wetlands are primarily comprised of shrub-carr communities dominated primarily by alders (*Alnus* spp.) and willows (*Salix* spp.). Herbaceous vegetation consists of a mix of sedges, cattails, or other hydrophytic species common to emergent wetlands.

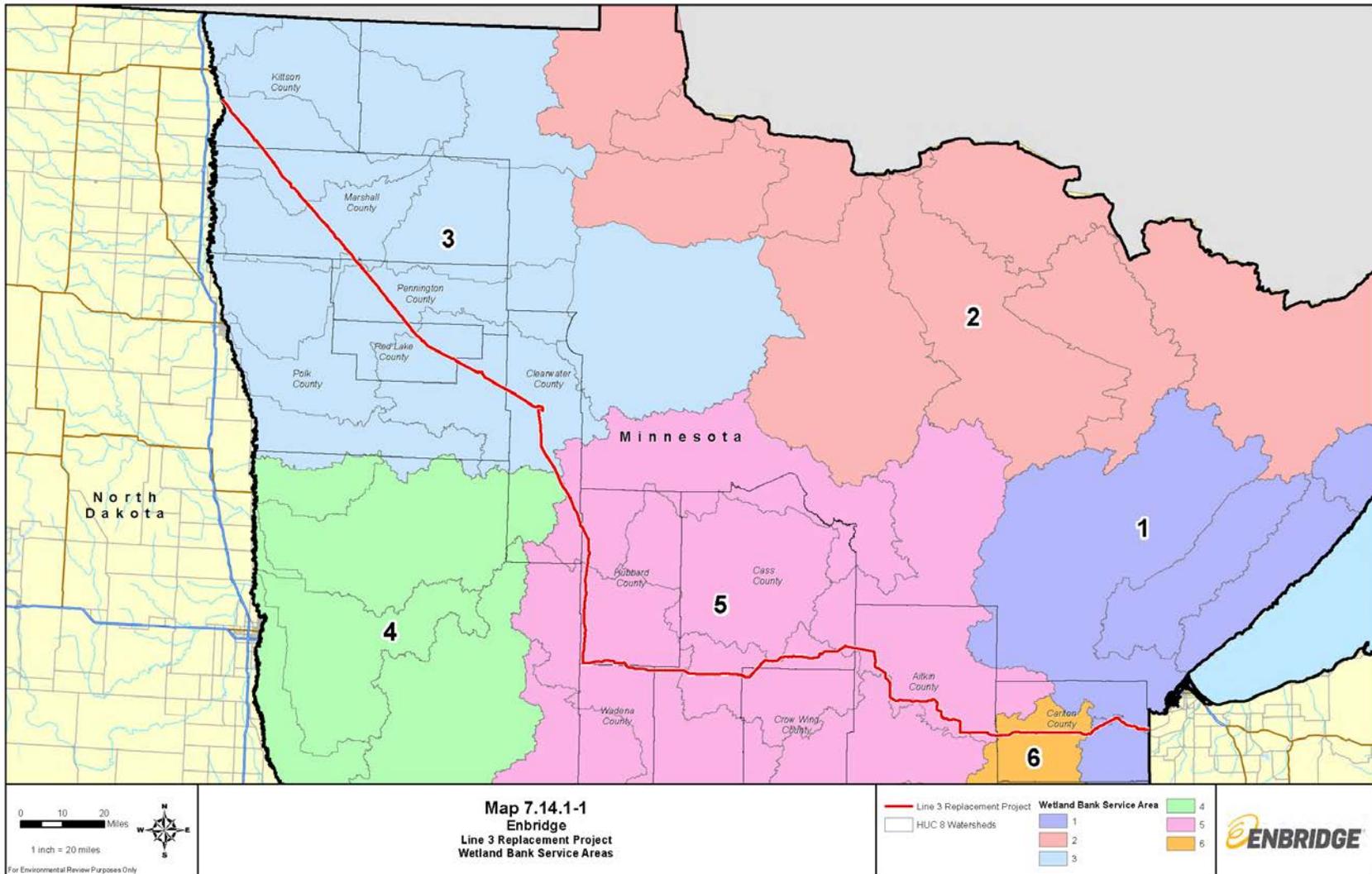
Palustrine forested (PFO) are wetlands dominated by a forest plant community. PFO wetlands are found in the form of several distinct communities, including floodplain forest, hardwood swamp, coniferous swamp, and coniferous bog. Tree species commonly associated with PFO wetlands include black ash (*Fraxinus nigra*), tamarack (*Larix laricina*), black spruce (*Picea mariana*), and silver maple (*Acer saccharinum*). Black ash also occurs as a fringe or minor component to larger wetland complexes or as isolated stunted specimens within some wetlands.

Wetlands provide an important flood protection function. Many of the wetlands in the Project area are topography-dependent and highly interspersed on the landscape. Wetlands hold water on the landscape, which slows the rate of water runoff to streams. Wetland loss causes increased runoff from the landscape, which in turn increases flooding and stream bank erosion. Stream bank erosion caused by excess water runoff can lead to habitat degradation from sedimentation.

#### Wetland Regulations

Enbridge will acquire all required wetland permits for the Project from local, state, and federal agencies. As part of the permitting requirements for WCA and USACE, Enbridge will avoid and minimize impacts on wetlands to the extent possible, restore temporary impacts to wetlands on-site, and provide compensatory mitigation as based on permit requirements.

USACE and BWSR have designated ten Wetland Bank Service Areas (BSAs) throughout the state (Map 7.14.1-1). BSAs are utilized for projects requiring compensatory wetland mitigation through the use of wetland bank credits. Typically wetland impacts can be mitigated by utilizing wetland bank credits that are within the same BSA as the impact. As the Project crosses Minnesota from west to east, it crosses BSAs 3, 4, 5, 6 and 1 (Table 7.14.1-1).



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TABLE 7.14.1-1 Wetland Bank Service Areas Crossed by the Line 3 Replacement Project			
Bank Service Area	Major Watershed Name	Major Watershed Number	Crossing Length (miles)
3	Red River of the North – Tamarac River	69	32.6
	Snake River	68	16.4
	Red River of the North – Grand Marais Creek	67	2.8
	Red Lake River	63	21.9
	Clearwater River	66	54.5
4	Wild Rice River	60	5.5
5	Mississippi River – Headwaters	7	18.3
	Crow Wing River	12	49.5
	Pine River	11	40.4
	Leech Lake River	8	0.5
	Mississippi River – Grand Rapids	9	48.9
	Mississippi River – Brainerd	10	6.4
6	Kettle River	35	22.8
1	Nemadji River	5	11.7
	St. Louis River	3	4.7
		<b>PROJECT TOTAL <sup>a</sup></b>	<b>336.9</b>

<sup>a</sup> Numbers may not total consistently due to rounding.

### Wetland Delineations

Enbridge conducted wetland delineation surveys along approximately 95 percent of the Preferred Route in 2013 and 2014 to identify the wetlands that will be affected during Project construction. Wetlands were identified and mapped in general accordance with the Great Plains, Midwest, and Northcentral and Northeast Regional Supplements of the 1987 Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987). Enbridge will conduct wetland delineations along the remaining five percent of the Preferred Route in 2015.

Where field-verified survey data were not available, Enbridge used National Wetlands Inventory (NWI) data in digital format obtained from MNDNR to identify potential wetlands that will be crossed by the Preferred Route (MNDNR 2013e). Through a combination of NWI and 2013-2014 field data, Enbridge determined that the Preferred Route will cross a total of 942 wetlands (based on feature IDs) and approximately 81.4 linear miles of wetlands. Summaries of the wetland types crossed, the total length of crossing, and areas affected by construction and operations are presented in the sections below.

**Public Water Wetlands**

The Project will cross five wetlands (Public Water Wetlands) and four basins (Public Water Basins) listed on the MNDNR Public Waters Inventory (MNDNR 2013f). Public Water Wetlands are Type 3, 4, and 5 wetlands, as defined in the USFWS Circular No. 39 (1971 edition), that are 10 acres or larger in unincorporated areas or 2.5 acres or larger in incorporated areas (MNDNR 2013d). Type 3, 4, and 5 wetlands include: inland shallow fresh marshes; inland deep fresh marshes; and inland open fresh water, shallow ponds, and reservoirs. These wetlands are regulated as public waters under the MNDNR’s License to Cross Public Waters program. These features are summarized in Table 7.14.1-2.

From Milepost	To Milepost	Crossing Length (miles)	Name	PWI Classification
64.9-W	65.0-W	0.1	Unnamed	Wetland
19.9-E	20.0-E	0.1	Mud Lake	Basin
50.0E	50.1-E	0.1	Unnamed	Wetland
53.9-E	54.1-E	0.2	Portage	Basin
74.5-E	74.5-E	<0.1	Frandsen Slough	Wetland
74.6-E	74.7-E	<0.1	Frandsen Slough	Wetland
91.7-E	91.7-E	<0.1	Unnamed	Basin
114.8-E	114.9-E	0.1	Peterson	Basin
127.6-E	127.6-E	<0.1	Scout Camp Pond Wetland	Wetland

**Outstanding Resource Value Waters**

MNDNR designates certain surface waters and wetlands as Outstanding Resource Value Waters (ORVW) to provide an additional level of protection to preserve their values for recreational, cultural, aesthetic, or scientific resources. Based on review of Minnesota Rule 7050.0180, Enbridge confirmed that the Project will cross a calcareous fen in Polk County that is considered a published ORVW (see further description below).

**Fens**

Calcareous fens are rare peat-accumulating wetlands that have additional legal protection in Minnesota. Calcareous fens are designated as ORVWs and are given special protection by Minnesota Rule 8420.0935. Calcareous fens may not be filled, drained, or otherwise degraded by any activity except as provided for in a Fen Management Plan approved by MNDNR. Enbridge has contracted with Midwest Natural Resources (MNR) to conduct wetland delineation surveys in Minnesota. Members of the MNR survey team are knowledgeable in the identification of

calcareous fens and other rare plant communities that may indicate the presence of a calcareous fen.

Enbridge reviewed available MNDNR data regarding known calcareous fens to identify documented sites and seeks to avoid impacts on calcareous fens by identifying known fens, documenting previously unknown fens during wetland surveys, coordinating with MNDNR, and making Preferred Route and construction modifications as necessary. Enbridge identified a known fen, referred to as Gully 30, in Polk County near MP 106.2-W. This fen is crossed by Enbridge's Mainline System and is associated with a SOBS site that was surveyed for protected flora as described in Section 7.9. Enbridge will continue to work closely with MNDNR to minimize impacts on the fen.

As of the end of the 2014 field season, Enbridge has surveyed approximately 95 percent of the entire Preferred Route, including areas that have characteristics that are conducive for the formation of calcareous fens. The remaining unsurveyed sections of the Preferred Route will be completed in 2015.

Enbridge is currently working with the USACE to develop criteria to identify sensitive wetland and waterbodies for which a Least Environmentally Damaging and Practicable Alternative (LEDPA) analysis will be performed. On July 15, 2014, Enbridge provided the USACE with a list of proposed criteria recommendations for selection of aquatic resources to be considered in the LEDPA analysis. This criteria included waterbodies with sensitive designations (e.g., state-listed sensitive resources, such as calcareous fens), aquatic resources in locations that may pose engineering/constructability concerns (e.g., extensively saturated wetlands), and areas identified by agencies such as MNDNR and MPCA as sensitive. Communication with the USACE regarding the criteria is ongoing. Furthermore, any permanent loss of wetlands, as well as functional loss resulting from wetland type conversion, will be mitigated as identified in a Wetland Compensatory Mitigation Plan, as required by the USACE.<sup>37</sup>

#### **7.14.2 CONSTRUCTION IMPACTS AND MITIGATION**

Based on review of field data collected through 2014, supplemented by NWI data where field data were not available, approximately 81.4 linear miles of wetlands will be crossed by the

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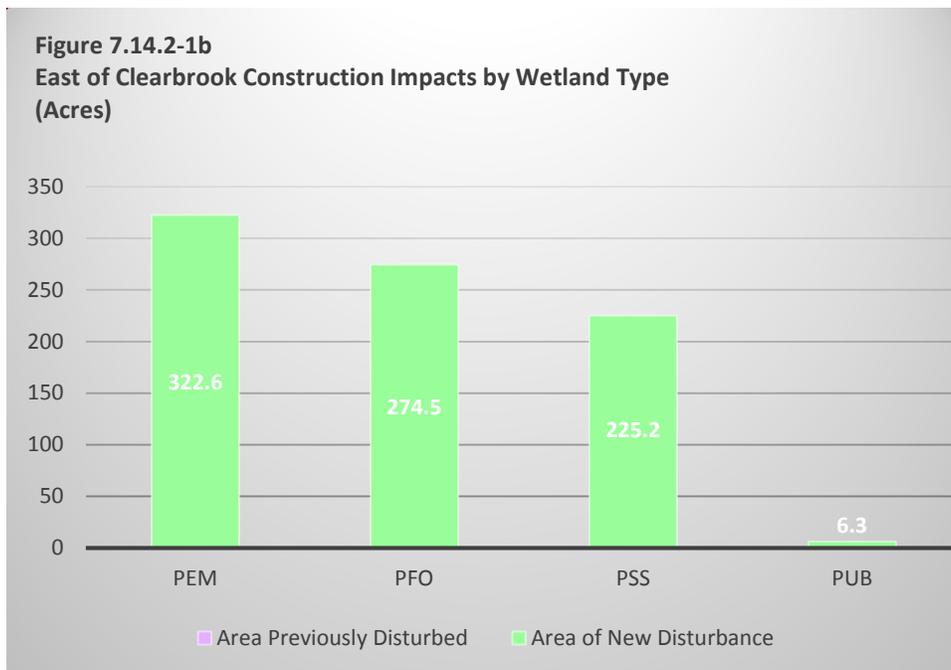
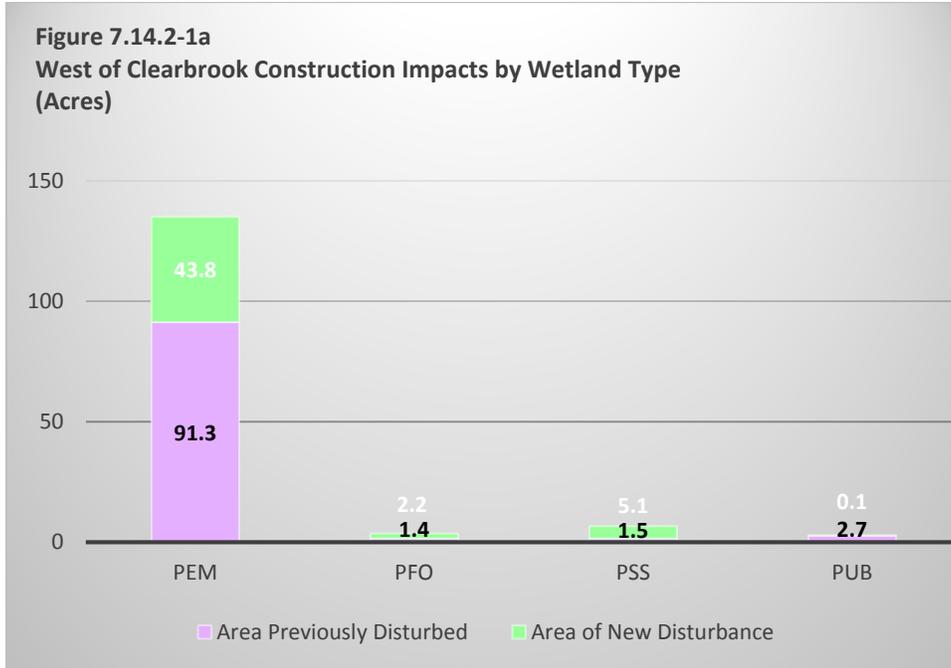
<sup>37</sup> This Enbridge commitment addresses comments provided by MPCA on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

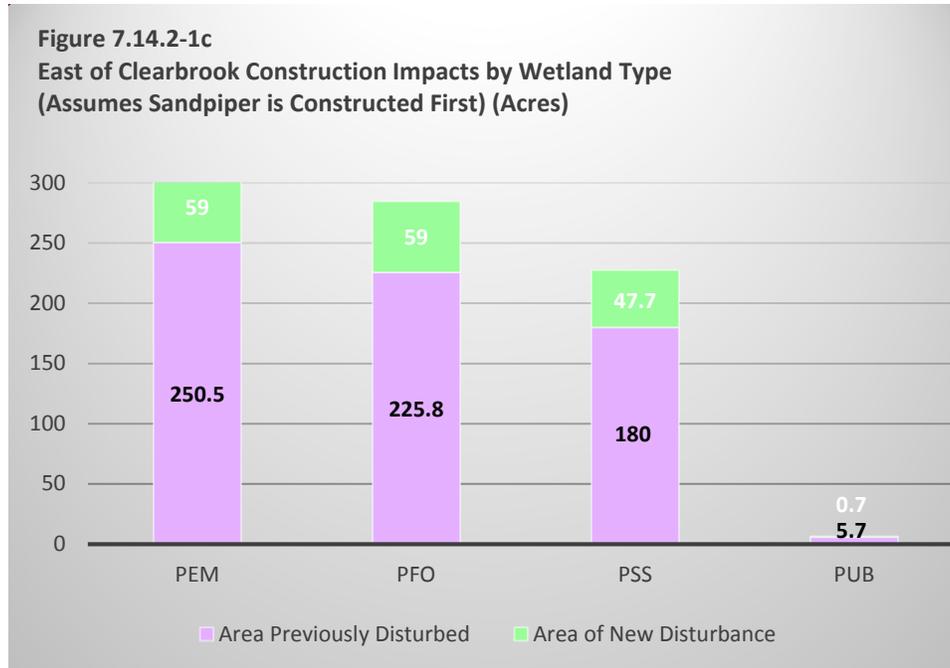
Project. Construction across wetlands will result in temporary impacts on approximately 976.6 acres. Enbridge has reduced the construction workspace width to 95 feet at wetland crossings to reduce impacts. Enbridge will continue to further evaluate workspace footprints to minimize wetland impacts. Final acreages will be determined pending completion of wetland field surveys and evaluation of workspace in wetland areas.

Table 7.14.2-1 and Figure 7.14.2-1 summarize the potential construction impacts breakdown by wetland type along the Project. Appendix N.3 provides a detailed breakdown by wetland type and county of the Project’s potential construction impacts in Minnesota.

Wetland Type	West of Clearbrook		East of Clearbrook New Disturbance (acres) <sup>c</sup>	East of Clearbrook (Assumes Sandpiper is Constructed First)		Project Total <sup>d</sup> (West + East)	Project Total <sup>e</sup> (West + East Assumes Sandpiper is Constructed First)
	Area of Previous Disturbance (acres) <sup>a</sup>	Area of New Disturbance (acres) <sup>b</sup>		Area of Previous Disturbance (acres) <sup>a</sup>	Area of New Disturbance (acres) <sup>b</sup>		
	Total			Total			
PEM	91.3	43.8	322.6	250.0	59.0	457.8	444.2
	<b>135.2</b>			<b>309.0</b>			
PFO	1.4	2.2	274.5	225.8	59.0	278.0	288.2
	<b>3.5</b>			<b>284.7</b>			
PSS	1.5	5.1	225.2	180.0	47.7	231.8	234.3
	<b>6.6</b>			<b>227.7</b>			
PUB	2.7	0.1	6.3	5.7	0.7	9.1	9.2
	<b>2.8</b>			<b>6.4</b>			
<b>TOTAL<sup>f</sup></b>	<b>96.9</b>	<b>51.2</b>	<b>828.6</b>	<b>661.5</b>	<b>166.4</b>	<b>976.6</b>	<b>975.9</b>
	<b>148.0</b>			<b>827.8</b>			

<sup>a</sup> Area previously disturbed by construction of Enbridge’s existing Line 67 or by Sandpiper (see Appendix N.3, Table N.3-1 and Table N.3-3).  
<sup>b</sup> 95-foot-wide typical area of impact where the Project is co-located with Line 67 or Sandpiper (see Appendix N.3, Table N.3-1 and N.3-3).  
<sup>c</sup> 95-foot-wide typical area of impact (see Appendix N.3, Table N.3-2). Assumes Line 3 is constructed first.  
<sup>d</sup> Total area of temporary construction impact east and west of Clearbrook. Assumes Line 3 is constructed first.  
<sup>e</sup> Total area of temporary construction impact east and west of Clearbrook if co-located with Sandpiper and Sandpiper is constructed first.  
<sup>f</sup> Numbers may not total consistently due to rounding. Calculations in this table reflect information gathered from field surveys.





Construction will result in temporary impacts and, in a few situations, minor changes in plant species composition. The temporary impacts include: loss of wetland vegetation and wildlife habitat as a result of clearing and other construction activities; soil disturbance associated with clearing, trenching, and equipment traffic; and increases in turbidity and alterations of hydrology as the result of trenching, dewatering, and soil stockpiling activities.

Approximately 457.0 acres of PEM wetland and 9.1 acres of palustrine unconsolidated bottom wetland will be temporarily affected by construction. Enbridge anticipates that there will be no long-term impacts on emergent wetlands. The wetlands will be restored to preconstruction conditions, and the herbaceous vegetation will be allowed to vegetate naturally in these areas.

Approximately 231.8 acres of PSS wetland and approximately 278.0 acres of PFO wetland will be cleared and temporarily disturbed during construction. The impacts on scrub-shrub wetlands and forested wetlands will be of a longer duration than emergent wetlands because the woody vegetation will require a longer time to reestablish on the temporary ROW after restoration.

Typical construction in most wetlands will be similar to construction in uplands and will consist of clearing, trenching, dewatering, installation, backfilling, cleanup, and revegetation. However, due to the unstable nature of some wetland soils, construction activities may differ somewhat from standard upland procedures. Construction activities will be minimized in wetlands and/or special construction techniques will be used to minimize the disturbance to vegetation and soils

and to maintain wetland hydrology. Enbridge has reduced the temporary construction workspace by 25 feet in wetlands to minimize impacts. Where a wetland cannot support construction equipment, construction activities will be accomplished from timber construction mats or by the use of low ground pressure equipment, thus limiting disturbance to the wetland. A typical construction schematic illustrating a wetland crossing is provided in Section 5.0. Posting of signage noting environmental features such as wetlands during construction is described in Section 7.15.

### **Associated Facilities**

Aboveground pump stations associated with the Project will impact approximately 11.6 acres of wetlands. Table 7.14.2-2 summarizes the potential construction impacts of the Project associated facilities by wetland type. Valves proposed for the Project are located within the construction workspace; therefore, temporary impacts are accounted for in Appendix N.3.

<b>TABLE 7.14.2-2 Line 3 Replacement Project Proposed Associated Facilities Construction Impacts by Wetland Type <sup>a</sup></b>					
<b>County</b>	<b>Facility <sup>b</sup></b>	<b>Total Temporary Impact (acres) <sup>c</sup></b>	<b>PEM</b>	<b>PFO</b>	<b>PSS</b>
Kittson	Donaldson Pump Station	0.2	0.2	0.0	0.0
Marshall	Viking Pump Station	0.0	0.0	0.0	0.0
Red Lake	Plummer Pump Station	0.2	0.2	0.0	0.0
Clearwater	Clearbrook Terminal	5.6	5.6	0.0	0.0
Hubbard	Two Inlets Pump Station	0.0	0.0	0.0	0.0
Cass	Backus Pump Station	0.0	0.0	0.0	0.0
Aitkin	Palisade Pump Station	5.3	4.4	0.6	0.4
Carlton	Cromwell Pump Station	0.3	0.2	0.0	0.1
	<b>TOTAL <sup>d</sup></b>	<b>11.6</b>	<b>10.6</b>	<b>0.6</b>	<b>0.5</b>
<sup>a</sup> Facility locations are preliminary and subject to change based on engineering design. <sup>b</sup> Valves will be located entirely within the construction workspace; therefore, are not included in temporary impact calculations (refer to Table 7.14.2-1 and Appendix N.3). <sup>c</sup> Areas with temporary impacts will be allowed to revert to pre-construction conditions after completion of the facility. Temporary impact calculations shown above include all impacts for construction of the facility including the area of permanent impact (Table 7.14.3-1). <sup>d</sup> Numbers may not total consistently due to rounding. Calculations in this table reflect information gathered from field surveys.					

### **Access Roads**

Enbridge conducts the same level of environmental survey for access roads that require improvement for use as it does for the construction workspace to facilitate avoidance and minimization of impacts on sensitive resources, including wetlands. Any proposed access roads that included wetland crossings went through review for avoidance and minimization of impacts

to wetlands. Enbridge will seek appropriate authorizations for any access roads that may impact a delineated wetland.<sup>38</sup>

### **Clearing and Grading**

Vegetation within wetlands will be cut off at the ground level, leaving existing root systems intact to preserve natural sources of rootstock and to facilitate revegetation of the native wetland species after construction. Stumps will only be removed over the trench line and where necessary for safe operation of equipment. Trees, shrubs, and stumps that are removed will be disposed of properly outside wetlands. Timber construction mats, as necessary, and temporary erosion control measures will be installed to minimize impacts to wetlands during construction.

### **Trenching and Installation**

Typically, the pipeline trench will be excavated in wetlands using a backhoe excavator. In unsaturated wetlands, up to 12 inches of topsoil will be stripped from the trench line and stockpiled separately from trench spoil.

If the soils in the wetland area are stable and capable of supporting equipment with or without timber construction mats, the pipe will be strung, welded, and lowered into the trench as in upland areas. When water is present in the trench, the trench may be temporarily dewatered and/or concrete and/or bag weights may be employed to install it into the trench and used as buoyancy control implements to achieve negative buoyancy.

It may not be feasible to use the construction methods described above for crossing large wetlands with standing water and saturated soils. In these wetlands, the trench will be dug by a backhoe supported on timber mats, but it is often not feasible to separate topsoil. The pipe will be assembled in an upland area and floated across the wetland in the excavated trench using the “push-pull” and/or “float” techniques. When the pipeline is in position, floats (if used) will be removed, the pipeline will be placed into position, and the pipe tied-in to the upland portion of the pipeline.

After the pipe has been installed, the trench will be backfilled and the original contours will be restored to the extent practicable. In areas where the topsoil has been segregated, the topsoil

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<sup>38</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

will be replaced after backfilling to facilitate the natural revegetation process. Any excess backfill material will be removed to an upland area.

### **Cleanup and Revegetation**

Cleanup and rough grading will begin as soon as practical after the trench is backfilled. The goal of cleanup and rough grading is to restore wetland hydrology and soils. By restoring wetland to pre-construction elevations, no permanent impacts to wetlands will occur. No hydrologic alterations will result from the project as there will be no changes to the cross-section of the wetland. Timber mats, if used, will be removed during final cleanup operations. Disturbed wetland areas will be revegetated with a cover crop in accordance with USDA NRCS or other agency recommendations, unless standing water is prevalent or as otherwise directed by landowners or regulatory agencies. No fertilizer, lime, or mulch will be applied in wetlands. Enbridge will restore wetland crossings in accordance with USACE permit conditions.<sup>39</sup>

### **7.14.3 OPERATIONS IMPACTS AND MITIGATION**

After the pipeline is constructed, the permanent ROW will be maintained free of larger-diameter trees and will result in the permanent conversion of approximately 131.1 acres of forested wetland to emergent or scrub-shrub wetland, based on varying ROW widths (as described in Section 4.0). Additional temporary impacts to wetlands may result from maintenance activities that require excavation.

Table 7.14.3-1 and Figure 7.14.3-1 summarize the potential operations impacts breakdown by wetland type along the Project. Appendix N.4 provides a detailed breakdown by wetland type and county of the Project's potential operations impacts in Minnesota.

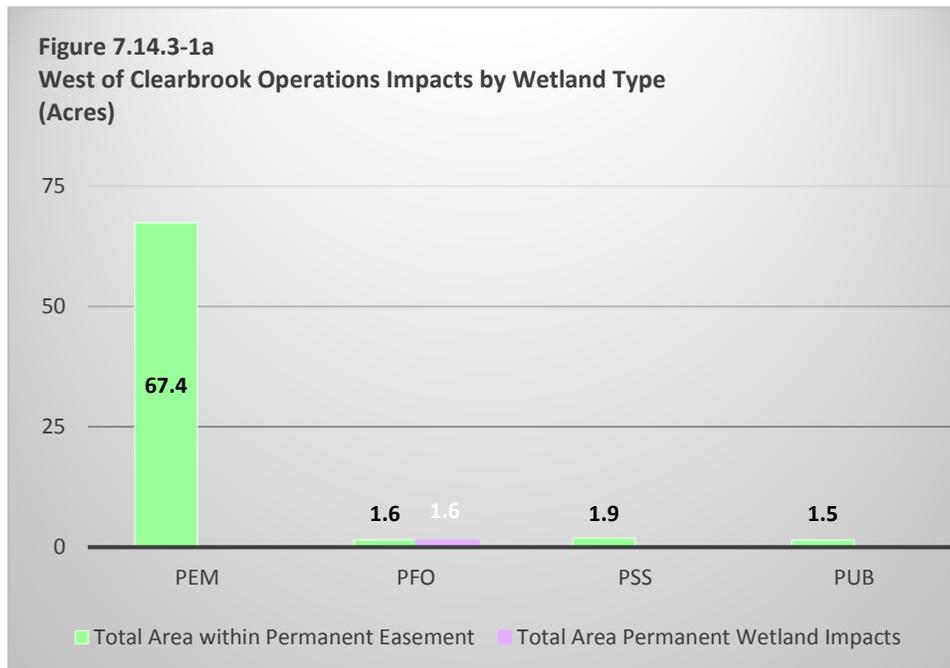
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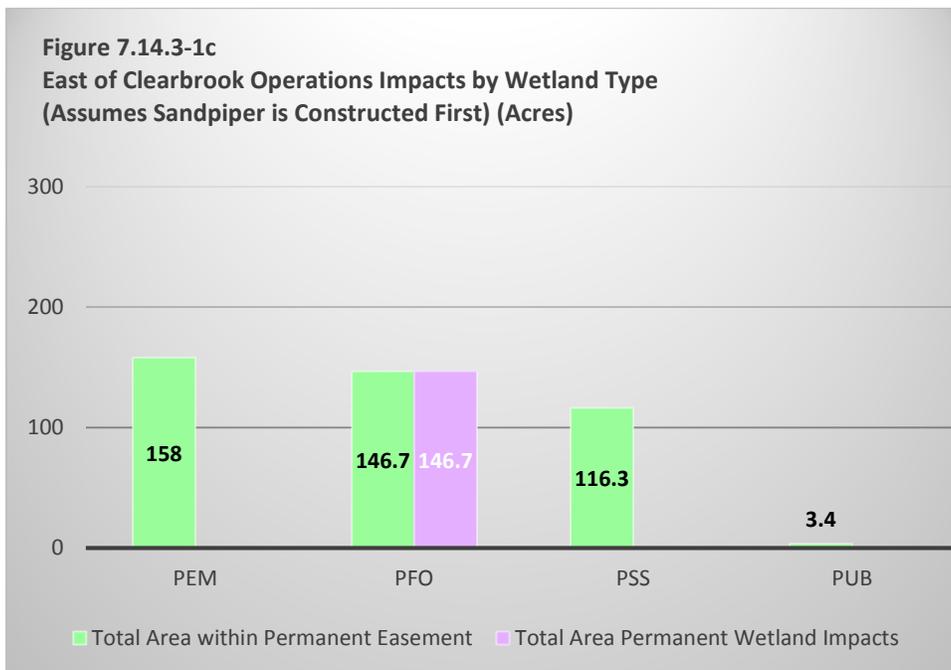
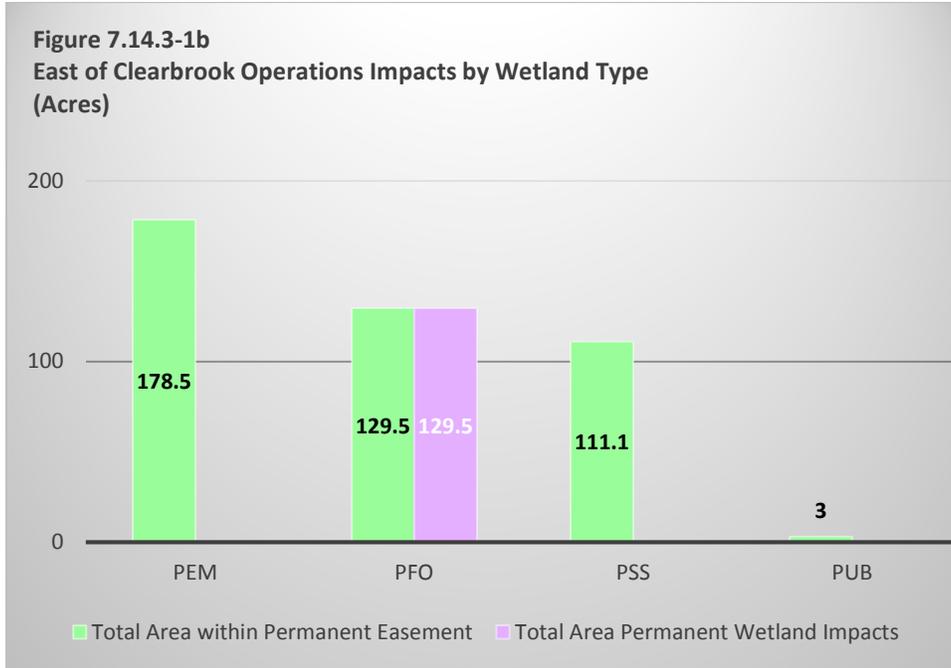
<sup>39</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

**TABLE 7.14.3-1**  
**Line 3 Replacement Project Operations Impacts by Wetland Type**

Wetland Type	West of Clearbrook		East of Clearbrook <sup>c</sup> New Permanent ROW (acres)	East of Clearbrook (Assumes Sandpiper is Constructed First)		Project Total <sup>d</sup> (West + East)	Project Total <sup>e</sup> (West + East Assumes Sandpiper is Constructed First)
	Existing Permanent ROW <sup>a</sup>	New Permanent ROW <sup>b</sup>		Existing Permanent ROW <sup>a</sup>	New Permanent ROW <sup>b</sup>		
	Total			Total			
PEM	30.7	36.8	178.5	81.0	77.0	245.9	225.4
	67.4			158.0			
PFO	0.4	1.1	129.5	70.1	76.6	131.1	148.3
	1.6			146.7			
PSS	0.3	1.6	111.1	56.7	59.6	113.0	118.2
	1.9			116.3			
PUB	1.1	0.5	3.0	1.6	1.8	4.5	4.9
	1.5			3.4			
<b>TOTAL<sup>f</sup></b>	<b>32.5</b>	<b>39.9</b>	<b>422.2</b>	<b>209.4</b>	<b>215.0</b>	<b>494.6</b>	<b>496.9</b>
	<b>72.4</b>			<b>424.5</b>			

<sup>a</sup> Area affected by operations within Enbridge's existing Line 67 or proposed Sandpiper permanent easement which is permanently maintained by periodic clearing activities (see Appendix N.4, Table N.4-1 and N.4-3).  
<sup>b</sup> Area affected by operations where the new Line 3 permanent easement will be permanently maintained by periodic clearing activities (see Appendix N.4, Table N.4-1 and N.4-3).  
<sup>c</sup> Area affected by operations east of Clearbrook where the new Line 3 permanent easement will be permanently maintained by periodic clearing activities (see Appendix N.4, Table N.4-2).  
<sup>d</sup> Total area affected by operations (including areas permanently maintained by Line 67).  
<sup>e</sup> Total area affected by operations (including areas permanently maintained by Line 67 and Sandpiper). If co-located with Sandpiper and Sandpiper is constructed first.  
<sup>f</sup> Numbers may not total consistently due to rounding. Calculations in this table reflect information gathered from field surveys.





Enbridge will minimize impacts on wetlands by implementing the mitigation measures specified in USACE permits. Furthermore, Enbridge understands, based on past project experience, that the USACE will outline a long-term monitoring plan for wetlands impacted by the Project. Enbridge will comply with long-term monitoring plans required by the USACE permit for the Project.<sup>40</sup> Wetland crossing general requirements are included in Section 3.0 of the EPP (Appendix E).

### **Associated Facilities**

Aboveground pump stations associated with the Project will permanently impact approximately 11.3 acres of wetlands. Table 7.14.3-3 summarizes the potential impacts of the Project associated facilities by wetland type.

The permanent loss of wetlands, as well as functional loss resulting from wetland type conversion, will be mitigated as identified in the Wetland Compensatory Mitigation Plan, as required by the USACE.<sup>41</sup>

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<sup>40</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

<sup>41</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

TABLE 7.14.3-3 Line 3 Replacement Project Proposed Associated Facilities Operations Impacts by Wetland Type <sup>a</sup>					
County	Facility	Total Permanent Impact (acres) <sup>c</sup>	PEM	PFO	PSS
Kittson	Donaldson Pump Station	0.1	0.1	0.0	0.0
Marshall	Viking Pump Station	0.0	0.0	0.0	0.0
Red Lake	Plummer Pump Station	0.0	0.0	0.0	0.0
Clearwater	Clearbrook Terminal	5.6	5.6	0.0	0.0
Hubbard	Two Inlets Pump Station	0.0	0.0	0.0	0.0
Cass	Backus Pump Station	0.0	0.0	0.0	0.0
Aitkin	Palisade Pump Station	5.3	4.3	0.6	0.4
Carlton	Cromwell Pump Station	0.3	0.2	0.0	0.1
<b>TOTAL <sup>b</sup></b>		<b>11.3</b>	<b>10.2</b>	<b>0.6</b>	<b>0.5</b>
<sup>a</sup> Facility locations are preliminary and subject to change based on engineering design. <sup>b</sup> Numbers may not total consistently due to rounding. Calculations in this table reflect information gathered from field surveys.					

## 7.15 WATERBODIES

### 7.15.1 EXISTING ENVIRONMENT

#### Major Basins and Watersheds

Minnesota is divided into 10 major drainage basins that are used by governing agencies to identify and assess water quality issues and develop water quality protection goals.

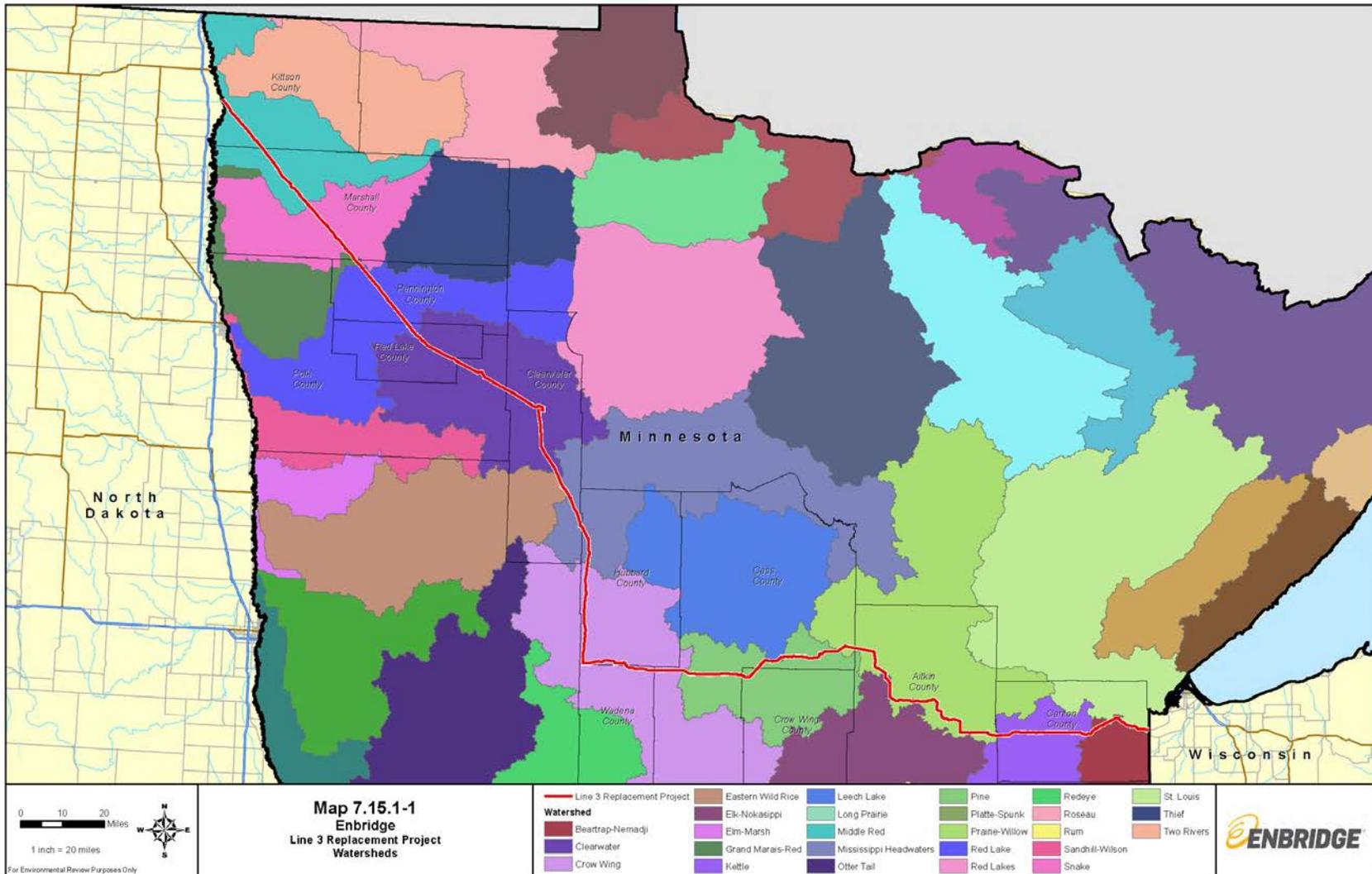
Surface waters crossed by the Preferred Route are located within the Red River of the North, Mississippi Headwaters, St. Croix River, and Western Lake Superior Basins (USGS 2013) (Map 7.15.1-1). Table 7.15.1-1 summarizes the watersheds crossed by the Project (USGS 2013).

Major Watershed Name	Major Watershed ID Number	Crossing Length (miles)
Red River of the North – Tamarac River	69	32.6
Snake River	68	16.4
Red River of the North – Grand Marais Creek	67	2.8
Red Lake River	63	21.9
Clearwater River	66	54.5
Wild Rice River	60	5.5
Mississippi River – Headwaters	7	18.3
Crow Wing River	12	49.5
Pine River	11	40.4
Leech Lake River	8	0.5
Mississippi River – Grand Rapids	9	48.9
Mississippi River – Brainerd	10	6.4
Kettle River	35	22.8
Nemadji River	5	11.7
St. Louis River	3	4.7
	<b>PROJECT TOTAL <sup>a</sup></b>	<b>336.9</b>

<sup>a</sup> Numbers may not total consistently due to rounding.

#### **Red River of the North Basin**

The Red River of the North Basin encompasses a 39,270-square-mile surface drainage area to the main stem of the Red River of the North within the United States. The basin represents an important hydrologic region where good quality water is a valued resource vital to the region's economy. Additionally, the drainage flows northward into Manitoba, Canada and is of international concern. Annual runoff varies greatly, but most runoff occurs in spring and early summer from rains falling on saturated soils (Red River Basin Commission 2005).



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### **Mississippi Headwaters Basin**

The Mississippi Headwaters Basin covers 20,162 square miles. The basin is a mixture of forest, prairie, agriculture, and urban land areas. From the headwaters, the Mississippi River flows south 2,340 miles to the Gulf of Mexico (USGS 1990).

### **St. Croix River Basin**

The St. Croix River Basin covers 7,733 square miles in Minnesota and Wisconsin and extends from near Mille Lacs Lake in Minnesota on the west to near Cable, Wisconsin, on the east. Approximately 45 percent of the watershed is located in Minnesota (Niemela et al. 2004).

### **Western Lake Superior Basin**

The Western Lake Superior Basin covers 9,126 square miles in Minnesota and Wisconsin. The Lake Superior Basin is Minnesota's only basin that is on a Great Lake coastline. Much of the land within the Lake Superior basin is forested, with very little agriculture due to the cool climate and poor soils (Rosberg et al. 2000). Streams within the basin flow to Lake Superior, which discharges into Lake Huron, and ultimately flows into the St. Lawrence Seaway via Lakes Erie and Ontario.

The Project will cross the Two Rivers, Middle-Snake-Tamarac Rivers, and Red Lake Watershed Districts in Minnesota. The primary purpose of watershed districts is to conserve the water resources within their jurisdiction through land use planning, flood control, drainage ditch maintenance, and other conservation practices. The Project also crosses 20.8 miles of the Big Sandy Lake Watershed Management Project in Aitkin and Carlton counties, which includes Big Sandy Lake and Lake Minnewawa. Neither lake is crossed by the Project.

### **Waterbody Crossings**

Enbridge conducted waterbody field surveys along the Preferred Route in 2013 and 2014, both west and east of Clearbrook, to identify locations and widths of waterbodies (i.e., lakes, streams, rivers, and drainage ditches) at the point of crossing. Enbridge used hydrographic spatial data to identify waterbodies crossed by the Preferred Route (MNDNR 2013g) when survey data were not available. This review identified 247 waterbodies crossed by the Preferred Route, including 80 perennial streams, 131 intermittent streams, and 36 ephemeral streams. Of these waterbodies, 53 are designated as Public Waters by MNDNR, two are considered wild rice waters, and 10 are considered Section 10 navigable waters. Waterbodies crossed by the Project are summarized in Table 7.15.1-2. A list of individual waterbodies crossed by the Project is included in Appendix O. The only known wild rice waters crossed by the Project are Hay Creek in Hubbard County and Shell River in Wadena County. As of the end of the 2014 field season, 95 percent of waterbody field surveys were complete in Minnesota. The remaining five percent will be surveyed in early 2015.

County	Perennial	Intermittent	Ephemeral	MNDNR Public Watercourses <sup>a</sup>	Wild and Scenic Rivers	State Canoe Routes <sup>b</sup>	Trout Streams & Tributaries <sup>c</sup>	Section 10 Navigable Waters <sup>d</sup>	Wild Rice Waters <sup>e</sup>
Kittson	1	16	2	2	0	0	0	0	0
Marshall	2	27	6	4	0	0	0	2	0
Pennington	1	18	2	3	0	1	0	1	0
Polk	0	16	0	0	0	0	0	2	0
Red Lake	2	13	0	1	0	0	0	0	0
Clearwater	13	8	1	11 <sup>e</sup>	0	1	0	0	0
Hubbard	9	0	0	8	0	0	2	0	1
Wadena	3	0	0	2	0	1	0	0	1
Cass	14	5	2	5	0	1	1	0	0
Crow Wing	3	0	0	0	0	0	0	0	0
Aitkin	21	20	13	7	0	1	0	2	0
Carlton	11	8	10	10 <sup>f</sup>	0	0	2	3	0
<b>Total</b>	<b>80</b>	<b>131</b>	<b>36</b>	<b>53</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>10</b>	<b>2</b>

<sup>a</sup> MNDNR (2013a)  
<sup>b</sup> MNDNR (2013b)  
<sup>c</sup> MNDNR (2013c); Designated a Trout Stream, per Minnesota Rules 6264.0050, Subp.4.  
<sup>d</sup> Snake River and South Branch Snake River (Marshall County); Red Lake River (Pennington County); Red River of the North and Red Lake River (Polk County); Mississippi River and Sandy River (Aitkin County); Kettle River, West Branch Moose River, and Moose River (Carlton County).  
<sup>e</sup> MNDNR (2013g); Hay Creek (Hubbard County) and Shell River (Wadena County)  
<sup>f</sup> Total includes Public Waters Inventory streams at MP 120.8-W and MP 212.5-E; however, Enbridge did not identify waterbodies at these locations during field surveys.

### Special Designated and Sensitive Waterbodies

#### **Public Water Watercourses**

The Project will cross 53 watercourses (Public Water Watercourses) listed on the MNDNR PWI (MNDNR 2013d). These watercourses are regulated as public waters under the MNDNR’s Public Waters Permit Program. Enbridge will prepare and submit an application to MNDNR to obtain a License to Cross Public Waters permit for public water crossings.

#### **Other Known Sensitive Crossings**

MNDNR identified water resources crossed by the Project that are sensitive in nature due to past construction activities on co-located projects or other factors. These water resources include:

- Mud Lake
- La Salle Creek
- Hay Creek

- Straight River
- Big Sandy Lake/Sandy River

Further details on the sensitive nature of these water resources are provided below under Construction Impacts and Mitigation.

### **Outstanding Resource Value Waters**

As described in Section 7.14, the Project will cross a calcareous fen pursuant to Minnesota Rule 8420.0935 subpart 2 and published in the State Register, in Polk County that meets the ORVW criteria. Enbridge continues to work with MNDNR to minimize impacts on this resource.

### **National Rivers Inventory and Wild and Scenic Rivers**

As described in Section 7.6, the Project will cross the Red Lake, Clearwater, Moose, Shell, Crow Wing, Middle, and Willow Rivers, which are listed on the NRI. The Project will not cross any river segments which are listed on the NRI as designated or potentially designated National Wild and Scenic Rivers. The Mississippi and Kettle Rivers have segments that are designated as Minnesota State Wild and Scenic Rivers; however, the Project does not cross either river at any of these designated segments.

### **State Canoe & Boating Routes**

As described in Section 7.6, the Project will cross four waterbodies listed as state-designated canoe and boating routes (MNDNR 2013b) in five different locations: the Red Lake River, Pine River, Crow Wing River, and the Mississippi River (twice). MNDNR manages canoe/boating routes in the state, and as described in Section 7.15, Enbridge initiated consultations with MNDNR regarding appropriate crossing plans as part of the License to Cross Public Waters permitting process.<sup>42</sup>

### Water Quality

#### **Impaired Waters**

Clean Water Act (CWA) Section 303(d) requires that each state review, establish, and revise water quality standards for all surface waters within the state. Waters that do not meet their designated

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<sup>42</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

beneficial uses because of water quality standard violations are considered impaired. To comply with this requirement, each state crossed by the Project has been delegated by the U.S. Environmental Protection Agency to develop its own beneficial use classification system to describe state designated use(s). Regulatory programs for water quality standards include default narrative standards, non-degradation provisions, a Total Maximum Daily Load (TMDL) regulatory process for impaired waters, and associated minimum water quality requirements for the designated uses of listed surface waterbodies within the state.

Of the 247 streams crossed, the Project will cross 13 impaired streams in 17 different locations as identified by MPCA’s 2012 Inventory of Impaired Waters per CWA Section 303(d). Table 7.15.1-3 lists these streams, their affected use, and reason for impairment. No impaired lakes or wetlands on the 2012 inventory will be crossed by the Project (MPCA 2013).

In addition, MPCA has recently released its draft list of 2014 impaired waters (MPCA 2013). All of the waterbodies crossed by the Project on the 2012 Inventory remain on the 2014 inventory. The Project will cross one new waterbody on the 2014 inventory that was not previously listed (three crossings of the Shell River). These draft changes are reflected in italics in Table 7.15.1-3. No impaired lakes or wetlands on the 2014 inventory will be crossed by the Project. Enbridge will continue to monitor the status of these waterbodies and plan construction activities accordingly in the event that the 2014 inventory is finalized by MPCA.

**Infested Waters**

MNDNR maintains a list of Minnesota waterbodies infested with aquatic invasive plants, animals, and diseases. Waters of the state are designated as infested if it is determined that they contain aquatic invasive species that could spread to other waters. The list is periodically updated as invasive species are observed in new waterbodies. Activities within these waters are regulated by MNDNR under Minnesota Rule 6216 to prevent spread to non-infested waters. Enbridge reviewed waterbodies crossed with MNDNR Designation of Infested Waters (dated December 11, 2014) (MNDNR 2014j). No waterbodies crossed by the Project were included on the Infested Waters list.

County	Waterbody	Milepost	Affected Use	Use Support <sup>a</sup>	Impairment
Marshall	Tamarac River	39.1-W	Aquatic Life	5A	Macroinvertebrates Bioassessment, Fisheries Bioassessment
	Middle River	47.0-W	Aquatic Life	5A	Dissolved Oxygen, Temperature
	Snake River	54.2-W	Aquatic Life	5C	Dissolved Oxygen
Pennington	Black River	66.3-W	Aquatic Life	5A	Dissolved Oxygen, Temperature

TABLE 7.15.1-3 Impaired Streams Crossed by the Line 3 Replacement Project					
County	Waterbody	Milepost	Affected Use	Use Support <sup>a</sup>	Impairment
	Red Lake River	75.6-W	Aquatic Consumption	4A	Mercury
Red Lake	Clearwater River	86.7-W	Aquatic Consumption, Aquatic Life	5B	Mercury, Dissolved Oxygen, Temperature
Clearwater	Silver Creek	119.0-W	Aquatic Recreation	5C	Fecal Coliform
	Silver Creek	119.3-W	Aquatic Recreation	5C	Fecal Coliform
	Silver Creek	119.6-W	Aquatic Recreation	5C	Fecal Coliform
	Clearwater River	12.0-E	Aquatic Consumption, Aquatic Life	5B	Mercury, Dissolved Oxygen
	Walker Brook	14.0-E	Aquatic Life	5C	Dissolved Oxygen
	Mississippi River	27.7-E	Aquatic Life	4D	Dissolved Oxygen
Hubbard	Straight River	60.5-E	Aquatic Life	5C	Dissolved Oxygen
	<i>Shell River</i>	<i>63.0-E</i>	<i>Aquatic Life</i>	<i>4C</i>	<i>Fisheries Bioassessment</i>
	<i>Shell River</i>	<i>67.7-E</i>	<i>Aquatic Life</i>	<i>4C</i>	<i>Fisheries Bioassessment</i>
Wadena	<i>Shell River</i>	<i>77.5-E</i>	<i>Aquatic Life</i>	<i>5C</i>	<i>Dissolved Oxygen</i>
	Crow Wing River	79.6-E	Aquatic Consumption	4A	Mercury
Cass	Moose River	134.4-E	Aquatic Life	5C	Dissolved Oxygen
Aitkin	Mississippi River	159.1-E	Aquatic Consumption	4A	Mercury
Carlton	Kettle River	198.5-E	Aquatic Consumption	5C	Mercury
Note <sup>a</sup>	<i>Italicized text</i> indicates draft status or change on the MPCA's 2014 List of Impaired Waters Categories: 4A: Impaired or threatened but all necessary TMDL plans have been completed. 4C: Impaired or threatened but does not require a TMDL because impairment not caused by a pollutant. 4D: Impaired or threatened but doesn't require a TMDL plan because the impairment is due to natural conditions with only insignificant anthropogenic influence. 5A: Impaired by multiple pollutants and no TMDL study plans are approved by EPA. 5B: Impaired by multiple pollutants and at least one TMDL study plan is approved by EPA. 5C: Impaired or threatened by one pollutant.				

### 7.15.2 CONSTRUCTION IMPACTS AND MITIGATION

Pipeline construction across rivers and streams can result in temporary and long-term adverse environmental impacts if not mitigated. Temporary impacts from in-stream trenching could include an increase in the sediment load downstream of the crossing location. Sustained periods of exposure to high levels of suspended solids have been shown to cause fish egg and fry mortality, as well as other deleterious impacts on fisheries and other aquatic resources. Surface runoff and erosion from the cleared ROW also can increase in-stream sedimentation during

construction resulting in the shallowing of pools and a reduction of the quality of spawning beds and benthic substrate. Enbridge's proposed waterbody construction methods, specifically with respect to erosion control, bank stabilization, and bank revegetation, will minimize short- and long-term impacts on the waterbodies along the Preferred Route.

Soil erosion associated with surface runoff and stream bank sloughing can also result in the deposition of sediments in waterbodies. Sediments deposited on stream bed gravel could result in fish egg mortality and damaged spawning habitat. Removal of riparian vegetation also can lead to increased light penetration into the waterbody, causing increased water temperature, which potentially could be detrimental to cold-water fisheries.

Enbridge will avoid or minimize impacts on waterbodies by implementing erosion and sediment control measures during construction (e.g., slope breakers, sediment barriers (i.e. silt fence, straw bales, bio-logs, etc.), stormwater diversions, trench breakers, mulch). Enbridge will limit the duration of construction within waterbodies and limit equipment operation within waterbodies to the area necessary to complete the crossing.

#### Waterbody Crossings

Enbridge conducts a detailed environmental and engineering review of the advantages and disadvantages of each possible crossing method before selecting the most environmentally appropriate and constructible method to use to cross a waterbody. Part of this review includes usage of industry best practices published by the Canadian Association of Petroleum Producers. In addition, Enbridge has sponsored detailed civil and environmental stream surveys at each waterbody crossing that inform the selection of the crossing method.

Enbridge initiated detailed geomorphic stream surveys in 2014 at the request of MNDNR to document the stability of a subset of sensitive PWI waterbodies crossed by the Project. The Rosgen Stream Classification System is a method for classifying streams and rivers based on common patterns of channel morphology. For each crossing, 1,000 linear feet of each waterbody identified for survey were studied. Data collected included the following:

- bankfull stage identification;
- longitudinal profile survey;
- plan form measurements;
- cross-section surveys;
- bed material characterization;
- pavement/sub-pavement sampling; and
- bathymetric survey.

Enbridge plans to complete Rosgen surveys at 47 PWI streams crossed by the Preferred Route in Minnesota. Thirty-six of the streams are east of Clearbrook, Minnesota and the remaining 11 are located west of Clearbrook. In 2014, Enbridge completed surveys at 26 streams. The remaining 21 streams will be surveyed in 2015 pending MNDNR's approval of Enbridge's proposed list of features west of Clearbrook.

Enbridge's proposed waterbody construction methods will minimize short- and long-term impacts on the waterbodies along the Preferred Route by implementing BMPs described in the EPP (Appendix E). If the HDD method is used to cross waterbodies, Enbridge will follow Section 11.0 of the EPP to prevent an inadvertent release of drilling mud or to minimize environmental effects resulting therefrom.

When stream channels and banks are disturbed during construction, negative impacts on stream stability will be avoided to the greatest extent possible. Stream banks will be protected from erosion through the use of temporary and permanent soil stabilization techniques. Examples of erosion control techniques include placement of erosion control blankets, mulch, straw bales, bio-logs, silt fence, and prompt seeding following construction activities. Stream banks will be restored to pre-construction grades when practicable and restored with appropriate vegetation. Placement of rock rip-rap, geotextile fabric, and other bioengineering techniques may be implemented to stabilize sites inherently unstable.

Enbridge will determine the appropriate crossing method for each waterbody upon further consultation with appropriate regulatory agencies and further engineering review. Enbridge is planning to install the pipeline under waterbodies using several different crossing methods, including open-cut or dry crossing methods, such as the dam-and-pump or flume method. Dry crossing methods may be used depending on site conditions, stream type, and presence of sensitive species. Enbridge is also evaluating the use of the HDD method at certain crossings. Enbridge continues to evaluate crossing plans based on the results of environmental, civil, and geotechnical surveys near waterbodies. For all public waterbody crossings, Enbridge will work with MNDNR to determine crossing plans that result in the least impact on the resource. The following subsections describe typical construction procedures that will be used to install the pipeline across waterbodies.

Public use of waterbodies crossed using the open cut method will be interrupted for a short time to allow installation of the pipeline. Enbridge plans to post signs upstream and downstream of the crossings to notify the public of pipeline construction activities and will work with MNDNR to

arrange for other appropriate user notifications. After construction is complete and the area is safe, Enbridge will allow flow to resume and allow river users to cross the area.<sup>43</sup>

### **Clearing and Grading**

Enbridge will clear existing vegetation from the construction workspace as necessary to prepare for grading operations. A minimum 20-foot buffer of undisturbed non-woody vegetation will be maintained on stream banks until the trenching begins at the stream crossing. Woody vegetation within this buffer may be cut manually and removed during initial clearing of the ROW.<sup>44</sup> Additionally, some limited grading at stream banks may be necessary to install temporary bridges across streams. Grading will be directed away from the waterbody to reduce the potential for material to enter the waterbody.

Prior to trenching, Enbridge may need to grade approaches to waterbodies to create a safe working surface and to allow for limitations on pipe bending. Temporary erosion and sediment control measures (e.g., silt fences, staked straw bales) will be installed as necessary to minimize the potential for disturbed soils to enter the waterbody from the ROW as discussed in Section 1.9 of the EPP (Appendix E). Additional temporary workspaces at waterbody crossings typically will be set back 50 feet from the water's edge where topographic and other site conditions permit.

Erosion control blankets (curlex, jute, or equivalent) will be placed on slopes over 30 percent or that are a continuous slope to a sensitive resource area (e.g., wetland or waterway) to ensure revegetation and slope stabilization occur (to preconstruction conditions) in these sensitive areas.<sup>45</sup>

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<sup>43</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

<sup>44</sup> This Enbridge commitment addresses comments provided by MNDNR and MPCA on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

<sup>45</sup> This Enbridge commitment addresses comments provided by MNDNR and MPCA on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

Spoil containment devices such as silt fences and/or staked straw bales will be installed and set back from the waterbody bank to minimize the potential for sediment to migrate off the construction workspace and back into the waterbody.

Enbridge anticipates it may need to remove beaver dams to construct across some waterbodies and is currently working to identify locations where removal could be necessary. If removal is necessary, Enbridge will work with local MNDNR Conservation Officers or Area Wildlife Offices prior to conducting a stream crossing where beavers will be impacted. Enbridge understands that MNDNR prefers that beavers are trapped during the trapping season (late October through mid-May). If beaver trapping is required, Enbridge will obtain permission from the affected landowner and a permit (NA-012650-02) from the local MNDNR Conservation Officer.

Enbridge updated its EPP (see Section 2.2.1 of Appendix E) to include preventative measures to address beavers from re-entering areas where Enbridge obtained permits and landowner permission to remove them.

#### **Temporary Equipment Bridges**

Temporary bridges will be installed across waterbodies to allow the passage of equipment along the construction workspace. Equipment bridges generally will be installed during the clearing and grading phase of construction. Construction equipment, with the exception of clearing/bridge installation equipment, will be required to use the bridge to cross over the waterbody. Equipment bridges will be designed to pass the maximum foreseeable flow of the stream and will be maintained to prevent flow restriction while the bridge is in place. Bridges will be cleaned as necessary to minimize loose soil from equipment entering the stream. A list of bridge types is described in Section 2.4.1 of the EPP (Appendix E). Enbridge proposes to use rock flume bridges when single mats or other bridge styles cannot safely be used to span a crossing. Enbridge will provide an updated list of bridge locations by type in Enbridge's application for a License to Cross Public Waters. Bridge locations will also be depicted on site-specific crossing plans.

If equipment must encroach into a stream, it must operate on clean construction mats (free of soil and plant material prior to being transported onto the construction workspace). Section 3.5 of the EPP (Appendix E) states that to prevent the spread of noxious and invasive plant species, timber mats will be free of soil and plant material prior to being transported onto the

construction workspace and/or moved from one area of the construction workspace to another area.<sup>46</sup>

### **Trenching and Installation**

After the initial clearing and grading is completed, the pipeline will be installed across waterbodies using one of four methods: open-cut, dam-and-pump, flume, or a trenchless method (such as boring or HDD), as discussed in Section 2.5 of the EPP (Appendix E). These methods are described below.

Enbridge will comply with the in-water work exclusion dates specific to MNDNR's Northeast and Northwest Regions. Any specific construction work window requirements should be included as part of Enbridge's License to Cross Public Waters.

The optimal crossing method is determined on a case-by-case basis, and the plan is reviewed and permitted by all agencies with jurisdictional authority. Proposed and alternate PWI stream crossing methods will be proposed to, and reviewed and permitted by MNDNR. All other proposed and alternate stream crossing methods will be permitted by the USACE and supporting MPCA 401 WQC.

The wet trench method will be used to cross streams and rivers not permitted to be flumed, dam and pumped, or directionally drilled. The dam and pump method is a dry crossing technique that is suitable for low flow streams and is generally preferred for crossing meandering channels. The flume method is a dry crossing technique that is suitable for crossing relatively narrow streams that have straight channels and are relatively free of large rocks and bedrock at the point of crossing.<sup>47</sup>

- **Wet Trench Method**

The open-cut method, also called the wet trench method (see Section 2.5.1 of the EPP [Appendix E]), is a waterbody crossing technique that often minimizes total duration of in-stream

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<sup>46</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

<sup>47</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

disturbance. This method will involve excavating the trench through the waterbody or ditch using draglines or backhoes operating from the stream banks.

- **Dam-and-Pump Method**

The dam-and-pump method (see Section 2.5.2 of the EPP [Appendix E]) is a dry crossing method used for sensitive streams with low gradients and flow, or sensitive streams with meandering channels. This method involves constructing temporary dams, generally consisting of sandbags, plastic sheeting, and/or steel bulkheads, across the waterbody upstream and downstream of the crossing prior to excavation.

- **Flume Method**

The flume method (see Section 2.5.3 of the EPP [Appendix E]) is a dry crossing method used for sensitive, relatively narrow waterbodies free of large rocks and bedrock at the trenchline and that have a relatively straight channel across the construction workspace. The flume method is generally not appropriate for wide, deep, or heavily flowing streams.

- **Horizontal Directional Drilling Method**

Enbridge will evaluate use of the HDD method at select waterbody crossings (Table 7.15.2-1). This method is used to minimize or avoid impacts on the streambed, banks, and associated riparian vegetation at a waterbody crossing (Section 2.5.4 of the EPP [Appendix E]). The feasibility of this method is dependent on site geology and length of the drill path; geotechnical studies at proposed HDD crossings are ongoing. The HDD method also requires additional temporary workspaces on both sides of the drilled area for materials and equipment associated with the drilling operation and to fabricate the pipeline segment that will be installed under the waterbody.

The HDD method will be conducted in three general stages. The first stage will consist of drilling a small diameter pilot hole along a pre-determined path under the waterbody. The second stage will involve incrementally enlarging or “reaming” the pilot hole to a diameter that will accommodate the pipeline. The third stage will involve pulling a prefabricated segment of pipeline through the enlarged hole and then welding the pipe segment to the adjoining sections of pipeline.

County	Name	Milepost
Kittson	Red River	12.4-W
Marshall	Tamarac River	39.4-W

	Middle River	47.0-W
	Snake River	54.2-W
Pennington	Red Lake River	75.6-W
Red Lake	Clearwater River	86.7-W
Clearwater	Clearwater River	12.0-E
	Mississippi River	27.7-E
Hubbard	Hay Creek	50.0-E
	Straight River	60.5-E
	Shell River	63.0-E
	Shell River	67.7-E
	Oxbow Pond	71.7-E
Wadena	Shell River	77.5-E
Aitkin	Willow River	155.2-E
	Mississippi River	159.1-E
	Sandy River	168.4-E
	Sandy River	175.2-E

Throughout the process of drilling and enlarging the pilot hole, a bentonite clay slurry, known as “drilling mud”, will be circulated through the drilling tools to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. Drilling mud will be recycled to the extent practicable and, after the pipeline is installed, the mud will be disposed of according to applicable regulations. Enbridge identifies procedures in Section 11.0 of the EPP (Appendix E) to address the potential for the inadvertent release of drilling mud during HDD operations.

Enbridge will conduct geotechnical investigations to evaluate the feasibility of using the HDD method at the select waterbodies. Geotechnical investigations are necessary because the Preferred Route will cross regions with soils that may not be conducive to HDD technology, such as soils containing cobbles, boulders, layers of gravel, and/or non-cohesive sands. If these investigations determine that potential installation problems exist in using the HDD method at the waterbody crossing, an alternate, environmentally acceptable method will be specifically designed for the crossing.

During drilling it is common to encounter weak areas in the ground where pressurized drilling mud can escape into the surrounding matrix. Unconsolidated gravel, coarse sand, and fractured bedrock all present circumstances that commonly result in mud releases as it follows the path of least resistance. This path can run laterally or vertically. If mud moves laterally, the release may not be evident on the ground. For a release to be evident there must be a weakness extending vertically from the drill hole to the surface of the ground. The volume of mud released is dependent on a number of factors, including the size of the weak area, the permeability of the geologic material, the viscosity of the drilling mud, and the pressure of the hydraulic drilling system.

Releases to the ground generally occur above or near the drill path. If a wetland, waterbody, or other important resource is nearby, the mud may be release into the wetland, waterbody, or other important resource. In most circumstances, Enbridge can contain and clean up a release. However, a release to a waterbody is much more difficult to contain. When mud releases to a waterbody, it quickly disperses into the water and can migrate downstream. Other circumstances can also result in abandoning the drill hole, such as refusal of the drill bit by a boulder or collapse of the drill hole in sandy soil. Typically HDD is not feasible in areas of glacial till or outwash interspersed with boulder and cobbles, fractured bedrock, or non-cohesive coarse sands and gravels.

HDD drilling fluids/mud consist primarily of water mixed with inert bentonite clay. Under certain conditions an additive may need to be mixed with the drilling fluids/mud for viscosity or lubricating reasons. Enbridge will only use approved additives and will maintain a Material Safety Data Sheet for the drilling fluid at the work site. The drilling additives are used to create mud with desired characteristics that help maintain the integrity of the drilled hole for a successful installation. Different additives are used at different times depending on the conditions. Some additives will help stabilize the walls from collapsing, others will prevent or slow the escape of drilling mud through small cracks or porous material. Other additives help with removal of cuttings, lubrication of the drill bit, or other necessary functions. Not allowing drilling additives could likely result in an increased chance of frac-outs and a higher potential for failed crossings.

Enbridge minimizes HDD risks by choosing sites that are geologically suitable for the methods and by developing contingency plans to address the unintended release of drilling mud to the environment and the inability to complete the crossing using HDD. Typically, Enbridge has a geotechnical assessment completed at each drill site to confirm that the HDD is in favorable material for drilling. The assessment considers soil fracture mechanics to provide an estimate on the potential for releases or failure. The soil fracturing software is strictly a modeling tool and does not perfectly reflect actual conditions during drilling. Where HDD is proposed at PWI features, Enbridge will prepare a geotechnical analysis.

Section 11.0 of the EPP (Appendix E) describes the Drilling Fluid Response, Containment, and Notification Procedures. Containment, response and clean-up equipment will be available at both sides of an HDD crossing location and one side of a guided or road bore prior to the commencement to assure a timely response in the event of an inadvertent release of drilling fluid.<sup>48</sup>

### **Restoration and Revegetation**

The following discussion on restoration and revegetation applies to streams crossed using the open-cut, dam-and-pump, and flume crossing methods. Typically, stream bank and streambed restoration and stream bank revegetation will not be necessary when the stream is crossed using the HDD method.

A vegetative buffer will be maintained on each stream bank during wet trench, dam and pump, and flume stream crossing methods. Waterbodies crossed using the directional drilling/guided bore method normally do not result in the disturbance of the stream banks or riparian vegetation (with exception to extremely limited hand clearing of woody required to facilitate guide wire placement), which further reduces the potential for erosion and sedimentation at the stream crossing.

Flumes and temporary dams will be removed from the streambed after the crossing has been returned to original grade and the banks have been reconstructed and stabilized with erosion control materials. Temporary erosion control measures will be installed and maintained until permanent erosion control measures are installed and effective. Permanent slope breakers will be installed, where needed, across the full width of the ROW during final cleanup.

Stream banks disturbed during construction will be restored as near as practicable to pre-construction conditions unless the slope is determined to be unstable. Mitigation measures such as bioengineering, rock riprap, or reshaping the banks will be utilized to prevent slumping. Enbridge will work closely with MNDNR to identify waterbodies where bioengineering practices

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<sup>48</sup> This Enbridge commitment addresses comments provided by MNDNR and MPCA on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

could be used as a method of bank stabilization. Rock riprap may be used in areas where other stabilization methods are not feasible or effective. Enbridge recognizes site-specific approval will be necessary in the event riprap is required to achieve bank stabilization.<sup>49</sup>

Once the banks have been stabilized, erosion control devices (ECDs) will be installed within 24 hours of backfilling the crossing. Temporary slope breakers will be installed on all sloped approaches to streams in accordance with the spacing requirements specified in Section 1.9.5 of the EPP (Appendix E). A temporary seed mix (e.g., annual rye or annual oats) and mulch and/or erosion control blankets will be installed within a 50-foot buffer on either side of the stream, with exception to actively cultivated land. Silt fence or functional equivalent as approved in advance by Enbridge will be installed upslope of the temporary seeding area (Section 2.5.1 of the EPP). Where necessary for access, the travel lane portion of the construction workspace and the temporary bridge will remain in place until final cleanup activities are completed. Temporary bridges will be removed after final cleanup, seeding, mulching, and other ROW restoration activities have been completed. The temporary erosion control measures will be removed after vegetation has been re-established.

The pipe section installed under the stream will be tied-in to the pipeline. If trench dewatering is necessary during the tie-in process, the water will be pumped into a filtration device located in a well-vegetated area and in a manner to prevent the migration of heavily silt-laden water into waterbodies or wetlands.

#### Special Designation and Sensitive Waterbodies

Enbridge will post signs for environmental features such as wetlands, waterbodies, drainages/drain tiles, buffer zones, rare plant or ecological community sites, invasive species and noxious weed locations, regulated wildlife habitat, cultural resources, and erosion-prone or steep slopes.

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<sup>49</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

### **Public Water Watercourses**

Enbridge will work with MNDNR to permit proposed and alternate crossing methods at all PWI features. Enbridge will provide example cross-sections and site-specific waterbody crossing plans based on project dimensions to MNDNR for review. Future revisions to the application will include site-specific crossing plans for many sensitive waterbodies, including trout streams and impaired waters. The plans will incorporate civil, environmental, and geomorphic stream survey data, along with geotechnical survey and study data, to inform the most appropriate crossing method. These plans, along with the proposed and alternate crossing method for each PWI feature crossed, will be reviewed and approved by MNDNR as part of the licensing process.<sup>50</sup>

### **Other Known Sensitive Crossings**

- **Mud Lake**

The Mud Lake crossing is identified as a sensitive crossing. Past construction and restoration difficulties associated with winter construction and replacement of peat blocks are still apparent at the crossing. Enbridge will prepare a site-specific plan for this crossing.

- **La Salle Creek**

As described in Section 7.11, MNDNR considers La Salle Creek to be a high-value trout stream. Enbridge and MNDNR discussed past difficulties with construction methods and alignment at La Salle Creek, including frac-outs and steep slopes. The construction method and alignment at this have been modified for the Project to address MNDNR's concerns. Upon conducting a geotechnical investigation at the site, subsurface conditions were deemed unsuitable for an HDD crossing and demonstrated an elevated risk of frac-outs. As a result, Enbridge has committed to a dry crossing method at La Salle Creek for the Project. In addition, Enbridge will prepare a site-specific plan for this crossing to include with its License to Cross Public Waters application.

- **Hay Creek**

MNDNR identified Hay Creek as a crossing with potential difficulties. Past difficulties included frac-outs at the crossing during a period of high water flow. Based on preliminary geotechnical data, Enbridge believes that use of the HDD method will result in the least impact. Enbridge will

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<sup>50</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

propose a final proposed and alternate crossing method as part of its License to Cross Public Waters application. Enbridge will prepare a site-specific plan for this crossing.

- **Straight River**

MNDNR has identified the Straight River as a crossing with potential difficulties. Past difficulties included frac-outs at the crossing and improper staging of emergency response equipment. Geotechnical data for this crossing are pending. Enbridge will propose a final proposed and alternate crossing method as part of its License to Cross Public Waters application. Enbridge will prepare a site-specific plan for this crossing.

- **Big Sandy Lake & Sandy River**

When looking at statewide resources as a whole, Enbridge has designed the least environmentally damaging and practicable Preferred Route through the Sandy River Watershed. The Preferred Route crosses the Sandy River in two locations but avoids the Salo Marsh WMA. There are very few reasonable alternatives in this area that will not cross the Sandy River while remaining outside of other sensitive areas including WMAs, large expansive wetlands, and other areas with restrictions (e.g., a private wetland mitigation site in the city of McGregor). Enbridge is planning to install a mainline valve one mile upstream and 4.5 miles downstream of the first Sandy River crossing. The downstream valve at the first crossing will cover the upstream valve at the second crossing (1.5 miles upstream) in order to curtail and limit the possible release of product and control the extent of a spill. Enbridge will abide by all MNDNR timing restrictions for construction across all waterbodies.

Concerns have been raised regarding the potential for proposed Sandy River crossings to release phosphorus into downstream Big Sandy Lake. Enbridge understands that Big Sandy Lake is impaired for excessive nutrients (phosphorous) and that there are concerns that introduction of additional phosphorus may have adverse impacts on wild rice and fisheries supported by the lake. Under natural conditions, phosphorous is typically scarce in water. Phosphorous contributed by human activity (e.g., farming, erosion caused by development or stormwater runoff) is a major cause of excessive algal growth and degraded lake quality. Construction at both Project crossings of the Sandy River will not contribute to further impairment of Big Sandy Lake for excessive phosphorous because Enbridge currently proposes to use the HDD/bore methods. Use of these methods will result in no disturbance of substrate and no chance that disturbed substrate could flow downstream and contribute to the lake's impairment. The minimal clearing conducted along HDD/bore crossings as well as the measures implemented in the EPP (Appendix E) will ensure that any phosphorous that might enter the waterbody will be minimized.

Enbridge plans to prepare site-specific plans for both crossings of the Sandy River. Enbridge has already conducted geotechnical investigations at both crossings of the Sandy River. Subsurface

conditions appear favorable for a successful HDD at both locations. These studies will inform Enbridge's final crossing plans for the Sandy River.<sup>51</sup>

#### Water Quality

It is anticipated that any impacts to water quality from construction of the Project will be temporary. The following measures from the EPP (Appendix E) address water quality issues.

- Section 11.3.2 describes inadvertent drilling fluid release response measures within wetlands and waterbodies and areas immediately adjacent to wetlands and waterbodies, such as stream banks or steep slopes, where drilling fluid releases could quickly reach surface waters.
- Section 10.0 addresses planning, prevention, and control measures to minimize impacts resulting from spills of fuels, petroleum products, or other regulated substances as a result of construction. Sections 10.9.1 and 10.10 state that if a spill should occur during refueling operations, operations shall stop until the spill can be controlled and the situation corrected.
- Section 10.6.3 requires that the storage of petroleum products, refueling, maintenance, and lubricating operations take place in upland areas that are more than 100 feet from wetlands, streams, and waterbodies (including drainage ditches), and water supply wells.
- Per Section 10.6.5, concrete wash water, grindings and slurry will not be discharged to wetlands, waterbodies, or storm sewer systems, or allowed to drain onto adjacent properties.
- Per Section 1.9, temporary ECDs will be installed at the edge of the construction workspace to slow water leaving the site and prevent siltation of waterbodies and

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<sup>51</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

wetlands downslope. Riparian buffers will be maintained to provide an additional barrier to prevent sedimentation.<sup>52</sup>

### **Impaired Waters**

Enbridge will work with MPCA's NPDES staff to ensure the Project's Stormwater Pollution Prevention Plan (SWPPP) will protect soils and prevent potential discharges to waterbodies and impacts on impaired waterbodies. Enbridge will work with NPDES staff to ensure the Project's SWPPP will protect soils and prevent potential discharges to waterbodies. Temporary erosion and sediment controls as described in Section 1.9 of the EPP (Appendix E) include, but are not limited to, slope breakers, sediment barriers (e.g., silt fence, straw bales, bio-logs), stormwater diversions, trench breakers, mulch, and revegetation subsequent to seeding of exposed soils. Enbridge will install temporary ECDs after clearing and prior to grubbing and grading activities at the base of sloped approaches to streams, wetlands, and roads, at the edge of the construction workspace as needed, and in other areas determined by the Environmental Inspector to slow water leaving the site and prevent siltation of waterbodies and wetlands down slope or outside of the construction workspace (e.g., swales and side slopes). Enbridge will also place temporary ECDs across the entire construction workspace at the base of slopes greater than five percent where the base of the slope is less than 50 feet from tile line inlets, drainage ways, wetlands, and/or waterbodies until the area is revegetated and there is no potential for scouring or sediment transport to surface waters. Adequate room will be available between the base of the slope and the sediment barrier to accommodate ponding of water and sediment deposition.<sup>53</sup>

### **Infested Waters**

Enbridge will continue to monitor the status of MNDNR's list of waterbodies infested with aquatic invasive plants, animals, and diseases and will plan construction activities accordingly in the event that any waterbodies crossed by the Preferred Route are added to the list.

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<sup>52</sup> This Enbridge commitment addresses comments provided by MPCA on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

<sup>53</sup> This Enbridge commitment addresses comments provided by MNDNR and MPCA on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

### **Hydrostatic Testing**

Enbridge will hydrostatically test the new pipe to verify its integrity prior to placing the pipeline in service. Hydrostatic testing will be conducted in accordance with U.S. Department of Transportation's Office of Pipeline Safety regulations. The test procedure consists of filling a section of pipe with water and maintaining a prescribed pressure for a prescribed period of time that will establish the maximum allowable operating pressure.

Enbridge is evaluating potential sources for appropriating hydrostatic test water, including major waterbodies crossed by or adjacent to the pipeline and/or groundwater sources such as high-capacity irrigation wells or municipal wells. Enbridge will obtain the applicable water appropriation and discharge permits for hydrostatic testing activities.

Water used for hydrostatic testing will be discharged on land or returned to the waterbody from which it was appropriated, in accordance with MPCA's NPDES permit requirements for the Project. If the water is discharged to an upland area, energy dissipation devices (e.g., straw bale structures) and controlled discharge rates will minimize the potential for erosion and subsequent release of sediment into nearby surface waters and wetlands. If hydrostatic test water is discharged directly into waterbodies, energy dissipation devices (e.g. splash pups) and controlled discharge rates will be used to prevent stream bottom scour. Enbridge will develop a site-specific discharge plan for each waterbody that will receive hydrostatic test discharges. At this time, Enbridge does not anticipate the use of test water additives and no chemicals will be used to dry the pipeline following the hydrostatic testing.

Enbridge will comply with all requirements of the individual NPDES hydrostatic test discharge permits issued for the Project. Enbridge has been in discussions with MPCA NPDES permitting staff since December 2013 to discuss new procedures that will be put in place to ensure that appropriate planning occurs prior to hydrostatic test discharge activities as well as the proper recording of information during the actual discharge event (refer to the Environment Hydrotest Discharge Authorization & Documentation [Appendix G] in the EPP [Appendix E]). In addition, new procedures are in place to measure discharge flows. The total volume of water discharged and the discharge rate will be verified with a flow meter (or equivalent), or as required by the individual NPDES permit. The total volume of water discharged and the discharge rate will not exceed that specified in the individual NPDES permit (refer to Section 5.2.5 of the EPP).

Enbridge intends to use the MNDNR's General Permit 1997-0005 for water appropriations over 10,000 gallons. Per guidance from MNDNR, Enbridge will select appropriation sites that will meet MNDNR's criteria of "doing no harm." All appropriation sites will be reviewed by MNDNR prior to issuance of a Water Appropriations Permit. The MNDNR General Permit further states that water withdrawals must have a minimal potential for impacts on groundwater resources and

must not adversely impact trout streams, calcareous fens, or other significant environmental resources. Enbridge may request withdrawal from impaired waters if use of the water will not impact the impairment for which the waterbody is listed. In the event that Enbridge must use water from a surface water source that is designated as infested, Enbridge will apply for an Infested Waters Diversion or Transportation Permit and will comply with all requirements of that permit.<sup>54</sup>

### **7.15.3 OPERATIONS IMPACTS AND MITIGATION**

Impacts on water quality due to operations and maintenance activities are expected to be temporary (e.g., excavation, mowing), minimal, and site-specific. Disturbed areas at crossings will be restored and stabilized as soon as practical after pipeline installation. Impacts could result from alteration of stream banks and maintenance clearing of woody vegetation as needed, approximately every five years within the 50-foot permanent ROW.

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<sup>54</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

## 7.16 CULTURAL RESOURCES

Cultural resources are the material remains of human activity and can include sites, buildings, districts, and landscapes. Cultural resources are finite and non-renewable; once destroyed they and the information they provide are lost. Federal laws and regulations provide the standards for cultural resources identification, evaluation, and mitigation of impacts. If a cultural resource site meets the criteria for listing on the National Register of Historic Places (NRHP), it is considered significant and termed a “historic property.” Enbridge prefers to avoid historic properties, and the Preferred Route was designed in part to consider impacts to cultural sites that may meet the criteria as historic properties.

Enbridge has completed Phase I reconnaissance surveys of approximately 97 percent of the acreage within the Project construction workspace (compared to 91 percent in terms of percentage of tracts/sites completed; see Table 7.1.2-1), which includes the Preferred Route, associated aboveground facilities (see Table 7.1.4-1), ATWS (see Figures 7.1.3-1 through 7.1.3-3), and access roads. Enbridge will conduct the remaining surveys in 2015. Enbridge identified 53 cultural resources sites within the Project construction workspace; of these, seven sites located within the construction workspace are recommended eligible for listing on the NRHP or are unevaluated for eligibility. A Phase II evaluation has been completed for three of the seven sites, and evaluative testing will continue in 2015.

Enbridge initiated Project consultation with the Minnesota State Historic Preservation Office (SHPO) on November 25, 2014 (Appendix J). Enbridge will continue to coordinate with SHPO on items that arise from the initial Project consultations as well as items that are ongoing from previous correspondence. SHPO has provided and will likely continue to provide technical guidance regarding archaeological site significance and impacts to significant sites along the Project.

### 7.16.1 EXISTING ENVIRONMENT

#### Previously Recorded Cultural Resources

Enbridge examined the historic preservation files maintained by SHPO and searched agency and online databases to confirm there are no National Landmarks, NRHP-listed properties, historic districts, or cultural landscapes within the Project construction workspace. The Minnesota Historical Society maintains a list of more than 30 historic sites around the state. Enbridge checked this list as well as the list of threatened historic sites on the Preservation Alliance of Minnesota’s website. No historic site listed by either institution is located in the Project construction workspace.

Enbridge reviewed SHPO reports on file in order to determine how much of the Project construction workspace was previously surveyed for cultural resources and what type of cultural resources sites were recorded in the vicinity. Forty-one reports for cultural resources surveys that cover portions of the Project construction workspace are on file with SHPO. These previous surveys are described in the Project reports completed (Table 7.16.1-1).

<b>TABLE 7.16.1-1</b>			
<b>Cultural Resources Reports Prepared for the Line 3 Replacement Project</b>			
<b>Principal Investigator/ Affiliation</b>	<b>Report Title</b>	<b>Preferred Route Segment</b>	<b>Date</b>
Anne Ketz, Saleh Miller/ The 106 Group	Phase I Cultural Resources Survey for the Enbridge Line 3 Pipeline Segment 21	West of Clearbrook	2013
Allison Lange Mueller/ Merjent	2014 Minnesota Archaeological Reconnaissance Studies	West of Clearbrook	2015
Robert Watson, Allison Lange Mueller/ CCRG	2013 Minnesota Archaeological Reconnaissance Studies	East of Clearbrook	2014
Michael Kolb/ Strata Morph	Minnesota Geomorphological Investigations	East of Clearbrook	2015
Robert Watson/ CCRG	2014 Minnesota Archaeological Reconnaissance Studies	East of Clearbrook	2015

Approximately 45 percent of the Project construction workspace west of Clearbrook was surveyed between 1980 and 2008 for previous Enbridge pipeline projects referred to as Line 67 and Southern Lights and was not re-surveyed for the current Project. Much of the Project construction workspace east of Clearbrook had not been previously surveyed, or areas were surveyed using methods that would not meet current standards for discovery and recordation. No previously surveyed acreage east of Clearbrook was excluded from Project surveys. Table 7.16.1-2 provides a tally of the acres previously surveyed, acres surveyed in 2013 and 2014 for the Project, and acres remaining to be surveyed.

<b>TABLE 7.16.1-2</b>			
<b>Tally of Cultural Resources Survey Acreage for the Line 3 Replacement Project</b>			
<b>Survey Area</b> <i>(pipeline corridor, off-corridor facilities, ATWS, access roads)</i>	<b>Acres previously surveyed using modern standards</b>	<b>Acres surveyed in 2013 and 2014</b>	<b>Acres remaining to be surveyed</b>
West of Clearbrook	3,821	4,450	133
East of Clearbrook	N/A	14,829	575
<b>Totals</b>	<b>3,821</b>	<b>19,279</b>	<b>708</b>

Records on file at SHPO indicate that 52 archaeological sites were previously recorded within a 2-mile-wide study area surrounding the Preferred Route, 21 west of Clearbrook and 31 east of Clearbrook. The known sites in the 2-mile-wide study area include earthworks, burials, and

numerous campsites and artifact scatters representing the Pre-contact period, as well as homesteads, logging camps, and a Civilian Conservation Corps camp representing the Post-contact or historic period. The Phase I survey reports prepared for the Project (see Table 7.16.1-1) provide additional details about the previously recorded archaeological sites.

The Shell River Prehistoric Village and Mound District (21HB06) is in close proximity to the Project. This important complex of sites is located 0.65 mile north of the Preferred Route in Hubbard County. The District was listed on the NRHP in 1973. It documents the Woodland Period occupation of the region and contains archaeological remains of the prehistoric village and associated mounds. No off-ROW facilities, ATWS, or access roads will be located within one mile of this District.<sup>55</sup>

#### Cultural Resources Phase I Reconnaissance Surveys

Enbridge designed a Phase I survey program that assured survey coverage for the entire Project construction workspace as defined above in the introduction to Section 7.16. Cultural resource surveys were conducted in 2013 and 2014, both west and east of Clearbrook. The reports listed in Table 7.16.1-1 provide detailed information about the previous and current Phase I reconnaissance surveys.

Enbridge conducted Phase I surveys for all proposed access roads that would be widened, graded, or improved for Project use. A 50-foot-wide cultural survey area was used to survey access roads, using the same survey protocols as for the Preferred Route. If a cultural site was recorded on an access road, that access road was removed from the Project workspace, and an alternative route was selected.<sup>56</sup>

In 2013, Enbridge contracted with the 106 Group to survey select workspaces along the Preferred Route for maintenance projects. The 106 Group surveyed 167.5 acres of non-contiguous workspaces in Marshall, Pennington, and Red Lake counties. Surveyors did not identify any archaeological sites. The report identified the Lakehead Pipeline Corridor Historic District, which is part of the existing Enbridge Mainline System that the Project follows west of its Clearbrook

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<sup>55</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

<sup>56</sup> This Enbridge commitment addresses comments provided by MNDNR on the MPUC Application Docket No. PL-6668/PPL-13-474 (see Appendix K).

Terminal, as the only NRHP-eligible property in the Project construction workspace. This historic architecture district encompasses six petroleum pipelines, along with terminals, pump stations, mainline valves, markers, and one refinery (Wolf and Ohland 2013). The Project will not alter the characteristics that make the Lakehead Pipeline Corridor Historic District eligible for listing on the NRHP.

Enbridge contracted with Merjent to conduct Phase I reconnaissance surveys for the portion of the Project west of Clearbrook beginning in 2014. Surveys were designed to cover areas that had not been previously surveyed. Merjent conducted field surveys between May 20 and October 15, 2014. The Project research design included a site sensitivity assessment that was used to focus field survey efforts on the high-probability areas. Use of the site sensitivity assessment reduced the overall survey effort by an estimated 20 percent by avoiding labor-intensive shovel testing at low-probability locations. Merjent surveyed 4,450 acres in 2014; surveys were not completed for 133 acres because of winter weather conditions and lack of landowner permission to enter. Merjent plans to survey the remaining acres in 2015.

Merjent is conducting a desktop review to determine the need for geomorphological deep testing west of Clearbrook. The desktop geomorphological assessment and any deep testing done in the field will be reported in 2015.

Enbridge contracted with Commonwealth Cultural Resource Group (CCRG) to conduct field surveys for east of Clearbrook, beginning in 2013. Standard survey methods included pedestrian walkover along the entire cultural survey area and subsurface shovel testing at specific locations determined by ground surface visibility and other factors. Surveys continued in 2014 and will carry over into 2015 for those areas not surveyed to date. Table 7.16.1-2 provides a summary of the acres surveyed and remaining to be surveyed for the Project.

Strata Morph Geoexploration, Inc. (Strata Morph), conducted a desktop assessment to identify locations with possible deeply buried living surfaces that might contain buried archaeological resources. Strata Morph then conducted a windshield survey and identified nine locations with potential to contain deeply buried surfaces and possibly archaeological material. These nine locations were tested by deep coring methods such as mechanical augering or backhoe trenching in 2014. The report is in preparation and is expected to be available in early 2015.

To summarize, Phase I reconnaissance inventories of approximately 97 percent (by acreage, as explained above in the introduction to Section 7.16) of the Project construction workspace were completed in 2013 and 2014, both west and east of Clearbrook. Surveyors identified 53 archaeological sites along the Preferred Route. No sites were recorded at facilities, ATWS, or access roads. Within the construction workspace, 23 sites were recorded. Of these, seven sites

are recommended eligible for the NRHP or have not been evaluated for eligibility (Table 7.16.1-3).

	Sites in Project Area	Sites in Construction Workspace	Unevaluated or potentially eligible sites in construction workspace
West of Clearbrook	25	8	1
East of Clearbrook	28	15	6
<b>Totals</b>	<b>53</b>	<b>23</b>	<b>7</b>

### Cultural Resources Phase II Evaluation Studies

West of Clearbrook, Enbridge conducted limited Phase II evaluation testing at site 21KT64 in 2014. This testing resulted in a recommendation that the site does not meet the criteria for listing on the NRHP, which was reported in Watson et al. (2014). Testing was completed at two of the other seven potentially eligible sites, and these results will be reported in April 2015.

The other four potentially eligible sites have not been evaluated for NRHP eligibility and may require Phase II evaluation testing (Watson et al. 2014). Testing will be designed to collect sufficient information to make a recommendation regarding NRHP eligibility. If avoidance of an NRHP-eligible property is not possible, or places an undue burden on the Project, Enbridge will consult with interested parties and consider mitigation options.

### **7.16.2 CONSTRUCTION IMPACTS AND MITIGATION**

Enbridge's preferred method of mitigating impacts on NRHP-eligible or potentially eligible properties is avoidance, which may include routing the Project around historic properties, installing the pipeline beneath historic properties using conventional bore or HDD technology, and/or fencing all or portions of historic properties to ensure that they are avoided during construction. If avoidance is not possible, mitigation measures, such as data recovery, may be used. Any cemeteries or burials within or near the construction workspace will be protected from unauthorized disturbance in accordance with Minnesota Statute 307.08. Enbridge will provide special treatment, such as fencing, and possibly noise and dust reduction for cemeteries or burials in proximity to the construction workspace.

The Unanticipated Discoveries Plan (UDP) (Appendix P) prescribes actions to be taken in the event that a previously unrecorded archaeological site or human remains are discovered during construction activities. The UDP directs the Construction Contractor and the Lead Environmental Inspector to stop activity and protect the find, then contact the appropriate expert or authority. In the event of such a discovery, construction activities in the immediate vicinity of the discovery will not resume until the find is fully investigated and cleared.

### **7.16.3 OPERATIONS IMPACTS AND MITIGATION**

Following construction, the pipeline and associated facilities will operate within workspace that has been surveyed for cultural resources. Enbridge's goal is to avoid properties that are eligible, or potentially eligible, for listing on the NRHP during Project operations. In the event that operations and maintenance activities could affect a NRHP-eligible or potentially eligible site, or a cemetery or burial, Enbridge will design a treatment program to minimize or mitigate impacts on that site.

## **7.17 AIR QUALITY**

### **7.17.1 EXISTING ENVIRONMENT**

The counties in which the Project will be constructed and operated are all designated as in attainment or unclassifiable for the National Ambient Air Quality Standards for all criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen oxides (NO<sub>x</sub>), ozone (O<sub>3</sub>), particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>), particulate matter less than 10 microns in diameter (PM<sub>10</sub>), and sulfur dioxide (SO<sub>2</sub>). Criteria pollutant emissions from pipeline systems are predominantly limited to volatile organic compounds (VOC) from transferring crude oil to and from storage tanks and fugitive VOC emissions from piping components (such as valves, flanges, and pump seals). The Project will connect to the existing Clearbrook Terminal which is subject to MPCA permitting requirements under Minnesota Administrative Rules Chapter 7007. Emissions of criteria pollutants are currently regulated at the Clearbrook Terminal under an existing air emissions permit.

Pump stations along the pipeline are not currently subject to air permitting requirements and are not expected to become subject to air permitting requirements due to the Project.

### **7.17.2 CONSTRUCTION IMPACTS AND MITIGATION**

Construction of the Project is not expected to have a substantial impact on air quality. Construction of the pipeline and associated facilities could result in intermittent and short-term fugitive emissions. These emissions would include dust from soil disruption and combustion emissions from the construction equipment. The fugitive dust emissions would depend on the moisture content and texture of the soils that would be disturbed. However, emissions from construction are not expected to cause or significantly contribute to a violation of an applicable ambient air quality standard because the construction equipment would be operated on an as-needed basis, primarily during daylight hours. Emissions from the gasoline and diesel engines would be minimized because the engines must be built to meet the standards for mobile sources established by the EPA mobile source emission regulations (Title 40 C.F.R. Part 85).

Enbridge will minimize dust generated from construction activities. The contractor will take all reasonable steps to control dust near residential areas and other areas as directed by Enbridge. Control practices may include wetting soils on the ROW, limiting working hours in residential areas, and/or additional measures as appropriate based on site-specific conditions. The use of dust suppression techniques will minimize fugitive dust emissions during construction of the project, thereby minimizing potential air quality impacts on nearby residential and commercial areas.

In addition to combustion emissions and fugitive dust, disturbance of wetlands during construction has the potential to temporarily release greenhouse gasses (GHG), in the form of CO<sub>2</sub> to the atmosphere, though wetland restoration after the project will also re-sequester that carbon. Peatlands (i.e., bogs, fens and marshes) represent the single largest terrestrial carbon stock in the state of Minnesota. Undisturbed peatland areas contain large, thick deposits of organic materials that have accumulated over long periods of time in saturated conditions where decomposition is minimal. Drainage and disturbance of these wetland areas introduces the accumulated organic material to oxygen resulting in comparatively rapid decomposition and a rapid release of CO<sub>2</sub> to the atmosphere. Wetland restoration, on the other hand, has the potential to sequester carbon from the atmosphere. This sequestration process occurs much more slowly than the carbon release associated with wetland disturbance but may ultimately result in total carbon accumulation that is comparable to an undisturbed wetland of a similar type. Peatlands in Minnesota have been accumulating carbon for on the order of 5,000 years, and peatlands can continue to accrue carbon for millennia. Because carbon accumulation in wetlands occurs gradually and over long periods of time, a restored wetland must be preserved over very long timescales to offset carbon released due to disturbance.

Based on the carbon cycle in wetlands and the potential impacts of the Project, construction activities will result in temporary carbon cycle impacts ranging from possible decreases in wetland carbon sequestration or partial loss of accumulated carbon to total loss of accumulated wetland carbon. Different wetland types will experience different levels of carbon release during construction and re-sequestration after restoration. It would be very difficult to predict with any certainty what the release or re-sequestering values will be.

### **7.17.3 OPERATIONS IMPACTS AND MITIGATION**

Project emissions of criteria pollutants at the Clearbrook Terminal will continue to be regulated under an air emissions permit. Indirect criteria and GHG emissions are generated as a result of using purchased electricity to run the pumps.

#### Minnesota GHG Reduction Goals

The operation of crude oil pipelines generate very little direct GHG emissions. Direct GHG emissions may be generated from trace amounts of methane contained in the crude oil as it is transferred through tankage at the terminals. Indirect GHG emissions will be generated by utility companies that provide electricity to Enbridge. Enbridge uses electricity to operate electric pumps that transport the crude oil through the pipeline. These pumps are located at pump stations along the pipeline at locations which are determined by a variety of factors including engineering design, terrain, power availability, and delivery needs.

Enbridge understands that Minnesota has GHG reduction goals as set out in Minnesota Statutes, Section 216H.02. To meet the requirements of Minnesota's GHG rules to develop a climate change action plan, the Minnesota Climate Change Advisory Group issued a report in April 2008 with recommendations to the governor for reducing Minnesota's GHG emissions. According to the report, electricity generation in Minnesota is one of the primary sources of GHG emissions in the state and several of the policy recommendations in the report apply to the energy supply sector. Enbridge's pipelines are currently designed to operate efficiently which minimizes demand for electricity (and as a result minimizes indirect GHG emissions). Because operation of the pipeline does not directly produce significant amounts of GHG emissions, operating the pipeline in the most efficient manner possible is the best way that Enbridge can help meet Minnesota's GHG reduction goals in comparison to other transportation methods.

Enbridge recognizes that climate change is a critical global issue and is a proactive participant in the development and implementation of climate change solutions. Enbridge tracks and publicly reports on its GHG emissions and continues to take steps to lower them. As of February 28, 2014, Enbridge is forecasting that the power consumption from Liquids Pipelines operations in 2015 will be 3,609 GWh over its December 31, 2008 level, while annual renewable energy production is expected to exceed 4,000 GWh.

## 7.18 PERMIT TABLE

Table 7.18-1 lists the government agencies or authorities with which Enbridge must file for the Line 3 Replacement Pipeline Project. This table lists the title of each permit or certificate issued, anticipated application and decision dates, and status of the permit or certificate.

<b>Table 7.18-1 Preliminary List of Government Authorities and Titles of Permits/Approvals (Minnesota Portion of Line 3 Replacement Project)</b>				
<b>Name of Agency</b>	<b>Title of Permit/Approval</b>	<b>Date of Application <sup>a</sup></b>	<b>Date of Decision <sup>b</sup></b>	<b>Status</b>
United States Army Corps of Engineers – St. Paul District and Minnesota Pollution Control Agency	Section 10/404 Individual Permit and associated state 401 Individual Water Quality Certification	July 2015	September 2016	Pending submittal
United States Fish and Wildlife Service	Section 7 Endangered Species Act Consultation (Federal endangered species)	July 2015	May 2016	Initial consultation in December 2014. Further consultation pending
Minnesota Public Utilities Commission	Pipeline Routing Permit	April 2015	July 2016	Submitted
	Certificate of Need	April 2015	July 2016	Submitted
Minnesota Department of Natural Resources	License to Cross Public Waters	July 2015	September 2016	Initial consultation in December 2014. Pending submittal
	License to Cross Public Lands	July 2015	September 2016	Initial consultation in December 2014. Pending submittal
	Water Appropriation General Permit (hydrostatic test water and trench dewatering)	June 2016	August 2016	Pending submittal
	State Endangered Species Consultation	December 2015	September 2016	Initial consultation in December 2014. Further consultation pending
Minnesota Pollution Control Agency	Clearbrook Station New Source Performance Standards Notifications and Submittals	June 2015	September 2016	Pending submittal
	NPDES Individual Construction Stormwater, Hydrostatic Test, and Trench Dewatering Permit – Pipeline Construction	November 2015	September 2016	Initial consultation in December 2014. Further consultation pending
	NPDES General Construction Stormwater Coverage – Facilities	December 2015	August 2016	Initial consultation in December 2014. Further consultation pending
	NPDES General Construction Stormwater Coverage – Pipeyards and Contractor Yards	April 2015	May 2015	Pending submittal (varies for each yard)
Minnesota State Historic Preservation Office	Cultural Resources Consultation, NHPA Section 106 Clearance	July 2015	August 2016	Initial consultation in December 2014. Further consultation pending

<b>Table 7.18-1 Preliminary List of Government Authorities and Titles of Permits/Approvals (Minnesota Portion of Line 3 Replacement Project)</b>				
<b>Name of Agency</b>	<b>Title of Permit/Approval</b>	<b>Date of Application <sup>a</sup></b>	<b>Date of Decision <sup>b</sup></b>	<b>Status</b>
Minnesota Department of Agriculture	Agricultural Protection Plan	May 2015	September 2016	Initial consultation in December 2014. Further consultation pending
Minnesota Department of Transportation	Road Crossing Permits	Early Summer 2015	Fall 2015	Pending Submittal
Mississippi Headwaters Board	Local Land Use Review	December 2014	September 2016	Consultation only
Red Lake, Wild Rice, Two Rivers, and Middle-Snake Watershed Districts	Watershed District Permit	January 2016	April 2016	Initial consultation in December 2014. Further consultation pending
Minnesota Department of Health and Wrenshall, Sundruds Court, and Oklee Drinking Water Supply Management Area	Drinking Water Supply Management Area Consultation	December 2014	September 2016	Consultation only
Minnesota Board of Water and Soil Resources	Wetland Conservation Act Utility Exemption	July 2015	August 2016	Initial consultation in December 2014. Further consultation pending
Local/County	Permits pertaining to off-right-of-way (ROW) yard use	Feb/March 2015	Late May 2015	In Progress
<sup>a</sup> Actual date of initial consultation/anticipated dates for submission. <sup>b</sup> Projected dates of action, presuming MPUC approvals are received in July 2016.				