APPENDIX U

Leech Lake Reservation and Chippewa National Forest Environmental Analysis

This page left intentionally blank.

Environmental Analysis

of the

Proposed Alberta Clipper and

Southern Lights Diluent Pipeline Projects

within the

Leech Lake Reservation

and the

Chippewa National Forest

An Appendix to the

Environmental Impact Statement

U.S. Department of State

April 2009

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES (SEE APPENDIX 3)

APPENDICES

ACRONYMS AND ABBREVIATIONS

ADT	Average Daily Traffic
Applicant	Enbridge Energy, Limited Partnership and Enbridge Pipelines (Southern Lights) L.L.C.
ATV	All Terrain Vehicles
BA/BE	Biological Assessment / Biological Evaluation
bbls	Barrels
BIA	Bureau of Indian Affairs
BNSF	Burlington Northern - Santa Fe
bpd	barrels per day
CNF	Chippewa National Forest
EIS	Environmental Impact Statement
DRM	Leech Lake Division of Resources Management
EF	Experimental Forest Management Area
Forest Plan	Chippewa National Forest Land and Resource Management Plan, 2004
GF	General Forest
HCAs	High Consequence Areas
HDD	Horizontal Directional Drill
HVTL	High Voltage Transmission Line
Keystone	TransCanada Keystone Pipeline, L.L.C.
kV	kilovolt
LIC	Local Indian Council
LLBO	Leech Lake Band of Ojibwe
LLR	Leech Lake Reservation
LR	General Forest - Longer Rotation Management Area
LULC	Land Use Land Cover
MCLs	Maximum Contamination Levels
MDH	Minnesota Department of Health
MDNR	Minnesota Department of Natural Resources
Mn/DOT	Minnesota Department of Transportation
MP	milepost
MPCA	Minnesota Pollution Control Agency
NEPA	National Environmental Policy Act of 1969
NFS	National Forest Service or National Forest System
NHD	National Hydrography Database
NRDA	Natural Resource Damage Assessment
NRHP	National Register of Historic Places
NRI	Nationwide River Inventory
NWI	National Wetlands Inventory
OHV	Off Highway Vehicles
PAHs	Polycyclic Aromatic Hydrocarbons
PCP	Pentachlorophenol
PEM	Palustrine Emergent wetland classification

PFO	Palustrine Forested wetland classification
Projects	The Alberta Clipper Project and the Southern Lights Diluent Project
PSS	Palustrine Shrub-Shrub wetland classification
PUB	Palustrine Unconsolidated Bottom wetland classification
RE	Riparian Emphasis Management Area
RMP	Resource Management Project
RTC	Leech Lake Reservation Tribal Council
SOI	Scenic Integrity Objectives
UB	Unique Biological, Aquatic, Geological, or Historical Management Area
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USFS	United States Forest Service
VIA	Visual Impact Assessment
VMP	Vegetation Management Project

1 PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

The Director of the Division of Resources Management (DRM) of the Leech Lake Band of Ojibwe (LLBO) has authority to participate in the environmental review of projects that occur on lands within the Leech Lake Reservation (LLR) boundaries. The DRM has the responsibility of overseeing the development of land leases and easements for Tribal and Band lands that are approved by the Tribal Council (RTC) and the Bureau of Indian Affairs (BIA). The DRM works with the BIA and owners of tribal titled lands that the project will cross to obtain heir consent and easements or other agreements. The DRM Director is also responsible for management and evaluation of the occupation and use of Tribal and Band lands and may grant an easement on those lands in accordance with BIA procedures. The DRM would analyze how proposed projects will affect the hunting, fishing, and gathering treaty rights of the LLBO on lands within the LLR. The DRM's review may also include impacts to gathering activities for tribally important species such as blueberries and sweetgrass. The DRM Director has requested that this Appendix be prepared to appropriately address LLBO Tribal issues. This Appendix and the other environmental documents issued in connection with the projects here under review will assist DRM in connection with applicable approvals to be issued for the construction of two new pipelines on or adjacent to the Applicant's existing pipeline right-of-way on the LLR.

The Forest Supervisor of the Chippewa National Forest (CNF) is authorized to approve or deny certain special uses on National Forest System (NFS) lands including lands co-extensive with the LLR. In response to a request from Enbridge Energy, Limited Partnership and Enbridge Pipelines (Southern Lights) L.L.C., the Forest Supervisor must decide whether to grant amendments to a Special Use Permit to construct two new pipelines on or adjacent to the Applicant's existing pipeline right-of-way if alternative 2 is chosen. The CNF would need to issue a new Special Use Permit if another alternative were chosen. The Forest Supervisor is responsible for management and evaluation of the occupation and use of NFS lands and may grant a special use on those lands in accordance with the Mineral Leasing Act of 1920, Section 28.

Both the DRM Director and Forest Supervisor's decision must comply with other applicable laws and regulations, including but not limited to: Tribal Land Use Plan; Tribal Conservation Code: the Endangered Species Act of 1973; the Clean Water Act as amended in 1972; the National Historic Preservation Act; the Archaeological Resource Protection Act; the Native American Graves Protection and Repatriation Act; and the National Environmental Policy Act of 1969 (NEPA).

Additionally, the Forest Supervisor review will include compliance with the Rangeland Renewable Resources Planning Act of 1974; the Multiple Use Sustained Yield Act of 1960; the National Forest Management Act; the Mineral Leasing Act of 1920; and the CNF Land and Resource Management Plan (Forest Plan) as revised in 2004.

The following environmental review of the proposed project within the LLR and the CNF would assist the DRM Director and Forest Supervisor, respectively, in making a decision regarding approvals to construct and operate two new liquid petroleum pipelines on LLR and NFS lands in observance of the aforementioned laws and regulations.

The Applicant is planning to increase its ability to provide additional supplies of liquid petroleum to markets in the United States in response to customer requests and marketplace demands. To fulfill this goal, the Applicant would embark upon an expansion program to increase its transportation capacity. This program is specifically designed to increase crude petroleum transportation services from the increasingly accessible oil sands supply in the Western Canadian Basin to refineries in the American Midwest. Between the U.S./Canada border near Neche, North Dakota, and Superior, Wisconsin, the Applicant plans to build two new liquid petroleum pipelines. A project overview map depicting the project route in the Unites States is included as figure 1 (see Appendix 3). The two new pipelines, referred to as the Alberta Clipper Project and the Southern Lights Diluent Project, hereafter referred to as the Projects, includes the crossing of the Leech Lake Reservation; which are lands which the LLBO has retained complete treaty rights for hunting and gathering. The project also crosses lands that are currently in Tribal, Band or Allottment ownership, as well as public lands within the CNF.

On November 30, 2006, the Applicant filed two applications, one for each pipeline, with the CNF seeking amendments to its existing Special Use Permit to allow construction, operation, and maintenance of the portions of the pipelines on NFS land managed by the CNF. The Applicant's applications (Form SF-299) were accepted by the CNF on December 8, 2006. Upon the acceptance of the applications by the CNF, the consideration of a new special use became a NFS action.

NEPA mandates that, in certain circumstances, federal agencies implement a systematic environmental review of proposed projects prior to issuing a decision regarding permits, clearances and approvals. Being that the Leech Lake Band is a self-governed tribe it assumes federal responsibility and authority of a federal agency within the LLR. The U.S. Department of State is responsible for the issuance of a Presidential Permit for the Alberta Clipper Project's crossing of the Canadian border, and is also the lead federal agency for NEPA implementation. As such, the U.S. Department of State is preparing an Environmental Impact Statement (EIS) that will document the environmental effects of the combined pipeline projects from the Canadian border in North Dakota to Superior, Wisconsin. This document has been prepared as an appendix to the EIS and is designed to focus on the portion of the Projects within the boundaries of the LLR and CNF. In addition to this review, further analyses would be conducted by various other agencies issuing permits for the Projects. A list of other agencies that would be issuing permits for the Projects is included in table 1.6-1 of the EIS.

1.2 PURPOSE OF AND NEED FOR THE PROPOSED PROJECTS

The Applicant has four existing pipelines located within the boundaries of the LLR and CNF. The Applicant's preferred route is presented as the most direct and practicable route between these distribution points and allows further collocation with the Applicant's existing pipelines. Construction of the Projects is essential to completing the entire expansion project between Neche, North Dakota and Superior, Wisconsin, as described in section 1.1 of the EIS. The completion of the entire expansion project in Canada and the United States is necessary for increasing crude oil supply to the American Midwest. If the proposed Projects, or any significant portions thereof, could not be approved for construction, the Applicant's purpose of and need for the Projects could not be met and the Applicant would not pursue building the pipelines. The following summarizes the purpose of and need for each of the two Projects. A full description of the Projects' purpose and need may be found in section 1.2 of the EIS.

1.2.1 Alberta Clipper Project

The purpose of the Alberta Clipper Project is to transport petroleum from the Applicant's existing facilities in Hardisty, Alberta to meet the growing demand by refineries and markets in the United States and eastern Canada. This new pipeline would provide the capacity needed to transport increasingly accessible supplies of crude oil produced in western Canada. To meet this anticipated demand, the Alberta Clipper Project would provide up to 450,000 barrels per day (bpd) of crude oil capacity from Alberta's oil sands. The capacity provided by this new pipeline would provide independent utility to the Applicant and its customers, who would use the pipeline for the transportation of commodities to breakout tankage facilities at Clearbrook, Minnesota for subsequent delivery to interconnected facilities operated by Minnesota Pipeline Company, and to the Applicant's Superior, Wisconsin breakout tanks for subsequent delivery to interconnected pipeline systems to the south and east of Superior, Wisconsin.

The need for the project is dictated by a number of factors including:

- increasing the petroleum supply capacity on the Applicant's pipeline system by 450,000 bpd;
- growing crude oil demand in the United States and eastern Canada and diminishing domestic crude oil supply;
- the opportunity to reduce the United States' dependence on foreign offshore oil through increased access to stable, secure Canadian crude oil supplies; and
- demonstrated shipper interest in an overall system expansion.

1.2.2 Southern Lights Diluent Project

The purpose of the Southern Lights Diluent Project from Superior, Wisconsin to Clearbrook, Minnesota is to deliver light petroleum liquids, referred to as "diluents," from U.S. refineries to the Alberta oil sand producers to dilute the heavy crude oil produced in that region, thereby facilitating pipeline transportation.

The need for the project is dictated by a number of factors including:

- establishing a diluent supply capacity on the Applicant's pipeline system of 180,000 bpd;
- enabling recycling of diluent between the refinery and production center, helping to satisfy an increasing demand for crude oil supplies in the Midwestern United States and eastern Canada;
- the opportunity to reduce the United States' dependence on foreign offshore oil through increased access to stable, secure Canadian crude oil supplies; and
- demonstrated shipper interest in establishing a pipeline from the Midwestern United States to western Canada to supply diluent.

1.3 PROPOSED ACTION

The Director of the DRM will decide whether to approve environmental documents for this project and develop easement agreements for RTC, heirs to allotments, and BIA approval to cross the reservation and tribal lands. The Forest Supervisor of the CNF will determine whether to issue amended Special Use Permits to the Applicant for the construction and operation of two new liquid petroleum pipelines on NFS land. As part of the DRM Director and Forest Supervisor evaluation, the following project information will be considered. A general location map depicting the Projects within the LLR and CNF is included as figure 2 (see Appendix 3).

As proposed by the Applicant, the Projects would generally be collocated with or adjacent to the Applicant's existing pipelines through North Dakota, Minnesota, and Wisconsin, including within the LLR and CNF. Currently, the Applicant has four continuous pipelines in operation between Clearbrook, Minnesota and Superior, Wisconsin (see EIS, section 2.0, Project Description). The Applicant's proposal for the Alberta Clipper Project would include construction and operation of the following:

- approximately 42.72 miles of new 36-inch-diameter underground petroleum pipeline on or adjacent to existing utility rights-of-way within the LLR only;
- approximately 34.11 miles of new 36-inch-diameter underground petroleum pipeline on or adjacent to existing utility rights-of-way within the CNF only; and
- mainline valves at major waterbody crossings and over the length of the project route.

The Southern Lights Diluent Project would be co-constructed with the Alberta Clipper Project. The Southern Lights Diluent Project would include the construction and operation of the following:

- approximately 42.72 miles of new 20-inch-diameter underground petroleum pipeline generally on or adjacent to existing utility rights-of-way within the LLR only;
- approximately 42.72 miles of new 20-inch-diameter underground petroleum pipeline generally on or adjacent to existing utility rights-of-way within the CNF only; and
- mainline valves at major waterbody crossings and over the length of the project route.

The Projects would cross portions of Hubbard, Cass and Itasca Counties within the LLR and CNF. The Projects would also cross the proclamation boundaries of the LLR as well as several parcels of land

owned by or held in trust for the LLBO. The LLBO would be responsible for issuing the appropriate approval and authorizations for activities to cross lands upon which it retains treaty rights and easements or authorizations for activities on lands under its jurisdiction.

The Projects would be required to implement both general and route-specific construction techniques to minimize the environmental impacts of the Projects. These techniques are discussed in detail in sections 2.3 and 2.4 of the EIS. Land required for construction and operation of the proposed pipelines can be divided into the following five categories:

1) construction right-of-way;
2) extra workspaces;
3) a contractor yard;
4) access roads; and
5) permanent right-of-way.

Figure 5 illustrates the typical sequence of pipeline construction and installation methods. Table 1.3-1 provides a summary of the land use impacts in acres associated with the proposed Projects. Tribal treaty lands are lands within the boundary of the LLR. Tribal titled lands are real property within the LLR boundaries and include tribal member-owned, Band owned and Allottment Tribal member tracts. CNF are lands within the NFS, and are managed by the Forest Service.

Table 1.3-1 Land Use[a] within the Proposed Project Area with Delineated Wetlands

TRIBAL TITLED LANDS (4 tracts)				
Land Use	**Extra[b] (acres)**	**CROW[c] (acres)**	**Perm[d] (acres)**	**Total[e] (acres)**
Agricultural Land	0.00	0.00	0.00	0.00
Delineated Wetland and Open Water	0.00	0.19	0.02	0.19
Developed Land	0.07	0.05	0.00	0.12
Forest Land	0.23	8.08	3.24	8.31
Open Land	0.00	0.52	0.26	0.52
Total	0.30	8.84	3.52	9.14
TRIBAL TREATY LANDS				
Land Use	**Extra[b] (acres)**	**CROW[c] (acres)**	**Perm[d] (acres)**	**Total[e] (acres)**
Agricultural Land	0.92	18.52	12.15	19.44
Delineated Wetland and Open Water	3.54	217.52	157.40	221.06
Developed Land	1.06	16.78	9.92	17.84
Forest Land	14.54	269.77	150.10	284.31
Open Land	0.86	8.67	6.30	9.53
Total	20.92	531.26	335.87	552.17
CHIPPEWA NATIONAL FOREST				
Land Use	**Extra[b] (acres)**	**CROW[c] (acres)**	**Perm[d] (acres)**	**Total[e] (acres)**
Agricultural Land	0.92	18.52	12.15	19.43
Delineated Wetland and Open Water	3.54	222.28	159.87	225.81
Developed Land	1.13	16.82	9.92	17.96
Forest Land	14.76	277.24	152.93	292.02
Open Land	0.86	8.94	6.45	9.80
Total	21.21	543.80	341.32	565.02

[a] Land Use Land Cover (LULC) is a public database
[b] Extra = Extra Workspace
[c] CROW = Construction Right-of-Way
[d] Perm = Permanent Workspace. Determined using the Formula (CROW*75/140)
[e] The total for each category of landuse/landcover is calculated by CROW + Extra together.
Permanent ROW is not included as it is a percentage of the Temporary Workspace acres.

References to specific area resources crossed by the project (e.g. wild rice areas, etc.) are described in more detail in Section 3 of this document. The Applicant proposes to begin construction within the LLR and CNF lands in August 2009. Construction of the overall project would occur over approximately 14 months, with an in-service date in the second quarter of 2010 for both Projects. Restoration of the Projects area would take place during the 2009 construction season and continue into 2010, or until revegetation requirements are met. The new pipelines would be operated year round, 24 hours a day, and are intended to be used on a long-term or permanent basis. Abandonment or termination of the proposed or existing facilities is not anticipated in the foreseeable future.

The purpose of this document is to inventory and analyze the effects of the proposed Projects on land that would be crossed within the LLR and CNF, and to provide information sufficient to make a decision on the request for permission to cross the reservation and easements to cross Tribal and Band lands, and special use authorization. Note the Forest Supervisor's jurisdiction to make such a decision is limited to those parcels of land that are managed by the NFS. Not all land inside the LLR and CNF boundaries is managed by Tribe or NFS, but rather includes a patchwork of multiple owners and managers, including tribal trust land, tribal fee land, state land, county land, and private ownership (see figure 22). Nevertheless, in order to maintain continuity within the review, this analysis includes all lands that would potentially be impacted by the proposed Projects within the boundaries of the LLR and CNF. Note the Tribe retains treaty

rights on all lands within the LLR boundaries. Throughout this document, the term "Projects" refers only to those portions of the proposed pipelines on land within the proclamation boundaries of the LLR and CNF, unless otherwise stated.

1.4 SCOPE OF THE ENVIRONMENTAL ANALYSIS

This environmental analysis follows the process outlined by NEPA, and as set forth in the U.S. Department of Agriculture, NFS procedures for implementing Council on Environmental Quality regulations, and BIA regulations, LLBO procedures and policies, Federal treaties, executive orders, acts, laws and regulations, as applicable. Various other laws, regulations, and policies that may be applicable to the Projects provide the framework for all levels of environmental review and NFS planning. These include, but are not limited to: the Endangered Species Act of 1973; the Clean Water Act as amended in 1972; the Forest and Rangeland Renewable Resources Planning Act of 1974; the Multiple Use Sustained Yield Act of 1960; the National Historic Preservation Act; the Archaeological Resource Protection Act; the Native American Graves Protection and Repatriation Act; the National Forest Management Act; the Mineral Leasing Act of 1920; the CNF Forest Plan as revised in 2004; Leech Lake Reservation Conservation Code and Ordinances; Leech Lake Land Use Plan; Leech Lake Division of Resource Management Special Permitting; and NEPA.

The full geographical scope of the Projects subject to NEPA review is within the continental United States in the states of North Dakota, Minnesota, and Wisconsin. The analysis of the proposed Projects as presented in this Appendix is limited to the area that would be crossed within the LLR and CNF, and includes portions of Hubbard, Cass and Itasca Counties in Minnesota.

The temporal scope of this review includes the time period during which agency consultations have occurred, environmental data has been gathered, and the time that the Projects would be in construction and the land restored after construction, approximately October 2006 to June 2010. In addition, for the purpose of the cumulative effects analysis, other projects were considered that have occurred in the Project area prior to proposed construction or are reasonably foreseeable within 5 years after Project construction.

The projects that are considered in the cumulative effects analysis include the following:

- A proposed approximately 68-mile-long 230 kilovolt (kV) electric transmission line that would primarily follow existing utility rights-of-way within the LLR and CNF. Construction of the transmission line is proposed to begin in 2009 and to be completed by the end of 2011. The decision has not yet been made on this project.

- The Cuba Hill Resource Management Project (RMP), a proposal by the CNF, would include various management activities in an area entirely south of U.S. Highway 2 and east of Minnesota Highway 371. Activities include commercial harvest, transportation projects, prescribed burns, and other activities consistent with the Forest Plan. The decision on this project is expected in November 2008. The Cuba Hill RMP is expected to be implemented during the next 5 years;

- The Lower East Winnie Vegetation Management Project (VMP), a proposed CNF project, would primarily constitute timber harvest, conversion, and planting, but would also include road and impoundment decommissioning. The Lower East Winnie VMP area is centered on U.S. Highway 2 from the Cities of Bena to Ball Club, north to Lake Winnibigoshish, and south to the Deer River Ranger District boundary. The decision on this project was recently made in September 2008. The Lower East Winnie VMP is expected to be implemented during the next 5 years;

- A non-native invasive plant management program that may be developed for the LLR and CNF. The program would identify weed control treatments (mechanical, chemical, or manual) to be used along access roads, utility rights-of-way, and other project related areas for a select group of undesirable plants.

- The Lydick RMP, a proposed CNF project that would occur adjacent to but would not overlap the proposed Projects and would occur entirely north of U.S. Highway 2;

- Past projects accomplished within the last 5 years. These are harvest units covered by Environmental Assessments for the following projects: Mississippi River, Leech Lake River, Portage, Conifer Thin, Cass Lake, and Sand Plain; and

- Unaccomplished projects under decision but not yet harvested or roads not yet decommissioned. These activities were covered by Environmental Assessments for the following projects: Mississippi River, Leech Lake River, Portage, Conifer Thin, Cass Lake, and Sand Plain. For the purpose of this analysis, it is assumed these activities will be completed within the next 5 years.

The subject matter scope of this environmental analysis covers health and safety, roads and trails, vegetation and wildlife, heritage resources, aesthetics, recreation, socioeconomic impacts, special status species, soils, wetlands, and surface waters. Note the CNF Forest Plan emphasizes the use of common corridors and multiple use sites when granting rights-of-way for utility transmission corridors (Forest Plan, page 2-50).

1.5 CONSISTENCY WITH LAND MANAGEMENT GUIDELINES

In accordance with the National Forest Management Act of 1976, the CNF developed its Forest Plan to provide management direction to ensure that ecosystems are capable of providing a sustainable flow of beneficial goods and services to the public (Forest Plan, page 1-2). Toward this end, the Forest Plan divides the CNF into several Management Areas with specific management purposes (Forest Plan, page 3-2). As shown on figure 3 (see Appendix 3), the proposed project alternatives would cross five Management Areas: General Forest (GF), General Forest – Longer Rotation (LR), Riparian Emphasis (RE), Unique Biological, Aquatic, Geological, or Historical (UB), and Experimental Forest (EF). Table 3.3.2-1 in section 3.3 describes the crossing lengths for each project alternative relative to the various Management Areas, and each project alternative is described in greater detail in section 2.3. All five Management Areas contain existing utility corridors.

1.5.1 General Forest Management Area (GF)

GF Management Areas emphasize land and resource conditions that provide a wide variety of goods, uses, and services. The Forest Plan states on page 3-8 that most special uses (included utility transmission corridors) can be accommodated in Management Area GF.

1.5.2 General Forest – Longer Rotation Management Area (LR)

LR Management Areas emphasize land and resource conditions that provide a wide variety of goods, uses, and services. The Forest Plan states on page 3-12 that most special uses (included utility transmission corridors) can be accommodated in Management Area LR.

1.5.3 Riparian Emphasis Management Area (RE)

Page 3-31 of the Forest Plan states that special uses that do not complement or are not compatible with the kind and development level of associated NFS facilities in the RE Management Area are generally not permitted, and that new special uses that would degrade the long-term ecological function of the riparian ecosystem are not permitted.

Both rivers that would be crossed by the Projects that are within the Management Area RE (Pike's Bay Channel and Deer River) are proposed to be crossed using the Horizontal Directional Drill (HDD) method (see figure 11), thereby minimizing or eliminating impacts to the riparian ecosystems. In addition, the point at which the Deer River would be crossed by the Projects is outside of CNF boundaries.

1.5.4 Unique Biological, Aquatic, Geological, or Historical Management Area (UB)

The Ten Section portion of the UB Management Area is characterized by large red and white pine trees that exist both as stands and individual trees within younger stands. This area was protected from timber harvest and Euro-American settlement during the logging era of the early 1900s. The Forest Plan states that for Management Area UB the operation and maintenance of existing utility corridors in the Ten Section area is appropriate (page 3-27), and otherwise that the authorization of special uses that protect or enhance the Management Area UB are generally allowed (page 3-28). The plan for Management Area UB does not specifically address new utility corridors, but states that renewable and extractive special uses are generally restricted or not permitted. Liquid petroleum transmission pipelines are neither a renewable nor an extractive use.

1.5.5 Experimental Forest Management Area (EF)

Management Area EF includes the Pike Bay Experimental Forest in the proposed Projects area, which is managed for research conducted by North Central Forest Experiment Station (Forest Plan, D-EF-4, page 3-33). The Forest Plan states on page 3-34 that new special use permits are generally not allowed in EF Management Areas, but the Forest Plan does not specifically prohibit amendments to existing special use permits.

The Pike Bay Experimental Forest is administered by the Northern Research Station in Grand Rapids, Minnesota. The director of the Northern Research Station provided the following additional information regarding the potential impacts of special uses in CNF experimental forests.

The Pike Bay Experimental Forest is the site of long-term, active research on forest management. In addition to current research studies, the EF Management Area also offers the potential for greatly increased research at larger spatial scales, due to the largely intact, un-fragmented condition of the forest.

The proposed utility rights-of-way have the potential to negatively impact current and future research activities on the EF Management Area. The specific impacts will depend on which rights-of-way are actually routed through the forest.

Current proposals include the possibility for one or two new rights-of-way through the EF Management Area adjacent to an existing natural gas pipeline right-of-way. The existing natural gas pipeline right-of-way is 75 feet wide and bisects the EF Management Area from east to west over a distance of approximately 2 miles.

Either individually or in combination, these new rights-of-way have the potential to negatively impact both ongoing and future work on the EF, as well as its ecological value in the larger landscape. The potential impacts are summarized below within three categories: impacts to current research; impacts to future research opportunities; impacts to ecological value of the Experimental Forest.

1. *Impacts to current research*

The current natural gas pipeline right-of-way bisects an existing long-term study: NC-1103-261: A test of methods for the establishment and control of aspen suckers with prescribed fire. This study was established in June 1968. In 2005, long-term plots were established on this study that have been providing regular vegetation measurements in partnership with collaborators from the University of Northern British Columbia with the goal of examining mixed-species forest development after disturbance.

The existing natural gas pipeline right-of-way does not greatly detract from this study, in fact it may have existed prior to study establishment. Either of the proposed new rights-of-way, and certainly the two in combination, could compromise this long-term study. The northern boundary of an existing treatment stand for the study lies 184 feet south of the southern edge of the existing right-of-way. New rights-of-way, plus buffers, in the combined scenario (250-305 feet) would largely obliterate this treatment stand. The power line right-of-way alone, plus a buffer, (125-165 feet), or the new dual pipeline right-of-way alone, plus a buffer (125-140 feet) would create significant edge effects adjacent to the study stand.

The southern boundary of an existing treatment stand for the study lies 289 feet north of the northern edge of the existing right-of-way. New rights-of-way, plus buffers, in the combined scenario (250-305 feet) would overlap this treatment stand or create significant edge effects next to it. The power line right-of-way alone, plus a buffer (125-165 feet), or the new dual pipeline right-of-way alone, plus a buffer (125-140 feet), would not overlap the existing study stand to the north, but still could create significant edge effects adjacent to the study stand. As there is a seasonally flowing stream located between the existing right-of-way and a northern treatment stand, it is suspected the new right-of-way would not be located to the north of the existing right-of-way.

2. *Potential impacts on future research*

While the above referenced study is the only active study that could be impacted directly by the proposed projects, the potential exists for these rights-of-way to limit the suitability of the Experimental Forest for future research. The combined right-of-way scenario would encompass a 2-mile-long corridor ranging from 250 to 305 feet in width, or an area of 61 to 74 acres. The power line corridor alone or the new pipeline corridor alone would encompass approximately one-half this area. While the areas included in these corridors are not excessive, they will nevertheless limit the usefulness of the Experimental Forest for future research, specifically research that requires larger landscapes of relatively unfragmented forest, such as work on animal movement and dispersal. New corridors would essentially bisect the Experimental Forest into two management units. This is less of an issue now given the relatively narrow width of the current right-of-way.

3. *Deterioration of the ecological value of the Experimental Forest*

The Pike Bay Experimental Forest is unique because of its research value, particularly research studies that span decades. However, it also has unique ecological value. It is generally less managed than the surrounding landscape and, as a consequence, supports older mature forest, which is an underrepresented habitat condition in north central Minnesota. It is also relatively unfragmented, at least by major road systems or non-forest land use. Routing of either or both of the proposed utility rights-of-way through the Experimental Forest would detract from these unique ecological values. Moreover, conversion of 25 to 70 acres of mature hardwood forest to open brush or grass vegetation would likely represent a loss of atmospheric carbon storage on the CNF.

1.5.6 Goblin Fern Administrative Study Area

One of the Project's route alternatives would be adjacent to, but would not cross, a CNF administrative study area of the Goblin Fern. Goblin fern, *Botrychium Mormo*, is a small species of moonwort found in rich hardwood forests in the northern portions of Minnesota. It is a Regional Forester Sensitive Species for Region 9. The Forest Plan, pages 2-31 to 2-32, includes specific prohibitions on activities near known populations of Goblin Fern, their habitat, or microhabitat, including setback areas of 250 feet from such locations.

One of the information needs identified for the Goblin Fern was to investigate the response of this species to changes in overstory vegetation and winter logging as would occur in some typical forest management practices. One of the known colonies of goblin fern on the CNF was chosen. The site selected for this study is south of Lower Sucker Lake (see figure 23A), where goblin fern colonies occur on either side of Forest Road 2135. The colony on the west side of the road (14 acres) was chosen as a control and the east side (17 acres) was chosen for treatment of a typical hardwood management practice.

The Goblin Fern study area is protected in accordance with the provisions of the Forest Plan, and any approved action in the vicinity of the study area must observe these protections.

1.5.7 Tribal Interests

The Projects' proposed route bisects the reservation in areas that are used extensively by tribal members for a variety of traditional gathering activities. Additionally, the Forest Plan delineates Areas of High Interest to the LLBO. Under Forest Plan Tribal Rights and Interests standards and guidelines (S-TR-3, S-TR-4, page 2-36), and LLBO regulations, project activities must be conducted in a manner to minimize impacts to the ability of Tribal members to hunt, fish, and gather plants and animals on LLR lands within the CNF. Interests of the residents of local Indian communities will be addressed when planning activities in close proximity to these communities or in areas where traditional gathering is practiced. In addition, Forest Plan Desired Conditions (D-TR-1, D-TR-2, D-TR-3, p.2-35) provide direction for (1) sustaining American Indians' way of life, cultural integrity, social cohesion, and economic well-being and (2) working within the context of a respectful government-to-government relationship. The USFS recognizes it's special, unique relationship with the LLBO and its trust relationship in administering federal laws, administrative authorities, and public needs.

Tribal interests were guaranteed in a series of treaties, executive orders, acts and laws which help shape the role of the federal government obligations in Indian law generally referred to as trust responsibilities. This issue includes an "undisputed" existence of a general trust relationship between the United States and the Indian people (Pevar, 1992). This relationship is one of the most important concepts in Indian law. The foundation of the role is grounded in the premise that the Indians trust the United States to fulfill the promises which were given in exchange for their land. The Federal Courts as well as Executive Orders further define that trust responsibility extends beyond the need to enforce the commitments in treaties. It also means that the federal government has an obligation to protect traditional Indian resources and way of life, consistent with the requirements of federal law. The trust doctrine also recognizes and encourages autonomy of the Indian tribes. The federal government has recognized that the Leech Lake Band never relinquished their treaty rights. For this reason, as part of the Federal Governments Trust responsibility, they assure that actions both on and off the reservation, are consistent with the requirements of federal law, do not diminish or extinguish the ability of the band to use the lands on their reservation "for Indian purposes", which includes the right to hunt, fish and gather within the reservation boundary.

DECISION TO BE MADE

a. DRM

Based on the evaluation of effects of the proposed Alternative 2 as presented in this document, and in the EIS, the DRM Director will determine whether to sign a decision notice for the project, grant approval to cross the LLR, and prepare easements for RTC and BIA approval to cross tribal lands.

b. CNF

Based on the analysis of effects of the proposed alternatives as presented in this document, and in the EIS being prepared by the U.S. Department of State in cooperation with various other federal agencies, the CNF Forest Supervisor must decide:

- whether the decision to grant amendments to the Special Use Permit would be consistent with the Forest Plan; and
- if authorization is granted to construct, operate, and maintain the Projects, the Forest Supervisor must decide under what conditions to amend the existing Special Use Permit and under what conditions to issue a Temporary Construction Permit.

1.6 SCOPING AND PUBLIC INVOLVEMENT

NEPA requires federal agencies to involve the public in environmental review of projects. "Scoping" is part of the process used to meet this requirement. The objective of scoping is to invite federal, state, and local units of government; Native American tribes; organizations; and individuals interested in the project to comment on the proposed action. Issues raised during the scoping process are then used to define the extent of the environmental review.

The Alberta Clipper Project would require issuance of a Presidential Permit by the U.S. Department of State. Pursuant to the authority delegated to it by the President of the United States under Executive Order 13337, the U.S. Department of State has taken on the role of lead federal agency for the NEPA environmental review and preparation of an EIS for the Alberta Clipper Project. The impacts of the Southern Lights Diluent Project will also be assessed in the EIS even though the activities proposed would not require a Presidential Permit from the U.S. Department of State. Thus, scoping conducted for the Alberta Clipper Project also includes the activities proposed by and impacts from the Southern Lights Diluent Project.

On September 17, 2007, the CNF sent a scoping letter and project location map to the LLBO and approximately 111 federal, state, and local units of government; Local Indian Councils (LIC); organizations; and individuals thought to be interested in the proposed project. Included in the letter was a summary of proposed activities, internet links to additional project and company information, and an address for delivery of comments the recipient would like to see addressed in the environmental analysis. The letter requested that all comments be submitted to the CNF by October 23, 2007. Two comments were received in response to the scoping letters. The first comment, received by CNF staff by telephone on September 24, 2007, was from a private landowner with regard to the expansion of the Applicant's pipeline system on his land, and was not related to NFS or tribal lands. On October 10, 2007, the Minnesota Department of Natural Resources (MDNR) provided CNF staff with a copy of a letter that was sent to the U.S. Department of State by way of comments to the Department's *Notice of Intent to Prepare an Environmental Assessment and To Conduct Scoping Meetings* for the Alberta Clipper Project. The Department of State's Notice was published in the Federal Register on July 27, 2007. The comments in the MDNR letter are summarized in Appendix 2 and would also be addressed in the Department of State's EIS.

On October 9, 2007, the CNF held an internal scoping meeting to identify preliminary concerns with the project. Ten CNF staff attended the meeting, as did four members of the LLBO Division of Resource Management, three staff members from the Applicant, including the Applicant's consultants, and one meeting facilitator. Fifteen concerns, or "issues," were identified at the meeting (see section 1.7).

Additionally, the applicant has periodically attended meetings have been held with each of the LICs (specifically, Ball Club, Bena, Cass Lake and Deer River) at the request or suggestion of the DRM to describe the project and learn about the issues of concern to the local LLBO tribal population. Feedback from those meetings contributed to the listing of issues summarized in Table 1.7-1.

Additionally, the Projects have been posted in the CNF Quarterly, a schedule of proposed CNF activities subject to NEPA, since January 2007. The Applicant has also held numerous meetings with members of CNF and LLBO staff to gather information and address staff questions, including a monthly project status update conference call that has been held almost every month since June of 2007.

1.7 ANALYSIS ISSUES

NEPA asserts that "issues" are effects (or perceived effects, risks, or hazards) on a physical, biological, social, or economic resource. Issues for the Projects were identified as points of discussion or dispute raised during scoping. Some of the comments received were considered issues because of their relevance to the project and their bearing on the environment. In total, 15 issues were evaluated for the Projects (see Appendix 1). The 15 issues that arose during the scoping process are assessed in this document (see table 1.7-1).

Table 1.7-1 - Analysis Issues

Issue
ISSUE 1 Pipeline rupture or failure after construction resulting in contamination of soil and water resources.
ISSUE 2 Construction near the St. Regis Paper Company Superfund site could lead to surface water contamination in the Pike Bay Channel or create a conduit to enhance contaminant migration.
ISSUE 3 Widening of the existing right-of-way and removal of vegetation could cause an increase of unauthorized off-highway vehicle use, in turn causing detrimental impacts to the area.
ISSUE 4 Pipeline construction activities could impact local transportation.
ISSUE 5 Increasing the width of the cleared area along the existing utility and transportation corridor could increase the existing limitations to wildlife movement and reduce security-providing vegetative cover, thereby impeding movement of wide-ranging wildlife.
ISSUE 6 Clearing of trees for pipeline construction would convert forested areas to open areas, which could alter some forest community types.
ISSUE 7 Equipment and vehicles that would be used in the construction of the pipelines, as well as both authorized and unauthorized vehicle use during operations of the pipelines, may act as vectors for the spread of noxious weeds.
ISSUE 8 Pipeline construction activities could have inadvertent impacts on archaeological sites and Native American properties.
ISSUE 9 Pipeline construction activities and widening of the right-of-way could affect the scenic quality and landscape character observed from US Highway 2 and adjacent roads and recreational trails.
ISSUE 10 Construction activity may restrict recreational use, and corridor widening may affect the recreational experience of forest visitors.
ISSUE 11 Pipeline construction activities could have socioeconomic impacts on communities in the project area.
ISSUE 12 Pipeline construction activities, including ground disturbing activities, could have impacts on special status species.
ISSUE 13 Pipeline construction in forested areas may affect soils that are wind or water erodible, compaction prone, or drought prone.
ISSUE 14 Groundwater and surface water movement in wetlands may be impeded across the pipeline either by compaction of the soils during construction or by the pipeline and/or excess backfill material after construction. Alterations of groundwater and surface water hydrology could change the type or total area of wetlands crossed by the proposed Projects.
ISSUE 15 Pipeline construction activities could have impacts on surface waters crossed by the pipelines.

1.8 AGENCY PERMITS AND APPROVALS

Table 1.6-1 of the EIS identifies federal, state, and local permits and approvals required for the Projects.

2 ALTERNATIVES

2.1 INTRODUCTION

NEPA requires all environmental assessments to include a comprehensive analysis of the proposed project as well as an evaluation of other reasonable courses of action that could be implemented in place of the project while still meeting the purpose and need. The purpose of evaluating other courses of action is to determine if there are environmentally preferable options to the proposed action. Alternative courses of action on pipeline projects frequently consist of employing different construction techniques, following alternative routes (or portions of routes), or using other pipeline systems. All of these alternatives can result in a reduced environmental impact. Evaluation criteria and processes are described more fully in section 4.0 of the EIS.

Alternative 1, a "no action" alternative was evaluated for the Projects. The "No Action" Alternative, as its name implies, involves not proceeding with the proposed actions. The purpose of the No Action Alternative is to establish a baseline condition by which the other alternatives can be compared.

Four alternatives, including the proposed action and No Action Alternatives, were evaluated for the Projects (see figure 2 in Appendix 3). Alternative 1 is the No Action Alternative under which the Projects would not be constructed. Alternative 2 is the proposed action, which involves construction of the two proposed pipelines primarily parallel and adjacent to the Applicant's existing pipeline corridor. The CNF also analyzed two additional alternatives that were dismissed or not considered by the LLBO. Alternative 3 is a route alternative that follows the existing Great Lakes Gas Transmission Company pipeline corridor through the LLR and CNF. Alternative 4 is a route variation to Alternative 3 and has been evaluated solely as an alternative to crossing the Pike Bay Experimental Forest, which would be crossed by Alternative 3. The following sections provide a detailed description of each alternative. Alternative 4 was added by the USFS prior to the issuance of the EIS to address specific spatial and resource concerns.

2.2 ALTERNATIVES CONSIDERED BUT DROPPED FROM FURTHER EVALUATION

In addition to the four alternatives presented in this chapter, a number of other alternatives were considered but dropped from further evaluation. Other alternatives considered but dropped from further evaluation included creating an entirely new pipeline corridor through the CNF around the north side of Cass Lake; collocating with two existing Applicant pipelines on the north side of the City of Cass Lake; and avoiding the Reservation and NFS lands altogether by routing the new pipelines around the Reservation and CNF to the south. Creating a new corridor through the CNF was not evaluated because, as stated on page 2-50 of the Forest Plan, the use of existing utility corridors for the placement of new utilities is emphasized. A collocated route on the north side of the City of Cass Lake was discarded because of the residential nature of that area in addition to physical restrictions on the south side of Cass Lake but north of U.S. Highway 2. Routing the new pipeline around the Reservation and CNF was not evaluated because in order to connect to the existing facilities at each end of the Projects, the length of the pipeline would be notably increased (approximately 61 miles), making such an approach currently infeasible.

The LLBO also considered but dropped alternative 3 from further consideration. Alternative 3 would have followed the Great Lakes natural gas corridor and would increase fragmentation to an important area of northern hardwood forests that contain numerous species of rare, threatened or endangered species. If alternative 3 was selected, the LLBO believe that it may result in the extirpation of a Tribal, State and CNF listed species (Orobanche uniflora) from the LLR. This alternative would also result in significant impact to the Ten Section Area. This area was set aside for the LLBO under the Morris Act as an area to be reserved from harvest. This area is currently managed by the CNF as an area of minimal disturbance. Alternative 3 would also have significant negative impact on the traditional gathering activities that occur in this area.

In addition, the following system alternatives were considered and discarded due to the engineering impracticability of each alternative.

2.2.1 SYSTEM ALTERNATIVES

System alternatives are options to the proposed action that would make use of other existing or proposed pipeline or transportation systems to meet the stated objectives of the Projects. System alternatives are discussed more fully in section 4.2 of the EIS.

2.2.1.1 Alberta Clipper Project

Although it is feasible to move some portion of the increased volumes from Canada through the Applicant's North Dakota Pipeline System, to Clearbrook, Minnesota through what is known as the "Portal Link" crossing the international border, the Applicant's North Dakota System is currently at full capacity and would not accommodate this volume of crude oil. The more direct route on the proposed expanded Enbridge system is considered preferable for all North American shippers, including those that transport on the Applicant's North Dakota System. The TransCanada Keystone Pipeline Project (Keystone) is currently constructing a new, 1,833-mile-long pipeline from Alberta, Canada, through North Dakota, South Dakota and on to Patoka, Illinois. The Keystone Pipeline is not a system alternative because the proposed pipeline does not connect directly to the Minnesota, Wisconsin, and greater Chicago area markets that the Applicant's existing pipeline system serves.

No other existing pipeline systems provide delivery between Hardisty, Alberta and Superior, Wisconsin. Any other pipeline system would require entirely new right-of-way as well as new pump station sites, power supplies, mainline valve sites, and potentially access roads whereas the existing Applicant system enables collocation and use of existing infrastructure. Therefore, it is not advantageous to consider a new, not collocated (or greenfield) pipeline route to achieve the objectives of the Alberta Clipper Project.

The Projects evaluated the following possible system alternatives:

- expanding the Applicant's pipeline system by constructing additional pump stations that provide additional horsepower, and constructing additional loops to the existing mainlines along the existing route (see section 2.2.2); and
- trucking delivery of petroleum supplies from Canada to Superior, Wisconsin (see section 2.2.3).

2.2.1.2 Southern Lights Diluent Project

The Applicant considered alternatives to the Southern Lights Diluent Project with the objective of providing economical and reliable access to diluent material to meet growing demand in Alberta. Specifically, the Applicant is responding to this industry interest within the context of: a) responding to the oil sands producers' request to access light hydrocarbon liquids in the Chicago area; b) using existing pipeline assets to the extent feasible to minimize the impact of pipeline construction to the environment, communities, and landowners along the right-of-way; c) identifying the available diluent supply in the Chicago region as being sufficient and competitively priced to be used in the oil sands projects; and d) meeting shipper requirements and industry need in a timely manner.

The Applicant identified and proposed to Canadian producers an opportunity to reverse its existing crude oil pipeline that originates in Edmonton, Alberta and now terminates in Clearbrook, Minnesota and convert it to diluent delivery service. Thus, the optimum pipeline solution for delivery of diluent from Chicago and the wider Midwest to reach this existing pipe segment at Clearbrook became the focus for screening pipeline alternatives. Based on these considerations, the following alternatives for diluent delivery were considered:

- expanding the Applicant's pipeline system by reversing an existing line from Chicago to Clearbrook, constructing additional pump stations that provide additional horsepower, and constructing additional loops to the existing mainlines along the existing route (see section 2.2.2); and
- trucking delivery of diluent supplies from Chicago to Clearbrook (see section 2.2.3).

2.2.2 Expanding Existing Applicant Facilities

2.2.2.1 Alberta Clipper Project

In the United States, the Applicant's corridor consists of five pipelines from the United States-Canada border near Neche, North Dakota to the Clearbrook, Minnesota tankage terminal, and four pipelines from Clearbrook, Minnesota to the Superior, Wisconsin tankage facility. This existing system does not contain any discrete pipe segments (loops). Adding new looping was found to be inadequate because a new continuous line for petroleum is needed (for additional discussion, see section 1.2 of the EIS). However, if looping was feasible to ship product, the operation and maintenance costs associated with additional pump stations and horsepower would not be cost effective. Due to these factors, expansion of existing facilities was not considered in evaluating potential options. The alternative would not meet the objective of expanding current delivery capacity of Canadian petroleum to customers receiving service from the Applicant's Superior, Wisconsin tankage facility. Additional take-away capacity at the Superior, Wisconsin tankage terminal would not be realized by these alternatives.

2.2.2.2 Southern Lights Diluent Project

The Applicant's system does not contain any separate pipe segments (loops). Adding new looping was found to be inadequate as a new continuous line for diluent product is needed. However, if looping was feasible to ship diluent, the operation and maintenance costs associated with additional pump stations and horsepower would not be cost effective. Due to these factors, expansion of existing facilities was not considered in evaluating potential options. The alternatives would not meet the objective of initiating delivery of diluent to Canadian crude oil producers in need of receiving service from United States refineries. Use and recycling of this diluent product would not be realized by these alternatives.

2.2.3 Trucking

2.2.3.1 Alberta Clipper Project

As an alternative to the Alberta Clipper Project, the Applicant could transport petroleum supplies from its Cromer, Manitoba facility to the Superior, Wisconsin tankage facility by truck. This alternative is, however, characterized by higher public safety and environmental risk, unreasonable logistics, and higher incremental cost. Accident data consistently illustrate that pipelines are the safest form of transportation for bulk liquids, including petroleum (MDOT-OPS, 2008, 2008). The safety risk is magnified significantly by the impact created by increased truck traffic on Minnesota highway routes. A typical truck transport would carry 150 barrels (bbls) of petroleum. Truck frequency for 450,000 bpd on a per annum basis would require 3,000 trucks (assuming one load per day per truck) between Cromer, Manitoba and Superior, Wisconsin. The trucks would primarily use U.S. Highway 59 in northern Minnesota and U.S. Highway 2 across northern Minnesota, which already carries a significant burden of commercial traffic. Collectively, this alternative would add 585,825,000 miles per year of additional truck traffic to Minnesota highways, and the trucks would consume approximately 117,165,000 gallons of fuel per year, which would cost approximately $0.5 billion annually to distribute (assuming gas averages $4 dollars per gallon). Finally, the estimated trucking costs that incorporate operation and maintenance along with average fuels costs is greater than the existing alternative, which is the primary reason trucking is not currently used to transport petroleum. The safety and environmental risks, logistical requirements, and high cost eliminate the trucking option as a viable alternative.

2.2.3.2 Southern Lights Diluent Project

With the trucking alternative applied to the Southern Lights Diluent Project, the Applicants could also transport diluent supplies from its Superior, Wisconsin tank facility to the Clearbrook, Minnesota tank facility as a receipt point for transport through the Southern Lights Reversal Project. This alternative would also be characterized by the negative aspects discussed above. For this alternative a typical truck transport would carry 150 bbls of diluent product. Truck frequency for 180,000 bpd on a per annum basis would require 600 trucks (assuming two loads per day per truck) between Superior and Clearbrook. The trucks would primarily use U.S. Highway 2 across east-central Minnesota, which already carries a significant burden of commercial traffic. Collectively, this alternative would add 43,362,000 miles per year of additional truck traffic to Minnesota highways, and the trucks would consume approximately 8,672,400 gallons of fuel per year, which would cost approximately $145 billion annually to distribute (assuming fuel costs of $4 dollars per gallon). As above, the estimated trucking costs that incorporate operation and maintenance along with average fuels costs is greater than the existing alternative, which is the primary reason trucking currently is not used to move petroleum products significant distances. The safety and environmental risks, logistical requirements, and high cost eliminate the trucking option as a viable alternative.

2.3 ALTERNATIVES CONSIDERED IN THIS ANALYSIS

2.3.1 Alternative 1

Alternative 1 is the No Action Alternative under which the Projects would not be constructed. The existing pipeline right-of-way would remain the same and pipeline maintenance activities currently carried out on the existing pipelines would be allowed to continue under the Applicant's existing Special Use Permit with the CNF.

If no action is taken, the Applicant's customers would be required to make other arrangements to obtain the additional crude oil requested from the Applicant. The No Action Alternative would necessitate that customers use alternative pipeline systems, other transportation methods, or different energy sources to fulfill their needs. Section 1.2.2 of the EIS discusses Crude Oil Supply and Demand related to the Projects in their entirety. Expanding the Applicant system is more economically feasible than expanding other systems.

2.3.2 Alternative 2

Alternative 2 is the proposed action and would involve constructing, operating, and maintaining 43.79 miles each of 36- and 20-inch-diameter pipeline within the LLR and CNF boundaries. Approximately, 42.72 miles is LLBO treaty rights lands, and approximately 34.11 miles is land within the CNF. Alternative 2 is shown on figure 2 (see Appendix 3). Approximately 22.95 miles (or 67 percent) of the Alternative 2 path differs from Alternatives 3 and 4, while 11.15 miles of Alternative 2 is the same path as shown for Alternatives 3 and 4. The new pipelines would largely be located adjacent to the Applicant's existing pipelines where within the proclamation boundary of the LLR and CNF. Those existing pipelines are primarily adjacent and parallel to U.S. Highway 2 and the Burlington Northern – Santa Fe (BNSF) Railroad within LLR and CNF. Alternative 2 would also cross state land, county land, LLR, CNF, and private land as shown in figure 22 of Appendix 3. Between the City of Cass Lake and Pike Bay Loop Road, Alternative 2 would cross approximately 3 miles of the Ten Section Area of the UB Management Area. The Ten Section, set aside under the Morris Act to protect it from logging, is characterized by large red and white pine trees that exist both as stands and individual trees within younger stands. This area was protected from timber harvest and Euro-American settlement during the logging era of the early 1900s. This area continues to be managed for old growth forest characteristics and the interests of the LLBO.

Alternative 2 was derived from the Applicant's original proposal and incorporates NFS, LLBO, and public input.

2.3.3 Alternative 3

Alternative 3 would follow an existing natural gas transmission pipeline corridor, the Great Lakes Gas Transmission Company pipeline, located partly within the CNF. Alternative 3 is shown on figure 3 (see Appendix 3).

Alternative 3 would depart from the Applicant's existing pipeline corridor at milepost (MP) 946 west of Steamboat Road outside of the CNF and would run parallel along the south side of the existing Great Lakes Gas Transmission Company right-of-way for approximately 32 miles (see figure 3 in Appendix 3). Within the CNF, Alternative 3 would include 34.6 miles each of 36- and 20-inch-diameter pipe and would cross approximately 22.9 miles of NFS land. Alternative 3 would present a major system deviation from the existing the Applicant pipeline corridors for the entire 32 miles along the U.S. Highway 2 corridor. This alternative route would rejoin Alternative 2 and a combined Applicant and Great Lakes Gas Transmission Company right-of-way south of the Village of Bena at approximately MP 974.

2.3.4 Alternative 4

Alternative 4 would follow the same route as Alternative 3, except that a portion would be routed around the Pike Bay Experimental Forest for a distance of approximately 6.1 miles. The Pike Bay Experimental Forest is managed for research conducted by North Central Forest Experiment Station (Forest Plan, D-EF-4, page 3-33). The portion routed around the Experimental Forest would be a greenfield route not adjacent to an existing utility corridor. Alternative 4 would depart from the Applicant's existing pipeline corridor at MP 946 west of Steamboat Road outside of the CNF and would run parallel along the south side of the existing Great Lakes Gas Transmission Company right-of-way before departing from the Great Lakes right-of-way, then would rejoin the Great Lakes right-of-way at Alternative 4 MP 10.5. Alternative 4 is shown on figure 3. As with Alternative 3, this alternative route would rejoin Alternative 2 and a combined Applicant and Great Lakes Gas Transmission Company right-of-way south of the Village of Bena at approximately MP 974.

Within the CNF, Alternative 4 would comprise 35.3 miles each of 36- and 20-inch-diameter pipe and would cross approximately 22.5 miles of NFS land.

2.4 COMPARISON OF ROUTE ALTERNATIVES

Alternative 1 is the No Action Alternative under which the Projects would not be constructed. The existing pipeline right-of-way would remain the same and pipeline maintenance activities currently carried out on the existing pipelines would be allowed to continue under the Applicant's existing Special Use Permit with the CNF, and easements from the Leech Lake Band to cross the LLR.

The Applicant conducted a detailed quantitative analysis of environmental impacts along the proposed (Alternative 2) and alternative (Alternatives 3 and 4) routes within the CNF/ LLR. This analysis used the same sources of publicly available environmental data that are used in the EIS, supplemented by field reviews of the proposed route and additional GIS data provided by CNF staff. The analysis primarily focused on land use issues and wetland and waterbody crossings. A variety of factors were identified and compared for each route, including total length, proximity to an existing right-of-way, National Wetland Inventory (NWI)-mapped wetlands, highly wind erodible soils, depth to water table, hydric soils, agricultural land, forest and herbaceous lands, intermittent and perennial waterbodies, railroads, roads, and major highways. After review, the Applicant identified one proposed route (Alternative 2) in the CNF/ LLR and two alternative routes (Alternatives 3 and 4). Table 2.4-1 provides a comparison of environmental features for the four Alternatives. It should be noted that while Alternatives 3 and 4 are included in this document in order to conduct a thorough alternatives analysis under CNF NEPA, the LLBO DRM dismisses route 3 because it was not a viable alternative to LLBO due to multiple environmental concerns, nor was alternative 4 considered for the same reasons. Section 3.0 of this document provides a detailed route comparison of all route alternatives sufficient for the Forest Supervisor to make an informed decision.

Table 2.4-1 - Comparison of Effects for Alternatives

Issue indicator	No Action Alternative	Alternative 2 (Proposed Route)	Alternative 3[a]	Alternative 4[a]
Health and Safety: Potential for Pipeline Rupture Issue #1: Pipeline rupture or failure after construction resulting in contamination of soil and water resources.				
1 Potential for Pipeline Spill	No change to the existing environment. No short- or long-term changes to health or safety Should a pipeline rupture occur on the existing pipelines, the effects would be the same as those described under Alternative 2	Based on the small difference in the length of each alternative, (Alternative 2 is 43.79 miles overall, 42.72 miles crosses LLR land, and 34.11 miles crosses CNF land.) the risk is essentially the same for each alternative.	*Based on the very small difference in the length of each alternative, (Alternative 3 is 34.6 miles overall, 22.9 miles crosses CNF land) the risk is essentially the same for each alternative.* *Response time to access a spill may increase slightly due to more limited access.*	*Based on the very small difference in the length of each alternative, (Alternative 4 is 35.3 miles overall, 22.5 miles crosses CNF land) the risk is essentially the same for each alternative.* *Response time to access a spill may increase slightly due to more limited access.*
Health and Safety: St. Regis Superfund Site Contamination Issue #2: Construction near the St. Regis Paper Company Superfund site could lead to surface water contamination in the Pike Bay Channel.				
1. Likelihood of encountering contaminated sediments	N/A	Insignificant because both pipelines are proposed to be installed using the HDD method. Risk of new contamination is low, but construction through pre-existing contaminated soils and sediments could result in adverse impacts. Subsurface investigation being completed fall/winter of 2008 to verify HDD won't encounter contamination.	*No Impacts*	*No Impacts*
Roads and Trails: Increased Opportunities for Off-Highway Vehicle Access Issue #3: Widening of the existing right-of-way and removal of vegetation could cause an increase of unauthorized off-highway vehicle use, in turn causing detrimental impacts to the area.				
1.Overall Project Length (Miles) for LLR and CNF Lands	N/A	-38.35 miles adjacent to existing utility -5.44 miles Greenfield -43.79 miles total length	*-43.19 miles adjacent to existing utility* *-0.77 miles Greenfield* *-43.96 miles total length*	*-34.90 miles adjacent to existing utility* *-14.90 miles Greenfield* *-49.80 miles total length*

Issue indicator	No Action Alternative	Alternative 2 (Proposed Route)	Alternative 3[a]	Alternative 4[a]
2. Width of Construction Footprint	No change.	-Up to 75 foot wide new permanent easement, -Up to 200 foot easement (for 6 pipelines) -140 foot total construction footprint width	*-Up to 75 foot wide new permanent easement* *-Up to 125 foot easement (for 4 pipelines)* *-140 foot total construction footprint width*	*-Up to 75 foot wide permanent easement* *- Up to 125 foot easement (for 4 pipelines)* *-140 foot total construction footprint width*
3. Roads intersecting the pipeline	No change	26	*34*	*29*
Roads and Trails: Effects on Local Transportation Issue #4: Pipeline construction activities could impact local transportation patterns.				
1. Additional Construction Traffic	No Change	-Increase in traffic volume would occur during morning and evening peak times, corresponding to normal workday hours. -Short access road distance off Highway 2.	*Similar to Alternative 2, but over a longer access road length compared to Alternative 2.*	*Similar to Alternatives 2 and 3, except for the Greenfield portion of the route which is more remote, so noise and dust from construction would affect a new area.* *-Longer access road length compared to Alternative 2.*
Vegetation and Wildlife Analysis: Wildlife Movement Issue #5: Increasing the width of the cleared corridor could reduce security-providing vegetative cover, thereby impeding movement of wide-ranging wildlife.				
1. Comparison of proposed changes to corridor width	No Change	Increase corridor approx. 75 feet	*Increase corridor approx. 75 feet*	*6.1 miles are Greenfield, increase remaining portion of corridor by 75 feet*
2. Large carnivore movements across existing corridors	No Change	No additional direct effects influenced by distance and existing developments such as railroad and Highway 2.	*Greater effect than incrementally widening a corridor*	*Greenfield portion will likely have a greater adverse impact on carnivore movements than incremental increases to an existing corridor.*
Vegetation and Wildlife: Forest Conversion Issue #6: Clearing of trees for pipeline construction, especially coniferous species, would convert forested areas to open areas, which could alter some forest community types.				
1 Effects of clearing on forested community types	No Change	-22 miles of forest land crossed. -205 acres permanently removed from forest production. -184 acres of timber temporarily affected.	*-28 miles of forest land crossed.* *-29 acres permanently removed from forest production.* *-49 acres of timber temporarily affected.*	*-33 miles of forest land crossed.* *-115 acres permanently removed from forest production.* *-69 acres of timber temporarily affected.*
Vegetation and Wildlife: Spread of Noxious Weeds Issue #7: Equipment and vehicles that would be used in the construction of the pipelines, as well as authorized vehicle use during operations of the pipelines, may act as vectors for the spread of noxious weeds.				
1. Size of existing noxious weed areas	N/A	41.57 acres	*5.3 acres*	*12.2 acres*
Heritage Resources Issue #8: Pipeline construction activities could have inadvertent impacts on archaeological sites and Native American properties.				

Issue indicator	No Action Alternative	Alternative 2 (Proposed Route)	Alternative 3[a]	Alternative 4[a]
1. Findings of cultural resource surveys	N/A	-2 sites (21CA000569 and 21CA0169) eligible for NRHP. - 3 properties (active railroads) eligible for NRHP.	*-14 potential sites identified in portions of existing corridor (eligibility status for NRHP unknown)*	*-9 potential sites identified in portions of existing corridor (eligibility status for NRHP unknown)*
Aesthetics Issue #9: Pipeline construction activities and widening of the right-of-way could affect the scenic quality and landscape character observed from US Highway 2 and adjacent recreational trails.				
1.Crossing Locations where Changed Landscape Character could be Observed	N/A	26 road crossings and 5 surface water crossings.	*36 road crossings and 7 surface water crossings.*	*36 road crossings and 6 surface water crossings.*
Recreation Issue #10: Construction activity may restrict recreational use, and corridor widening may affect the recreational experience of trail users.				
1. Number of Recreational Areas Crossed which could be Temporarily Disrupted by Construction	N/A	- Mi-Ge-Zi Bike Trail -Soo Line Trail -26 Roads -7 Waterbodies Crossed	*- No Trails* *- 35 Roads* *- 8 Waterbodies Crossed*	*- No Trails* *- 36 Roads* *- 7 Waterbodies Crossed*
Socioeconomic Issue #11: Pipeline construction activities could have socioeconomic impacts on communities in the project area.				
1. Increase of workers (jobs)	None	300 temporary construction workers	*300 temporary construction workers*	*300 temporary construction workers*
2. Estimated increase in tax revenue	None	$20,300,000 increase in annual property tax payment	*Amount very similar to Alternative 2*	*Amount very similar to Alternative 2*
3. Tribal Benefits	None	-Approximately $2,760,000 in LLBO Tribal Employment Rights Office Tax -Funding of LLBO Department of Resource Management position for 3 years. - Community Center and fire protection equipment donation - Firewood made available to local community members.	*Same as Alternative 2*	*Same as Alternative 2*
Special Status Species Analysis Issue #12: Pipeline construction activities, including ground disturbing activities, could have impacts on special status species.				
1. Area Crossed by Each Alternative	None	579 acres	*587 acres*	*584.6 acres*

Issue indicator	No Action Alternative	Alternative 2 (Proposed Route)	Alternative 3[a]	Alternative 4[a]
2. Potential Impacts for Special Status Species	None	-Unlikely to affect Canada Lynx due to very small amount of habitat. - Unlikely to affect Gray Wolf -Unlikely to affect any federally threatened or endangered species in the CNF. Unlikely to affect regional forest sensitive species such as Botrychium, heron rookeries or white pine.	*- Impacts similar to Alternative 2 with small potential for maintenance activities to have a slightly greater impact due to the lack of co-location with existing right-of-way.* *- Potential for impacts to the Bomo protected species study area.* *- This route could have a larger impact to regional forest sensitive species such as northern goshawk.*	*- Impacts similar to Alternative 3 except for the 6 mile long Greenfield route around the experimental forest. This route could have a larger impact by introducing forest fragmentation where it currently does not exist.* *- Potential for impacts to the Bomo protected species study area.* *- This route may have greater impacts on regional forester sensitive species such as Canada lynx, northern goshawks, and red-backed salamanders, which could be affected by fragmentation.*
Soils: Sensitive Soils in Forested Areas Issue #13: Pipeline construction in forested areas may affect soils that are wind erodible, droughty, hydric, compaction prone, or are prime f				
1 Miles of soil characteristic:				
Wind erodible farmland.	None	26.70 Miles	*21.83 Miles*	*19.15 Miles*
Droughty	None	20.00 Miles	*18.46 Miles*	*17.65 Miles*
Hydric	None	10.47 Miles	*11.14 Miles*	*11.37 Miles*
Compaction prone	None	9.95 Miles	*10.54 Miles*	*10.69 Miles*
Prime Farmland	None	3.68 Miles	*9.17 Miles*	*9.17 Miles*
Wetlands Issue #14: Compaction of soils during construction, excessive backfill material after construction, and alterations to the land topography on groundwater and surface water hydrology, and what effect these changes would have in lowland conifer stands adjacent to the pipeline.				
1. Length of wetland crossed (NWI in Miles)	None	12.38 Miles	*10.69 Miles*	*11.20 Miles*
2. Length of Forested wetland (NWI in Miles)	None	4.52 Miles	*2.22 Miles*	*2.38 Miles*
Surface Waters Issue #15: Pipeline construction activities could have impacts on surface waters crossed by the pipelines.				
1. Surface water crossed	None	19 Waterbodies crossed	*8 Waterbodies crossed*	*7 Waterbodies crossed*

Issue indicator	No Action Alternative	Alternative 2 (Proposed Route)	Alternative 3[a]	Alternative 4[a]
2. Method of crossing [b]	None	-7 Open Cut Dry Crossings -5 Open Cut Wet -6 Horizontal Directional Drills (HDD) -2 Undetermined pending field surveys	*-7 Open Cut Crossings* *-1 HDD*	*-6 Open Cut Crossings* *-1 HDD*
[a] **These alternatives were initially considered but dropped from detailed analysis by the LLBO due to multiple environmental concerns.** [b] **Waterbody crossing methods are specific to the 36 and 20-inch diameter pipes.**				

2.5 MITIGATION MEASURES

Mitigation was considered in evaluating the environmental effects of each alternative. All applicable Tribal management directives, Forest Plan Standards and Guidelines, and Minnesota State Best Management Practices would be implemented during construction to mitigate impacts of the project. In addition, specific mitigation measures would be designed to alleviate potential adverse environmental impacts. A summary of the mitigation measures that would be required in the event an action alternative is approved is included table 2.5-1 below. Additional mitigation measures may be developed by the Applicant in cooperation with DRM and CNF staff and incorporated into the amended agreement to cross the reservation and USFS Special Use Permit.

Table 2.5-1 – Summary of Mitigation Measures

Resource/Topic	Mitigation	Alt. 2	Alt. 3	Alt. 4
Health and Safety (Pipeline Rupture, Section 3.1.1)	1. Construct, operate, and maintain the proposed pipeline in compliance with Office of Pipeline Safety regulations, including employment of a three-part program that involves prevention, detection, and response initiatives.	X	X	X
Health and Safety (St. Regis Superfund Site, Section 3.1.2)	2. Cross the Pike Bay Channel using the horizontal directional drill technique.	X	N/A	N/A
	3. Conduct a Phase II Environmental Site Assessment at the proposed HDD site prior to construction and perform soil analysis for the presence of existing contaminants.	X	N/A	N/A
	4. Implement handling, storage, and disposal procedures for the drill cuttings and fluids generated by the horizontal directional drill as approved by the CNF, U.S. Environmental Protection Agency, the Minnesota Pollution Control Agency, and the LLBO.	X	N/A	N/A
	5. Implement a *Drilling Mud Containment, Response, and Notification Plan* that identifies the mud cleanup equipment that would be on-site, and the personnel training, cleanup actions, notifications, and other actions that would be followed to ensure a release is contained and cleaned up if one occurs during drilling. This Plan is found in Appendix G of the EIS.	X	N/A	N/A
Roads and Trails (Off-Highway Vehicle Access, Section 3.2.1)	6. Actively replant the temporary right-of-way and extra workspaces at selected road and trail crossing locations to limit visibility of, and access to, the pipeline corridor. Within the permanently maintained right-of-way, regular maintenance activities will allow some brush and other low woody species and herbaceous vegetation to grow and act as a natural barrier to off-highway vehicles access.	X	X	X
	7. At road and trail crossings where woody vegetation exists, extra workspaces will be set back 25 feet from the road or trail and the trees within that buffer allowed to remain and act as a natural barrier and visual screen.	X	X	X
	8. At select road crossings as identified in the Visual Impact Assessment (see Appendix M of the EIS), strategic plantings and berm installation may restrict visibility of the utility corridor from the road and restrict access to off-highway vehicles.	X	X	X
Roads and Trails (Local Transportation, Section 3.2.2)	9. Use appropriate traffic controls, such as flag persons, signs, barriers, and flashing lights to alert travelers to the existence of construction equipment when appropriate.	X	X	X
	10. Install a combination of matting, culverts, and crushed stone access pads at the approaches to paved roads to minimize the tracking of mud onto the roads. If excess soil or mud is tracked onto a roadway, shovel off as soon as possible and place within a sediment containment structure.	X	X	X
	11. Install temporary sediment barriers at the base of all slopes adjacent to roads.	X	X	X
	12. At paved road crossings, require all tracked vehicles to cross on rubber mats, tires, plywood sheets, steel plates, or similar material to prevent damage to the road surface. Transport tracked vehicles to the construction site using rubber tired vehicles.	X	X	X
	13. If it is determined that roads that provide the sole access to private property or designated recreation areas within the CNF cannot be bored, then the roads may be open-cut, but must be kept open to traffic at all times through the use of bridging equipment or other special construction techniques.	X	X	X
	14. Provide detours for all roads that would be closed for construction, and use appropriate traffic controls such as flag persons, signs, barriers, and flashing lights.	X	X	X
	15. Limit road closures for pipeline crossing construction to 24 hours, except where LLBO and CNF provides approval for greater periods of time to minimize need for extra workspaces at selected road crossings.	X	X	X

Resource/Topic	Mitigation	Alt. 2	Alt. 3	Alt. 4
	16. Provide 72-hour advance notice to the LLBO, CNF, and state and local emergency responders (fire, police, and medical) when forest roads or roads that provide access to LLR and NFS lands will be closed due to use of the open cut crossing method.	X	X	X
	17. Repair all roads used during construction (paved and gravel) to their pre-construction condition or better.	X	X	X
	18. To prevent the deterioration of paved roads from tracked vehicles, tracked vehicles would be transported to the site on rubber-tire trailers.	X	X	X
	19. Develop a burning plan in cooperation with the CNF and LLBO which will take into account smoke generation and wind direction to not have affects on traffic safety.	X	X	X
Vegetation and Wildlife (Wildlife Movement, Section 3.3.1)	20. Develop DRM / CNF-specific measures for revegetation and reforestation of temporary disturbance areas to minimize long-term impacts to wildlife movement, where practical.	X	X	X
Vegetation and Wildlife (Conversion of Land Cover Types, Section 3.3.2)	21. Limit tree removal to the extent practicable based on factors determined in consultation with the DRM, CNF, and MDNR, such as tree type, diameter, location, age, and distance from the centerline of the 36" pipeline. Tree removal by the Applicant will be coordinated with the CNF by way of a NFS timber sale procedure.	X	X	X
	22. During restoration, trees would be replanted in selected disturbed forested areas, including lowland conifer forests and non-permanent portions of the construction right-of-way, in accordance with the reforestation measures that will be developed by the Applicant in consultation with the DRM, CNF, MDNR and added to the Projects' final Revegetation Plan.	X	X	X
	23. Conduct tree clearing in a manner which does not result in a difference of the underlying biomass ground cover.	X	X	X
Vegetation and Wildlife (Noxious Weeds, Section 3.3.3)	24. Mechanically clean all construction equipment before it is used on the project or when traveling from an area of known noxious weed population.	X	X	X
	25. Prior to and during construction, treat known noxious weed populations within work areas to avoid seed development and dispersal.	X	X	X
	26. In some circumstances, soil would be returned to the vicinity from which it was removed in order to limit the dispersal of noxious weeds.	X	X	X
	27. Use certified weed-free straw for mulching and erosion control, and use only certified weed free seed for restoration.	X	X	X
	28. Avoid increasing areas of known weed populations by fencing off such areas and avoiding or covering them with equipment mats or mulch to prevent spread by vehicular construction traffic.	X	X	X
	29. Restore all disturbed areas according to the seed mix, application rates, and recommended seeding dates outlined in the Revegetation Plan. Mechanically control any noxious weeds present prior to planting if planting is delayed.	X	X	X
	30. Following construction, monitor the construction right-of-way for new or expanded weed infestations, and use accepted controls, as necessary, to eliminate development of new weed areas until the construction right-of way is successfully revegetated with native species. The Applicant will work with the CNF and LLBO to fund and implement such monitoring and treatment programs.	X	X	X
Heritage Resources (Section 3.4)	31. Three active railroads that have been identified as potentially eligible sites will be crossed using the road bore method, thereby avoiding all disturbances to these sites.	X	X	X

Resource/Topic	Mitigation	Alt. 2	Alt. 3	Alt. 4
	32. In traditional LLBO resource harvesting areas, delineate areas that would be clear-cut prior to actual ground-disturbing activities to provide adequate time for the Tribal Historic Preservation Office to notify affected communities.	X	X	X
	33. In traditional LLBO resource harvesting areas, allow LLBO community members to harvest non-saleable timber (for firewood), and other traditional resources prior to clear-cut or surface disturbance.	X	X	X
	34. In traditional LLBO resource harvesting areas, replant disturbed areas with native plant species that are beneficial to wildlife and with those native plants that are used by LLBO community members for traditional purposes, as will be outlined in the final Revegetation Plan.	X	X	X
Aesthetics (Section 3.5)	35. Limit tree clearing at road crossings as specified in mitigation measure 7.	X	X	X
	36. At all waterbody crossings with existing woody buffers, Applicant would replant woody vegetation between both new and existing pipelines up to 50 feet back from the top of bank to promote a natural riparian wildlife corridor. A 10-foot strip over each pipeline will be maintained in herbaceous cover for operations and maintenance needs. A typical stream crossing replanting design is described in figure 21 of Appendix 3.	X	X	X
	37. Limit tree removal to the extent practicable based on factors determined in consultation with the LLR and CNF, such as tree type, diameter, location, age, and distance from the centerline of the 36" pipeline.	X	X	X
	38. Restore the temporary construction right-of-way to pre-construction conditions through reforestation as will be specified in the future Vegetation Management Plan being developed between Enbridge the DRM and the CNF. The permanent right-of-way would be periodically maintained to limit the establishment of woody vegetation.	X	X	X
Recreation (Section 3.6)	39. If possible and in consultation with the CNF, conduct construction and restoration activities along the Mi-Ge-Zi and Soo Line Trails between the west side of Pike Bay Channel and Pike Bay Loop (approximately mileposts 955.8 to 958.5) during times that will avoid conflicts with planned annual events and the Mi-Ge-Zi and Soo Line Trails high-use period.	X	N/A	N/A
	40. Restore the Mi-Ge-Zi Bike Trail to its original engineering specifications, which include, among other things, installation of a new root barrier under the portion of the trail disturbed by construction. In addition, if permitted by the railroad, create a paved connection for the trail across Pike Bay Loop at the intersection with the Burlington Northern – Santa Fe Railroad.	X	N/A	N/A
	41. Maintain access throughout construction on paved roads and Forest Roads to allow continuous access to recreational areas and facilities.	X	X	X
Socioeconomics (Section 3.7)	42. Project would allow refineries to meet consumer demands for additional petroleum supply	X	X	X
	43. Project would have a positive economic impact on factors such as payroll tax, local expenditures, and sales tax. Economic benefits may be derived from employing local laborers and related benefits such as worker spending, as well as spending on construction goods and services.	X	X	X
	44. Increase in annual property tax of $20,300,000 paid to the 15 Minnesota counties crossed by the project.	X	X	X
	45. Contribute to the LLBO for the training and development of work skills for tribal members	X	X	X
	46. Funding of a three year staff position for the LLBO Department of Resource Management	X	X	X
	47. Firewood cut during the project will be made available to the local tribal communities.	X	X	X
	48. Agricultural crop and forestry compensation would be paid to landowners for the areas impacted by construction.	X	X	X

Resource/Topic	Mitigation	Alt. 2	Alt. 3	Alt. 4
	49. Increased demands for temporary housing for construction workers would occur in the project area.	X	X	X
	50. Native American laborers would be considered and utilized to the maximum extent possible on all aspects of the project based upon worker availability, worker skills, and the needs of the project.	X	X	X
Special Status Species (Section 3.8)	51. Avoid construction activity within 0.5 miles of a known gray wolf den or rendezvous site during the period from March 1 through July 31; Provide the Environmental Inspectors with copies of the WDNR Wolf Management Guidelines; Notify the appropriate agency if a wolf, den, or rendezvous site is sighted before or during construction.	X	X	X
	52. Conduct pre-construction surveys for northern goshawk nest activity at previously identified nest sites; Minimize construction activities and do not clear trees within 860 feet of active nests	X	X	X
	53. Conduct pre-construction surveys for red shouldered hawk nest activity at previously identified nest sites; Minimize construction activities and do not clear trees within 860 feet of active nests	X	X	X
	54. Conduct pre-construction surveys for great gray owl nest activity at previously identified nest sites; Minimize construction activities and do not clear trees within 660 feet of active nests	X	X	X
	55. If construction activities occur between May through July in areas where black-backed woodpeckers were identified during call surveys, conduct nest occupancy surveys in these areas; Minimize construction activities and do not clear trees within 200 feet of active nests	X	X	X
	56. Restrict construction activities within 660 feet from active great blue heron rookeries on CNF lands; A known rookery was identified within the right-of-way for Alternative 2, and the construction right-of-way and pipeline route would be modified to avoid taking of roost trees	X	X	X
	57. Conduct pre-construction surveys for bald eagle nest activity at previously identified nest sites; Restrict construction activities within 330 feet of active nests, and only allow limited activity within 330-660 feet of active nests; A nest was identified within the right-of-way for Alternative 2, and the construction right-of-way and pipeline route would be modified to avoid taking of the nest tree	X	X	X
	58. Conduct pre-construction surveys for osprey nest activity at previously identified nest sites; Restrict construction activities within 660 feet of active nests	X	X	X
	59. Potential habitat exists for the pugnose shiner, greater redhorse, and Vertree's caddisfly on Alternative 2, the waterbody(s) are proposed to be crossed by HDD; no in-stream impacts are expected (see figure 11).	X	X	X
	60. The Applicant is developing a *Botrychium* Avoidance and Monitoring Plan for protection of *Botrychium* species. This plan will be finalized per agency approvals prior to construction.	X	X	X
	61. The Applicant is developing a *Canada Yew* Avoidance Plan for protection of *this* species. This plan will be finalized per agency approvals prior to construction.	X	X	X
Soils (Section 3.9)	62. Install temporary and permanent soil erosion and sediment control measures as identified in section 2.4.7, such as slope breakers, trench breakers, temporary vegetation, mulch, sediment barriers, and dewatering devices.	X	X	X
	63. Seed disturbed areas with native plant species that are well adapted to the local soil types. Apply seed at sufficient rates and in accordance with the revegetation procedures outline in mitigation measure 24.	X	X	X
	64. During reseeding, apply and anchor mulch as necessary in dry, sandy areas to conserve soil moisture and on slopes greater then eight percent to minimize erosion.	X	X	X

Resource/Topic	Mitigation	Alt. 2	Alt. 3	Alt. 4
	65. To minimize the potential for soil compaction to wetlands, limit construction equipment working in wetlands to that essential for right-of-way clearing, excavating the trench, fabricating and installing the pipeline, backfilling the trench, and restoring the right-of-way. In areas where there is no reasonable access to the right-of-way except through wetlands, equipment would be allowed to travel through wetlands only as absolutely necessary. Figure 12 of Appendix 3 describes typical pipeline construction in wetlands.	X	X	X
	64. To prevent rutting and compaction in wetlands, require low ground pressure equipment or equipment that would work off of timber riprap or mats as necessary. Remove all equipment pads and newly placed timber riprap following construction.	X	X	X
	67. Suspend construction during extensive periods of significant precipitation as determined by the project Environmental Inspector and the CNF.	X	X	X
	68. Identify areas of compacted soils following construction by monitoring for areas where vegetation is sparse after the first growing season. Areas that become compacted could be mechanically ripped where appropriate using a chisel plow or similar implement following construction.	X	X	X
Wetlands (Section 3.10)	69. When clearing, cut woody vegetation flush with the surface of the ground except where necessary to provide a safe work surface and leave the rootstock in place to facilitate revegetation of native species.	X	X	X
	70. Limit stump removal, grading, and excavation to the area directly over the trenchline, except in situations where safety-related constraints require stump removal in other areas.	X	X	X
	71. Install sediment barriers, such as silt fence and/or straw bale structures, across the right-of-way at all approaches to wetlands where runoff is expected to pose a significant erosion hazard.	X	X	X
	72. Limit construction equipment working in wetlands as specified in mitigation measure 54.	X	X	X
	73. Use low ground pressure construction equipment, timber mats, or corduroy roads to reduce the potential for rutting and soil compaction in inundated wetlands as specified in mitigation measure 55. Remove and restore all temporary access roads, including corduroy roads through wetlands.	X	X	X
	74. Direct dewatering discharges to well-vegetated upland areas away from wetlands, or into geotextile filter bags and/or straw bale dewatering structures (see figures 19 and 20).	X	X	X
	75. Suspend construction during extensive periods of significant precipitation.	X	X	X
	76. Install trench breakers at the base of slopes immediately adjacent to wetlands and at the edges of wetlands near the tops of slopes (see figures 15 and 16).	X	X	X
	77. Restore wetland topography and hydrology to pre-construction conditions by leaving no "crown" over the trenchline.	X	X	X
	78. Following construction, seed unsaturated wetlands with annual oats at a rate of 40 pounds per acre, and actively plant sapling trees in the temporary workspace in forested wetlands using the same species as those that occur adjacent to the work areas, as specified in the reforestation plan for the proposed project.	X	X	X
	79. Monitor wetlands for up to three years following construction for evidence of hydrologic impacts due to compaction. Where compaction has affected hydrology, Lakehead would be required implement practicable corrective actions such as installation of drains across compacted areas.	X	X	X
	80. To reduce the effects of blocked subsurface drainage in deep-peat wetlands, Lakehead would install cross drains, as practicable, across the construction right-of-way in accordance with the BMPs specified in the Voluntary Site-level Forest Management Guidelines.	X	X	X

Resource/Topic	Mitigation	Alt. 2	Alt. 3	Alt. 4
Surface Waters (Section 3.11)	81. Cut woody vegetation by hand within 50 feet of waterbodies and dispose of at an appropriate facility. Leave grassy vegetation and rootstock intact until just before construction across the waterbody.	X	X	X
	82. Minimize disturbance to boaters as outlined in mitigation number 35.	X	X	X
	83. Install temporary bridges to allow construction equipment to cross the streams (see figures 6 and 7).	X	X	X
	84. Install sediment barriers, such as silt fence and/or straw bale structures, across the right-of-way at all approaches to waterbodies. The barriers may be removed during active construction, but shall be replaced each night and during precipitation events.	X	X	X
	85. Maintain sediment barriers, such as silt fence and/or straw bale structures, across the full width of the right-of-way until the stream banks are revegetated.	X	X	X
	86. Store spoil excavated from the trench in a straw bale/silt fence containment structure located a minimum of 10 feet from the water's edge.	X	X	X
	87. Complete in-stream construction within 48 hours if practical.	X	X	X
	88. Construct across streams during low-flow periods and during non-spawning and non-migration periods, as practical.	X	X	X
	89. Begin stream bank restoration immediately after backfilling. Restore original stream bank contours and stabilize the banks with erosion control matting.	X	X	X
	90. Install temporary slope breakers at steep approaches to streams where runoff may pose an erosion hazard.	X	X	X
	91. Dispose of all excess spoil, vegetative debris, and all other construction-related waste following construction. No waste should remain in waterbodies or natural drainage ways.	X	X	X
	92. Direct all dewatering operations to a well vegetated upland area, a straw bale filter structure or a geotextile filter bag located back from the edge of waterbodies.	X	X	X
	93. Implement the spill prevention, containment, and countermeasure procedures outline in section 2.4.8.	X	X	X
	94. Install shallow root native woody vegetation along the riparian corridors from the top of the waterbody bank back a distance of 50 feet.	X	X	X
	95. Wait to cut woody vegetation within 50 feet of waterbodies until no more than 24 hours prior to trenching and leave grassy vegetation in place until just before construction across the waterbody.	X	X	X

3 EXISTING ENVIRONMENT AND ENVIRONMENTAL EFFECTS

This chapter is divided into 11 sections. Each section corresponds to a category under which issues typically addressed in environmental assessments may be grouped. These 11 sections include:

1) Health and Safety
   Issue 1 – Potential for Pipeline Rupture
   Issue 2 – St. Regis Paper Company Superfund Site Contamination

2) Roads and Trails
   Issue 3 – Increased Opportunities for Off-Road Vehicle Access
   Issue 4 – Effects on Local Transportation

3) Vegetation and Wildlife
   Issue 5 – Wildlife Movement
   Issue 6 – Conservation of Land Cover Types
   Issue 7 – Spread of Noxious Weeds

4) Heritage Resources
   Issue 8 – Construction Impacts to Heritage Resources

5) Aesthetics
   Issue 9 – Affects to Scenic Quality and Landscape Character

6) Recreation
   Issue 10 – Recreation Use and Experience

7) Socioeconomics
   Issue 11 – Construction Impacts on Local Communities

8) Special Status Species
   Issue 12 – Construction Impacts to Special Status Species

9) Soils
   Issue 13 – Sensitive Soils in Forested Areas

10) Wetlands
    Issue 14 – Wetlands

11) Surface Water
    Issue 15 – Impact to Surface Waters

Within the above sections, the 15 specific issues raised during scoping are evaluated in detail. In sections where no specific issues were raised during scoping, a general discussion of the resource/topic is provided. The issues considered for each section, whether general or specific, are described at the beginning of each section. Then, in the next part, the indicators that were used to assess each issue, such as field surveys or historical information, are identified. In the third part, the scope of the evaluation, such as the locations where field surveys were conducted or the extent of historical information evaluated, are summarized. In the fourth part, the existing (affected) environment is summarized. This may include the results of field surveys or known impacts from past construction within the project area. The fifth part discusses potential direct and indirect environmental effects of each alternative and the mitigation measures that would be required in the event an action alternative is approved to minimize or avoid significant environmental impacts. Finally, the sixth part assesses the potential incremental impacts for each alternative when viewed in conjunction with other past, present, and reasonably foreseeable future projects.

An evaluation of cumulative impacts is included because even though the environmental impacts of an individual project may be insignificant, the cumulative effects of all the projects combined could be significant. The analysis of cumulative effects is frequently problematic because many details about past and future projects are not known or are unreliable. Therefore, the scope of the cumulative effects analysis must be well defined. For the purposes of this analysis, the scope of cumulative effects is limited to those past, present, and reasonably foreseeable projects in the vicinity of the proposed project as listed below:

- A proposed 68-mile-long 230 kV electric transmission line that would primarily follow existing utility rights-of-way within the LLR and CNF. Construction of the transmission line is proposed to begin in 2009 and to be completed by the end of 2011. The decision has not yet been made on this project or where it will be located.

- The Cuba Hill RMP, a proposal by the CNF, would include various management activities in an area entirely south of U.S. Highway 2 and east of Minnesota Highway 371. Activities include commercial harvest, transportation projects, prescribed burns, and other activities consistent with the Forest Plan. The decision on this project is expected in November 2008. The Cuba Hill RMP is expected to be implemented during the next 5 years;

- The Lower East Winnie VMP, a proposed CNF project, would primarily constitute timber harvest, conversion, and planting, but would also include road and impoundment decommissioning. The Lower East Winnie VMP area is centered on U.S. Highway 2 from the Cities of Bena to Ball Club, north to Lake Winnibigoshish, and south to the Deer River Ranger District boundary. The decision on this project was recently made in September 2008. The Lower East Winnie VMP is expected to be implemented during the next 5 years;

- A CNF non-native invasive plant management program that would be implemented in the spring or summer of 2009. The program would identify weed control treatments (mechanical, chemical, or manual) to be used along roads, utility rights-of-way, skid trails, and other areas for a select group of undesirable plants. The decision on this project is expected by the spring of 2009;

- The Lydick RMP, a proposed CNF project that would occur adjacent to but would not overlap the proposed Projects and would occur entirely north of U.S. Highway 2;

- Past projects accomplished within the last 5 years. These are harvest units covered by Environmental Assessments for the following projects: Mississippi River, Leech Lake River, Portage, Conifer Thin, Cass Lake, and Sand Plain; and

- Unaccomplished projects under decision but not yet harvested or roads not yet decommissioned. These activities were covered by Environmental Assessments for the following projects: Mississippi River, Leech Lake River, Portage, Conifer Thin, Cass Lake, and Sand Plain. For the purpose of this analysis, it is assumed these activities will be completed within the next 5 years.

3.1 HEALTH AND SAFETY ANALYSIS

3.1.1 Scoping Issue 1 - Potential for Pipeline Rupture

3.1.1.1 Description

Pipeline rupture or failure after construction was identified as an issue during scoping that may result in contamination of soil and water resources, and temporary air impacts.

3.1.1.2 Indicator

The potential for pipeline rupture or failure after construction to affect soil, air and water was evaluated by quantifying the number of spill incidents and magnitude of spills per mile per year for existing pipelines. In addition, the number and magnitude of spills on lands within the LLR and NFS was also evaluated.

3.1.1.3 Scope

The scope of the analysis for pipeline rupture and failure information includes the historical incident records for similar pipelines in the United States, and for the Applicant pipelines operating within the LLR and CNF.

3.1.1.4 Affected Environment

According to the United States National Transportation Safety Board, pipelines are the safest way to transport petroleum products (U.S. General Accounting Office, 2001). Although pipelines are not immune to incidents such as ruptures, spills, and releases, they do have a superior safety record, especially in comparison to other forms of freight transportation such as trucking and railroad transport. The U.S. Department of Transportation, Office of Pipeline Safety regulates pipeline safety and requires that accidents be reported for each incident if the incident results in explosion or fire; loss of 50 or more barrels of liquid; escape to the atmosphere of more than 5 bpd of highly volatile liquids; death or bodily harm to any person or persons; or estimated property damage, including the cost of cleanup and recovery, in excess of $50,000. Refer to section 3.13.1 and 3.13.2 of the EIS for a thorough discussion of pipeline reliability and safety.

The proposed Projects will be transporting crude bitumen that is extracted from the Alberta oil sands. This type of crude oil is a tar-like form of petroleum that is so viscous that it must be heated or diluted before it will flow. In order to transport this crude oil over long distances, the standard practice is to dilute the material using a low molecular weight hydrocarbon mixture generally referred to as diluent. Diluent is a generic term that encompasses mixture range of hydrocarbons used for this purpose. Diluent is also referred to as condensate, natural gas oil, or pentane plus. The most prevalent types are condensate and naphtha. Diluent is expected to have a similar composition and physical characteristics to gasoline. Therefore, if released into the environment, diluent will behave in a similar manner to gasoline.

For the period between 1987 and 2007, the Office of Pipeline Safety documented 2,963 incidents (MDOT-OPS, 2008). During that period, the national average net loss per accident was approximately 530 barrels. In comparison, the Applicant has had an average of 1 accident per 1,292 miles of pipeline per year. The average net loss from accidents that have occurred within the LLR and CNF boundary is 14 barrels per accident (Enbridge, 2001).

The Applicant currently operates four pipelines totaling approximately 175.75 miles in aggregate within the LLR and CNF boundaries. Of the 175.75 miles, approximately 172.86 are on lands that the LLBO retains treaty rights to, and 135.81miles are on NFS lands. The four existing pipelines in the immediate Projects area are 18-, 26-, 34-, and 36-inch-diameter pipelines that were installed in 1950, 1954, 1963, and 2002, respectively. The 36-inch-diameter pipeline connected to an existing loop, a 48-inch-diameter pipeline from Bena to Deer River that was constructed during the period from 1972-1973. Since those pipelines went into service, the Applicant has had nine mainline releases from its pipelines within the LLR/CNF boundaries as summarized on table 3.1.1-1.

Table 3.1.1-1 – History of Mainline Pipeline Releases within LLR and CNF Boundaries

Date	Milepost	Line #	Volume Released (barrels)	Date Regulatory Closure Received	Description

Date	Milepost	Line #	Volume Released (barrels)	Date Regulatory Closure Received	Description
11/9/1954	951.9	1	250	NA	Release occurred as part of a tie-in project. Located north of HWY 2 crossing on northerly corridor (i.e., not on Alberta Clipper alignment). Oil burned for removal.
9/29/1955	988	1	2	NA	Pinhole leak / corrosion identified.
8/3/1973	951	3	15	NA	Corrosion
9/13/1974	972	2	20	1/29/1998	Leak occurred during hydrotesting section of pipeline. Released material was an oil/water mixture.
6/23/1975	954.7	3	7	7/28/1975	Crack in weld seam.
7/22/1991	965.1	3	0	1/29/1998	Leak occurred during hydrotesting section of pipeline. No oil was observed in released water.
2/23/2000	957.1	2	10	12/28/2001	Crack in weld seam.
3/4/2001	955.05	3	25	12/28/2001	Crack in weld seam.
2/14/2002	953.03	4	1000	Open	Leaking flange. South Cass Station leak site.
NA = Not Applicable. Release occurred prior to 'official' closure process by regulatory agencies.					

Spill recovery methods vary according to setting, but typically involve the mechanical recovery of free oil using vacuum trucks. In general, two-thirds of the oil spilled is recovered and put back into the pipeline system for future refining into products. The remaining fractions of oil are accounted for in soils that are hauled off-site for disposal at permitted solid waste facilities, or lost to the atmosphere via volatilization. If limited amounts of residual oil are allowed to remain in place, they exist at levels that do not pose significant risks as determined by state and federal regulators.

3.1.1.5 Direct and Indirect Effects

Alternative 1

The No Action Alternative would result in no change to the existing environment and, as a result, no short- or long-term changes to health or safety. The proposed Projects would not be constructed and there would be no change in the operation of the existing pipelines within the Projects area. The existing permanent right-of-way would remain the same and activities previously undertaken in the Projects area, such as pipeline operation and maintenance and right-of-way maintenance, would still be allowed pursuant to the Applicant's existing Special Use Permit with the LLBO and CNF. Should a pipeline rupture occur on the existing pipelines, the effects would be the same as those described under Alternative 2.

Alternative 2

Direct effects from a pipeline release are the same for all Alternatives, but are discussed thoroughly under this Alternative. They include:

- potential contamination of soils, surface waters, air and shallow groundwater;
- potential for harm to plants and animals;
- habitat degradation at the release site; and
- risk of fire or explosion.

Depending of the location of the release, crude oil could have an adverse effect on air, soils, surface waters, wetlands, and/or shallow groundwater. Generally, oil spills on land are not considered to be as serious as spills on waterbodies. Spills on open water are generally not considered as serious as spills near a shoreline. This is because spills on land are much easier to contain and clean up than spills on water, and spills near shorelines impact a much more concentrated and diversified population of plants and animals than in open water. A spill in a wetland setting would have a temporary impact on vegetation while cleanup and revegetation occur. This may be more of an issue in the select wetlands which include open water portions which provide the habitat for wild rice plants. Wild rice is a native resource of particular importance to the native Leech Lake Reservation people.

Temporary impacts to air would be from the volatilization of the lighter fractions of the crude oil released from the pipeline, and in the event that a burn-off of remnant oil is permitted by the appropriate regulatory authorities, fugitive smoke from the short-term burning event would be released. The DRM maintains prevailing wind direction data that could be consulted in the event of a rupture to determine the upgradient wind direction.

The concerns to animal and plant health and safety would be more diverse. The seriousness of a pipeline incident in regards to plants and animals depends on several factors, including the incident's size and location, the weather, and the time of year. When crude oil is released to the environment, the more toxic, lighter portions of the oil are more likely to evaporate. Studies have shown that evaporation can reduce the volume of a crude oil release by 20 to 40 percent (Academy of Natural Science, 2001). Heavier oil that does not evaporate, although not as toxic, can cause harm to plants and animals. Oil can harm plants and animals in three different ways: by poisoning, by exposure, and by destroying habitat.

The toxic effects of ingesting oil are poorly understood for many organisms, especially microorganisms such as plankton. The effects on larger creatures are much better known. Mammals and birds that have been in direct contact with oil often ingest oil while attempting to clean themselves, or when they eat other petroleum-contaminated plants or animals. If a spill reaches water, fish may ingest oil through their gills. Ingesting oil can destroy an animal's internal organs (such as the liver) and interfere with the reproductive process (Academy of Natural Science, 2001).

Birds and mammals can also be killed by direct exposure to oil. Oil can affect a bird's feathers making it impossible for the bird to fly and can also affect the bird's buoyancy. Oil also eliminates the ability of a bird's feathers or a mammal's fur to keep the animal warm. In colder climates, hypothermia can result in animal mortality (Academy of Natural Science, 2001).

Habitat degradation is another potential direct effect from a pipeline release. Habitat degradation could occur due to crude oil being released into soils, surface waters, or shallow groundwater, or by the subsequent activities intended to contain and recover the crude oil.

Past experience, including an Applicant release that occurred in 1993 in Grand Rapids, Minnesota, suggests that the adverse effects of a pipeline release are temporary. In the Grand Rapids incident, a release occurred that adversely impacted soils, surface waters, and shallow groundwater. Following initial crude oil recovery and soil removal, the area was restored to pre-release conditions and subsequently monitored. In 1995, restoration was deemed complete as determined by the Minnesota Pollution Control Agency (MPCA).

In May 2001, the Applicant discovered oil impacted soils and groundwater within the Project area at the South Cass Lake Pumping Station as part of its Detection Monitoring Program (DPM). The DMP is a proactive program implemented at the Applicant's pumping facilities to detect and track impacts to shallow groundwater that may potentially occur from crude oil leaks. The detection of the South Cass Lake Pumping Station release, caused by a leaking Station flange, resulted in the removal of approximately 304 cubic yards of oil impacted soil. On-going remediation activities are primarily focused on recovery of free phase crude oil from impacted groundwater, and studies and assessments of further cleanup options. Independent hydrogeological investigations by the U.S. Geologic Survey (USGS) concluded that the contamination is <u>not</u> moving.

At the request of the LLBO DRM, the Site is currently enrolled in the LLBO Brownsfield's Program. Enbridge continues to work with DRM and Brownsfield's Program staff to assess risks associated with the released petroleum and to develop a long term plan for the Site. In order to keep the public informed of the activities at the site, the Applicant has created a website to communicate site investigation and remediation information to the public. The web address is www.enbridgecasslake.com/go/site/986/. In addition, a public meeting was held in January 2005 in Cass Lake to answer questions community members may have had regarding the Site.

The largest Applicant spill in the Projects area within the past decade was the Cohasset spill on July 4, 2002. The release was caused by a pipe failure that resulted in approximately 6,000 barrels of crude oil being released into a peat wetland. The spill was contained with booms, which prevented oil from migrating into an adjacent creek. As a result, the impacted area was limited to approximately 6 acres. Approximately 90 percent of the released oil was recovered from the marsh. Remediation activities included the controlled burning of crude oil from the surface of affected soils. Emissions associated with the surface oil burning activities temporarily impacted local air quality. State regulators determined cleanup was complete in 2006, and the Applicant was responsible, under federal law, to compensate the public for environmental impacts. Presently, the adverse air affects associated with the control burn has diminished, and local air quality has returned to standard conditions. As part of the Natural Resource Damage Assessment (NRDA) claim, the Applicant is required to spend $20,000 to retrofit Cass Lake school buses with emission control equipment as a resolution for the air damages associated with the controlled burn. The Applicant is currently coordinating with the LLBO DRM and MPCA staff to finalize the retrofitting activities.

If a pipeline incident should occur, the primary concerns to human health and safety would be from fumes and risk of fire or explosion. The potential for a fire or explosion exists with the release of crude oil to the environment. The Applicant's Emergency Response Plan addresses the potential for fire or explosion. In addition, public education information provided to landowners includes guidance for reducing the potential for fire or explosion.

Indirect effects that may occur as a result of a release include:

- clearing of vegetation to access area of petroleum release; and
- possible disruption to traffic & residents in the vicinity of the release site.

The clearing of vegetation, possibly including trees, may be necessary to allow for the recovery and cleanup from a petroleum release. In addition, depending on the location of the release, traffic may be diverted to allow response equipment access to the release area. Residents living in the vicinity of the release may also be delayed or detoured to secure the area and allow for recovery efforts to occur. Any and all traffic issues and detaining of residents would be handled by the local law enforcement agency in conjunction with the Applicant's Emergency Response Plan.

To minimize the potential for pipeline ruptures, the Applicant would construct, operate, and maintain the proposed pipelines in compliance with Office of Pipeline Safety regulations. Safety controls required by the Office of Pipeline Safety include quality control and testing during construction, inspection of structural integrity of the pipelines during operation, and steps to prevent damage to the pipeline by third parties.

The Applicant addresses concerns regarding an accidental release by employing an emergency preparedness plan that includes prevention, detection, and response. The three main plan components are discussed below.

Prevention

Prevention includes the use of high-quality materials (such as pipe coatings) that meet or exceed the industry standards. The Office of Pipeline Safety requires that all external pipe surfaces be coated with anticorrosion epoxy. The protective coating provides a barrier between the steel pipeline and the corrosive environment of the surrounding soils. A cathodic protection system is also required on pipelines to inhibit corrosion. The cathodic protection system applies a small, continual electrical charge on the pipeline system to combat the chemical reaction that would otherwise occur between a buried metal object and soils. All the Applicant's pipelines employ protective coatings and cathodic protection systems to guard against corrosion. The possible placement of an overhead power line project adjacent to the pipeline corridor is a compatible utility co-location. Utilities in many cases are encouraged to be located in shared or adjacent corridors as a means to group utilities and minimize forest fragmentation and consolidate utility corridors. Enbridge has experience operating its pipeline system adjacent to electric transmission lines and the co-location does not result in an increased occurrence of pipeline corrosion issues. In cases where the pipeline is located adjacent to electric transmission lines, the cathodic protection system is designed to account for the adjacent utility.

Once pipeline construction is complete, three types of testing are conducted to verify the integrity of the pipeline. First, each weld is x-rayed to confirm the competency of the entire weld. Next, an instrument is run through the inside of the pipe to assure that the pipeline was not dented during the construction process. Finally, a pressure test (hydrostatic test) is conducted by filling the new pipe with water and pressurizing the line to beyond the pressure under which it would be operated. Hydrostatic testing measures are guided by Office of Pipeline Safety specifications, and a successful test verifies that the pipeline is ready to be put into service.

During operation of the pipeline, the risk of a pipeline rupture due to induced corrosion is very small for pipelines crossing or paralleling high voltage powerlines. However, Enbridge noted that the proximity of pipelines to high voltage conductors can increase the requirements for mitigation to protect against the impact on pipeline cathodic protection systems due to induced voltage. Mitigation measures include:

- the installation of metal wire or magnesium strips to attract stray electrical currents away from the steel of the pipe. The design is based on a number factors (i.e., soil, moisture, natural and induced electric current potential) to achieve maximum effectiveness;

- design the pipeline route relative to the powerline to minimize voltage peaks. Voltage peaks at locations where the pipeline enter and exit a powerline right-of-way, crosses from one side of the powerline right-of-way to the other, or its distance from the powerline varies widely; and

- grounding the pipeline, particularly at voltage peak locations, to dissipate induced electric currents. Additionally, special grounding precautions and equipment operation techniques are employed during operation of heavy equipment for construction and maintenance.

Enbridge's existing cathodic protection systems would be redesigned to accommodate the new pipelines as well as the presence of other above and below ground utilities. This system complies with the federal pipeline safety regulations 49 CFR Part 195, and is subject to testing and inspections in accordance with these regulations. Enbridge's maintenance procedures require monitoring and testing along the pipeline to inspect for changes to electrical and physical specifications that could potentially result in corrosion.

Detection

The Applicant's Pipeline Control Center is staffed by pipeline operators 24 hours per day. The computerized control system allows operators to monitor and control the pipeline facilities, which includes shutting down a line down if abnormal conditions are observed.

In addition, aerial patrols of the entire pipeline system are performed every other week or at least 26 times a year. The Applicant-employed pilot notes unusual excavation activity or conditions that may be related to a petroleum leak. If abnormal conditions are noted, ground crews are immediately dispatched for further investigation. As a supplement to aerial patrol, the Applicant's employees visually inspect the right-of-way in selected locations on a periodic basis.

To further enhance its leak detection program for the proposed Projects, Enbridge proposes to treat the 43.79 miles each of 36- and 20-inch-diameter pipeline within the LLR and CNF boundaries as high consequence areas (HCAs). HCAs are defined as populated areas, areas unusually sensitive to environmental damage and commercially navigable waterways that could potentially be affected by a pipeline leak or failure. Enbridge's HCA program provide for periodically evaluating the pipeline segments through comprehensive information analysis, remediating potential problems found through the assessment and evaluation, and ensuring additional protection to the segments and the high consequence areas through preventive and mitigative measures. The HCA analysis includes internal inspections, pressure testing, or other equally effective assessment means for continually assessing the integrity of the pipeline segments in HCAs.

Lastly, the Applicant employs a public awareness program. The Applicant regularly provides information to landowners and local officials on the pipeline operations, what to do in the event of a spill, whom to contact, etc.

Response

As required by law, the Applicant has developed an emergency response program that includes pre-planning, equipment staging, notifications, and emergency and leak containment procedures. The LLBO and CNF concur with the Applicant's Emergency Response Plan, a plan that has been reviewed and approved by the Office of Pipeline Safety. The Applicant has staged emergency equipment along the pipeline system, and has conducted drills at locations to practice spill-response activities. These practice drills have been conducted since 1994 in the following locations near the vicinity of LLR and CNF: Cass Lake; Mississippi River/Ball Club; Necktie River; and White Oak Lake/Deer River.

Alternative 3

The effects on health and safety could be increased than those discussed in Alternative 2. The relatively remote nature of Alternative 3 could likely reduce access and potentially delay emergency response actions.

Alternative 4

The effects on health and safety could be increased than those discussed in Alternative 2. The relatively remote nature of Alternative 4 could likely reduce access and potentially delay emergency response actions.

3.1.1.6 Cumulative Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no cumulative effects would occur.

Alternative 2

Past activities such as the construction of U.S. Highway 2, the Burlington Northern Santa Fe Railroad, and the Mi-Ge-Zi and Soo Line trails have not resulted in additional potential for pipeline rupture or failure. However, the Applicant currently operates four pipelines totaling approximately 175.75 miles in aggregate on LLR treaty trust lands within and CNF lands. Alternative 2 would result in two additional pipelines being placed in operation that would involve some incremental additional risk of a release. After the pipelines are constructed, the Applicant's pipelines would total approximately 263.31miles in aggregate on LLR and CNF lands. The risk of a release from the proposed lines would be expected to be less than the risk from the existing lines due to improved pipe construction, operation, and maintenance standards. Although having more miles on the LLR and CNF may increase the overall risk of a rupture or incident, the Applicant expects that accidents will decrease with more stringent construction, operation, and maintenance practices that now occur.

Future execution of the Cuba Hill RMP would not result in additional impacts on health and safety. The Applicant's proposed pipelines would only cross one of the activities that would occur as part of the Cuba Hill RMP. The proposed activity would involve the harvesting of single trees by type and would cross the proposed pipeline between MPs 961.34 and 961.39, affecting a total of approximately 0.21 acre. In the interest of health and safety, the proposed activity could only occur up to the edge of the right-of-way, or a minimum of 25 feet away from the proposed centerline, thus minimizing risk.

Future construction of the 230 kV high voltage transmission line (HVTL) is unlikely to result in additional impacts on health and safety because there would be limited collocation with the Applicant's pipelines and it would probably occur subsequent to construction of the proposed pipelines. In addition, the HVTL proponents would be required by state and federal law to maintain a minimum safe distance from the pipelines during construction and operation of the transmission lines, would install measures so as not to interfere with the pipelines' cathodic protection system, and would be required to call the state one-call system to have the pipeline and other utilities marked prior to excavation.

Future construction of the Lower E. Winnie VMP is unlikely to result in additional impacts on health and safety because only one section of the Projects is crossed between MPs 977.95 and 978.1, affecting a total of approximately 2.36 acres. Trees in this area are slated to be harvested utilizing the clear-cut method, and additional measures would be implemented to protect the integrity of the pipeline and to ensure worker safety.

Alternative 3

The cumulative effects on health and safety would be identical to Alternative 2, except that there would be an increased degree of collocation with the 230 kV HVTL along the proposed route, which would be subject to the same safety standards discussed in Alternative 2. Additionally, Alternative 3 would cross one section of the proposed Cuba Hill RMP near MP 5.85, while Alternative 2 would cross one section of the Cuba Hill RMP and one section of the Lower E. Winnie VMP. Trees within the proposed Cuba Hill area crossed by Alternative 3 would be singly harvested by type. Additional measures and mitigation would need to occur to protect the integrity of the pipeline and to ensure worker safety.

Alternative 4

The cumulative effects of Alternative 4 on health and safety would be nearly identical to Alternative 3, except that Alternative 4 would cross one additional section of the proposed Cuba Hill RMP between MPs 10.51 and 10.64. Trees within this section would be singly harvested by type. Additional measures and mitigation would need to occur to protect the integrity of the pipeline and to ensure worker safety.

3.1.2 Scoping Issue 2 – St. Regis Paper Company Superfund Site Contamination

3.1.2.1 Description

Construction of the pipeline near the St. Regis Paper Company Superfund Site was identified as an issue during scoping because work in this area may expose workers to contaminants or introduce or re-suspend contaminants from the Site to surface waters if work is done within Pike's Bay Channel, or the pipelines may act as a conduit to enhance contaminant migration.

3.1.2.2 Indicator

The likelihood that contaminants from the St. Regis Paper Company Superfund Site may be encountered or suspended into surface waters was assessed by reviewing previous studies and analytically measuring soil.

3.1.2.3 Scope

The scope of the analysis to determine if contaminated soils may be encountered is relevant only to Alternative 2.

3.1.2.4 Affected Environment

The proposed Projects are near the St. Regis Paper Company Superfund Site, a former wood treating facility in the City of Cass Lake. The site is located on private property immediately south of the proposed pipeline between MPs 954.5 and 955.3. Historically, chemicals used to treat wood products, primarily creosote, pentachlorophenol, ketone, and copper chromium arsenate, were released to the environment and contaminated soil and groundwater. Contaminated soils were removed from within the site boundary during remediation in the 1980s. According to comments received during a previous Applicant project in the same area (Lakehead Terrace III Project, 2002), the contaminated soils and sludges were removed as required by the Minnesota Enforcement Decision Document. Excavation limits were based on a visual inspection of the soils and post-excavation field testing methodology under the oversight of the MPCA. Excavated areas were backfilled with on-site borrow (i.e., sand). Contaminated soils were placed in a containment vault constructed to Resource Conservation Recovery Act subtitle C requirements.

Groundwater remediation has also been conducted consisting of a series of extraction wells that capture the contaminated water, remove the contaminants via granular activated carbon filtration, and discharge the treated groundwater to Pike's Bay Channel. During the Terrace III Project, officials from the U.S. Environmental Protection Agency, the MPCA, and representatives from the LLBO, speculated that water from the site had drained into Pike's Bay Channel prior to the remediation system being installed. As a result, some Channel and lake sediments were evaluated for contaminants. State records (MPCA, 2001) show that some pentachlorophenol (PCP)-contaminated sediment was documented in 1984 and 1995 in Cass Lake, Pike Bay, and the connecting Channel.

Under Alternative 2, the Applicant has proposed to cross Pike's Bay Channel at this location to maximize collocation with another Applicant pipeline and the transportation corridor. In addition, the crossing is proposed to be accomplished using the HDD method due to the physical constraints of the crossing area and to minimize the likelihood of encountering contaminated sediments because work would be upgradient from the St. Regis Paper Company Superfund Site.

In order to ensure impacts from the Superfund site would not be encountered, the applicant retained the services of an environmental consulting firm to check for soil contamination at depth along the proposed HDD alignment. Four test borings were advanced in December 2008 and the results are presented in a report entitled "Site Investigation Report for Proposed Pike Bay HDD Crossings" dated January 2009. The report has been submitted to the LLBO DRM and CNF under separate cover. Laboratory analysis of the soil samples for semi-volatile organic compounds [including polycyclic aromatic hydrocarbons (PAHs) and pentachlorophenol (PCP)] was conducted by Pace Analytical Laboratory of Minnesota. The analytical results did not detect the presence of known contaminants from the St. Regis Paper Company Superfund Site. As a result, the potential risk of encountering contaminated soils appears minimal.

3.1.2.5 Direct and Indirect Effects

Alternative 1

The No Action Alternative would result in no change to the existing environment and, as a result, no short- or long-term changes to health or safety would occur. The Applicant would not construct the proposed pipeline and there would be no change in the operation of the existing pipelines within the Projects area. The Applicant's existing permanent right-of-way would remain the same and activities previously undertaken in the Projects area, such as pipeline operation and maintenance and right-of-way maintenance, would still be allowed pursuant to the Applicant's existing Special Use Permit with the CNF.

Alternative 2

Under Alternative 2, direct or indirect effects associated with disturbing contaminants from the St. Regis site are small because they are not known to occur at the crossing location. The likelihood of introducing or resuspending other contaminants that were identified in the center of Pike's Bay Channel (Pyrene and diesel range organic) is insignificant because both pipelines are proposed to be installed using the HDD method (see figure 11). This technique would involve setting up a drill rig on the west side of Pike's Bay Channel on a privately owned tract to the north and upgradient of the St. Regis Paper Company Superfund site at approximate MP 955.6. Drilling would proceed from this location to the east, under Pike's Bay Channel, and up to a point on the east side on land managed by the CNF at approximate MP 956.1. In addition, the levels for those compounds were below the state guideline requiring action.

Any direct effects that may occur from introducing or resuspending contaminants from the St. Regis Paper Company Superfund Site would include:

- the potential for providing a conduit for contamination from the Superfund site to migrate east beyond Pike's Bay Channel; and
- the potential for a release of drilling mud from the HDD into the bed or banks of Pike's Bay Channel.

The risk of creating new a contamination conduit due to the Projects is low, as verified by the results from soil samples collected along the Alternative 2 proposed Pike Bay HDD crossing. However, the parties involved with regulating the St. Regis Paper Company Superfund site, specifically the U.S. Environmental Protection Agency, the MPCA, and the LLBO, are of the opinion that the shallow groundwater within the existing Applicant easement has likely already been contaminated by the St. Regis Paper Company Superfund Site. According to a comment received on the Terrace III Project preliminary environmental assessment from International Paper, the site-related contaminants in shallow groundwater at Pike's Bay Channel are below Maximum Contaminant Levels (MCLs) and risk-based concentrations. Nevertheless, the HDD would advance through the groundwater within the confines of the remediation system and, as a result, could potentially transport minor contaminated (below MCLs) groundwater though the drill hole. In addition, the potentially contaminated soils and groundwater could be brought to the ground surface as cuttings and drilling fluids are circulated through the drill hole. This could result in new areas of contamination that would not have existed prior to construction. The new areas of contamination could presumably result in additional degradation of ground and water resources.

In order to further minimize the potential for drill cuttings and fluids to create new areas of contamination, the Applicant would implement handling, storage, and disposal procedures for the drill cuttings and fluids generated by the HDD such as disposal at an approved waste handling facility as approved by the CNF, U.S. Environmental Protection Agency, the MPCA, and LLBO.

The potential for a release of drilling mud from a HDD is affected by a number of factors, including the presence of fissures in the underlying soils. The possibility of a drilling mud release cannot be predicted accurately, and consequently precautions would be put into place in case a drilling mud release should occur. In order to minimize the potential for an inadvertent release of drilling mud, the Applicant has prepared a Drilling Mud Containment, Response, and Notification Plan (Appendix G of the EIS) that identifies the cleanup equipment that would be on-site, and the personnel training, cleanup actions, notifications, and other actions that would be followed to ensure that a release would be contained and cleaned up if one occurs during drilling. The implementation of this plan would help to minimize the effects of a drilling mud release to the environment should one occur.

Alternative 3

Under Alternative 3, Pike's Bay Channel would not be crossed and, therefore, no impacts associated with the St. Regis Paper Company Superfund Site would occur.

Alternative 4

Under Alternative 4, Pike's Bay Channel would not be crossed and, therefore, no impacts associated with the St. Regis Paper Company Superfund Site would occur.

3.1.2.6 Cumulative Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no cumulative effects would occur. Contamination associated with the St. Regis Paper Company Superfund Site would continue to be an issue to evaluate for projects in the vicinity of Pike's Bay Channel near the existing Applicant pipeline.

Alternative 2

Construction of the proposed pipeline could result in cumulative effects on contamination when considered in conjunction with the past construction of the BNSF Railroad and the existing Applicant pipelines. It is possible that construction of the railroad and the existing Applicant pipeline may have crossed the St. Regis site's contaminants and resulted in some movement of contaminants to other sites during construction. It is unlikely that cumulative effects would occur in conjunction with the proposed Non-Native Invasive Plants Plan, the proposed Lower East Winnie VMP, the proposed Cuba Hill RMP, or the proposed HVTL. The future NFS projects are not expected to have any activities in the area of the St. Regis Paper Company Superfund Site. The HVTL project, if constructed as proposed, would not cross or otherwise impact the Superfund site.

Alternative 3

Construction of Alternative 3 would not occur in the vicinity of the St. Regis Paper Company Superfund Site contamination and, therefore, no cumulative effects would occur.

Alternative 4

Construction of Alternative 4 would not occur in the vicinity of the St. Regis Paper Company Superfund Site contamination and, therefore, no cumulative effects would occur.

3.2 ROADS AND TRAILS ANALYSIS

3.2.1 Scoping Issue 3 – Increased Opportunities for Off-highway Vehicle Access

3.2.1.1 Description

Removing vegetation and widening the right-of-way was identified during scoping as an issue that may increase unauthorized off-highway vehicle use on the pipeline corridor and adjacent areas by providing better access than had previously existed. This could result in detrimental impacts on vegetation, wildlife, soils, and waters through human activity and noise, the inadvertent spread of noxious weeds, and the exposure of soils to erosion and compaction.

3.2.1.2 Indicators

Increased off-highway vehicle access would be measured by the width of ROW clearing, existing and additional, along roads intersecting the pipeline construction corridor, and corridor construction as it intersects with USFS designated motorized or non-motorized trails and non-motorized Management areas: Semiprimitive non-motorized; unique; research natural areas and experimental forests. In addition, a Mitigation Plan would be developed by the Applicant that will, in part, identify such access areas and propose potential measures to reduce access by off-highway vehicles.

3.2.1.3 Scope

This analysis would focus on access points and roads on Tribal, federal, state, and private land on the proposed route, and three alternatives. This analysis includes state and private land because the potential for increased access in these areas may result in additional traffic and impacts on the right-of way on Tribal and NFS land. State, county, tribal and NFS land crossed by the Projects is summarized in the EIS.

3.2.1.4 Affected Environment

The proposed route would cross, and at some locations, parallel or roughly follow, a system of roads and trails that are located within the LLR and CNF and are generally on NFS lands. This includes a total of 28 crossings, of which 12 are numbered Forest Roads, and 4 are unclassified roads or recreational trails. The roads and trails range from grass- or dirt-based tracks to maintained gravel and paved surfaces.

The roads and trails in the vicinity of the Projects are summarized in tables 3.2.2-2, 3.2.2-3, and 3.2.2-4. The most developed roads crossed by the Projects include U.S. Highway 2, Forest Road 2137 (Pike Bay Loop), Forest Road 2133 (Cuba Hill Road), Forest Road 2930, Forest Road 2135 (Ketchum Road), Sucker Bay Road, Portage Lake Road, and Portage Road. Tables 3.2.2-2, 3.2.2-3, and 3.2.2-4 provide the MP, road name, jurisdiction, type, surface, and restriction data of each road crossed by each alternative.

For approximately the first 6 miles of the Projects, from the Applicant's South Cass Lake Pumping Station (MP 953.6) to the northeast edge of Pike Bay (MP 958.4), the existing corridor either closely parallels or is collocated with several other road, trail, and/or railroad facilities. These facilities include the BNSF Railroad, local roads in the Cities of Cass Lake and Bena, and the Mi-Ge-Zi and Soo Line trails. Existing roads and trails also run along the existing corridor in the vicinity of MPs 960.2, 961.0, 967.3, and 973.8. The Soo Line Trail is a 49-mile-long off-highway vehicle trail near the Projects area that is open to all-terrain vehicles between April 1 and November 1.

Under Alternative 2, the proposed pipeline and Mi-Ge-Zi Trail would be collocated or directly adjacent to each other for approximately 4,650 feet of the trail between MP 956.9 on the northern edge of Pike Bay and MP 958.3 at Forest Road 2137 (Pike Bay Loop). Under Alternative 3 and 4, the proposed pipeline would not parallel any recreational trails.

In general, the existing permanent pipeline right-of-way is maintained in a non-forested condition along its length, including at road and trail crossings. The maintained corridor is typically 20 feet wide for each pipeline. Where 4 pipelines are collocated, the width of the maintained corridor is typically 125 feet. Where the pipeline parallels other existing facilities, such as roads, trails, or railroads, the width of the non-forested corridor can be more than 125 feet in width. The existing right-of-way is currently wide enough for off-highway vehicles to use the corridor. There are generally no constructed or human-made barriers to off-highway vehicles that would prevent travel along the maintained corridor. However, there are natural barriers such as wetlands, brush, and similar features that may prohibit off-highway travel into the corridor.

MNDNR published a summary of Minnesota's safety laws, rules and regulations for off-highway vehicles (MNDNR, 2008). The following acts are prohibited by the MDNR:

1. Operating an off-highway vehicle below the ordinary high-water level of unfrozen lakes, rivers, and streams; certain wetlands; or in calcareous fens.

2. Riding on designated non-motorized trails.

3. Riding on any frozen public waters were there is no legal access or where it is prohibited.

4. Riding in any area restricted by local ordinances or municipalities, including streets.

5. Riding in a tree nursery or planting area on state forest lands that are posted or designated closed to motorized uses.

6. Riding in most state parks, state recreation areas, state historic sites, wildlife management areas, state scientific and natural areas with the exception of posted trails and areas.

7. Entering or leaving lands by cutting wire or tearing down fence.

8. Mutilating, destroying, damaging or removing any property within a trail or on state land.

9. Impacting a wetland or public waters wetland in excess of minimum amounts established under law.

The CNF regulates off-highway vehicle use on NFS lands (CNF, 2001). Under authority of the Act of Congress of June 4, 1897, as amended (16 USC 551), and pursuant to the Secretary of Agriculture's Regulations set forth at 36 CFR 261, Subpart B (36 CFR 261.50(a) and (b)), the following acts or omissions are prohibited on National Forest System Lands, National Forest System Roads and Trails within the proclaimed boundaries of the CNF in Minnesota:

1. It is prohibited to possess or use a motor vehicle off National Forest System roads; including road ditches, shoulders, and cross country travel. (36 CFR 261.56).

2. It is prohibited to use an Off Road Vehicle, (ORV) or highway-legal vehicle on National Forest System roads except where and when designated. (36 CFR 261.54(a)).

3. It is prohibited to use snowmobiles on any plowed National Forest System road. (36 CFR 261.54(a)).

4. It is prohibited to use a motor vehicle on a National Forest System road or segment thereof, which has a physical barrier in place, such as: a sign, gate, post, boulder(s) and/or berm(s) to prevent such use. (36 CFR 261.54(b)).

5. It is prohibited to use a motor vehicle on a National Forest System Trail except where designated. (36 CFR 261.55(b)).

6. It is prohibited to use motorized equipment within the Trout Lake, North Winnie, and Suomi semi-primitive non-motorized areas, with the exceptions of the following roads:

   a) NFSR 3494 within Trout Lake SPNMA; (Moonshine Lake);

   b) NFSR 2153 within Suomi SPNMA; (Orange Lake Road):

   c) NFSR 2376 within Suomi SPNMA; (Adele Lake; seasonal restriction);

   d) NFSR 3464 within Suomi SPNMA;(Hill Lake; seasonal restriction);

   e) NFSR 3548 within Suomi SPNMA (Grave Lake).

Pursuant to 36 CFR.50 (e), the following persons are exempt from this order:

1. Any Federal, Tribal, State, or local officer, or member of any organized rescue of fire fighting force in the performance of an official duty.

2. Persons with a permit specifically authorizing the otherwise prohibited act or omission.

The CNF has also developed a Land and Resource Management Plan (CNF, 2004) that provides desired resource conditions, resource management practices, levels of resource production and management, and the availability of suitable land for resource management. Sections 2-42 and 43; and 3-7, 11, 26-28, 30, and 31 provide management direction for off-highway vehicle trail construction, maintenance, and use.

Hubbard County prohibits the operation of off-highway vehicles for cross country travel off designated roads and trails as provided in Minnesota Statute 84.926 subdivision 2 & 4. The designated roads and trails are those included in the Forest Road and Trail Designation Plan for DNR and County Administered forest land in Hubbard County adopted on March 17, 2006. Additionally, Hubbard County Ordinance #36 contains the following restrictions on Forest Land:

1. It is unlawful to construct unauthorized permanent trails.

2. No person shall operate a motor vehicle on forest lands on or over the beds of lakes, rivers, or streams when ice is not covering the water body, except on a bridge culvert, or similar structure or designated low water crossing.

3. No person shall operate a motor vehicle on forest lands on a designated non-motorized trail, including ski, foot, horse, or bike trail, unless the trail is also posted open for a motorized use.

4. No person shall operate nor shall an owner permit the operation of a motor vehicle on forest lands in such a manner that causes damage, erosion or rutting or injures, damages roads and land, or destroys trees, growing crops or other natural resources.

5. No person shall operate motor vehicles on forest lands within the boundaries of an area that is posted and designated as closed to the operation of motor vehicles.

6. No person, passenger, or operator of a motor vehicle shall travel on or along a forest road that is designated as closed with signs, barricaded, or blocked with a gate.

7. A motor vehicle on a forest road shall travel at a speed that is reasonable and prudent. All posted parking and traffic signs and regulations, including but not limited to speed, stop, traffic flow –one way and do not enter shall be obeyed at all times on all forest toads and trails.

Itasca County prohibits the operation of off-highway vehicles on county roads. However, operation of off-highway vehicles is allowed on designated trails, ditch bottoms or on the right slope of the ditch. For additional safety and environmental preservation policies, the county references the MNDNR regulations.

Cass County does not have restrictions for off-highway vehicles on county roads. However, Cass County's Land Use Ordinance, Section 1105 contains the following restrictions:

1. It shall be a violation of this ordinance for any person to operate a motor vehicle on County administered land within 50 feet of a lake, river or type 1-8 wetland except on County - Administered forest trails.

2. It shall also be a violation of this ordinance for any person to destroy native aquatic or upland vegetation, create erosion problems, or cause an increase in sediment deposition into lakes, rivers, or type 1-8 wetlands.

3. It shall be a violation of this ordinance for any person to operate a motor vehicle on County Administered forest trails that are posted: "CLOSED TO MOTORIZED VEHICLES".

The following Minnesota Statues also apply:

84.773 RESTRICTIONS ON OPERATION

Subdivision 1. Restrictions. A person may not intentionally operate an off-highway vehicle:

1. On a trail on public land that is designated or signed for non-motorized use only;

2. On restricted areas within public lands that are posted or where gates or other clearly visible structures are placed to prevent unauthorized motorized vehicle access;

3. Except as specifically authorized by law or rule adopted by the commissioner, in unfrozen public waters, as defined in section 103G.005; in a state park; in a scientific and natural area; or in wildlife management area; or

4. In a calcareous fen, as identified by the commissioner.

Subdivision 2. Wetland disturbance. A person may not operate an off-highway vehicle in a manner to:

1. Indicate a willful, wanton, or reckless disregard for the safety of persons or property;

2. Carelessly upset the natural and ecological balance of a wetland or public waters wetland; or

3. Impact a wetland or public waters wetland in excess of the amounts authorized in section 103G.2241; subdivision 9, unless:

   a) Sequencing of the impact is followed according to section 103G.222, subdivision 1, paragraph (b), and the impact is repaired under section 103G.2242, and rules adopted pursuant to that section; pr

   b) The activity is exempt under section 103G.2241.

The Applicant may construct various barriers at or near road crossings to limit unauthorized off-highway vehicles or other vehicle traffic on the right-of-way with landowner consent. If a barrier is requested on NFS lands, the Applicant would coordinate in advance with CNF regarding design and installation matters. The Applicant would restore the area and revegetate the barrier as needed to aid long-term stability (Enbridge Operations and Maintenance Plan, 2004).

Differing opinions exist between the LLBO and the CNF regarding ATV rules that are in effect within the project area. The DRM believes that tribal members, if operating ATVs in the pursuit of traditional gathering activities, are not subject to regulation by federal, state or county authorities. The CNF belief is that federal rules apply to ATV users when within the confines of the CNF. The issue is unlikely to be resolves as part of this project nor does the issue have a material effect on the environmental review of the project.

3.2.1.5 Direct and Indirect Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no short- or long-term changes to off-highway vehicle access would occur in the context of this project. Off-highway vehicle use of the pipeline corridor would remain prohibited under CNF regulations, and natural barriers (e.g., trees and brush) to off-highway vehicle access would remain undisturbed. The Applicant would not construct the proposed pipeline, remove vegetation, or widen the right-of-way, and an increase in unauthorized off-highway vehicles on the right-of-way would not occur in the context of this project. The Applicant's existing permanent right-of-way would remain the same and activities previously undertaken in the Projects area, such as right-of-way and pipeline maintenance, would still be allowed pursuant to the existing Special Use Permit with the CNF.

Alternative 2

Under Alternative 2, only existing roads would be used to access the Projects area, therefore, no new roads would be created that would potentially allow for unauthorized off-highway vehicles to access the pipeline corridor.

Vegetation at road and trail crossings would be removed from the pipeline corridor during construction and the pipeline corridor would be more visible and accessible from the roads and trails. Forested vegetation would principally be removed by cutting it off at the ground surface and grading and grubbing roots only as necessary to allow installation of the pipe and safe operation of equipment.

Construction would typically result in an increase in the permanent cleared corridor by approximately 75 feet, as depicted on figure 4 (see Appendix 3). A minimum of 65 feet of vegetation could also be cleared for the typical construction right-of-way at road and trail crossings, and possibly more for temporary extra workspaces. The temporary extra workspaces would range from 50 to 100 feet of additional width by 150 to 300 feet in length adjacent to the typical construction right-of-way depending on the crossing method used.

Following construction, the temporary construction right-of-way and extra workspaces would be replanted in accordance with the Applicant's Revegetation and Restoration Monitoring Plan, which is included as an Appendix to the EIS. The permanent maintained right-of-way would be periodically cleared following construction in a manner similar to the existing right-of-way, which would allow brush and other shallow-rooted woody vegetation to develop as a natural barrier to off-highway vehicle use along the pipeline corridor. It is estimated that it would take 5 to 10 years following construction for natural barriers to become re-established following construction.

In order to minimize the visibility and restrict access to the maintained corridor at road and trail crossings, all temporary extra workspaces would be set back 25 feet from the road crossings. In addition, the Visual Impact Assessment (VIA) and Visual Mitigation Plan (see Appendix M of the EIS) specifies tree planting and small berm installation which will also restrict visibility and access to the pipeline corridor (approximately 20 feet beyond the existing right-of-way boundary).

Discussions are ongoing between the DRM, CNF and the Applicant regarding site-specific mitigation measures that would be implemented if the proposed Projects are approved.

Alternative 3

Alternative 3 crosses more roads than Alternative 2, and would increase access for off-highway vehicles to the right-of-way. Access to Alternative 3 is more remote, and as a result, construction traffic will have to travel longer distances, and may increase noise and dust levels in the area. Measures to prevent or restrict off-highway vehicles access would be similar to Alternative 2. The VIA, Appendix M of the EIS, includes possible mitigation measures that may be employed to reduce off-highway vehicles access.

Alternative 4

Alternative 4 would require the construction of a new utility corridor, or greenfield route, through the CNF. This route would cross 29 roads within the CNF, 9 of which would provide new access to the right-of-way for off-highway vehicles. Access is more remote for Alternative 4 than for Alternatives 2 and 3, which may lead to additional impacts during construction. Restriction measures for roads crossed would be identical to Alternatives 2 and 3.

3.2.1.6 Cumulative Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no cumulative effects would occur.

Alternative 2

Construction of the proposed pipeline would result in some cumulative off-highway vehicle effects when considered in conjunction with existing CNF Service and other local roads, U.S. Highway 2, the BNSF Railroad, the existing Applicant pipelines, the Mi-Ge-Zi bike trail, and the Soo Line off-highway vehicle trail. Construction of these projects has occurred at various times in the past. Increases in the off-highway vehicle access points as a result of these projects are no longer relevant as these projects have been completed and are expected to be maintained. Maintenance work could be expected on some or all of these facilities in the future, but the time, location, and magnitude of the projects cannot be predicted. Should a maintenance project occur, it may require additional construction, which, in turn, could result in a temporary increase in the visibility and number of points for unauthorized off-highway vehicles to access the pipeline corridor. Maintenance work would generally be expected to be infrequent and smaller in scale than original construction, and therefore the impacts would be expected to be relatively minor.

Proposed future activities in the Projects area could include implementation of the Cuba Hill RMP and construction of the 230 kV HVTL. The RMP has no known implementation date, and any activities that could cumulatively increase the opportunity for off-highway vehicle access are not known at this time. The HVTL is scheduled for installation in 2009 to 2011. Installation of the HVTL would require additional tree clearing in any areas of collocation that would cumulatively increase the opportunity for off-highway vehicles to access the pipeline corridor.

With the implementation of the buffer along road crossings according to the Applicant's Revegetation and Restoration Monitoring Plan, a long term reduction in access to the corridor is expected. An increase in short-term access to the corridor may be noticed until plantings mature.

Alternative 3

Proposed future activities in the vicinity of Alternative 3 could include implementation of the Cuba Hill RMP and construction of the 230 kV HVTL. The RMP has no known implementation date, and any activities that could cumulatively increase the opportunity for off-highway vehicle access are not known at this time. The HVTL is scheduled for installation in 2009 to 2011. Installation of the HVTL would require additional tree clearing along the majority of Alternative 3 that would cumulatively increase the opportunity for off-highway vehicles to access the pipeline corridor. Mitigation similar to what is described in Alternative 2 would be expected.

Alternative 4

Alternative 4 would have similar cumulative effects as Alternative 3, but increase opportunities for off-highway vehicle access for the greenfield portion.

3.2.2 Scoping Issue 4 – Effects on Local Transportation

3.2.2.1 Description

Pipeline construction may result in effects on transportation surrounding the Projects area; therefore, a general discussion of the effects of pipeline construction on transportation is presented as part of this environmental analysis.

3.2.2.2 Indicator

Effects on roads were evaluated based on anticipated additional construction traffic and proposed road closures.

3.2.2.3 Scope

The scope of the roads analysis includes all CNF jurisdictional roads on the proposed route.

3.2.2.4 Affected Environment

The Projects area is readily accessible by an extensive system of roads, including local, collector, and arterial roads, most notably U.S. Highway 2. The proposed Projects would involve construction across 12 numbered Forest roads and four unclassified Forest roads. The most significant forest roads crossed by the Projects include Forest Road 2137 (Pike Bay Loop), Forest Road 2133 (Cuba Hill Road), Forest Road 2930, Forest Road 2135 (Ketchum Road), Sucker Bay Road, Portage Lake Road, and Portage Road. None of these roads are major arterial roadways. Tables 3.2.2-2, 3.2.2-3, and 3.2.2-4 provide the MP, road name, jurisdiction, type, surface, and restriction data of each road crossed by each alternative.

The proposed Projects would utilize an as-yet undetermined number of roads (including U.S. Highway 2 and Minnesota State Highway 371) to transport personnel, equipment, and materials to the construction site (see tables 3.2.2-2, 3.2.2-3, and 3.2.2-4). Most roads proposed for access on the Projects already allow for the passage of a range of vehicles, including high-clearance vehicles and logging trucks. Roads in the Projects area experience wide levels of year-round use by area residents, recreational users, and logging trucks.

3.2.2.5 Direct and Indirect Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no short- or long-term changes to roads or traffic would occur. The Applicant would not construct the proposed pipeline and an increased use of roads would not occur. The Applicant's existing permanent right-of-way would remain the same and activities previously undertaken in the Projects area, such as right-of-way and pipeline maintenance, would still be allowed pursuant to the existing Special Use Permit with the CNF.

Alternative 2

Pipe and other construction materials would be delivered to contractor yards in the general Projects vicinity outside of the CNF by rail or truck. Construction vehicles would load equipment and materials at predetermined contractor yards and transport them on approved access roads to the construction right-of-way. Pipe in lengths of 40 to 80 feet would be hauled from the yards by truck trailers throughout the stringing phase of construction.

No new roads would be constructed as part of the proposed Projects. Most of the existing roads are gravel, and improvements to these roads, such as widening, grading, or filling, are not expected. Construction traffic accessing the right-of-way would travel approximately 500 yards from U.S. Highway 2, and noise and dust in the area would be minimized.

The existing transportation system within the Projects area could be temporarily affected by the use of roads to move construction equipment, materials, and workers to and from the work site, and from pipeline construction across roadways. An increase in traffic volume would occur during morning and evening peak times, corresponding to normal workday hours. It is expected that up to 50 vehicles would be transporting equipment, materials, and workers to the site each day during the height of construction. Some project-related vehicles would make single trips to and from the Projects site while others would make multiple trips.

Existing average daily traffic (ADT) counts for each access road would be researched when access roads are identified for the Projects. The information will be presented in a format similar to table 3.2.2-1. It is expected that construction activities would result in a modest increase in traffic flow of up to six percent on the highways during the most active phase of construction. This increase would be well within the normal variation of highway traffic flow. Based on information gathered from the CNF office, ADT on forest roads can have an ADT of 100 or greater, depending on the time of year. An increase in traffic flow of between 40 and 200 percent would be expected on these roads during peak construction times. The increase in traffic would be within the capacity of the roads as estimated by the CNF. Roads that would experience the greatest percentage increase in traffic would be the smaller Forest Roads, which would see an expected increase in traffic flow from 1000 to 2000 percent. The increase would be within the capacity of these roads, but because these roads are infrequently used, the impacts on travelers are not expected to be significant.

The primary effect of construction on roads would be heavier traffic on access roads and some slow-moving construction vehicles on roads in the general area. Traffic disturbances would be limited to the duration of construction and would occur mostly during daylight hours. The CNF would require the Applicant to use appropriate traffic controls, such as flag persons, signs, barriers, and flashing lights.

Table 3.2.2-1 – Average Daily Traffic Counts on Potential Access Roads

MP	Road Name	Current ADT Count[1]	Expected ADT During Peak of Construction	Percent Change
974.03	County Hwy 8	760	To be determined when access roads are defined by Applicant.	To be determined when access roads are defined by Applicant.
986.71	County Rd 137	135		
986.98	County Rd 137	135		
987.64	County Rd 137	135		
994.44	White Oak Public Access Road	85		

[1] The source of ADT counts for roads identified in this table is: Minnesota Department of Transportation. 2008 web site (www.dot.state.mn.us/tda/data/fnlstf00.pdf). .

Note: Exact ADT data for forest roads crossed by pipeline construction was unavailable. However, depending on the road level of maintenance, CNF estimates an average traffic volume of 5-20 cars per hour during regular park hours.

During construction, heavy equipment utilizing the roads could track soil and mud onto the roadway. Dirt and mud on paved roads can cause slippery conditions. To minimize the tracking of mud onto paved roads, a combination of matting, culvert installation, and crushed stone access pads would be installed at paved road crossings. These pads help remove mud from vehicles prior to leaving the work area. If excess soil or mud is tracked onto roadways, it would be shoveled off as soon as possible and placed within a sediment containment structure. Sediment barriers would be installed at the bases of slopes adjacent to roads to prevent sediment from the construction area from being washed onto roads during rain events.

Air quality impacts associated with construction include emissions from fugitive dust, fossil-fueled construction and temporary fuel transfer systems and related storage tanks. Air emissions from construction traffic and equipment would be intermittent and short term, and would not significantly affect local or regional air quality. Emissions from construction-related activities would not produce significant air quality impacts, and fugitive dust emissions from access road traffic would be minor. The applicant will monitor fugitive dust from construction activities on unpaved roads and will spray roads if needed with water for dust suppression purposes.

To prevent the deterioration of paved roads from tracked vehicles, tracked vehicles would be transported to the site on rubber-tire trailers. In addition, a combination of rubber mats and plywood sheets would be used to protect the road surface when driving tracked vehicles across paved roads. All roads used during construction (paved and gravel) would be restored to their pre-construction condition as agreed upon between the CNF and the Applicant and may be documented by photographs prior to construction. The CNF and the Applicant would work together to determine photographic documentation requirements regarding road conditions prior to construction.

Temporarily closing roads to facilitate pipeline installation could affect the existing transportation system. Where it is determined that paved roads and gravel roads that provide the sole access to private property or designated recreation areas within the LLR and CNF cannot be crossed by the bore method, then the roads may be open cut provided the right-of-way is kept open to traffic at all times through the use of bridging equipment or other special-construction techniques. Other roads could be closed for up to 24 hours to allow open-cut trenching and pipe placement across the roadway but detours would be provided. Some roads may be closed for up to 1 month to eliminate the need for additional workspaces that are necessary for the special construction technique used on roads that can not be closed for extended periods of time. All connector/detour routes would be inspected prior to designation to ensure that passenger cars can use the roads safely. The Applicant would be required to provide 72-hour advance notice to the LLBO, CNF and state and local emergency responders (fire, police, and medical, including Leech Lake Department of Public Safety) when Forest Roads or roads that provide access to National Forest Lands would be closed due to use of the open cut crossing method.

The most significant forest roads crossed by the Projects include Forest Road 2137 (Pike Bay Loop), Forest Road 2133 (Cuba Hill Road), Forest Road 2135 (Ketchum Road), Sucker Bay Road, Portage Lake Road, and Portage Road. Several other forest roads would be used to access the pipeline corridor.

Table 3.2.2-2 – Roads Crossed by Alternative 2

MP	Road Name	Jurisdiction[1]	Type [2]	Surface	Restrictions[3]		
					Vehicle Designation	Date Open	Date Closed
958.29	Forest Road 2137 (Pike Bay Loop NW)	CNF	Collector	Gravel	HLV Only		
960.28	Forest Road 2133 (Cuba Hill Road NW)	CNF	Collector	Gravel	HLV Only	01/1	12/31
					OHV Only	05/1	03/15
961.26	Forest Road 2298	CNF	Collector	Gravel	All Vehicles	7/2	2/29
962.59	Forest Road 2930	CNF	Collector	Gravel	HLV Only	01/1	12/31
					OHV Only	05/1	03/15
963.6	Unknown or No Street name		Local	Gravel			
964.52	Unknown or No Street name		Local	Gravel			
964.82	Unknown or No Street name		Local	Gravel			
965.24	Forest Road 2135 (Ketchum Road NW)	CNF	Collector	Gravel	HLV Only	01/1	12/31
					OHV Only	05/1	03/15
966.98	Sucker Bay Road NW	CC	Arterial	Paved			
969.16	(Portage Lake Road NE)	LLBO TAR	Local	Paved			
970.41	Iowana Beach Rd NW		Local	Gravel			
970.89	Portage Rd NE	CC	Local	Gravel			
971.64	Wildwood Dr. NE	NA	Local	Gravel			
972.57	Forest Road 2129	CNF	Local	Gravel	HLV Only	01/1	12/31
					OHV Only	05/1	03/15
972.71	Forest Route 3033	CNF	Local	Gravel	HLV Only	01/1	12/31
					OHV Only	05/1	03/15
974.03	County Hwy 8	CC	Arterial	Paved			
975.63	Old Six Mile Lake Road		Local	Gravel			
976	Forest Road 3052	CNF	Local	Gravel	HLV Only	01/1	12/31
					OHV Only	05/1	03/15
978.32	Forest Road 2127	CNF	Local	Gravel	HLV Only	01/1	12/31
					OHV Only	05/1	03/15
980.65	Unknown or No Street name		Collector	Gravel			
983.32	Forest Road 3079	CNF	Collector	Gravel	HLV Only	01/1	12/31
					OHV Only	05/1	03/15
985.24	Forest Road 2127	CNF	Collector	Gravel	HLV Only	01/1	12/31
					OHV Only	05/1	03/15
986.71	County Rd 119	CC	Arterial	Paved			
986.98	County Rd 137	CC	Arterial	Paved			
987.64	County Rd 137	CC	Arterial	Paved			
994.44	White Oak Public Access Road	NA	Local	Paved			

MP	Road Name	Jurisdiction[1]	Type [2]	Surface	Restrictions[3]		
					Vehicle Designation	Date Open	Date Closed

[1] USDOT = United States Department of Transportation
CNF = Chippewa National Forest
CC = Cass County Highway Department
LLBO TAR = Leech Lake Band of Ojibwe Tribal Administered Road

[2] Local = roads that connect terminal facilities, such as log landings and recreation sites, with collector or arterial roads, or with public highways. These roads are often less than 1.5 miles in length and typically serve a single resource. Collector = roads that connect major, heavily traveled, multiple-purpose arterial roads and single-resource local roads. Arterial = roads that provide service to large land areas, usually from 3,000 to 10,000 acres. In many cases, arterial roads are public highways.

[3] HLV = Highway Legal Vehicles, these roads are open to only motor vehicles licensed under State law for general operation on all public roads within the State. OHV = Off-highway vehicles.

Forest Road 2137 (Pike Bay Loop) is a two-lane gravel collector road that provides access to a boat ramp, the Ojibway Resort, approximately 40 summer residences, and a National Forest campsite on Pike Bay. It also provides access to the Mi-Ge-Zi Bike Trail. This road may be closed at the pipeline crossing during construction, and traffic would be detoured on to Forest Road 2133 (Cuba Hill Road) which would remain open during construction across Forest Road 2137 (Pike Bay Loop). Access to Forest Road 2137 (Pike Bay Loop) is also available from State Highway 371 south of the Projects area. This road, as well as other road closings, would be coordinated with municipal public works officials (where relevant), the Leech Lake Department of Public Safety, other appropriate municipal police departments, county sheriffs, *etc*. Barriers and signs would be erected in accordance with the Minnesota Uniform Traffic Control Devices Manual.

Forest Road 2133 (Cuba Hill Road) is a significant two-lane gravel collector road between U.S. Highway 2 and the west side of Sucker Bay on Leech Lake. This road receives a high degree of logging and tourist traffic. If this road would be closed during construction, traffic would be detoured on to Forest Road 2135/2136, which would remain open during construction across Forest Road 2133 (Cuba Hill Road).

Forest Road 2135 (Ketchum Road) is a two-lane gravel collector road providing access to several area lakes and private residences from U.S. Highway 2. If this road would be closed during construction, traffic would be detoured to Sucker Bay Road, which would remain open throughout construction.

Sucker Bay Road is a two-lane asphalt road under the jurisdiction of Cass County, and is a collector road between U.S. Highway 2 and the east side of Sucker Bay on Leech Lake. This road receives a moderate amount of traffic, including tourist traffic to the lake. Because it is an asphalt road, it is likely that this crossing would be bored during construction. However, if it is determined that the road cannot be bored, the road may be open cut by the Applicant, and the Applicant would attempt to keep the road open to traffic at all times through the use of bridging equipment or other special construction techniques.

Portage Lake Road is a local, single-lane paved tribal road that provides the only access to a boat ramp and campground on Portage Lake. Although it is a gravel road, it would either be bored during construction or traffic would otherwise be provided access in order to maintain access to the boat ramp and campground at all times.

Portage Road is a single-lane gravel road under the jurisdiction of Cass County and is a collector road between U.S. Highway 2, Portage Lake, and Leech Lake. If this road would be closed during construction, traffic would be detoured onto Sucker Bay Road. Sucker Bay Road would remain open throughout construction.

Alternative 3

Under Alternative 3, effects of construction on roads and traffic would be similar to Alternative 2. The Alternative 3 area is less readily accessible but is still served by a system of roads, including local, collector, and arterial roads. The proposed Projects would involve construction across twenty-three numbered Forest roads and five unclassified Forest roads. Table 3.2.2-3 represents all roads crossed by Alternative 3, including significant forest roads. Alternative 3 crosses four roads that have been identified by The USFS as being on the list for decommissioning within the next 5 years; 2927A, 2140, 2131B and 2140A. Access to the Alternative 3 route is more remote than access to Alternative 2, and as a result, there would be an increase in traffic over a longer distance, which would increase noise and dust in the area throughout construction.

Table 3.2.2-3 - Roads Crossed by Alternative 3

Road Name	Jurisdiction [1]	Type [2]	Surface	Restrictions [3]		
Forest Road 2136	CNF	Collector	Gravel	HLV Only		
Forest Road 3913	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 3917	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 3901	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 3917	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2133	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2135 (Ketchum Rd NW)	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2135Z	CNF	Local	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2966	CNF	Local	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Sucker Bay Road		Arterial	Gravel			
Forest Road 2927A	CNF	Local	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2341	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2341	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2341	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Sunset Beach Road		Arterial	Gravel			
Pipeline Road		Local	Gravel			
Unknown or No Street name		Collector	Gravel			
Forest Road 2131B	CNF	Local	Gravel	HLV Only		
Forest Road 3033	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
County Road 8	CC	Arterial	Paved			
Forest Road 3032	CNF	Local	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2140B	CNF	Local	Gravel	HLV Only	04/1	11/30

Road Name	Jurisdiction [1]	Type [2]	Surface	Restrictions [3]		
				OHV Only	05/1	11/30
Forest Road 2140	CNF	Collector	Gravel	HLV Only		
Forest Road 2140A	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Unknown or No Street name		Arterial	Gravel			
Old Six Mile Lake Road		Arterial	Gravel			
Forest Road 3052	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2127	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Unknown or No Street name		Collector	Gravel			
Forest Road 3079	CNF	Collector	Gravel	HVL Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2127	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
County Rd 119	CC	Arterial	Paved			
County Rd 137	CC	Arterial	Paved			
County Rd 137	CC	Arterial	Paved			
White Oak Public Access Road	NA	Local	Paved			

[1] USDOT = United States Department of Transportation
CNF = Chippewa National Forest
CC = Cass County Highway Department

[2] Local = roads that connect terminal facilities, such as log landings and recreation sites, with collector or arterial roads, or with public highways. These roads are often less than 1.5 miles in length and typically serve a single resource. Collector = roads that connect major, heavily traveled, multiple-purpose arterial roads and single-resource local roads. Arterial = roads that provide service to large land areas, usually from 3,000 to 10,000 acres. In many cases, arterial roads are public highways.

[3] HLV = Highway Legal Vehicles, these roads are open to only motor vehicles licensed under State law for general operation on all public roads within the State. OHV = Off-highway vehicles.

Alternative 4

Alternative 4 would cross nine roads that have not been previously affected by utility corridors. Construction of this alternative involves construction across thirty numbered forest roads and four unclassified roads. Table 3.2.2-4 outlines significant roads crossed by the Projects. Access to Alternative 4 would be similar to access available in Alternative 3, except for in the greenfield portion. Access to the greenfield portion of the route is more remote, and as a result dust and noise from construction activities would affect a new area. Alternative 4 crosses four roads that have been identified by the USFS as being on the list for decommissioning within the next 5 years; 2927A, 2140, 2131B, and 2140A.

Table 3.2.2-4 - Roads Crossed by Alternative 4

Road Name	Jurisdiction [1]	Type [2]	Surface	Restrictions [3]		
144th St NW		Collector	Paved			
Forest Road 2136	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 3772	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15

Road Name	Jurisdiction [1]	Type [2]	Surface	Restrictions [3]		
Unnamed or No Street name		Local	Gravel			
Forest Road 3772	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2133I	CNF	Local	Gravel	HLV Only	8/16	3/31
				OHV Only	8/16	3/15
Forest Road 3915	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 3914	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2133	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2135 (Ket-chum Rd NW)	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2135Z	CNF	Local	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2996	CNF	Local	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Sucker Bay Road		Arterial	Gravel			
Forest Road 2927A	CNF	Local	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2341	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2341	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2341	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Sunset Beach Road		Arterial	Gravel			
Pipeline Road		Local	Gravel			
Unknown or No Street name		Collector	Gravel			
Forest Road 2131B	CNF	Local	Gravel	HLV Only		
Forest Road 3033	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
County Road 8	CC	Arterial	Paved			
Forest Road 3032	CNF	Local	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2140B	CNF	Local	Gravel	HLV Only	04/1	11/30
				OHV Only	05/1	11/30
Forest Road 2140	CNF	Collector	Gravel	HLV Only		
Unknown or No Street name		Arterial	Gravel			
Old Six Mile Lake Road		Arterial	Gravel			
Forest Road 3052	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2127	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15

Road Name	Jurisdiction [1]	Type [2]	Surface	Restrictions [3]		
Unknown or No Street name		Collector	Gravel			
Forest Road 3079	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
Forest Road 2127	CNF	Collector	Gravel	HLV Only	01/1	12/31
				OHV Only	05/1	03/15
County Rd 119	CC	Arterial	Paved			
County Rd 137	CC	Arterial	Paved			
County Rd 137	CC	Arterial	Paved			
White Oak Public Access Road	NA	Local	Paved			

[1] USDOT = United States Department of Transportation
CNF = Chippewa National Forest
CC = Cass County Highway Department

[2] Local = roads that connect terminal facilities, such as log landings and recreation sites, with collector or arterial roads, or with public highways. These roads are often less than 1.5 miles in length and typically serve a single resource. Collector = roads that connect major, heavily traveled, multiple-purpose arterial roads and single-resource local roads. Arterial = roads that provide service to large land areas, usually from 3,000 to 10,000 acres. In many cases, arterial roads are public highways.

[3] HLV = Highway Legal Vehicles, these roads are open to only motor vehicles licensed under State law for general operation on all public roads within the State. OHV = Off-highway vehicles.

3.2.2.6 Cumulative Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no cumulative effects would occur.

Alternative 2

Construction of the proposed pipeline would not result in cumulative effects on roads or traffic when considered in conjunction with past construction of U.S. Highway 2, the BNSF Railroad, the existing Applicant pipelines, the Mi-Ge-Zi bike trail, or the Soo Line off-highway vehicle trail. No new roads would be constructed as part of the proposed Projects. Also, all roads used during construction (paved and gravel) would be restored to their pre-construction condition after work is completed as agreed upon between the CNF and the Applicant and documented by photographs prior to construction. The CNF and the Applicant would work together on photographing the road conditions.

Proposed future activities in the Projects area include implementation of the Cuba Hill RMP and construction of the 230 kV HVTL. Specific dates for the implementation of the RMP have not been established, although the Projects are generally expected to be implemented over the next 5 years. The HVTL is scheduled for construction from 2009 - 2011. The Applicant's proposed construction schedule calls for summer construction in 2009 and possible winter construction in 2009-2010. This would allow for an in-service date in the first quarter of 2010. Given the construction schedules, some overlap of the projects may occur, and traffic from two or more of the projects could be in the same area at the same time. However, given the current project schedules, it is unlikely that any of the projects' peak phases would overlap, and consequently the additive impacts on roads or traffic would be expected to be relatively small.

Alternative 3

The cumulative effects of Alternative 3 on roads and traffic would be similar to Alternative 2. If the 230 kV HVTL project is built along its proposed route and collocated with Alberta Clipper and Southern Lights along the Applicant's Alternative 3, and if the two projects' schedules overlap, traffic from the two projects could be in the same area at the same time. However, given the current project schedules, it is unlikely that any of the projects' peak phases would overlap, and consequently the additive impacts on roads or traffic would be expected to be relatively small.

Alternative 4

The cumulative effects of Alternative 4 on roads and traffic would be similar to Alternative 3, except that Alternative 4 would cross one section of the Cuba Hill RMP twice, while Alternative 3 would only cross it once. The 230 kV HVTL project is considering this route as a potential alternative. If both projects are to be constructed along the Alternative 4 route, and if the two projects' schedules overlap, traffic form the two projects could be in the same area at the same time. However, given the current projects schedules, it is unlikely that any of the projects' peak phases would overlap and consequently the additive impacts on roads and traffic would be expected to be relatively small.

3.3 VEGETATION AND WILDLIFE ANALYSIS

3.3.1 Scoping Issue 5 – Wildlife Movement

3.3.1.1 Description

Widening the existing utility/transportation corridor (consisting of the existing pipelines, U.S. Highway 2, and the Burlington Northern Santa Fe Railroad) was identified during scoping as an issue because it may exacerbate the present disruption in connectivity of habitat of wide-ranging carnivores, such as the wolf (*Canis lupus*), Canada lynx (*Lynx canadensis*), black bear (*Ursus americanus*), and marten (*Martes americana*). In particular, increasing the width of the cleared corridor could reduce security cover, thereby affecting movement and fragmenting habitat.

3.3.1.2 Indicator

The effects of the Projects on large carnivore movements were evaluated by reviewing the existing and proposed changes to corridor widths, and by reviewing existing studies on large carnivore movements across existing corridors.

3.3.1.3 Scope

The scope of analysis of impacts on wildlife movements includes the forested areas that would be cleared by construction of the proposed Projects.

3.3.1.4 Affected Environment

U.S. Highway 2, the BNSF Railroad, and the Applicant Pipeline corridors occur in close proximity to each other (i.e., generally within 100 to 200 feet) along the majority of Alternative 2. All three extend in a generally east to west direction. Human activity and disturbance regularly affects wildlife along these corridors; average daily traffic on U.S. Highway 2 runs to 3,400 vehicles per day (see table 3.2.1-1), and there are regular trains and intermittent local traffic on Forest Roads and trails throughout the Projects area.

Each of the respective corridors vary in terms of width of existing cleared or maintained non-forested span; the U.S. Highway 2 corridor varies between 130 and 200 feet wide, the BNSF Railroad varies between 30 and 100 feet wide, and the non-forested width along the existing Applicant pipeline corridor varies from 20 to 125 feet wide. The pipeline corridor, which includes the existing cleared area and the proposed cleared area for both the permanent easement and the temporary workspace, may be up to 265 feet wide. The permanent easement portion of the Projects may be up to 200 feet wide. A schematic that illustrates the pipeline right-of-way configuration is included as figure 4 (see Appendix 3).

There are a few locations (described below) where these open corridors merge and can be considered one very large open corridor. Otherwise, the existing joint utility/transportation corridors are separated from each other by forested strips or vegetative buffers consisting of trees and brush in widths from 25 to 250 feet wide.

The existing pipeline corridor is maintained in low herbaceous and woody vegetation. Large forested areas and unpopulated areas generally exist north and south of the existing rights-of-way, particularly east of Forest Road 2137 (Pike Bay Loop). The forest types vary in age and class but generally provide the kind of cover, forage habitat, and breeding habitat necessary for large carnivores to survive. To the west of Pike Bay Loop, forested areas are generally smaller or nonexistent, as exemplified by those adjacent to the open-water areas of Pike Bay and Cass Lake, or in the City of Cass Lake. There are also greater numbers of residences, larger human populations, and concurrent increases in human activity west of Pike Bay Loop, including numerous campgrounds, paved trails, and recreation areas. Given these facts, it is believed that the relative population density and human activity west of Pike Bay Loop would tend to provide poor cover, forage, or habitat, and generally inhibit large carnivore habitation or movement in that area of the Projects.

The locations at which two or three of the existing rights-of-way merge into one large open utility and transportation corridor occur at MPs 955.5 to 958.3 (north side of Pike Bay), at MP 974.0 (City of Bena), and at MP 987.1 (City of Ball Club). The first area, from MP 955.5 to 958.3, is located from the eastern edge of the City of Cass Lake to Pike Bay Loop. As stated above, this segment is relatively populated, particularly north of U.S. Highway 2, and it is not likely to attract or sustain large carnivores.

The other two areas, located at MPs 974.1and 987.1, are similarly prohibitive to the movement of large carnivores due to their relatively urban nature. These areas create a large open corridor primarily due to the presence of developed residential and industrial land and the resulting lack of trees between the utility and transportation rights-of-way. At these two locations, the existing corridors can be detected but are not readily distinguishable from one another. These two locations may provide some suitable road crossing locations for large carnivores such as black bear and other species that have grown less sensitive to human activities. However, wolves would likely not prefer these areas. Kohn et al. (2000) documented that wolves prefer to cross highways where they bisect large, homogeneous landscapes, especially lowland complexes. These two sites are homogeneous in nature but do not exhibit the typical characteristics of lowland complexes and wolves tend still to shy away from human activities.

Alternatives 3 and 4 follow an existing utility corridor as well, though this corridor does not include railroad or road rights-of-way. The existing utility corridor is approximately 75 feet wide. Alternatives 3 and 4 generally cross more forested areas west of Bena, with fewer human activities than Alternative 2. There are more lakes and rivers crossed by these alternatives, and the route goes through the Ottertail Peninsula, one of the Forest's largest contiguous tracts of mesic hardwood forest. To the east of Bena, where the alternatives would rejoin with the existing Applicant corridor, the landscape is dominated by aspen and pine plantations.

3.3.1.5 Direct and Indirect Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no short- or long-term changes to vegetative or wildlife communities would occur. The proposed pipeline would not be constructed and no clearing of vegetation would be required. The Applicant's existing permanent right-of-way would remain the same and activities previously undertaken in the Projects area, such as right-of-way and pipeline maintenance, would still be allowed pursuant to existing arrangements with the CNF. Any non-forested or open barriers the existing corridors create for large carnivore movements would continue to be non-forested and open.

Alternative 2

Based on the existing environment west of Forest Road 2137 (Pike Bay Loop), where there is little to no suitable habitat for large carnivores, there would be no additional direct or indirect effects from Alternative 2 on the movements of large carnivores. Frair (1999) found that wolves avoid developed lands and do not cross highways in areas adjacent to homes, lakes or large rivers. Therefore, it is unlikely that the expansion of the Applicant right-of-way would alter large carnivore use of the area west of Pike Bay Loop.

In general, carnivores are particularly vulnerable to habitat fragmentation because of their large home ranges, low reproductive rates, and low population densities. Road corridors can affect large carnivore movements through direct mortality, indirect mortality, displacement or avoidance, habitat fragmentation, and direct habitat loss. Examples of direct mortality on large carnivores are numerous. Gibeau and Heuer (1996) documented direct mortality from collisions with vehicles in coyote (*Canis latrans*), black bear, cougar (*Felis concolor*), grizzly bear (*Ursus arctos*), wolverine (*Gulo gulo*), and Canada lynx. Kohn et al. (2000) reported that 10 wolves were killed in collisions with vehicles during the study period of 1992 to 1999. Indirect mortality usually results when roads/corridors provide additional human access to carnivores where none existed prior to the construction of the corridor. Numerous researchers have found that as road densities increase, habitat suitability for large carnivores decreases (Mech, 1989; Thiel, 1985; Lavallo and Anderson, 1996). Road densities greater than 0.93 mile of road per square mile have been shown to reduce habitat security and increase mortality for a range of predators, including wolves, black bear and Canada lynx (Theil, 1985; Britell et al., 1989; Naney, 1991; Brody and Pelton, 1989).

Displacement and avoidance studies show that large carnivores usually avoid crossing primary and secondary hard-surfaced highways and improved dirt roads, favoring unimproved dirt roads and trails (Beldon and Hagedorn, 1993; Lovallow and Anderson, 1996). Habitat fragmentation that results from the building of roads and associated development (e.g., railroads, power lines, and other utility corridors) may artificially define territories of individuals or packs (Kohn et al., 2000) and reduce connectivity of habitat (Ruediger, 1996). Direct loss of habitat can be quantified by calculating the area currently utilized by large carnivores that would be changed, cleared, or eliminated once a project has been constructed.

Research is scarce regarding how wide of an open corridor would limit large carnivore movements in forested landscapes. For example, most studies on lynx movements focus on the limits to movement caused by highways and roads, not vegetated corridors. The Biological Assessment/ Biological Evaluation (BA/BE) describes potential affects to movement of the Canada lynx (section 2.4.1.1), gray wolf (section 2.4.1.2), and mountain lion (section 2.4.1.3) for each alternative. In summary, the presence of existing collocated facilities adjacent to the existing utility/transportation corridor has not limited lynx movements in the recent past (MDNR, 2007). However it is not known what limiting crossing thresholds are for the lynx. Wolves have been seen traveling on the existing Applicant right-of-way, and the existing utility corridor (adjacent to proposed Alternatives 3 and 4) by field surveyors in the last year. Existing road densities would not be expected to increase after construction of the proposed Projects, and the proposed alternatives do not cross large areas of remote habitat which wolves prefer. The additional corridor width would not be anticipated to impact movement of wolves in this area. The presence of wolves within the Projects area suggests that wolves have adapted to the current utility/transportation corridor. The construction of Alternative 2 would temporarily limit movement of the lynx and other species during construction of the proposed project through the forest.

In the same manner that large carnivores are negatively impacted by road and corridor construction, they can also be aided by corridor presence. Unimproved roads or maintained corridors can act as preferred travel routes and forage areas. Gehring (1995) found that wolves used man-made roads and trails extensively when traveling within their territories during winter. They selected travel routes with shallower snow depths, greater visibility, and lower stem densities, and the man-made roads and trails provided these features. Likewise, Brody and Pelton (1989) found that black bear sometimes used abandoned roads as travel corridors. Frair (1999) found that as wolves approached major highways, 37 percent of the trails followed coincided with trails such as railroad tracks, pipeline rights-of-way, plowed roads or snowmobile trails. Biologists conducting songbird, raptor, and plant surveys for the Applicant regularly observed evidence of corridor use (i.e., tracks and scat) by wolves and black bear on the existing pipeline right-of-way.

The direct effects of the proposed Projects on the movement of large carnivores within Alternative 2 (the proposed route) fall into three categories: temporary and permanent loss of habitat adjacent to the existing Applicant corridor, a temporary increase in noise associated with pipeline construction, and a temporary increase in traffic along U.S. Highway 2 during pipeline construction while construction equipment and personnel arrive at various portions of the Projects area as the Projects proceed.

The proposed Projects would typically widen the existing pipeline corridor by 140 feet temporarily and by up to 75 feet permanently. Impacts on open communities would last one to two seasons following construction because herbaceous and shrub species would regenerate suitable forage conditions within this span of time (see the Applicant's Environmental Mitigation Plan in Appendix F of the EIS). Large carnivores (wolves and black bear) utilize the Upland Open community type during foraging and seasonal or daily movements. However, this habitat type does not provide optimal den habitat for wolves or other large carnivores due to the lack of cover.

Adjacent forested habitats are more likely to provide adequate habitat for hunting and rearing of young. Impacts on the forested areas could last up to 60 years, as the clearing of trees would convert existing forested areas to open areas. Table 3.3.2-2 provides the acreage of forested ecosystems affected by the four proposed alternatives. The temporary work-space would be actively reforested by the Applicant as part of the reforestation plan that will be developed in cooperation with the CNF and the LLBO; these forested areas would require more than 2 years to return to a shrubby condition, and over half a century to regenerate larger trees. These regeneration areas provide habitat for large herbivores such as white-tailed deer (*Odocoileus virginianus*). A review of North American studies indicates that wolf numbers are directly related to ungulate biomass. Where deer are primary prey, territory size is related to deer density. Deer availability likely affects pup survival, the major factor in wolf population growth (Fuller, 1989).

An increase in pioneering species such as raspberries and browsing may increase on the corridor by deer and black bear (Jaako Pöyry Consulting, 1994; Garshelis and Noyce, 2008; NatureServe Explorer Species Report). Therefore, to the degree that the improved forage habitat benefits deer it should also benefit wolves. However, improvements in forage habitat could also increase large carnivore mortality. Deer use of the regenerating corridor may also increase the attractiveness of the pipeline corridor as a hunting area for species such as wolves (Fuller, 1989); this could increase wolf use of areas adjacent to U.S. Highway 2 and may increase large carnivore-vehicle accidents or encounters.

The increase in noise that would occur within the Projects area would be temporary (2 to 3 months) in duration and small in terms of decibel increase. Pipeline construction usually occurs in stages or in assembly-line fashion and the amount of traffic or equipment and the associated noise varies. In most cases the noise associated with pipeline construction would not be any more significant than noise that is currently generated along the U.S. Highway 2 and BNSF Railroads, although it would be more sustained during the construction period.

Average daily trips along U.S. Highway 2 would increase as pipeline construction gets underway. However, this increase in traffic would occur sporadically over the time it takes to construct the Projects. The various stages of pipeline construction require a varying number of individuals to complete each stage. For example, clearing and grading can usually be accomplished by as few as six to ten people depending upon the amount of land being cleared, while welding may take up to 25 people at any one location. Due to the sporadic and temporary nature of pipeline construction it is unlikely that the construction of the Projects would create enough disturbance to alter long-term large carnivore movement patterns.

Widening the existing pipeline corridor could result in additional human disturbance after construction by encouraging additional off-road vehicle use on the right-of-way. However, The Applicant has agreed to construct various barriers at or near road crossings to limit unauthorized off-road vehicle traffic. In addition, as discussed in section 3.2.1 (off-road vehicle section), it is unlikely that increasing the right-of-way width would result in a proportionate increase in the number of off-road vehicles using the area. Generally, the increase in corridor width associated with Alternative 2 would be separated from the other highway and railroad corridors by a woody buffer. Most of the clearing would be on the south side of the existing Applicant corridor and would not adjoin the other rights-of-way. Thus, due to the current level of disturbance created by the highway, railroad and adjacent utility rights-of-way, this incidental increase should not significantly effect wolf movement beyond present levels.

During restoration, trees would be replanted in selected disturbed forested areas, including lowland conifer forests and the temporary construction right-of-way areas, in accordance with the Applicant Revegetation Management Plan and a CNF Reforestation Plan that would be developed for the proposed Projects. The reforestation plan would outline a specific strategy involving a combination of plantings, primarily using long rotation conifers, as well as natural regeneration and propagation.

The DRM also raised the issue whether construction across wild rice areas would have an impact on resident and migratory animal habitat. Alternative 2 may cross two locations (Upper Sucker Lake and Portage Creek) where temporary disturbance of wild rice populations may occur. The disturbance is short term and these areas make up a small portion of the wild rice habitat available in the area. As such, the project crossing these wild rice areas is not expected to have a significant effect on wildlife habitat.

Alternative 3

Alternative 3 differs from Alternative 2 in that the existing utility corridor is only 75 feet wide and is not located adjacent to a transportation corridor. Therefore, restrictions to wildlife movement would be effected as a function of the increase in maintained corridor width (approximately 150 feet wide total). In addition, the existing Great Lakes Gas Transmission corridor has not been maintained as actively as the existing Applicant pipeline corridor and tends to exist in a later successional stage than the Applicant's rights-of-way. The effect of the construction of the proposed Projects along Alternative 3 would be to create a 75-foot-wide maintained corridor adjacent to a 75-foot-wide transitional scrub/shrub and birch/aspen corridor, surrounded by actively managed hardwood species. Ultimately, this alternative would directly effect animal movement more than the increment widening by Alternative 2 along the existing utility/transportation corridor which, in its current state, already disrupts animal movement. This alternative is in an area with relatively fewer human activities, such as towns, and a transportation corridor.

Alternative 4

Alternative 4 is 83 percent collocated with Alternative 3. Therefore, many of the direct impacts addressed in the Alternative 3 section also apply to Alternative 4. However, the first 6.1 miles of Alternative 4 are routed exclusively through a relatively undisturbed greenfield area and thus, present effects unique to this Alternative. By creating an entirely new stretch of right-of-way in a previously forested area, this Alternative is more likely than the others to adversely affect wildlife movement.

3.3.1.6 Cumulative Effects

Alternative 1

The No Action Alternative proposes no change to the Projects areas from the existing condition; however, the effects associated with the ongoing maintenance of the existing transportation and utility corridors and facilities are expected to continue. The time, location, duration, and magnitude of maintenance work along the existing facilities are unpredictable. These types of maintenance activities are generally isolated and small in size and the impacts to large carnivore movement or habits are expected to be short-term and temporary.

Alternative 2

If this alternative were built, the combined highway, railroad, existing utility, and new utility permanent rights-of-way would range in width from approximately 250 feet to 1,775 feet, averaging approximately 500 feet; this includes parcels between rights-of-way. Cumulative effects associated with pipeline maintenance may increase after the new pipeline is complete. The time, location, duration, or magnitude of maintenance work at these locations is unforeseeable. Because such work would likely occur infrequently, and would likely be localized, temporary, and on a smaller scale than the proposed Projects, associated impacts would be expected to be minor.

Past impacts from the construction of U.S. Highway 2 and BNSF Railroad adjacent to the proposed Projects area resulted in the fragmentation of large expanses of several types of forested and open communities. It also eliminated several hundred acres of forest and shrubby and open habitats, and created a permanent series of corridors where there was once only a Soo Line railroad corridor. This expansion of human intrusion into a largely undeveloped forest likely resulted in the artificial segmentation of territories to large carnivores. It is also likely that the construction of these corridors and the Applicant pipeline have altered movements and dispersal of the large carnivores within the CNF. It is unknown how wide an open, but vegetated corridor has to be, before it limits wildlife movement; most research has focused on highway/road corridors, or "island" type fragmentation, for patches of cleared forest. Current information from the MDNR suggests that carnivores currently use the existing transportation/utility corridor, but it is unknown if an additional 75 feet of open vegetation will further restrict movements of wildlife.

Possible future activities in the Projects area include implementation of the Cuba Hill RMP and construction of the 230 kV HVTL. Implementation of the RMP is set for 2009-2010, and the HVTL, if approved, is scheduled for construction in 2009 to 2011. The Applicant's current construction schedule calls for construction beginning within the LLR and CNF in August 2009, with an in-service date in the second quarter of 2010. The construction of the HVTL could be collocated with the proposed pipeline route for approximately 10 miles. Any impacts associated with the proposed RMP would be limited in scope relative to the existing highway/utility corridor.

Alternative 3

If this alternative were built, the combined existing utility, and new utility permanent right-of-ways is approximately 140 feet in width west of Bena, and 250 to 1,775 feet east of Bena, averaging 500 feet; this includes parcels between rights-of-way. The cumulative effects of constructing the HVTL and proposed pipelines along Alternative 3 on large carnivore movements would differ from those described in Alternative 2. The parallel corridors of Alternative 3 would increase the amount of cleared area through remote forest and, while it is possible that the HVTL project would keep a buffer of trees and other vegetation between the transmission line corridor and the expanded pipeline corridors, this is unlikely to serve as large predator habitat. In addition, Alternative 3 would occur in remote areas where wildlife is less habituated to human activity than in the area around Alternative 2.

Alternative 3 would also occur in the central section of the Cuba Hill RMP. The Cuba Hill RMP was designed to restore ecological processes and components to specific areas of the CNF. This would be achieved by combining silvicultural treatments, reducing upland open areas and, the demolition or decommissioning of roads in the area. Alternative 3 would increase the amount of open space within the Cuba Hill RMP area, thereby diminishing the project's intended effect. Constructing Alternative 3 would create a new disturbance to large carnivores that would likely alter or impede their movement in the Projects area.

Alternative 4

If this alternative were built, the combined existing utility, and new utility permanent rights-of-way would range in width from 75 feet to 140 feet, west of Bena, and 250 to 1,775 feet east of Bena, averaging 500 feet; this includes parcels between rights-of-way. As stated above, Alternative 4 is 83 percent collocated with Alternative 3. Therefore, many of the cumulative impacts addressed in the Alternative 3 section also apply to Alternative 4. However, the first 6.1 miles of Alternative 4 are routed exclusively through green-field and thus, present effects unique to this Alternative. This Alternative would also likely impact the effectiveness of the Cuba Hill RMP. The Cuba Hill RMP would reduce the amount of open upland areas within its area boundaries. Alternative 4 would add many acres of open space to what was previously forested land. By creating an entirely new stretch of right-of-way in a previously forested area this Alternative would create additional fragmentation through the central part of the CNF. This fragmentation may adversely affect wildlife movement more than the other alternatives.

3.3.2 Scoping Issue 6 – Conversion of Land Cover Types

3.3.2.1 Description

Clearing of trees for pipeline construction was identified during scoping as an issue because it would convert forested areas to open areas which could alter some forest community types.

3.3.2.2 Indicator

The effects of the Projects on forested communities were evaluated by reviewing previous studies regarding the effects of clearing on forested community types and determining how clearing would alter species richness (i.e., how clearing would change the number of different wildlife species inhabiting an area because of a change in community type). The effects of the Projects were also measured by reviewing previous studies that evaluated shifts in species composition due to widening the utility corridor and altering the vegetative community. Shifting species composition in a forest could indicate a change in community type. Many plant species thrive in disturbed habitat and some animal species are highly adapted to living on or near edge and herbaceous habitats, and may benefit from the Projects. Effects to areas managed for silviculture are also evaluated.

3.3.2.3 Scope

The scope of analysis for this issue includes forested areas that would be cleared by construction on LLR and NFS lands.

3.3.2.4 Affected Environment

The existing Applicant pipeline corridor within the Projects area is currently a 100- to 125-foot-wide corridor adjacent to the U.S. Highway 2 and the BNSF Railroad. The Projects area crosses a variety of vegetation types and distinctive communities of plants and animals. Most of the areas associated with the Projects are intensively managed commercial forestland; clearcutting and conversion from deciduous forest to conifer plantation has altered some of the original ecosystems, though still providing a habitat utilized by certain species (Chazdon, 2008). The Projects area crosses the following management areas as described in the current CNF ***Forest Plan***, which are illustrated on figure 3 (see Appendix 3), and in table 3.3.2-1.

- Management Area UB – Unique Biological, Aquatic, Geological, or Historical: Includes areas with outstanding biological, aquatic, geological, historical, and other special values.

- Management Area LR – General Forest – Longer Rotation: Managed to emphasize land and resource conditions that provide a wide variety of goods, uses, and services. These include wood products, other commercial products, scenic quality, developed, and dispersed recreation opportunities, and habitat for diversity of terrestrial and aquatic wildlife and fish species.

- Management Area GF – General Forest: Managed to emphasize land and resource conditions that provide a wide variety of goods, uses, and services, including wood products, other commercial products, scenic quality, developed and dispersed recreation opportunities, and habitat for a diversity of terrestrial and aquatic wildlife and fish.

- Management Area RE – Riparian Emphasis: Riparian ecological functions are actively restored, protected, and enhanced in areas where ecosystem processes are sensitive to degradation.

- Management Area EF – Experimental Forest: Managed for research conducted by scientists assigned to the North Central Forest Experiment Station. Silvicultural or other treatments appropriate to research and experimentation are used in these areas.

Table 3.3.2-1 -CNF Management Areas Crossed by Each Alternative

Management Area	Alternative 2		Alternative 3		Alternative 4	
	Miles Crossed	MP Range(s)	Miles Crossed	MP Range(s)	Miles Crossed	MP Range(s)
UB- Unique Biological, Aquatic, Geological, or Historical	4.5	955.8-958.9 985.2-986.5	4.1	0-0.1 0.3-0.7 0.9-3.1 30.1-31.6	1.5	0-0.1 4.9 35.0-35.7 35.8-36.5
LR- General Forest – Longer Rotation	2.8	958.9-961.3 961.9-962.4	6.8	3.1-3.6 10.8-11.0 11.1-11.5 11.6-14.1 15.2-15.9 16.5-18.9	11.4	4.6-9.0 9.2-10.1 15.7-15.9 16.0-16.3 16.4-19.0 20.0-20.8 21.3-23.8
GF- General Forest	25.8	961.3-961.9 962.4-985.2 986.5-988.9	19.9	5.7-10.8 11.0-11.2 11.5-11.6 14.1-15.2 18.9-30.1 30.6 31.6-33.9	20.6	9.0-9.2 10.0-15.7 15.9-16.0 16.3-16.4 19.0-20.1 23.8-35.0 35.4 36.5-38.7
RE- Riparian Emphasis	1.1	955.8 994.2-995.3	1.6	15.9-16.5 39.2-41.0	1.6	20.1-21.3 44.0-45.0
EF- Experimental Forest	0	NA	2.1	3.6-5.7	0	NA

There are approximately 332 species of terrestrial vertebrates known to occur on the LLR and in the CNF during all or parts of a year. Due to the diversity of habitats associated with the pipeline corridor, all but about 15 of these species could potentially occur in the Projects area, including approximately 242 birds, 53 mammals, and 22 reptiles or amphibians. These species occupy a variety of different habitats, from closed-canopy upland conifers where forest interior species occur to open heath bogs and young deciduous upland where species associated with edges occur.

3.3.2.5 Direct and Indirect Effects

Alternative 1

Alternative 1 proposes no change to the Projects area from the existing condition and, as a result, no short- or long-term changes to vegetative or wildlife communities would occur. The existing joint transportation/utility corridor already bisects managed forest, and no additional fragmentation would occur. Forest regeneration is already well underway and many large-diameter conifers and hardwoods are located along the edge of the right-of-way. The Applicant would not construct the proposed pipeline and no clearing of vegetation would be required. The Applicant's existing permanent right-of-way would be maintained in low shrubby and herbaceous species and the same activities previously undertaken in the Projects area, such as right-of-way and pipeline maintenance, would still be allowed pursuant to existing arrangements with the LLBO and CNF.

Alternative 2

Alternative 2 crosses approximately 18.33 miles of forested land within the LLR and 16.20 miles on NFS land (mileage estimates for LLR and CNF includes co-ownership lands). The acreage of landscape ecosystem types crossed within the CNF by Alternative 2 is shown in table 3.3.2-2. The primary impact of construction would be the modification of one habitat type to another. In particular, forest communities within the proposed new permanent right-of-way would be replaced with open or shrubland plant communities. The temporary construction right-of-way would be replanted with plant species similar to adjacent vegetation. At most locations, clearing would be minimized by collocating the new pipelines with the existing pipeline and/or transportation corridors. The existing pipeline corridor is between 100 and 125 feet wide. The transportation corridors range between 30 and 200 feet or more wide. As a result of Projects construction, the width of the pipeline corridor would generally increase by 140 feet (more where extra workspaces are located), of which 75 feet (permanent right-of-way) would be maintained in an herbaceous condition to facilitate an ongoing pipeline inspection program. The remaining 65 feet would be restored to its prior condition upon completion of construction as outlined in the Revegetation Plan, and per further discussions with the CNF. Following construction, woody vegetation would begin establishing within the work area within a few years of construction, but it would take 35-55 years for forests to become reestablished (MDNR, 2008). In order to minimize the total amount of forest conversion, the Applicant would, to the extent practicable, limit tree removal based on several factors that would be determined in consultation with the CNF. Such factors could include tree type, tree size, location (i.e., management area), age, and distance from the trenchline. The end result would be an undulation of the corridor edge, and preservation of large trees for use by species such as downy woodpeckers (*Picoides pubescens*) and short-eared owls (*Asio flammeus*). The partial clearing of trees within the construction right-of-way would reduce the extent of cleared areas and minimize the corridor edge effect and conversion of forested areas to open areas.

Table 3.3.2-2 – Acreage of CNF Landscape Ecosystem Types Affected by Proposed Action

Landscape Ecosystem Type	Alternative 1 (acres)	Alternative 2 (acres)	Alternative 3 (acres)	Alternative 4 (acres)
Boreal Hardwood Conifer (BHC)	0	10	105.5	109.7
Dry Mesic Pine (DMP)	0	27	27	20.9
Dry Mesic Pine/Oak (DMPO)	0	342.5	204.5	165.0
Dry Pine (DP)	0	28.5	0	0
Mesic Northern Hardwoods (MNH)	0	0	35	86.4
Tamarack Swamp (TS)	0	160	190	182.8
Lakes	0	0.5	0	0
White Cedar Swamp (WCS)	0	0	0	0
Wet Sedge Meadow (WSM)	0	10.5	25	19.8
Total	0	579	587	584.6

Overall, the *type* of species utilizing the Projects area would remain relatively the same; with an existing utility and transportation corridor along this alternative that already harbors edge and herbaceous species along permanent rights-of-way, and forest dwelling species where vegetation has reverted back to its original forested state along temporary workspaces, and adjacent forested areas. However, there would be an increase in species which prefer herbaceous habitats within the permanent right-of-way. Where trees are cleared, habitat may no longer be suitable for forest-dwelling species such as pine warbler (*Dendroica pinus*), black-throated green warbler (*Dendroica virens*), northern parula (*Parula americana*), red-backed salamanders (*Plethodon cinereus*), pine martins (*Martes americana*), or eastern chipmunks (*Tamias striatus*). On the other hand, herbaceous habitats created in the permanent right-of-way and along the forest edge may support other species not present in the forest communities, such as golden-winged warbler (*Vermivora chrysoptera*), chestnut-sided warbler (*Dendroica pensylvanica*), mourning warbler (*Oporonis philadelphia*), Franklin's ground squirrel (*Spermophilus franklinii*), white footed mouse (*Peromyscus leucopus*), and red-disked alpine (*Erebia discoidalis*). During regrowth of the temporary and permanent workspace, early successional plant species such as quaking aspen (*Populus tremuloides*),

beaked hazelnut (*Corylus cornuta*), large-leaf wood aster (*Aster macrophyllus*), wild sarsaparilla (*Aralia nudicaulis*), and dwarf red raspberry (*Rubus pubescens*) are likely to populate the right-of-way. In 35 to 55 years, temporary rights-of-way would be reforested with similar tree species as adjacent forested habitats.

Often, clearing forested areas influences the composition of species associations, especially those species, such as the Canada lynx *(Lynx canadensis)* or the gray wolf *(Canis lupus,)* that rely on large tracts of unbroken forest. Although species richness may increase in highly fragmented landscapes, certain area sensitive species would become less abundant (Hayden and Faaborg, 1985). Most of these area sensitive species are Neotropical migrant birds. Studies in eastern North America show that more than 25 species of forest songbirds tend to be more abundant in large forests than in small, isolated patches of forest (Askins et al., 1987; Robbins et al., 1989; Wilcove and Robinson, 1990). Research on neotropical migrants indicate that many have reduced nest success because of brood parasitism and nest predation by species that occur most frequently near the edge of the forest (Wilcove, 1985; Robinson, 1988). Nest depredation from predators such as raccoons (*Procyon lotor*) or striped skunks (*Mephitis mephitis*) also occurs most frequently where forest edges meet open habitat. Edge effects to species such as Neotropical migrant forest-nesting songbirds are often confounded by small patches of surrounding fragmented forest (Parker et al., 2005). Edge effects can also be highly variable due to overall habitat characteristics at the landscape scale and other local factors such as predators (Donovan et al., 1997).

Studies of the impact of timber harvesting on forest songbirds indicate that densities of most species are not substantially reduced as a result of moderate clear-cutting in extensively forested landscapes (Derleth et al., 1989; Thompson et al., 1992; Welsh and Healy, 1993). Although clear-cutting is a temporary reduction of forested habitat, it can take upwards of 50 years for the area to regenerate to its pre-clear-cutting composition.

Hairy woodpeckers (*Picoides villosus*) may be adversely affected by the removal of mature and older trees, which may provide cavities for nesting, and the blackburnian warbler (*Dendroica fusca*) could also be impacted where mature conifer trees are removed. The pine warbler and blackburnian warbler could also be adversely affected where mature upland conifer trees are removed during construction, but as with the pileated woodpecker and northern parula warbler, the land area involved is relatively small; while individuals may be displaced, significant impact on the population is unlikely.

Barred owls (*Strix varia*) may use some areas adjacent to the Projects area as foraging and nesting sites. However, no barred owls were identified during the Great Horned Owl stick nest surveys, although some barred owl call backs were experienced during surveys conducted for songbirds, northern goshawk, and red-shouldered hawks. Nesting sites for barred owls are typically located in the middle of large expanses of woods, and not in proximity to the edge of the right-of-way or near heavily traveled highways.

It is unclear how wide a forest opening must be to allow open-country species and other small predators into interior forest habitat. Some studies have shown that as the width of corridors increase to more than 75 feet, nesting success for forest interior species diminish (Rich and Dobkin, 1994). Other studies by Small and Hunter (1988) have shown no significant relationship between nest predation and distance into the forest from the edge. Chasko and Gates (1982) found that distance to the edge and nest success was not as obvious for a second corridor in their study that was 150 feet wide. There is ample documentation of the association between edge habitat and an increase in species diversity and abundance (Kroodsma, 1982; Reese and Ratti, 1988; Fleming and Schmiegelow, 2002; MacArthur and MacArthur, 1961). However, species composition did change and species such as bay-breasted warbler (*Dendroica castanea*), blackburnian warbler (*Dendroica fusca*), and winter wrens (*Troglodytes troglodytes*) were positively correlated to distance from the corridor. In a few locations, primarily where the pipeline right-of-way overlaps road, railroad, and/or trail corridors, the total existing corridor width (i.e., the width of the existing pipeline and adjacent transportation corridors) is greater than 300 feet and may be temporarily widened as a result of construction. Insofar as select trees would be saved by the Applicant during construction, a somewhat narrower, more natural looking corridor would be expected after construction. The preservation of select trees would also allow for habitation by disturbance driven and edge species. This preserved habitat would not increase the total acres of forest considered to be edge habitat. The Projects would increase the amount of area disturbance (i.e., wider utility corridor), but not additional fragmentation of the forest as the route is adjacent to an existing utility line corridor and transportation corridor. Increasing the width of the current right-of-way would have less of an impact on edge sensitive species than alternative routes through a greenfield area.

As areas that are cleared become reforested, some game species, such as white-tailed deer, ruffed grouse (*Bonasa umbellus*), and woodcock (*Scolopax minor*), as well as several Neotropical migrants, would generally be favored during the earlier stages of regrowth. These beneficial effects would gradually diminish as the forest matures, and despite the negative influence on avian composition in heavily forested landscapes by wider corridors, there may be a benefit to consolidating open corridors. One possible benefit would be to manage the continuous open habitat (permanent right-of-way) for species that are characteristic of early successional habitats. Data from the Breeding Bird Survey database of the National Biological Survey between 1966 and 2003 show that populations of several shrubland specialists have declined significantly over that period. Brown thrashers (*Toxostoma rufum*) and indigo buntings (*Passerina cyanea*) showed significant declines while chestnut-sided warbler, golden-winged warblers, and clay-colored sparrows (*Spizella pallida*) showed declining trends. Several other Neotropical migrants would benefit from the management of open shrubby habitat; these include mourning warblers and black-billed cuckoos (*Coccyzus erythrophthalmus*) (Sauer at al, 2008). The proposed pipeline Projects would augment the existing corridor, which would not only reduce further fragmentation of forest within the LLR and CNF but also may result in better habitat for some shrubland species than the existing corridor currently provides. The corridor would permanently increase by approximately 75 feet, but new forest fragments would not occur as a result of the Projects because most of the length of the route would overlap an existing pipeline and/or transportation corridor. Further, by sharing right-of-way the amount of clearing required for construction and effects on interior wildlife habitat would be minimized. Area-sensitive species, such as the lynx and the gray wolf, may be affected by a change in land type from forested to open or shrub, however, early successional forest stages provide additional habit for the snowshoe hare, prey for the lynx, and for the white-tailed deer, prey for the gray wolf.

Amount of cover (i.e., forested habitat versus clear-cut forest edge) can create different microclimates within an area. For example, conditions such as solar radiation, soil temperature, soil moisture, and wind speeds can vary between these environments (Chen et al., 1995). While vegetation is re-establishing along the right-of-way, the microclimate in the cleared right-of-way can be expected to be different; e.g., higher soil temperatures, higher wind effects, and lower soil moisture. These effects are expected to be minor and temporary (along the order of months), as active restoration establishes vegetation in the right-of-way.

Construction of two additional pipelines in this corridor will not substantially alter the current conditions or negatively affect the Tribal land management and Forest Plan's objectives. The acres of construction impact for Alternative 2 is approximately 729 acres, out of a total of approximately 1,683,112 acres of LLR and CNF land (this accounts for less than 0.04 percent of overall LLR and CNF land). However, construction would temporarily and permanently reduce the acreage of LSC 500 (timber suited for production). Assuming that the corridor would have a temporary construction width of 125 feet, approximately 173 acres of LSC 500 land from Alternative 2 would be temporarily affected. Approximately 104acres would be permanently removed from LSC 500, from Alternative 2, assuming a permanent corridor width of 75 feet. Alternative 2 avoids the Experimental Forest; no impacts are anticipated.

Indirect Effects

Converting forested land to open or shrub land could result in several indirect effects. Some known indirect effects of major forest conversion include; alterations of the hydrologic cycle, increased green house gas emissions and soil erosion. Temporary and permanent erosion controls, a Revegetation Plan, and the temporary nature of the activity should eliminate or reduce effects of these indirect effects. It is unlikely that construction through an existing corridor would significantly contribute to these indirect effects.

During regeneration of the vegetation within the right-of-way, increased deer-browsing may occur. Increased deer browse, with an increase in local deer populations, can cause changes to plant species composition and limit the regrowth of certain species such as white cedar (*Thuja occidentalis*) and white pine (*Pinus strobus*) (Jaako Pöyry Consulting, 1994).

Alternative 3

The impacts of Alternative 3 on forest communities would be similar to Alternative 2; Alternative 3 is also collocated with an existing utility corridor. Similarly to Alternative 2, the amount of fragmentation and edge habitat would not be changed under this alternative. Alternative 2 and Alternative 3 cross approximately 28 miles of forested land. The acreage of landscape ecosystem types crossed by Alternative 3 is shown in table 3.3.2-2. Alternative 3 would cross four miles less of General Forest land than Alternative 2 and four miles more of General Forest Land – Longer Rotation land. Construction would temporarily and permanently reduce the acreage of LSC 500 (timber suited for production). Assuming that the corridor would have a temporary construction width of 125 feet, approximately 49 acres of LSC 500 land would be temporarily affected. Approximately 29 acres would be permanently removed from LSC 500, assuming a permanent corridor width of 75 feet.

Alternative 3 crosses approximately 2.1 miles of the Experimental Forest, negatively impacting current and future work within the Experimental Forest, as well as affecting its ecological value in the larger landscape. An on-going, 40-year long term project exists within this alternative's route location; disturbance of this area could compromise this project's existing and future research. The existing utility was placed prior to the onset of this long-term study, so a new corridor would have direct impacts on existing vegetation studies. In addition, a new right-of-way could limit the potential quality of the Experimental Forest for future studies. The current Experimental Forest is less managed and therefore harbors an older more mature forest than the surrounding forest; therefore, impacts to this area would be greater than other forested areas within the CNF (Palik, 2008).

Construction of two additional pipelines in this corridor will not substantially alter the current conditions or negatively affect the Forest Plan's objectives. The acres of construction impact for Alternative 3 is 587.32, out of a total of 1,596,807 acres of CNF land (this accounts for less than 0.04 percent of overall CNF land).

Indirect Effects

The indirect effects of Alternative 3 would be identical to those described in Alternative 2. Both Alternatives would construct along-side existing corridors, and the indirect effects would be minimized.

Alternative 4

Alternative 4 crosses approximately thirty-three miles of forested land. The acreage of landscape ecosystem types crossed by Alternative 4 is shown in table 3.3.2-2. It would cross approximately the same amount of General Forest Land as Alternative 2 and four fewer miles than Alternative 3. It would cross eight more miles of General Forest Land – Longer Rotation than Alternative 2 and four more miles than Alternative 3. Construction will temporarily and permanently reduce the acreage of LSC 500. Assuming that the corridor would have a temporary construction width of 125 feet, approximately 115 acres of LSC 500 land would be temporarily affected. Approximately 69 acres would be permanently removed from LSC 500, assuming a permanent corridor width of 75 feet.

Alternative 4 avoids the Experimental Forest; no impacts are anticipated. However, in order to avoid impacts to the Experimental Forest, Alternative 4 is routed south of the Experimental Forest in a greenfield area. This alternative would increase fragmentation and create an isolated patch of forest for the 6 miles it is not collocated with another utility corridor. This would also increase the amount of edge habitat in the Forest. Isolated patches of forest can affect species use of the local area, natural processes within the fragmented area and adjacent forest, and function of natural processes. Fragmented landscapes create barriers to plant and animal dispersion and therefore genetic material exchange (Jaako Pöyry Consulting, 1994).

Construction of two additional pipelines in this corridor will not substantially alter the current conditions or negatively affect the Forest Plan's objectives. The acres of construction impact for Alternative 4 is 599.03, out of a total of 1,596,807 acres of CNF land (this accounts for less than 0.04 percent of overall CNF land).

Indirect Effects

The indirect effects of Alternative 3 would be similar to those described in Alternatives 2 and 3. However, Alternative 4 would require construction across a greenfield route which would increase the potential level of indirect effects relative to Alternatives 2 and 3.

3.3.2.6 Cumulative Effects

Alternative 1

The No Action Alternative presents no change to the Projects area's conditions; however, the effects associated with the ongoing maintenance of the existing pipeline are expected to continue. The time, location, duration, and magnitude of maintenance work along the existing route are unpredictable. These types of maintenance activities are generally isolated and small in size and it is unlikely that impacts from forest conversion would be significant.

Alternative 2

Cumulative effects associated with pipeline maintenance may increase with an additional pipeline once construction is complete. The time, location, duration, or magnitude of maintenance work at these locations is unforeseeable. Because such work would likely occur infrequently, and would likely be localized, temporary, and on a smaller scale than the proposed construction Projects, associated impacts would be expected to be minor.

Historic impacts from the construction of U.S. Highway 2 and BNSF Railroad adjacent to the proposed Projects area resulted in the fragmentation of large expanses of several types of forested and open communities. It also eliminated several hundred acres of forest, as well as shrubby and open habitats and forced the associated wildlife into smaller expanses of these same types of communities. These impacts, along with the past construction of the Applicant pipelines, have altered the original extent and character of the forest in those areas that were cleared to construct these projects. However, periodic timber harvest and other land-clearing activities have contributed to maintaining a dynamic ecological system that provides habitat to myriad species that are adapted to minor and massive changes to the forest. An example of minor impacts that occur naturally would be the openings created when a tree or group of trees topples due to old age, disease or other factors. An example of naturally occurring massive impacts to forested areas would be large-scale fires or windstorms that may change the character of the land from forest to shrub lands or open habitat, and take up to 100 years to re-establish as climax forest.

Several large conifers were removed by the construction of the original highway/utility corridors. The fragmentation of contiguous forest into smaller segments has already impacted the character of the forest and the species assemblages that occur here. Alternative 2 potentially crosses 288.76 acres of known past and future harvest treatment projects (commercial thinning, stand clear cutting, and harvest by type- single tree selection) see the Cumulative Effects Summary attached to this environmental assessment.

Future activities in the Projects area that could contribute to cumulative effects could include implementation of the Cuba Hill RMP and construction of the 230kV HVTL. The schedule for the RMP is unknown, and the HVTL is scheduled for expansion in 2009 to 2011. The Applicant's current construction schedule calls for construction in 2009-2010, with an in-service date of the first quarter of 2010. The implementation of the Cuba Hill RMP would mostly occur outside of the existing transportation and pipeline corridor and could have temporary forest conversion impacts of its own. The construction of the 230kV HVTL would likely result in additional permanent forest conversion, and additional fragmentation of forested areas where the transmission line would be separated from the existing utility corridor.

Alternative 3

Construction of Alternative 3 would have fewer cumulative effects on forest areas and large conifers than Alternative 2 because of the habitats it crosses. The proposed construction of the 230kV HVTL is scheduled for installation in 2009 to 2011. Installation of the HVTL would require additional tree clearing in any areas of collocation that would cumulatively increase the opportunity for edge effects and allow open-country species and other small predators into interior forest habitat. The HVTL would likely result in additional permanent forest conversion, and additional fragmentation of forested areas where the transmission line would be separated from the existing utility corridor. Alternative 3 potentially crosses 0.84 acres of known past and future harvest treatment projects (commercial thinning, stand clear cutting, and harvest by type- single tree selection) see Cumulative Effects Summary attached to this environmental assessment.

Alternative 4

The cumulative effects of Alternative 4 would have fewer cumulative effects on forested areas and large conifers than Alternative 2. Alternative 4 potentially crosses 3.04 acres of known past and future harvest treatment projects (commercial thinning, stand clear cutting, and harvest by type- single tree selection) see Cumulative Effects Summary attached to this environmental assessment.

3.3.3 Scoping Issue 7 – Spread of Invasive Species

3.3.3.1 Description

The clearing of the pipeline corridor and subsequent use of the corridor for maintenance purposes were identified during scoping as issues that may increase the distribution of existing noxious weed populations and exotic or non-native earthworms. Unauthorized vehicles, including off-highway vehicles (OHVs) and equipment from areas outside the local community used in construction of the pipeline can act as vectors for the spread or introduction of noxious weeds and exotic earthworms.

3.3.3.2 Indicator

The likelihood that construction would have an effect on the spread and establishment of noxious weeds has been assessed by evaluating the size and location of existing weed populations relative to anticipated areas of disturbance.

Studies indicate that non-native earthworms could adversely impact the understory of hardwood forests. As a result, the potential for construction-related activities to introduce or spread exotic earthworms was assessed by evaluating the location of high earthworm probability areas (lakeshores, boat ramps, and fishing cabins and resorts with road access) relative to the Project corridor.

3.3.3.3 Scope

The scope of the noxious weeds and exotic earthworm analysis includes land that would be disturbed by the proposed Projects.

3.3.3.4 Affected Environment

The existing Applicant pipeline corridor is regularly maintained by mowing as a grass/forb/shrub open community. The maintained corridor is about 20 feet wide for each existing pipeline. Where there are four pipelines, the maintained corridor is approximately 125 feet wide. Within the corridor are both upland and lowland (i.e., wetland) communities.

The existing Applicant right-of-way is commonly dominated by dense growths of both native and non-native herbaceous species and shrubs. Some typical species on the right-of-way include evening primrose (*Oenothera biennis*), common milkweed (*Asclepias syriaca*), Kentucky bluegrass (*Poa pra*tensis), giant goldenrod (Solidago gigantea), flat-top white aster (*Aster umbellatus*), giant hyssop (Agastache foeniculum), wool grass (Scirpus cyperinus), bracken fern (Pteridium aquilinum), and Canada goldenrod (*Solidago canadensis*). Shrubs commonly found include choke cherry (*Prunus virginiana*), wild plum (*P. ameri-*

cana), and willow (*Salix* spp.). Most non-native invasive plants on the LLR and in the CNF occur in disturbed areas such as roadsides, utility corridors, and temporary roads, including the existing Applicant right-of-way and the Great Lakes Gas Transmission Company pipeline corridor.

There are 25 noxious weed species on the state, and county noxious weed lists or list of non-native invasive plants of concern on the in the CNF (table 3.3.3-1). Eighteen of these species are listed as non-native plants of concern. Poison ivy is a native species found throughout much of the forest, but it is not tracked or eradicated. Spotted knapweed, leafy spurge, purple loosestrife, common tansy, wild parsnip, and Siberian peashrub are primary management species, meaning that the LLR and USFS will actively manage these plants within the LLR and CNF boundaries. Plumeless thistle, common buckthorn, and garlic mustard are listed as Early Detection and Rapid Response species by the LLR and USFS, and both, the LLBO and USFS actively manages these species to identify and eliminate new populations on the LLR and in the CNF. Secondary species that will not be actively managed by the LLBO and USFS include hoary alyssum, Canada thistle, bull thistle, orange hawkweed, perennial sowthistle, St. John's wort, and oxeye daisy. Hemp and common buckthorn infestations are uncommon. Note some of these species release chemicals known as allelopathics into the soil that inhibits growth of competing vegetation (MNDNR, 2009). As a result, revegetation may be more difficult in those areas having allelophathic producing plants.

Table 3.3.3-1 – State- and County-designated Noxious Weeds and Plants of Concern within the CNF

Common Name	Scientific Name	Observed in Project Area in 2001-2002	Identified in 2008 Survey	On Designated List		
				State	Cass Co.	Itasca Co.
Hoary alyssum[4]	*Berteroa incana*	√			√	
Plumeless thistle[3]	*Carduus acanthoides*	√		√	√	√
Field sandbur	*Cenchrus longispinus*	√				
Spotted knapweed[2]	*Centaurea maculosa*	√	√		√	
Canada thistle[4]	*Cirsium arvense*	√	√	√		√
Bull thistle[4]	*Cirsium vulgare*	√	√	√		√
Field bindweed	*Convolvulus arvensis*	√	√	√		√
Leafy spurge[2]	*Euphorbia esula*	√		√		√
Orange hawkweed[4]	*Hieracium auranticum*	√			√	√
Purple loosestrife[2]	*Lythrum salicaria*			√	√	√
Common buckthorn[3]	*Rhamnus cathartica*			√[1]	√[1]	√[1]
Perennial sowthistle[4]	*Sonchus arvensis*		√	√	√	√
Common tansy[2]	*Tanacetum vulgare*	√	√		√	√
Poison ivy	*Toxicodendron radicans*	√	√[6]	√	√	√
Garlic Mustard[3]	*Alliaria petiolata*					
Curlyleaf pondweed[5]	*Potamogeton crispus*					
Eurasion watermilfoil[5]	*Myriophyllum spicatum*					
Wild parsnip[2]	*Pastinaca sativa*					
Musk thistle	*Carduus nutans*			√		
Common St. Johnswort[4]	*Hypericum perforatum*					
Oxeye daisy[4]	*Chrysanthemum leucanthemum*				√	√
Siberian Peashrub[2]	*Caragana arborescens*					
Hemp	*Cannabis sativa*			√		√
Tall buttercup	*Ranunculus acris*				√	√
Wormwood	*Artemisia absinthium*				√	

Common Name	Scientific Name	Observed in Project Area in 2001-2002	Identified in 2008 Survey	On Designated List		
				State	Cass Co.	Itasca Co.
[1] Indicates that the species is restricted, not prohibited.						
[2] Primary management species						
[3] Early Detection Rapid Response (EDRR) species						
[4] Secondary management species						
[5] Notify management species						
[6] Poison ivy (western), *Toxicodendron rydbergii*						

There are 53 noxious weed species or plants of concern identified by the DRM within the LLR (table 3.3.3-2). Seven species are listed as primary and 17 are of secondary concern. Forty species are listed as nuisance weeds and plants likely to become problematic. The leafy spurge and spotted knapweed were identified as noxious species of special concern by the LLBO. The LLBO has implemented a variety of control measures, including biological measures such as the utilization of beetles, to eradicate populations of leafy spurge in the Projects corridor.

Table 3.3.3-2 – Noxious Weeds and Plants of Concern within the LLR

	Common Name	Scientific Name
I. Primary Noxious Weeds	Garlic mustard	*Alliaria petiolata*
	Spotted knapweed	*Centaurea biebersteinii*; formerly *C. maculosa*
	Canada thistle	*Cirsium arvense*
	Leafy spurge	*Euphorbia podperae*; formerly *E. esula*
	Purple loosestrife	*Lythrum salicaria*
	Wild Parsnip	*Pastinaca sativa*
	Common buckthorn	*Rhamnus cathartica*
II. Secondary Noxious Weeds	Hoary alyssum	*Berteroa incana*
	Ox-eye daisy	*Chrysanthemum leucanthemum*
	Orange hawkweed	*Hieracium aurantiacum*
	Common reed grass	*Phragmites australis*–unclear if native or exotic
	Common tansy	*Tanacetum vulgare*
	Hybrid cattail	*Typha* x *glauca*—hybrid of two native cattails that outcompetes its parents.
III. Nuisance Weeds	Quack grass	*Agropyron repens*
	*Common ragweed	*Ambrosia artemisiifolia*
	Burdock	*Arctium minus*
	Smooth brome	*Bromus inermis*
	*Field sandbur	*Cenchrus longispinus*
	Pineapple weed	*Chamomilla suaveolens*
	Bull thistle	*Cirsium vulgare*
	Cypress spurge	*Euphorbia cyparissias*
	Creeping charlie	*Glechoma hederacea*
	Baby's breath	*Gypsophila* spp.
	*Wood nettle	*Laportea canadensis*
	Birdsfoot trefoil	*Lotus corniculatus*
	White sweet clover	*Melilotus alba*

	Common Name	Scientific Name
	Yellow sweet clover	*Melilotus officinalis*
	Reed canary grass	*Phalaris arundinacea*–unclear if native or exotic
	*Bracken fern	*Pteridium aquilinum* var. *latiusculum*
	*Poison ivy	*Rhus radicans*
	Curly dock	*Rumex crispus*
	Bouncing-bet; soapwort	*Saponaria officinalis*
	Perennial sowthistle	*Sonchus arvense*
	Stinging nettle	*Urtica dioica*
IV. Plants That May Become a Problem in the Future	Siberian pea-shrub	(*Caragana arborescens*)–popular hedge shrub
	Plumeless thistle	(*Carduus acanthoides*)–may be present in nearby counties
	Musk thistle	(*Carduus nutans*)–may be present in nearby counties
	Celandine	(*Chelidonium majus*)–has infested forest in one area of reservation
	Chicory	(*Cichorium intybus*)
	Russian olive	(*Elaeagnus angustifolia*)–promoted by conservation agencies in the past
	Autumn olive	(*Elaeagnus umbellata*)–landscape species
	Cypress spurge	(*Euphorbia cyparissias*)
	Tall fescue	(*Festuca arundinacea*)
	Common St. John's-wort	(*Hypericum perforatum*)–now present on roadsides
	Exotic bush honeysuckles	(*Lonicera maackii, L. morrowii, L. tatarica*)
	Eurasian watermilfoil	(*Myriophyllum spicatum*)--not present on the Reservation as of the writing of this list, but almost certain to arrive in the near future
	Canada bluegrass	(*Poa compressa*)
	Curly pondweed	(*Potamogeton crispus*)
	Common buckthorn	(*Rhamnus cathartica*)
	Glossy buckthorn	(*Rhamnus frangula*)
	*Black locust	(*Robinia pseudoacacia*)–present about 100 miles south and probably naturalizing
	Siberian elm	(*Ulmus pumila*)–may be naturalizing less than 100 miles south of reservation
	European cranberry bush	(*Viburnum opulus* var. *opulus*)–promoted by landscapers. *Other exotic or hybrid species promoted by landscapers and conservation agencies for use as ornamentals, to control erosion, as wildlife food or habitat, etc.*
*Plants native to North America		

According to Mauer and Russo (1995), once a spotted knapweed plant or colony is established in a disturbed area, it continues to spread aggressively by seed. Leafy spurge is an aggressive weed commonly occurring in transportation rights-of-way that propagates by means of buds on lateral roots and by seeds. According to Mortensen (2000), leafy spurge develops a massive, shallow network of roots (to 12 inches deep) and taproots extending up to 21 feet into the soil that enable plants to maintain high root reserves of sugars and recover quickly from most damage.

At the request of the MDNR and Minnesota Department of Agriculture, the Applicant surveyed the proposed Projects area in July through September of 2008 to identify infestations of listed noxious weed species. Over the 2007 and 2008 field seasons, the Applicant also made observations about the presence of noxious weed species that occur within the Projects area for Alternative 2 in the course of the wetland delineation surveys completed as part of Projects planning. The results of the noxious weed surveys are tabulated in table 3.3.3-3 with the approximate MP and area of the infestation along the construction right-of way.

Table 3.3.3-3 – Noxious Weeds Identified within the Proposed Action (Alternative 2) Project Area [1]

MP	Common Name	Scientific Name	Approximate # of Individuals	Other Weeds Present, Population	Area (acres)	Location
956.22	Spotted Knapweed	*Centaurea maculosa*	75	poison ivy 50 (Toxicodendron rydbergii)	0.12	Temp ROW
956.40	Poison Ivy	*Toxicodendron rydbergii*	1,000	spotted knapweed 50; infestation excluding trails within polygon (Centaurea maculosa)	0.32	Temp ROW
956.43	Poison Ivy	*Toxicodendron rydbergii*	1,000	spotted knapweed 10 (Centaurea maculosa)	0.20	Temp ROW
956.51	Canada Thistle	*Cirsium arvense*	400		0.14	Temp ROW
956.69	Poison Ivy	*Toxicodendron rydbergii*	1,200	spotted knapweed 40 (Centaurea maculosa)	0.50	Temp ROW
956.88	Poison Ivy	*Toxicodendron rydbergii*	12,000	spotted knapweed 800 and Canada thistle 50 (Cirsium arvense, Centaurea maculosa)	1.09	Temp ROW
957.23	Poison Ivy	*Toxicodendron rydbergii*	250		0.10	Temp ROW
957.28	Poison Ivy	*Toxicodendron rydbergii*	350	spotted knapweed 2 (Centaurea maculosa)	0.09	Temp ROW
957.47	Spotted Knapweed	*Centaurea maculosa*	450	poison ivy 400, Canada thistle 200, and sow thistle 50 (Cirsium arvense, Toxicodendron rydbergii, Sonchus arvensis)	5.91	Temp ROW
958.28	Canada Thistle	*Cirsium arvense*	150	spotted knapweed 50, tansy 15 (Centaurea maculosa, Tanacetum vulgare)	0.02	Temp ROW
958.33	Poison Ivy	*Toxicodendron rydbergii*	1,500		0.56	Temp ROW
958.34	Poison Ivy	*Toxicodendron rydbergii*	1,500		0.12	Extra Workspace
958.44	Poison Ivy	*Toxicodendron rydbergii*	300	spotted knapweed 50 (Centaurea maculosa)	0.06	Temp ROW
959.33	Common Tansy	*Tanacetum vulgare*	25	Canada thistle 40 (Cirsium arvense)	0.06	Temp ROW
959.71	Canada Thistle	*Cirsium arvense*	7,500	bull thistle 25, sow thistle 35, and tansy 50 (Tanacetum vulgare, Sonchus arvensis, Cirsium vulgare)	4.00	Temp ROW
960.28	Canada Thistle	*Cirsium arvense*	2,000	tansy 20, sow thistle 50, bull thistle 10, poison ivy 450 (Tanacetum vulgare, Sonchus arvensis, Cirsium vulgare, Toxicodendron rydbergii)	1.82	Temp ROW

MP	Common Name	Scientific Name	Approximate # of Individuals	Other Weeds Present, Population	Area (acres)	Location
960.61	Canada Thistle	*Cirsium arvense*	300	tansy 15 (Tanacetum vulgare)	0.43	Temp ROW
960.74	Canada Thistle	*Cirsium arvense*	200	sow thistle 75 and tansy 1 (Tanacetum vulgare, Sonchus arvensis)	0.11	Temp ROW
960.81	Canada Thistle	*Cirsium arvense*	700	poison ivy 600, tansy 100, sow thistle 50, bull thistle 10 (Tanacetum vulgare, Cirsium vulgare, Sonchus arvensis, Toxicodendron rydbergii)	2.24	Temp ROW
961.18	Canada Thistle	*Cirsium arvense*	350	spotted knapweed 50, bull thistle 10, sow thistle 25, and tansy 50 (Tanacetum vulgare, Sonchus arvensis, Cirsium vulgare, Centaurea maculosa)	0.30	Temp ROW
961.74	Canada Thistle	*Cirsium arvense*	2,500	tansy 25, spotted knapweed 300, bull thistle 15, sow thistle 15 (Tanacetum vulgare, Centaurea maculosa, Cirsium vulgare, Sonchus arvensis)	1.16	Temp ROW
962.59	Poison Ivy	*Toxicodendron rydbergii*	1,000		0.20	Temp ROW
962.62	Poison Ivy	*Toxicodendron rydbergii*	1,000		0.04	Extra Workspace
964.75	Poison Ivy	*Toxicodendron rydbergii*	1,000		0.19	Temp ROW
964.85	Poison Ivy	*Toxicodendron rydbergii*	4,000		0.26	Temp ROW
965.25	Poison Ivy	*Toxicodendron rydbergii*	8,000	Canada thistle 50, tansy 25, spotted knapweed 25 (Cirsium arvense, Tanacetum vulgare, Centaurea maculosa)	2.23	Temp ROW
965.26	Poison Ivy	*Toxicodendron rydbergii*	8,000	Canada thistle 50, tansy 25, spotted knapweed 25 (Cirsium arvense, Tanacetum vulgare, Centaurea maculosa)	0.17	Extra Workspace
966.45	Canada Thistle	*Cirsium arvense*	5,000	tansy 10, (Tanacetum vulgare)	1.88	Temp ROW
966.77	Canada Thistle	*Cirsium arvense*	4,000	tansy 25, sow thistle 50, bull thistle 10, poison ivy50 (Tanacetum vulgare)	1.47	Temp ROW
966.99	Canada Thistle	*Cirsium arvense*	750	tansy 100, spotted knapweed 25, sow thistle 50 (Tanacetum vulgare, Sonchus arvensis, Centaurea maculosa)	0.36	Temp ROW
967.07	Canada Thistle	*Cirsium arvense*	500	tansy 25 (Tanacetum vulgare)	0.47	Temp ROW
967.25	Canada Thistle	*Cirsium arvense*	200		0.07	Temp ROW
967.41	Canada Thistle	*Cirsium arvense*	400		0.42	Temp ROW

MP	Common Name	Scientific Name	Approximate # of Individuals	Other Weeds Present, Population	Area (acres)	Location
969.12	Spotted Knapweed	*Centaurea maculosa*	250		0.13	Temp ROW
969.16	Poison Ivy	*Toxicodendron rydbergii*	400		0.10	Temp ROW
969.17	Poison Ivy	*Toxicodendron rydbergii*	400		0.00	Extra Workspace
969.19	Spotted Knapweed	*Centaurea maculosa*	35		0.02	Temp ROW
969.25	Spotted Knapweed	*Centaurea maculosa*	60		0.01	Temp ROW
969.28	Poison Ivy	*Toxicodendron rydbergii*	125	spotted knapweed 20 (Centaurea maculosa)	0.03	Temp ROW
969.88	Poison Ivy	*Toxicodendron rydbergii*	15,000	Canada thistle 350, tansy 25, sow thistle 50 (Cirsium arvense, Tanacetum vulgare, Sonchus arvensis)	2.16	Temp ROW
970.28	Canada Thistle	*Cirsium arvense*	125	tansy 40 (Tanacetum vulgare)	0.07	Temp ROW
970.40	Poison Ivy	*Toxicodendron rydbergii*	200	tansy 20, sow thistle 5 (Tanacetum vulgare, Sonchus arvensis)	0.06	Temp ROW
970.42	Poison Ivy	*Toxicodendron rydbergii*	350	tansy 5 (Tanacetum vulgare)	0.05	Temp ROW
970.44	Poison Ivy	*Toxicodendron rydbergii*	350	tansy 5 (Tanacetum vulgare)	0.01	Extra Workspace
970.58	Spotted Knapweed	*Centaurea maculosa*	500	tansy 2, Canada thistle 5, and poison ivy 50 (Cirsium arvense, Tanacetum vulgare, Toxicodendron rydbergii)	0.31	Temp ROW
971.62	Poison Ivy	*Toxicodendron rydbergii*	1,000		0.09	Temp ROW
971.63	Poison Ivy	*Toxicodendron rydbergii*	1,000		0.01	Temp ROW
971.65	Common Tansy	*Tanacetum vulgare*	25		0.05	Temp ROW
972.51	Canada Thistle	*Cirsium arvense*	100		0.09	Temp ROW
973.63	Common Tansy	*Tanacetum vulgare*	500	poison ivy 100, spotted knapweed 100 (Toxicodendron rydbergii, Centaurea maculosa)	1.26	Temp ROW
973.75	Common Tansy	*Tanacetum vulgare*	800	poison ivy 500, Canada thistle 10 (Cirsium arvense, Toxicodendron rydbergii)	0.01	Temp ROW
973.75	Common Tansy	*Tanacetum vulgare*	500	poison ivy 100, spotted knapweed 100 (Toxicodendron rydbergii, Centaurea maculosa)	0.01	Temp ROW
973.94	Common Tansy	*Tanacetum vulgare*	800	poison ivy 500, Canada thistle 10 (Cirsium arvense, Toxicodendron rydbergii)	1.33	Temp ROW
974.04	Common Tansy	*Tanacetum vulgare*	100		0.03	Temp ROW

MP	Common Name	Scientific Name	Approximate # of Individuals	Other Weeds Present, Population	Area (acres)	Location
974.08	Poison Ivy	*Toxicodendron rydbergii*	10,000	tansy 2000 (Tanacetum vulgare)	0.78	Temp ROW
976.14	Poison Ivy	*Toxicodendron rydbergii*	100,000	field bindweed 25, tansy 20, Canada thistle 2000, spotted knapweed 200 (Cirsium arvense, Tanacetum vulgare)	5.37	Temp ROW
977.09	Poison Ivy	*Toxicodendron rydbergii*	10,000	field bindweed 25 (Convolvulus arvensis)	0.22	Temp ROW
977.41	Poison Ivy	*Toxicodendron rydbergii*	1,000		0.04	Temp ROW
977.82	Poison Ivy	*Toxicodendron rydbergii*	1,000		0.04	Temp ROW
977.90	Poison Ivy	*Toxicodendron rydbergii*	2,000	Canada thistle 300 (Cirsium arvense)	0.10	Temp ROW
978.42	Canada Thistle	*Cirsium arvense*	200	tansy 25 (Tanacetum vulgare)	0.08	Temp ROW
978.57	Canada Thistle	*Cirsium arvense*	200		0.02	Temp ROW
985.21	Spotted Knapweed	*Centaurea maculosa*	50		0.04	Temp ROW
985.21	Spotted Knapweed	*Centaurea maculosa*	100		0.03	Temp ROW
985.55	Poison Ivy	*Toxicodendron rydbergii*	2,000	tansy 5 (Tanacetum vulgare)	0.80	Temp ROW
986.31	Poison Ivy	*Toxicodendron rydbergii*	1,000	tansy 3 and spotted knapweed 100 (Tanacetum vulgare, Centaurea maculosa)	0.31	Temp ROW
986.97	Canada Thistle	*Cirsium arvense*	350	tansy 5 (Tanacetum vulgare)	0.04	Temp ROW
987.33	Canada Thistle	*Cirsium arvense*	500	field bindweed 25 (Convolvulus arvensis)	0.00	Temp ROW
987.64	Common Tansy	*Tanacetum vulgare*	500	field bindweed 15, spotted knapweed 50 (Centaurea maculosa, Convolvulus arvensis)	0.36	Temp ROW
994.75	Perennial Sowthistle	*Sonchus arvensis*	2,000	Canada thistle 100 (Cirsium arvense)	0.40	Temp ROW
[1]	Survey included state listed species except for hemp, musk thistle, and plumeless thistle and also included garlic mustard, spotted knapweed, and common tansy.					

Surveys were not conducted adjacent to or on the Alternative 3 or 4 routes. Known noxious weed locations have been identified and mapped by the CNF and are proposed for treatment upon completion of the CNF Non-native Invasive Plant Management environmental assessment. The most prevalent species are spotted knapweed and tansy.

Native earthworm species are not known to occur in the Minnesota region. Earthworms native to Minnesota were extirpated when glacial ice sheets covered the Upper Midwest 11,000 to 14,000 years ago. As a result, Minnesota's forests developed free of earthworms. However, over the last 150 years, exotic or non-native earthworms were introduced with the importation of plant material and soils, and the use of earthworms as fishing bait. Currently, over fifteen species of exotic earthworms inhibit Minnesota (Reynolds et al. 2002).

Minnesota hardwood forests have developed a thick, spongy soil layer, called "duff" in the absence of earthworms. The duff layer provides nutrients for many native understory plants and tree seedlings to germinate and grow. Also, the duff layer provides protection from predation and extremes in weather conditions to the seeds of understory plant species.

Ongoing studies suggest that the invasion of exotic earthworms could adversely impact forest understory plant diversity and cover, nutrient cycling and soil characteristics. A significant decrease or loss of forest understory plant cover and the duff could affect the primary habitat of many small animals and insects. Additionally, the decrease of material covering of the forest floor could result in increased surface runoff and erosion.

Although, surveys were not conducted adjacent to or on the Alternative 2, 3 or 4 routes, a University of Minnesota study indicate that the majority of the mature, northern hardwood forests in the CNF have established exotic earthworm communities (Frelich and Holdsworth, 2002). The most prevalent exotic earthworm species is the *Lumbricus rubellus* and *Lumbricus terrestris*. L, rubellus is most associated with impacts to the duff layer and understory plant diversity. L. terrestris pulls into its burrow large quantity of leaf litter creating bare spots on the forest floor.

3.3.3.5 Direct and Indirect Effects

Alternative 1

The No Action Alternative would result in no changes to current conditions or the factors affecting the distribution and abundance of noxious weed species within the Projects area due to pipeline construction. Distribution and abundance of noxious weed species in the area may change despite the lack of action because of existing and ongoing vectors associated with the use of U.S Highway 2, the BNSF Railroad corridor, the existing Applicant pipelines, the Mi-Ge-Zi Bike trail, the Soo Line off-road vehicle trail, and unauthorized off-road vehicle use of the pipeline right-of-way. Noxious weed seeds could also be brought to the Projects area by wind or wildlife, and may be present in the soil.

Also, the No Action Alternative would have no affect on the current conditions or the factors affecting exotic earthworm population density within the Project area. Earthworm populations spread at a rate of approximately 5.5 yards (5 meters) a year. Even with "no action," the introduction of new exotic earthworms in the area could occur from a variety of human activities such as dumping of unused fishing bait, transport of compost & mulch, and vehicle tire treads that carry soil including farming and logging equipment, mountain bikes and OHVs.

Alternative 2

Direct and indirect effects of Alternative 2 would include the existing and ongoing effects discussed under Alternative 1, as well as effects related to the proposed construction. The total area impacted by Alternative 2 would be 566.4 acres. Soil disturbance during construction would create favorable conditions for the introduction and spread of noxious weeds and exotic earthworms. Earthworm cocoons and noxious weeds seeds could be introduced from equipment used at other construction sites or via equipment proceeding along the construction right-of-way.

Increased occurrences of noxious weeds and exotic earthworm communities would directly affect the native and planted species allowed to revegetate the right-of-way. Noxious weeds would outcompete the preferred vegetation for light, nutrients, and moisture. Exotic earthworms infestation would reduce the duff layer and naturally, nutrient rich soils. Increased populations of noxious weeds and exotic earthworms may indirectly affect wildlife by excluding the native species and decreasing overall species diversity and habitat. Wildlife species accustomed to native vegetation could lose local food sources if weeds were to out-compete the native vegetation or understory plant cover is removed due to exotic earthworms' infestation. Some wildlife could adapt to the vegetative changes and may use the noxious weed or earthworm species as a food source.

A total of 41.6 acres of noxious weed infestation were delineated by field survey in the proposed Alternative 2 workspace (see table 3.3.1-3). The CNF was aware of approximately 7.4 acres of noxious weed infested areas that exist along the proposed Alternative 2 workspace. To avoid spreading known populations of noxious weeds (e.g., spotted knapweed and leafy spurge) from one area to another on the right-of-way prior to and during construction, the Applicant would implement measures detailed in the Noxious Weeds and Invasive Species Control Plan (included as Appendix F to the EIS). Such measures would include treating known populations within the construction right-of-way prior to and during construction to avoid seed development and dispersal. The Applicant would also be required to mechanically clean construction equipment before it is used in the Projects area or when traveling from an area of known noxious weed populations to another area where such populations do not exist. Where practicable, known weed locations would be fenced and avoided by construction equipment during construction, or covered by equipment mats or mulch. In some circumstances, soil would be required to be restored to the vicinity from which it was removed during grading, trenching, and restoration measures.

To minimize the introduction or spread of exotic earthworms within the Project area during construction, the Applicant would mechanically clean construction equipment to remove soil and earthworms. Construction equipment would be cleaned before leaving a high exotic earthworm probability area (i.e., lake shorelines, camps and fishing resorts).

Based on ongoing consultations with the CNF and DRM staff, the Applicant has proposed the development of a long term plan to control noxious and invasive species along its entire corridor throughout the LLR/CNF after construction has been completed. This plan will be developed in compliance with the LLBO DRM Invasive Species Management Plan. The survey information collected as part of this potential Project would be used as a baseline to disclose types and locations of noxious and invasive species. Ongoing monitoring and intermittent approved controls would be funded and implemented by the Applicant or potentially by trained LLBO members thus creating employment opportunities. The Applicant will continue to work with CNF and DRM staff to finalize the details of this plan.

During restoration and stabilization of work areas, noxious weeds could also be introduced to the Projects area by the seed used for revegetation, or in straw mulch or straw bales used for erosion control. In order to avoid the introduction of noxious weeds from mulch or straw bales, the Applicant would be required to use certified weed-free straw for mulching and erosion control and would use certified weed-free seed during revegetation. To reduce the introduction of exotic earthworms, topsoil will not be imported into the Project area.

While it is not possible to avoid introduction of weed seeds by wind and wildlife, the Projects would minimize the opportunity for noxious weeds to become established by restoring disturbed areas according to the seed mix, application rates, and seeding dates outlined in the Revegetation and Restoration Monitoring Plan and in section 2.4.2.10 of the BA/BE. In addition, the Projects may be required to mechanically control noxious weeds present prior to planting if planting is delayed, and weed free seed would be used for restoration. Mechanical control would include pulling, cutting, mowing, and tilling. Following construction, the company would be required to monitor the construction right-of-way for new or expanded weed infestations, and use mechanical or approved chemical controls as necessary to eliminate development of new weed areas and ensure successful revegetation with native species.

Alternative 3

The direct and indirect effects on invasive species establishment and spread would include the same types of effects as Alternative 2. The total area impacted by Alternative 3 would be approximately 587 acres based on total crossing length and a 140-foot-wide construction workspace. The CNF is aware of approximately 5.3 acres of noxious weed infested areas that exist along the Alternative 3 pathway. A noxious weed survey of the Alternative 3 pathway has not been conducted. The Alternative 3 pathway would include a length adjacent to exiting pipeline right-of-way 1.6 miles greater than Alternative 2. Areas intersecting or adjacent to existing right-of-way are generally more likely to include noxious weed infestations. Therefore, it is likely that the total area of noxious weed infestation that would be encountered along Alternate 3 is as large as or larger than the area of noxious weed infestation that would be encountered along Alternate 2 (41.6 acres). The Applicant would be required to conduct a noxious weed survey of the entire alternative pathway prior to construction. The same mitigation measures described for Alternative 2 would be implemented to prevent the introduction and spread of invasive species.

Alternative 4

The direct and indirect effects on invasive species establishment and spread would include the same types of effects as Alternatives 2 and 3. The total area impacted by Alternative 4 would be approximately 599 acres based on total crossing length and a 140-foot-wide construction workspace. The CNF is aware of approximately 12.2 acres of noxious weed infested areas that exist along the Alternative 4 pathway. A noxious weed survey of the Alternative 4 pathway has not been conducted. About 4.1 miles less of Alternative 4 would be adjacent to existing pipeline right-of-way than Alternative 2. Areas intersecting or adjacent to existing right-of-way are generally more likely to include noxious weed infestations. Therefore, it is likely that a smaller total area of noxious weed infestation would be encountered along Alternate 4 than along Alternatives 2 and 3, but more area not previously susceptible to weed infestation would be disturbed under Alternative 4. The Applicant would be required to conduct a noxious weed survey of the entire alternative pathway prior to construction. The same mitigation measures described for Alternative 2 would be implemented to prevent the introduction and spread of invasive species.

3.3.3.6 Cumulative Effects

Alternative 1

The No Action Alternative proposes no changes to the Projects area from the existing condition due to pipeline construction. It is entirely possible that past, present, and future projects introduced or would introduce invasive species to the Projects area, and that additional invasive species could invade new areas without soil or vegetation disturbance. Table 3.3.1-2 lists noxious weed infestations identified in the proposed Alternative 2 Projects work area during surveys constructed in July through September 2008. Soil disturbance and construction equipment from past construction of the Applicant pipelines, U.S. Highway 2, the BNSF Railroad, the Mi-Ge-Zi bike trail, the Soo Line ORV trail, and recent timber harvests within the Projects area were potential vectors for the introduction or spread of invasive species into the Projects area. Subsequent vehicle use of the transportation corridors and recreational trails were additional potential vectors for the introduction or spread of invasive species into the Projects area.

Proposed future RMP implementation, the 230 kV HVTL, and pipeline operations and maintenance would be potential vectors for the introduction or spread of invasive species into the Projects area. Noxious weed seeds and exotic earthworms could be brought to the Projects area by dirty equipment used during construction. Invasive species could also be transported to the Projects area by the seed or plants with soil around their used for revegetation of disturbed areas.

Currently, the state of Minnesota; Hubbard, Cass and Itasca Counties; the CNF, the DRM, and private landowners are using available resources to attempt to control the spread of noxious weeds and comply with the Minnesota Noxious Weed Law. The DRM is focusing its efforts on raising *Galerucella* beetles for purple loosestrife control and working with the CNF and private land owners to remove garlic mustard from the Reservation using primarily manual or mechanical techniques. Under the ongoing CNF Non-native Invasive Plant Environmental Assessment, the NFS proposes to treat occurrences of common tansy, leafy spurge, Siberian peashrub, purple loosestrife, common buckthorn, plumeless thistle, spotted knapweed, garlic mustard and wild parsnip by using one or more of the following means: herbicide, biocontrol, manual, or mechanical. The LLBO DRM emphasizes an integrated management approach which views herbicides as a less desirable treatment measure. The program is designed to treat existing and future non-native invasive plant populations in areas identified throughout the CNF for approximately the next 10 years, beginning with treatments on delineated infested acres and finding and treating additional acres over the 10 year period, including several areas intersected by Alternatives 2, 3, and 4. Alternative 1 would have no impact on the planned treatment areas.

Alternative 2

The cumulative effects of Alternative 2 include the cumulative effects from Alternative 1. Additionally, construction of the proposed Projects would be a potential vector for the introduction or spread of invasive species into the Projects area. Noxious weed seeds and exotic earthworms could be brought to the Projects area by dirty equipment used during construction. Invasive species could also be transported to the Projects area by the seed or plants with soil around their used for revegetation of disturbed areas.

Roads and trails crossing the proposed Project could be pathways for spreading of invasive species to or from areas disturbed by the Projects. Alternative 2 would cross 11 gravel forest roads, 8 other gravel roads, and 7 paved roads (See Section 3.2). Under Alternative 2, the proposed pipeline and Mi-Ge-Zi Trail would be collocated or directly adjacent to each other for approximately 4,650 feet (See Section 3.6). The proposed pipeline corridor crosses two other trails, the Soo Line Trail and the Winnie Trail. To minimize the visibility and restrict access to the maintained corridor at road and trail crossings, all temporary extra workspaces would be set back 25 feet from the road crossings. In addition, the VIA and Visual Mitigation Plan (see Appendix M of the EIS) specifies tree planting and small berm installation which will also restrict visibility and access to the pipeline corridor (approximately 20 feet beyond the existing right-of-way boundary).

Alternative 2 would include 38.33 miles of construction adjacent to existing right-of-way, and 15.45 miles of construction along a greenfield route. The pipeline corridor, which includes the existing cleared area and the proposed cleared area for both the permanent easement and the temporary workspace, would be up to 265 feet wide. The total permanent easement would be up to 200 feet wide. Given the proposed treatments in the foreseeable future, newly established weed populations along the pipeline corridor should be quickly treated and eliminated. In addition, treatment of existing populations would result in a net reduction in weed populations.

Alternative 3

The cumulative effects of Alternative 3 include the cumulative effects from Alternative 1 and the same types of potential vectors as Alternative 2. Alternative 3 would cross 23 gravel numbered CNF roads, 7 other gravel roads, and 5 paved roads. The Alternate 3 pathway would not parallel or cross any recreational trails. Measures to prevent or restrict OHV access would be similar to Alternative 2. The VIA, Appendix M of the EIS, includes possible mitigation measures that may be employed to reduce OHV access. Alternative 3 would be constructed adjacent to existing right-of-way (34.6 miles), except for 0.3 miles not adjacent to existing right-of-way. Given the proposed treatments in the foreseeable future, newly established weed populations along the pipeline corridor should be quickly treated and eliminated. In addition, treatment of existing populations would result in a net reduction in weed populations.

Alternative 4

The cumulative effects of Alternative 4 include the cumulative effects from Alternative 1 and the same types of potential vectors as Alternative 2 and Alternative 3. Alternative 4 would cross 23 gravel numbered Forest roads, 8 other gravel roads, and 6 paved roads. The Alternate 4 pathway would not parallel or cross any recreational trails. Measures to prevent or restrict OHV access would be similar to Alternative 2. The VIA, Appendix M of the EIS, includes possible mitigation measures that may be employed to reduce OHV access. Where Alternative 4 deviates from Alternative 3, it would not be constructed adjacent to existing right-of-way. Alternative 4 would include 28.9 miles adjacent to existing right-of-way and 6.4 miles not adjacent to existing right-of-way. The greenfield portions of the route would be primarily within General Forest – Longer Rotation and General Forest management areas.

3.4 HERITAGE RESOURCES ANALYSIS

3.4.1 Scoping Issue 8 – Construction Impacts to Heritage Resources

3.4.1.1 Description

Clearing, grading, and trenching associated with pipeline construction can result in impacts to archaeological sites and traditional Native American properties. Therefore, a general discussion of the measures that have been taken to avoid or minimize these impacts is presented as part of this environmental analysis.

3.4.1.2 Indicators

Phase 1 and Phase 2 cultural resource surveys were used to identify and evaluate cultural resources, including archeological sites, along the proposed pipeline route. A survey of tribe members would be used to identify traditional cultural properties. It is expected that a Traditional Cultural Properties survey will be completed during the winter of 2008/2009.

3.4.1.3 Scope

The scope of the heritage resources analysis includes all LLR and NFS lands managed by the CNF on the proposed route.

3.4.1.4 Affected Environment

The general area contains numerous cultural resource sites resulting from human settlement and other activities over the last 10,000 years. These include archeological sites which were ancient villages and camp sites, special activity areas such as wild rice processing sites, cemeteries, and sites of spiritual and traditional use. There is also evidence of a wide range of later historic activities ranging from the fur trade up to and including NFS administrative sites which are still in use today. Common late historic sites include those associated with mineral exploration, settlement, logging, fur trapping, resorts, and recreational dwellings such as cabins. Lands and resources both within and outside the LLR boundary are very important to Native American peoples for subsistence gathering, for the collection of plants for medicines, for spiritual and ceremonial purposes, and for everyday life.

Investigations of cultural resources for the Projects follow the implementing regulations of Section 106 (36 CFR 800) of the National Historic Preservation Act (PL 89-665; 16 USC 470) as amended 1992, to fulfill National Environmental Policy Act requirements. Information concerning the location and nature of cultural resource sites is protected from public disclosure by the National Historic Preservation Act, the Archeological Resources Protection Act (PL 96-95), and is exempt from information requests under the Freedom of Information Act.

Construction activities would generally utilize a 140-foot-wide right-of-way that includes approximately10 30 feet of existing pipeline corridor, up to 75 feet of new permanent right-of-way, and 65 feet of temporary construction easement. Additional temporary workspace adjacent to the construction right-of-way may be necessary in areas such as steep slopes and staging areas for stream, wetland, and road crossings. Construction within the existing pipeline corridor has little potential to affect archeological resources, as they would already have been disturbed. However, there is a greater potential for impacts within the remaining 110 feet of new and temporary rights-of-way plus additional workspace. Pipeline construction may prevent or alter people's ability to gather and utilize traditional resources such as birch bark, berries, medicinal plants, etc.

Additionally, construction activities could potentially impact wild rice waters. Wild rice is an important native plant to the Leech Lake native population, and is used as a traditional food source, a revenue source, and as well as providing to the LLBO culturally, spiritually, and socially. The DRM identified four locations of wild rice waters locations in the vicinity of the proposed Projects: Pike Bay Channel; Upper, Middle and Lower Sucker Lake; Portage Creek; and Mississippi River. The Applicant evaluated the potential impact of the proposed crossing method for the affected waterbody. Pike's Bay Channel and Mississippi

River will be crossed via HDD, and therefore would not result in a disturbance of the bed and banks of the waterbody, nor impact wild rice beds. Because the HDD method cannot be employed at the crossings of Sucker Lake (Upper, Middle and Lower) and Portage Creek due to engineering constraints, Enbridge is analyzing other feasible crossing methods that will minimize potential impacts to these resources. Also, since potential impacts to wild rice waters would be minimal and temporary, and the DRM has provided the locations of known wild rice waters likely to be affected by the proposed Projects, surveys or delineations were not considered necessary. If the crossings of Sucker Lake and Portage Creek cannot be constructed without disturbing the bed and banks of those waters, a temporary disturbance of the wild rice populations would occur. Wild rice would be expected to repopulate its previous footprint based on observing wild rice populations being present over the existing pipeline corridor. The portions of the two wild rice areas which may be temporarily impacted by the project does not represent a significant portion of the know wild rice areas that are managed by the DRM and harvested by the local population (Leech Lake Reservation, 2009).

Cultural resource investigations were performed along the applicant-preferred route Alternative 2 in two phases: reconnaissance (or Phase I) and site evaluation (or Phase II). Phase I reconnaissance was completed for all new work areas in 2007 and 2008 and involved archival research, surface reconnaissance, and subsurface shovel testing. Phase I cultural resources and architectural history survey resulted in the identification of six sites and four architectural history properties positioned within the boundaries of the LLR and CNF (see table 3.4.1-2). Phase II evaluation of Site 21CA0315 is currently being completed, while the proposed pipeline has been rerouted to the north in order to avoid CNF Site 09-03-03-1115. Phase II evaluations of Sites 21CA0569, 21CA0571, and 21CA0572 were previously conducted as part of the Lakehead Terrace III Project (Kluth, 2001) in 2001. Of these, Sites 21CA0571 and 21CA0572 were determined to be not eligible for listing to the National Register of Historic Places (NRHP), while Site 21CA00569 was found to be eligible for nomination to the NRHP (Kluth, 2001). An additional previously recorded archaeological site (21IC0109) is known to be present within the boundaries of the LLR and CNF; however, the site could not be relocated during Phase I cultural resources survey of the proposed Projects corridor (Doperalski et al., 2008). Doperalski et al. (2008) noted that the portion of Site 21IC0109 within the currently proposed construction corridor had been destroyed due to previous activities. Route Alternatives 3 and 4 have not been subject to cultural resources survey for the current Projects.

Architectural history properties CA-CLC-028, CA-PKB-022, CA-UOG-018, and CA-UOG-019 all represent architectural history properties consisting of railroads. Of these four properties, three (CA-CLC-028, CA-PKB-022, and CA-UOG-018) were determined to be eligible for listing to the NRHP, while the remaining property (CA-UOG-019) was found to be not eligible for the NRHP.

Table 3.4.1-1 provides a summary of the eligibility status for the 10 heritage resources described above. Six sites were recommended for listing to the NRHP: five sites were determined to be eligible, and one site as potentially eligible. Four sites were determined ineligible for listing.

Table 3.4.1-1 - Heritage Resources

Site Number	Site Type	National Resister of Historic Places
21CA0169	Prehistoric	Eligible
21CA0315	Prehistoric	Potentially Eligible
21CA0569	Prehistoric	Eligible
21CA0571	Prehistoric	Ineligible
21CA0572	Prehistoric	Ineligible
CNF Site 09-03-03-1115	Historic	Potentially Eligible
CA-CLC-028	Railroad	Eligible
CA-PKB-022	Railroad	Eligible
CA-UOG-018	Railroad	Eligible
CA-UOG-019	Railroad	Ineligible

The LLR Tribal Historic Preservation Office completed a traditional cultural property survey of the Terrace III Project Cass Lake Loop (Tribal Historic Preservation Office report, May 29, 2001). Based on the results of this survey, the Tribal Historic Preservation Office indicated that many Leech Lake Band members harvest traditional resources within the pipeline corridor. The Tribal Historic Preservation Office recommended that while these traditional harvesting areas may not be eligible to the National Register of Historic Places, the Applicant should nevertheless employ certain measures to mitigate potential impacts on these harvesting areas (Tribal Historic Preservation Office letter, August 21, 2001). The Tribal Historic Preservation Office has not, to date, provided the CNF with any specific information regarding traditional cultural properties on NFS lands within the Projects area.

The St. Paul District Corps of Engineers, a regulatory agency conducting a federal review of the Projects and originally assisting the U.S. Department of State with Section 106 consultations, sent out consultation letters to the Leech Lake tribe and other tribes on May 25, 2007. The U.S. Department of State sent additional consultation letters on January 14, 2007. A list of Native American tribes which have been contacted to date regarding the Projects is provided below (see table 3.4.1-2). Additionally, information regarding Native American tribes contacted to date is provided in Section 1.4 of the EIS document. To date, the LLBO and Fond du Lac Band of Lake Superior Chippewa, as well as Flandreau Santee Sioux Tribe of South Dakota, Forest County Potawatomi, Ho-Chunk Nation, Lower Sioux Indian Community, Mille Lacs Band of Ojibwe, Boise Forte Band of Chippewa, Upper Sioux Community of Minnesota, Red Cliff Band of Lake Superior Chippewa, and Sprit Lake Nation have indicated that they would like to serve as consulting parties for the Projects. A total of four tribes (Red Lake Band of Chippewa Indians, Sac & Fox Nation of Oklahoma, Sac & Fox Tribe of the Mississippi in Iowa, and the Stockbridge-Munsee Community) have indicated that they did not wish to participate in the consulting process. The remaining tribes contacted as part of the scoping process have not responded.

Table 3.4.1-2 - Native American Groups Contacted

Name of Group	
Leech Lake Band of Ojibwe	Flandreau Santee Sioux Tribe of South Dakota
Upper Sioux Community of Minnesota	Forest County Potawatomi
White Earth Band of Ojibwe	Ho-Chunk Nation
Fond du Lac Band of Lake Superior Chippewa	Mille Lacs Band of Ojibwe
Red Lake Band of Chippewa Indians	Sisseton-Wahpeton Oyate of the Lake Traverse Reservation
Boise Forte Band of Chippewa	Sisseton-Wahpeton Sioux
Sprit Lake Nation	Lac Courte Oreilles Band of Lake Superior Chippewa
Sac & Fox Nation of Oklahoma	Lac du Flambeau Band of Lake Superior Chippewa
Stockbridge-Munsee Community	Lac Vieux Desert Band of Lake Superior Chippewa
Bad River Band of Lake Superior Chippewa	Grand Portage Band of Lake Superior Chippewa
Oneida Nation of Wisconsin	Keweenaw Bay Indian Community
Prairie Island Indian Community	Menominee Indian Tribe of Wisconsin
Red Cliff Band of Lake Superior Chippewa	Sac and Fox Tribe of the Mississippi in Iowa
Sokagon Chippewa Community	Shakopee Mdewakanton Sioux Community
St. Croix Band of Lake Superior Chippewa	Lower Sioux Indian Community
Sac & Fox Nation of Missouri and Nebraska	Santee Sioux Nation, Nebraska

3.4.1.5 Direct and Indirect Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no short- or long-term changes to heritage resources would occur. The pipeline would not be constructed and no surface or ground disturbances would be required. The Applicant's existing permanent right-of-way would remain the same and activities previously undertaken in the Projects area, such as right-of-way and pipeline maintenance, would still be allowed pursuant to the existing Special Use Permit with the CNF.

Alternative 2

No further consideration is required for the ineligible sites (21CA0571, 21CA0572, and CA-UOG-019). Sites 21CA0169, 21CA0315, and CNF Site 09-03-03-1115 are located outside the pipeline construction corridor. Construction would avoid impacts to the sites. During fall of 2008, the site boundaries of Site 21CA0569 would be redefined so that the site can be avoided by proposed pipeline construction. If avoidance of Site 21CA0569 is not possible, the site would be mitigated prior to construction.

The three remaining cultural resources which were identified within the boundaries of the CNF (CA-CLC-028, CA-PKB-022, and CA-UOG-019) consist of segments of active railroads. The Applicant would cross under these three railroads with the use of the bore crossing method. This method of crossing would preserve the historic route of the railroad corridors and would not disturb the historic resources.

With regards to the Terrace III Project Cass Lake Loop (Tribal Historic Preservation Office report, May 29, 2001), the Tribal Historic Preservation Office recommended that traditional resource harvesting areas identified in the Projects area may not be eligible to the National Register of Historic Places. The Tribal Historic Preservation Office recommended that the Applicant should, nonetheless, employ certain measures to mitigate potential impacts on these harvesting areas (Tribal Historic Preservation Office letter, August 21, 2001). These measures are, in part, listed as follows:

- Delineate areas that would be clear-cut prior to actual ground-disturbing activity to provide adequate time for the Tribal Historic Preservation Office to notify affected communities.
- Allow community members to harvest non-saleable timber (for firewood), and other traditional resources prior to clear-cut or surface disturbance.
- Replant disturbed areas with native plant species that are beneficial to wildlife and with those native plants that are used by the Anishinabe people for traditional purposes, as outlined in the Revegetation Plan.

The Tribal Historic Preservation Office has not, to date, provided the CNF with any specific information regarding traditional cultural properties on NFS lands within the Projects area.

Alternative 3

CNF has identified a total of 14 cultural resource sites within the Alternative 3 corridor: CNF Sites 09-03-02-00287, 09-03-02-00364, 09-03-02-00451, 09-03-02-00538, 09-03-02-00539, 09-03-02-00540, 09-03-02-00541, 09-03-02-00542, 09-03-02-00544, 09-03-02-00545, 09-03-02-00546, 09-03-03-00361, 09-03-03-00989, and 09-03-03-00991. The National Register of Historic Preservation eligibility status of these sites is currently unknown. If the proposed 230 kV HVTL project is approved for the proposed route, which is nearly identical to Alternative 3, a comprehensive heritage resources analysis would be performed by that project proponent and the results made available to the Leech Lake Tribal Historic Preservation Office and CNF at that time.

Alternative 4

CNF has identified a total of nine cultural resource sites within the Alternative 4 corridor: CNF Sites 09-03-02-00287, 09-03-02-00540, 09-03-02-00541, 09-03-02-00542, 09-03-02-00544, 09-03-02-00545, 09-03-03-00361, 09-03-03-00989, and 09-03-03-00991. The National Register of Historic Preservation eligibility status for these sites is currently unknown. If the proposed 230 kV HVTL project is approved for the proposed route, a majority of which is nearly identical to Alternative 4, a comprehensive heritage resources analysis would be performed by that project proponent and the results made available to the Leech Lake Tribal Historic Preservation Office and CNF at that time.

3.4.1.6 Cumulative Effects

Alternative 2

Because Alternative 2 would have no affect on heritage resources, there would be no cumulative impacts when evaluated in conjunction with other past, present, and future projects.

The Applicant is committed to consulting with representatives from the LLBO with construction, mitigation, and restoration plans to ensure that Tribal interests pertaining to impacts to harvesting areas along the proposed pipeline alignment are addressed.

Alternatives 3 and 4

At this time a comprehensive heritage resources analysis has not been performed on Alternatives 3 and 4 so the cumulative effects are unknown. If the proposed 230 kV HVTL project is approved for the proposed route, a majority of which is nearly identical to Alternative 4, a comprehensive heritage resources analysis would be performed by that project proponent and the cumulative effect results would be made available to the Leech Lake Tribal Historic Preservation Office and CNF at that time.

3.5 AESTHETICS ANALYSIS

3.5.1 Scoping Issue 9 – Affects to Scenic Quality and Landscape Character

3.5.1.1 Description

Pipeline construction activities and additional clearing of the pipeline right-of-way were identified during scoping as an issue that could affect the scenic quality and landscape character observed by users of U.S. Highway 2 and other roads and trails in the Projects area such as the Mi-Ge-Zi Bike Trail and the Soo Line Trail.

3.5.1.2 Indicators

The effects of construction on aesthetic qualities were evaluated through the use of a VIA prepared by the Applicant and incorporated by reference within this environmental appendix.

3.5.1.3 Scope

The scope of the analysis is the visual impacts of each alternative on the landscape within and adjacent to the LLR and CNF. It also includes that of users at key views (e.g., select road and trail crossings) along or adjacent to the pipeline corridor on LLR and NFS lands within the CNF.

3.5.1.4 Affected Environment

The existing pipeline right-of-way traverses a landscape consisting primarily of forested areas interspersed with surface waters, wetlands, and open areas. Within this landscape, the Applicant's pipeline right-of-way appears as a linear feature (i.e., an open corridor surrounded by forest and shrub communities) that crosses a variety of viewsheds. The Applicant's right-of-way is one of many open linear corridors in the Projects area. Other visible linear corridors include U.S. Highway 2, the BNSF Railroad line, power lines, recreational trails, and forest roads.

Potential public viewing of the pipeline corridor occurs at locations where the pipeline is adjacent to or crosses transportation and recreational features such as roads, trails, and waterbodies. At these viewpoints, the pipeline corridor generally consists of a 125-foot-wide opening that is visible within the forested landscape. The corridor is larger at locations where power lines are located adjacent to the Applicant's right-of-way. Periodic clearing and mowing activities within the corridor prevent re-establishment of larger shrubs and trees and keep the corridor open and visible to the viewing public.

To analyze the potential for aesthetic impacts by the proposed Projects, the Applicant commissioned a VIA that incorporates methods commonly used by the Minnesota Department of Transportation (Mn/DOT) for linear projects. For this assessment the Mn/DOT VIA process was augmented to include VIA techniques developed by the Federal Highway Administration (FHWA) and scenic management practices developed by the USFS.

The USFS's Land and Resource Management Plan outlines desired conditions, objectives as well as standards and guidelines for scenic resources within the forest. Scenic Integrity Objectives (SIO) guide management activities needed to achieve desired scenic conditions, and are characterized as High SIO Areas, Moderate SIO Areas, and Low SIO Areas. The Forest Plan indicates that temporary openings should appear as follows:

- High SIO Areas: Temporary openings will be similar in size, shape, and edge characteristics to natural openings in the landscape being viewed. Or, temporary openings will mimic a natural disturbance process typical for the area so that when ground cover has been established the openings appear to be a natural occurrence.

- Moderate SIO Areas: Temporary openings may be more evident than in High SIO areas. Openings may be larger than those in the surrounding landscape and after groundcover has become reestablished openings may have the appearance of a management activity. Edge characteristics will be similar to those in the surrounding landscape and not dominate the surrounding landscape.

- Low SIO Areas: Temporary openings may dominate the view. The shapes of openings reflect vegetation changes in natural openings. Openings also have visual effects and patterns of the shapes, sizes, and edges of natural openings in the surrounding landscape.

The VIA is attached to the EIS as Appendix M and provides a full discussion of the affected environment, the assessment measures used, and potential mitigation measures that may be employed to minimize visual impacts during construction and operation of the proposed Projects. In addition, the Applicant is developing, in cooperation with the CNF, a Visual Mitigation Plan that would be available for review as part of the EIS and would define the specific measures the Applicant would employ to minimize the Projects' impacts to the aesthetic environment.

3.5.1.5 Direct and Indirect Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no change to aesthetic quality. The Applicant would not construct the proposed pipeline and disruption of the landscape would not be required. The Applicant's existing right-of-way would remain the same and activities previously undertaken in the Projects area, such as right-of-way and pipeline maintenance, would continue pursuant to the existing Special Use Permit with the CNF.

Alternative 2

Construction of Alternative 2 would affect aesthetics in the vicinity of the Projects. The principal effect on aesthetics would be the expansion of an existing pipeline corridor, including tree clearing at locations within view of travelers at several key views, including U.S. Highway 2, perpendicular forest roads, recreational trails, and other roads crossed by the Projects. Impacts would be greatest between the Pike Bay Channel and Forest Road 2137 (Pike Bay Loop). These impacts are discussed in the VIA.

During construction, clearing of vegetation, excavation of soil, and operation of heavy equipment would be visible from roads and trails adjacent to and crossed by the pipeline corridor. The existing pipeline corridor would be widened in open space and in forested areas. At most locations, the width of the pipeline corridor would increase by 140 feet (more where extra workspaces are located), of which up to 75 feet (permanent right-of-way) would be maintained in an herbaceous condition to facilitate an ongoing pipeline inspection program. Upon completion of construction, the remaining 65 feet would be allowed to revert to its prior condition by natural regeneration and selected plantings as specified in the section 2.4.2.10 of the BA/BE (revegetation).

The visual impacts on open terrain would be shorter in duration because the herbaceous and shrub communities would regenerate within a few growing seasons. Clearing of forested areas would result in more long-term visual effects due to longer regeneration times for trees. Clearing of trees adjacent to the existing right-of-way would convert existing forested areas to open areas and result in a visually wider corridor. Collocation of the proposed pipeline within the existing cleared pipeline corridor would minimize the visual interruption of the landscape.

To further minimize impacts of forest clearing on the visual landscape, the Applicant would be required to implement mitigation and minimization measures that are currently being identified in cooperation with the Forest and that would be documented in the Visual Mitigation Plan as well as the Revegetation Plan. Some possible mitigation measures include:

- In some cases, areas to be selectively cleared would be identified for the Applicant by the CNF with the intention of reducing the extent of cleared areas visible from travelways, to create a more natural appearance of the corridor edge, and to breakup the linear shape of the ROW. The construction right-of-way would be analyzed prior to construction to accurately identify the selected locations and trees to be avoided during clearing.

- At the Mi-Ge-Zi Trailhead, Old Sixmile Lake Road, and Sixmile Lake Road NE adjacent vegetation will either be left in place of selectively removed. At the Mi-Ge-Zi Trailhead, surface disturbance will be confined to the location of the HDD entrance and exit points. During construction, a staging area accommodating construction equipment and pipe will be apparent from Highway 2 and the trailhead. Ground level disruption will only affect an area of grassy vegetation and the parking lot near the current valve station. At Old Sixmile Lake Road, and Sixmile Lake Road NE, selected trees and plants will be removed to create a natural looking transition rather than a straight wall of trees.

- At all waterbody crossings with existing woody buffers (See Section 3.11 Surface Waters), the Applicant would replant woody vegetation between both new and existing pipelines up to 50 feet back from the top of bank to promote a natural riparian wildlife corridor. A

10-foot-strip of herbaceous vegetation would be maintained over each pipeline to prevent interference by tree roots with pipeline coatings and cathodic protection measures and to allow aerial inspection. Tree species would be selected in consultation with the Forest and would be allowed to grow up to 15 feet in height before being naturally trimmed during routine maintenance operations at the Applicant's discretion. Figure 21 of Appendix 3 describes a typical stream crossing replanting design.

- At waterbodies that are crossed by use of the HDD method, minimal clearing would occur between entry and exit points of the drill. Only hand-clearing would be allowed to facilitate line-of-sight installation of ground wires necessary for accurate placement of the drill. A typical waterbody crossing utilizing the HDD method is depicted in figure 11of Appendix 3.

- Upon completion of the Projects, the Applicant would be required to revegetate and maintain the new permanent right-of-way. The temporary construction right-of-way would be reforested with tree plantings or natural regeneration and allowed to revert to its previous state as specified in the revegetation plan. The Applicant would be required to reimburse the CNF for tree planting as part of their construction restoration effort. Plantings would include trees and/or shrubs at locations throughout the Projects area to meet the visual quality objectives of travelways crossed by or adjacent to the Projects.

Alternative 3

The visual effects of Alternative 3 are addressed in more detail in the VIA, which is attached to the EIS as Appendix M. One primary difference in potential impacts among Alternatives 2 and 3 is that Alternative 3 is more remote and is crossed by fewer users and Alternative 4 would cross more Moderate SIO and Low SIO areas than Alternative 2. However, unlike highway travelers, those viewing this area are recreation visitors, who are more sensitive to changes to visual impacts. These viewers typically travel to the area to enjoy the native natural environment and will consider the widened cut zone as a dramatic interruption of the forest, particularly at crossings that currently evince a closed character typical of a mature forest. The increase in traffic and periodic noise due to maintenance activity would be a more poignant interruption in this more isolated section of the forest.

Alternative 4

The visual effects of Alternative 4 would be similar to those discussed in Alternative 3 as visitors to this portion of the forest would be similar to those visiting the area crossed by Alternative 3. . A portion of this route is greenfield, or undeveloped land, and construction of this route would substantially affect the visual impact of this area. Alternative 4 was not evaluated in the VIA because it was a late addition to the alternatives analysis. However Alternative 4 would cross more Moderate SIO and Low SIO areas than Alternative 2.

3.5.1.6 Cumulative Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from existing condition and, as a result, no cumulative effects on aesthetics would occur.

Alternative 2

Cumulative impacts of the proposed Projects on aesthetics, when evaluated in conjunction with other past, present, and future projects, would be limited. Past projects that have visually altered the landscape include construction of the previous pipeline and development of roads throughout the Projects area. Although construction of Alternative 2 would have an additive effect by widening the pipeline corridor, the existing corridor is already a visually conspicuous feature within the landscape. As discussed in the VIA, three overarching strategies may be employed to mitigate loss of vegetation where pipelines cross

existing roadways and otherwise altered views. These include; planting strategies, mitigation vegetation removal and the incorporation of landform elements. The VIA discusses each technique in detail and indicates how each technique would minimize the visual disturbance from the highway and bike trail.

Although the proposed Cuba Hill RMP was designed to meet high SIOs by maintaining buffers and would potentially complete intermediate harvests to maintain a forested appearance, the minimal tree clearing along the highway corridor, could contribute to the cumulative effects on the aesthetics in the Projects area. Future construction of the 230kV HVTL would involve tree clearing visible to each key view crossed by the proposed pipeline Projects.

Alternative 3

Construction of Alternative 3 would have fewer cumulative visual effects than Alternative 2. Alternative 3 would cross one accomplished Projects area, which according to the CNF involved stand thinning, while Alternative 2 would cross five. The accomplished project that would be crossed by Alternative 3 would also be crossed by Alternative 2. Alternative 3 would affect one future project crossings while Alternative 2 would affect two. The nature and visual impact of these proposed future projects is unknown at this time.

Alternative 4

The cumulative effects of Alternative 4 would be similar to those discussed in Alternative 3. Alternative 4 would cross one accomplished project area, which according to the CNF, involved stand thinning. This accomplished project area is identical to the one crossed in Alternative 3, and it would also be crossed by Alternative 2. Alternative four would cross two future project areas, one of which would also be crossed by Alternative 3. The nature and visual impact of these proposed future projects is unknown at this time.

3.6 RECREATION ANALYSIS

3.6.1 Scoping Issue 10 – Recreational Use and Experience

3.6.1.1 Description

Construction activity that restricts public recreational use of the Mi-Ge-Zi Bike Trail, and intersections of other trails and roads, was identified as an issue during scoping that could affect the experience of users of recreational space. The removal of the vegetation buffer for Highway 2 and the railroad tracks to allow for the construction and the increased permanent right-of-way clearing could affect the recreational experience for users of the Mi-Ge-Zi Bike Trail, Scenic Highway 2, and other forest roads in terms of visuals, noise, and sense of seclusion.

3.6.1.2 Indicators

Effects of the Projects on the experience of recreational users were evaluated by identifying the potential disruption to recreational events and how reasonable adjustments can be made to continue use of the Mi-Ge-Zi Trail and other trail and roads during the construction period. The effects were also evaluated by quantifying the acres and linear feet of vegetation buffer area removed from near the Mi-Ge-Zi Bike Trail and Soo Line trail to U.S. Highway 2 and the railroad tracks.

3.6.1.3 Scope

The scope of the analysis for impacts to recreational uses is public recreation trails and roads accessing recreational sites that are crossed by or adjacent to the proposed Projects within the CNF.

3.6.1.4 Affected Environment

The CNF manages its land for multiple-use activities, including recreational opportunities. The proposed Projects would cross four management areas within the LLR and CNF, some of which have a management purpose to provide a variety of recreational activities including boating, hunting, fishing, snowmobiling, off-road vehicle use, and recreation related to the interpretation of the historic and biologic environment. Recreational facilities in the vicinity of the proposed pipeline include recreational trails, boat launches, dispersed campsites, and a designated recreation area. In addition, organized recreational events are held annually within the Projects area. The dates of activities held in 2008 are listed in table 3.6.1-1.

Table 3.6.1-1 – Recreational Events Occurring in the Project Area

Recreational Event	2009 Date	Location
16th Annual Memorial Walk/Run[2]	May 24	Cass Lake
Bald Eagle Day	June	Cass Lake
Muskie Fishing Opener	June 6	Walker
Mercury Walleye Classic	June 6-7	Leech Lake area
14th Annual Chippewa Triathlon	June 13	Cass Lake
Leech Lake 4th of July Pow-Wow	July 3-5	Cass Lake
Moondance Jammin Country Fest	July 16-18	
48th Annual Muskie-Northern Derby Days	July 24-26	Leech Lake
Onigum Pow-Wow	July 24-26	Onigum, MN
42nd Annual Frank Schneider Jr. Memorial Muskie Tournament[2]	Aug 5-7	Cass Lake/Walker
Minnesota Tournament Trail	Aug 8-9	Lake Winnibigoshish
Cha Cha Bahning Pow-Wow	Aug 21-23	Inger, MN
13th Annual Bike-Walk-Run	Aug 22	Cass Lake Rest Area
Leech Lake Labor Day Contest Pow-Wow	Sep 4-6	Cass Lake
Bear Hunting Season Opener	Sep 1	Leech Lake Area
42nd Annual Muskie Inc. International Tournament[2]	Sep 5-7	Cass Lake and Walker
Battle Point Pow-Wow	Sep 11-13	Sugar Point Community Pow-Wow grounds
Deer Archery Opener and Small Game Opener	Sep 19	Cass Lake
27th Annual North Country Marathon and 10K[2]	Sep 20	Leech Lake
Muskie tournament Trail	Sep 19-20	Cass and Leech Lakes
Paul Harman MN Muskie Tournament	Sep 21-22	Cass Lake
Cystic Fibrosis Walleye Classic	Oct 3	Cass Lake
Pheasant Hunting Opener	Oct 3	Leech Lake area
Deer Firearm Opener	Nov 7	Leech Lake area
Veteran's Day Leech Lake Pow-Wow	Nov 11	Cass Lake

1 Event dates gathered through Cass Lake Chamber of Commerce, Leech Lake Tourism Bureau, My Fishing Pals, Minnesota Tournament Trail and Chippewa National Forest websites.

2 2009 date for event is not yet posted; the 2008 date is shown.

The Mi-Ge-Zi Bike Trail connects the Norway Beach Recreation Area to the City of Cass Lake. The recreation area is located 0.5 mile north of the Projects area near MPs 958.7 – 960.0 and contains four campgrounds, a historic visitor center, boat launch, picnic area, swimming beach, interpretive facilities, and recreational trails. The trail is generally 13 feet wide and paved. In wooded areas, the trail is located within a twenty-five-foot cleared corridor. Between the City of Cass Lake and the east shore of Pike Bay, the trail is located mostly within the Applicant's existing corridor between MPs 956.4 - 956.5 and 956.7 – 958.4. The CNF estimates that the Mi-Ge-Zi Bike Trail receives about 100 users per day in June, July, and Au-

gust. Outside of that period, trail use is estimated to be at a rate of 50 people per day. Trail use is higher during weekends and special events.

The Soo Line Trail is an off-road vehicle trail that parallels the Projects area at most locations. The trail was converted from an old railroad grade. The trail is gravel and generally eight feet wide between the Pike Bay Channel and Forest Road 2137 (Pike Bay Loop). In wooded areas, the trail is located within a 15-foot cleared corridor. It is 49 miles long and is the longest motorized recreation trail located within the CNF. The trail is part of a larger system of trails that connect Carlton, Aitkin, and Cass Counties. The trail is open to off-highway vehicles between April 1 and November 1, but is groomed for snowmobiles in the winter. At most locations, the trail is located 500 feet to the north of the proposed pipelines, but between MPs 956.4 and 956.5 and MPs 956.7 and 958.4 the trail is primarily located adjacent to U.S. Highway 2. At MP 965.2, the trail crosses the pipeline corridor and continues south. Recreation surveys indicate the trail sees approximately 25 users per day during the off-road season.

Winnie Trail is a small gravel track located primarily north of the proposed pipeline Projects. The trail is located within the existing pipeline corridor between MPs 970.8 and 971.1 and crosses the Projects at MP 972.7.

The proposed Project intersects a total of 26 roads that provide access to LLR and NFS lands for recreational users. Two of the roads, Forest Road 2930 and Forest Road 2175, provide the only access to dispersed campsites and boat launches located on Middle Sucker Lake and Portage Lake, respectively.

The proposed Projects crosses 19 bodies of water (see table 3.11.1-1). Five of the 19 waterbodies are designated as Minnesota Protected Waters: Pike's Bay Channel, the backwater bay of Upper Sucker Lake, the Mississippi River, Ball Club River Secondary Channel and Ball Club River. Twelve waterbodies are located in Cass County: Pike's Bay Channel, Upper Sucker Lake, Portage Creek, Bear Brook, Channel, Mississippi River and six unnamed streams. Itasca County contains seven of the waterbodies crossed: Mississippi River Tributary, Ball Club River Secondary Channel, Ball Club River, three unnamed streams and one roadside ditch. Portage Creek may have occasional recreational use but is not navigable to motorized boat traffic. The backwater bay of Upper Sucker Lake and two unnamed channels do not have significant recreational characteristics or use. The backwater bay has limited access by boat through its connection to Upper Sucker Lake, and the two channels are not navigable and are frequently impounded by beaver dams. Pike's Bay Channel and the Mississippi River are classified as navigable waterways.

Alternatives 3 and 4 do not cross established CNF trails. Alternative 3 does cross 34 roads and 8 waterbodies while Alternative 4 crosses 29 roads and 7 waterbodies.

3.6.1.5 Direct and Indirect Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no changes to recreation would occur. The proposed pipeline would not be constructed and no disturbance would be required. The Applicant's existing permanent right-of-way would remain the same and activities previously undertaken in the Projects area, such as right-of-way and pipeline maintenance, would still be allowed pursuant to the existing tribal easements and Special Use Permit with the CNF.

Alternative 2

The principal effect on recreation could be prohibited access to the Projects area during construction. The impacts on recreational facilities and experiences by Alternative 2 are anticipated to generally occur during the fall and early winter of 2009 – more specifically August through December. However, a specific timeline for each trail crossing and construction method is still under evaluation as areas will only be disturbed for as minimal a time period as possible – taking care to structure construction activity around major public events to reduce the amount of impact on local communities. The impact of Alternative 2 is likely to be greatest on the Mi-Ge-Zi Bike Trail and Soo Line off-road vehicle trail between the Pike Bay Channel and MP 958.4. The construction period does not affect planned events which would use the Mi-

Ge-Zi Trail or Soo Line trail. The Applicant proposes to re-route trail users during the limited period of time construction activities may interfere with normal trail operations, and will coordinate such activities with CNF staff.

Under Alternative 2, the proposed pipeline generally is located north of the Mi-Ge-Zi Bike Trail. The precise impacts of construction include the potential removal of the vegetative buffer between the trail and U.S. Highway 2 which could increase the visual presence and associated noises of the highway perceived by trail users. The visual buffer between the Mi-Ge-Zi Trail and the pipeline corridor and Highway 2 would get temporarily disrupted from the Pike Bay Channel to the east side of Pike Bay for a distance of approximately three miles. This may also lead to the indirect effect of a decreased perception of seclusion from passing vehicles experienced by trail users. In order to minimize this effect, the CNF would work with the Applicant to evaluate the need for tree or shrub plantings in the vicinity of recreational trails. Precise mitigation measures are under development as part of the Visual Mitigation Plan process.

Under Alternative 2, the proposed pipeline is generally located next to the Soo Line Trail between the Pike Bay Channel and MP 958.5 for a distance of approximately 3 miles. Potential impacts and mitigation measures similarly are under development in cooperation with the Applicant.

Roads providing access to lands within the LLR and CNF to recreation users may, if open-cut, be closed for up to 24 hours to allow construction of the pipeline. Paved roads and roads providing access to dispersed camping sites and boat launches would remain open during construction. Areas and facilities accessed by roads that would be closed would be accessible via alternate routes. Increased use of alternate portions and facilities within the forest may be an indirect effect of road closures. Recreational pleasure driving along Highway 2 and along Forest Roads would temporarily be impacted during construction but are not expected to change notably after construction.

Boating and fishing would be prohibited during construction across the backwater bay of Upper Sucker Lake. Minimum impacts to recreational activities on the non-HDD waterbodies are anticipated as these streams are generally not considered to be high use. No impacts to recreational activities on Pike's Bay Channel, Mississippi River, Ball Club River Secondary Channel and Ball Club River are anticipated because both waterbodies would be crossed by use of the HDD method (see figure 11).

Alternative 3

Under Alternative 3, effects on recreation may likely be less than those caused by Alternative 2 because of the remote nature of the route and the absence of recreational trails crossed by the route. However, Alternative 3 crosses a total of 35 roads providing access to NFS lands for recreational users, nine more than the total number crossed by Alternative 2. As stated in the VIA, increased traffic and periodic noise due to construction and maintenance activity would be a more poignant interruption in this more isolated section of the forest (Appendix M of the EIS). Additionally, Alternative 3 crosses eight waterbodies, of which three are protected waters and only the Mississippi River is listed as Section 10 Navigable. No impacts to recreational activities are anticipated by crossing these waterbodies using open cut methods as they are not considered to be navigable and do not support quality fisheries, the exception being the Mississippi River where disturbance will be avoided by using the HDD crossing method (see figure 11). Recreational pleasure driving along Forest Roads would temporarily be impacted during construction and may change the experience slightly due to the remote nature of this route.

Alternative 4

Under Alternative 4, effects on recreation may likely be less than those caused by Alternative 2 because of the remote nature of the route and the absence of recreational trails crossed by the route. However, Alternative 4 crosses a total of 36 roads providing access to NFS lands for recreational users, ten more than the total number crossed by Alternative 2. As stated in the VIA, increased traffic and periodic noise due to construction and maintenance activity would be a more poignant interruption in this more isolated section of the forest (Appendix M of the EIS). Alternative 4 crosses seven waterbodies, of which two are protected waters and only the Mississippi River is listed as Section 10 Navigable. No impacts to recreational activities are anticipated by crossing these waterbodies using open cut methods as they are not consi-

dered to be navigable and do not support quality fisheries, the exception being the Mississippi River where disturbance will be avoided by using the HDD crossing method (see figure 11). Recreational pleasure driving along Forest Roads would temporarily be impacted during construction and may change the experience slightly due to the remote nature of this route.

3.6.1.6 Cumulative Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no cumulative effects to recreation would occur. The Applicant's existing permanent right-of-way would remain the same and activities previously undertaken in the Projects area, such as right-of-way and pipeline maintenance, would still be allowed pursuant to the existing Special Use Permit with the CNF.

Alternative 2

Construction of the proposed Project could result in some cumulative recreational effects. Some maintenance work could be expected on U.S. Highway 2, the BNSF Railroad, the existing Applicant pipelines, the Mi-Ge-Zi bike trail, and the Soo Line off-road vehicle trail in the future, but the time, location, and magnitude of the maintenance projects cannot be predicted. Should a maintenance issue arise, it may require restricting areas and/or facilities from recreational use. Maintenance work would generally be expected to be infrequent and smaller in scale than original construction, and therefore the impacts to local recreation would be relatively minor as projects would likely occur in a few isolated areas along the route. The Applicant would use similar methods as those used during construction, for example re-routes and limited time periods of disturbance, to ensure a minimal impact to local recreation. The Cuba Hill RMP is crossed by Alternative 2 but is not anticipated to become an adverse impact on recreational opportunities. The CNF also plans the removal of approximately 13.55 acres of non-native species which are crossed by Alternative 2. This action is also not anticipated to adversely affect recreational opportunities.

Alternative 3

The cumulative effects for Alternative 3 on recreation would be similar to those experienced in Alternative 2 as the route only deviates slightly, crossing nine additional roads through a more remote area of the CNF. Four existing roads which are crossed by Alternative 3 are planned to be decommissioned. The decommissioning of these roads is not anticipated to limit the opportunities for automobile pleasure driving or traveling on the road using bicycles or off-highway vehicles. The CNF also plans the removal of approximately 4.93 acres of non-native species which are crossed by Alternative 2. This action is also not anticipated to adversely affect recreational opportunities.

Alternative 4

The cumulative effects for Alternative 3 on recreation would be similar to those experienced in Alternative 2 as the route only deviates slightly, crossing ten additional roads through a more remote area of the CNF. Four existing roads are also crossed by Alternative 4 that are planned to be decommissioned. The decommissioning of these roads is not anticipated to limit the opportunities for automobile pleasure driving or traveling on the road using bicycles or off-highway vehicles. The CNF also plans the removal of approximately 5.04 acres of non-native species which are crossed by Alternative 2. This action is also not anticipated to adversely affect recreational opportunities.

3.7 SOCIOECONOMIC ANALYSIS

3.7.1 Scoping Issue 11 – Construction Impacts on Local Communities

3.7.1.1 Description

Pipeline construction may result in socioeconomic impacts on the communities surrounding the Projects area. Therefore, a general discussion of the effects of pipeline construction on relevant socioeconomics is presented as part of this environmental analysis.

3.7.1.2 Indicator

Socioeconomic effects were evaluated based on the anticipated impacts on local communities from the influx of workers, employment, and from estimated property and sales tax revenues.

3.7.1.3 Scope

The scope of the socioeconomic analysis includes Tribal, federal, state, and private land associated with the Projects-related areas of LLR, and Hubbard, Cass, and Itasca Counties.

3.7.1.4 Affected Environment

The portion of the proposed Projects that is located within the LLR and CNF falls within the LLR, Hubbard, Cass County, and Itasca County in Minnesota. The total land mass of the LLR and CNF encompasses 1,683,112.19 acres. Approximately, 864,171.60 acres comprises the LLR and 1,596,807.48 acres are NFS lands.

According to information provided by the LLBO, (2007 Indians, Indian Tribes and State Government -4th Edition), LLR has a total population of 10,205 of which 4850 (47.5%) are American Indians. The 2007 estimate of the available workforce within LLR totaled 7,230, with an unemployment rate of 6.4 percent. The (1999) estimated median household income in LLR was $31,275, which is 25% lower than the $41,726 for surrounding counties as well as the State of Minnesota average (U.S. Census Bureau, 2008).

According to 2007 United States Census Bureau estimates, Hubbard County has a population of 18,781. The 2007 estimate of the available workforce within Hubbard County totaled 14,799 persons, with an unemployment rate of 6.4 percent (FedStats, 2007). The 2007 estimated median household income in Hubbard County was $42,231, which is lower than the State of Minnesota average of $55,664 (U.S. Census Bureau, 2008). The 2002 United States Economic Census indicates that the manufacturing industry (as defined by North American Industry Classification System Code 31-33) principally employs Hubbard County residents. Public safety in Hubbard County is overseen by the Hubbard County Sheriff's Office, with approximately 24 full-time officers. Healthcare is provided by the St. Joseph's Area Health Services Hospital and Dakota Clinic, an urgent care outpatient medical center. Both facilities are located within the City of Park Rapids. Hubbard County emergency ambulance service is provided by North Ambulance, and fire protection is provided by volunteer fire departments located throughout the county.

According to 2006 United States Census Bureau estimates, Cass County has a population of 29,036. The 2006 estimate of the available workforce within Cass County totaled 14,899 persons, with an unemployment rate of 6.2 percent (FedStats, 2008). The 2004 estimated median household income in Cass County was $38,906, which is lower than the State of Minnesota average of $51,202 (U.S. Census Bureau, 2008). The principal employer in the county is the LLBO, whose tribal government is located in the City of Cass Lake (Minnesota Indian Affairs Council, 2001). In addition, the LLBO operates the Palace Casino in Cass Lake. Public safety in Cass County is overseen by the Cass County Sheriff's Department, with 30 full-time officers. Currently the City of Cass Lake has its own public safety department consisting of six officers (Cass County Sheriff's Office, 2007). However, on August 1, 2008, the City of Cass Lake declared its intention to disband the city's police force and defer to Cass County sheriff services by the end of 2008. The LLBO also has a public safety department, which operates within the reservation proclamation boundaries. The reservation's public safety department consists of eight employees. Healthcare is provided by the PHS Indian Hospital located within the City of Cass Lake and the North Country Regional Hospital, located 21

miles away in Bemidji (City-Data, 2008). The City of Cass Lake has a local ambulance service, and fire protection is provided by municipalities, the closest of which include the cities of Cass Lake and Bena (Cass County Sheriffs Office, 2001).

According to 2006 United States Census Bureau estimates, Itasca County has a population of 44,729. The 2006 estimate of the available workforce within Itasca County totaled 22,814 persons, with an unemployment rate of 5.9 percent (FedStats, 2008). The 2004 estimated median household income in Itasca County was $39,823, which is lower than the State of Minnesota average (U.S. Census Bureau, 2008). Public Safety is overseen by the Itasca County Sheriff's Department, with 34 full-time officers, except in the City of Deer River, which has its own police department consisting of three officers (Itasca County Sherriff's Office, 2008). Deer River is also equipped with a volunteer fire department, with 24 on-call firefighters. The Deer River Healthcare Center provides local healthcare and ambulance services to the surrounding community.

The LLR, established by treaty in 1855 with the LLBO, consisted of 677,099 original acres (Minnesota Indian Affairs Council, 2001). The tribal governing office for the LLBO is located in Cass Lake, Minnesota. Approximately 48.7 percent of NFS lands are contained within the proclamation boundary of the LLR (see figure 1 in Appendix 3). The Project would pass through four LIC districts; Cass Lake, Bena, Ball Club and Deer River. The Applicant has presented the Project and fielded questions from these LICs in late 2007/early 2008. In addition, the Applicant has indicated that they will attend additional LIC meetings with representatives of the CNF in the future to continue to address the questions and provide Project updates to the local community.

Generally, the economic interests of the local communities in the Projects area are tourism, recreation, and small logging operations. There are small and scattered logging operations that actively harvest timber from both public and private lands crossed by the Projects area. In addition, the Native American population conducts hunting and gathering of resources within all lands on the LLR, and certain NFS lands managed by the CNF.

As stated in the CNF Land and Resource Management Plan, CNF representatives strive to contribute to local-scale social and economic vitality by protecting area resources, recreational, cultural, and other qualities of the forest (O-SE-1, pg. 2-35). Lands within the Forest also serve to help sustain American Indians' way of life, cultural integrity, social cohesion, and economic well-being (D-TR-1, pg. 2-35). The Applicant is committed to consulting with both CNF agents and representatives from the LLBO with construction, mitigation, and restoration plans to ensure that both the CNF and Tribal interests pertaining to social and economic stability are addressed.

3.7.1.5 Direct and Indirect Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no short-term changes to socioeconomics would occur. The No Action Alternative would result in the continuation of the status quo for crude oil transportation through the Projects area. However, the need for the Projects stems from the need to enhance the ability of the existing Applicant pipeline system to meet economic demands in the United States for an economical and reliable supply of crude oil. An increased supply of crude oil would allow refineries to meet consumer needs for refined petroleum products (such as gasoline for automobiles and heating oil for homes). Without this addition, consumers in the upper Midwest may experience long-term negative financial impacts from the rising cost of gasoline.

Alternative 2

In contrast to Alternative 1, constructing the Projects would result in a reliable supply of crude oil that would assist in allowing refineries to meet consumer needs for lower-cost refined petroleum products. Building the Projects would allow the general public to receive the economic benefits of an increase in supply.

Over 300 temporary construction workers would be hired on the Projects during the peak of construction from pipeline contractors, local laborers, equipment contractors, suppliers, and regional testing firms. In addition, environmental consultants, safety, environmental and construction inspectors, and county inspectors would all be employed during the Projects. The workers will come from throughout the U.S. based upon the skills needed for the Projects and would work on the overall Projects, not just the portion to be installed through the CNF. Local workers with the necessary skills would likely have opportunities to pursue these work opportunities. Many of these workers would be in or near the local communities in the vicinity of the CNF and LLR during various periods of construction.

During the almost 12 months of preparation, construction, and testing, these workers would have a positive economic impact on factors such as payroll tax, local expenditures, and sales tax within the Minnesota counties affected by the expansion. Economic benefits may be derived from employing local laborers and any related benefits such as wage earnings and worker spending, as well as spending on construction goods and services.

In all areas of the proposed Projects, including within the LLR, Native American laborers would be used to the extent possible based upon worker availability, worker skills and the needs of the Projects. No permanent positions would be created as a result of the construction schedule for the proposed Projects.

Non-local construction workers would require housing for the duration of construction. This influx would place additional demand on the housing resources in Cass, Itasca, Beltrami, and Hubbard Counties; however, due to area tourism and the number of rental properties, hotels, and campgrounds available, it is not anticipated that the influx of workers would strain these housing resources. According to 2008 Minnesota tourism data, along the proposed route there are 122 indoor lodgings and 57 campgrounds available in Cass County, 62 indoor lodgings and 36 campgrounds available in Itasca County, 42 indoor lodgings and 23 campgrounds available in Beltrami County, and 69 indoor lodgings and 29 campgrounds available in Hubbard County (Minnesota Tourism Office, 2008). The additional workforce would also temporarily increase revenue for necessary service providers, such as restaurants, grocery stores, and gas stations and the additional spending would increase local tax revenues.

Construction within the county would likely place additional demands on law enforcement agencies and medical services as any concentrated increase in population to an area would. The Applicant has outlined a Pipeline Integrity and Emergency Response Plan, which includes a requirement for all Applicant personnel to receive classroom and practical training in safety and emergency response procedures, followed by a demonstration of proficiency in these areas (see Appendix P of the EIS). As well, local law enforcement, fire protection and medical services would be notified of construction plans whenever possible in order to help prepare these public utilities for any possible increase in demand for their services.

The increased crude oil throughput caused by the expanded pipeline would also result in a permanent increased tax base. The total assessed value resulting from this expansion would increase the estimated annual property taxes paid to Minnesota Counties by approximately $20,300,000 in the 15 Minnesota counties affected by the Projects. The economic impact of these increased property taxes on these rural counties reflects a significant benefit to local communities. The proposed Projects may generate other revenues, such as sales and use taxes from goods and materials purchased by construction crews and income taxes levied on labor earnings. The magnitude of revenues in each county would vary because sales and income tax rates vary across counties. Refer to section 3.10 of the EIS for a greater discussion on these issues.

After construction is complete, the temporary workspace areas would be actively reforested or otherwise restored to pre-construction conditions. The Applicant would compensate landowners for any crop losses, including merchantable timber, which occurred during construction, and if a landowner demonstrates continued loss of productivity because of the pipeline Projects, the Applicant would work with the landowner to restore and compensate the individual accordingly.

A likely short-term impact due to project construction may be the temporary inaccessibility of wild rice areas that are crossed by the project. Eight known wild rice areas are crossed by Alternative 2 which would likely be inaccessible to members of the local population while construction is underway. Construction is estimated to be underway in later summer/early fall when harvesting of wild rice typically occurs. The effect on the wild rice population is expected to be temporary based upon wild rice plants being present within the existing pipeline corridor.

As part of the resolution with the LLBO Tribal Council to renew and expand easements for pipeline rights-of-way, the Applicant has prepared the following forms of compensation in an effort to preserve the health and welfare of LLBO members. To promote positive economic benefits, the Applicant would:

- recruit Native American workers for skilled jobs and for on-the-job training;
- purchase services and goods from businesses owned by tribal members, to the extent possible;
- make a contribution to the LLBO Tribal Employment Rights Office (TERO) for the training and development of work skills for LLBO members (in addition to the property lease payment);
- provide funding for a 3-year staffing position in the LLBO Department of Resource Management;
- endow community projects like fire department equipment and community center improvements;
- make available to the local community firewood cut during Projects construction; and,
- develop a plan for gathering rock resources for the use of tribal members.

Alternative 3

The direct and indirect socioeconomic impacts for Alternative 3 would be similar to Alternative 2 because the route is only slightly longer than Alternative 2. However, the route does avoid the City of Cass Lake and crosses through more rural areas of the CNF and the LLR. The overall impacts of this deviation are small, crossing through 0.52 more miles of the CNF, including 2.1 miles of the Pike Bay Experimental Forest. This would have a minimal effect on property tax rates, but other economic benefits to local goods and service providers on account of this increase in local labor force would remain relatively the same. The time to construct Alternative 3 would not be substantially greater than for Alternative 2, and so no notably different socioeconomic impacts would occur.

Alternative 4

The direct and indirect socioeconomic impacts for Alternative 4 would be similar to Alternatives 2 and 3, except that the Projects would avoid both the City of Cass Lake and the portion of the Pike Bay Experimental Forest within the CNF that is crossed by Alternative 3, passing through 1.17 more miles of primarily forested CNF lands. This would have a minimal effect on property tax rates, but other economic benefits to local goods and service providers on account of this increase in local labor force would remain relatively the same. Similarly, the duration of construction for this slightly longer alternative would not result in notably different socioeconomic impacts.

3.7.1.6 Cumulative Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no cumulative effects besides a potential for increases in gasoline prices to the local community may occur.

Alternative 2

Construction of the proposed pipeline would result in some cumulative socioeconomic effects when considered in conjunction with past construction of U.S. Highway 2, the BNSF Railroad, the existing Applicant pipelines, the Mi-Ge-Zi bike trail, and the Soo Line off-road vehicle trail. Construction of these projects has occurred at various times in the past and the contractors, laborers, and suppliers associated with their construction have since completed their work. Local expenditures and tax implications associated with implementing the projects are no longer relevant. However, some maintenance work could be expected on some or all of these facilities in the future, but the time, location, and magnitude of the projects cannot be predicted. Should a maintenance project arise, it may require the use of contractors, laborers, and suppliers, which, in turn, could result in a temporary increase in demand on the local infrastructure as well as an increase in local expenditures and tax benefits. Maintenance work would generally be expected to be infrequent and smaller in scale than original construction, and therefore the impacts would be expected to be relatively minor.

Possible notable future activities in the Projects area include implementation of the Cuba Hill RMP and construction of the 230 kV HVTL. The RMP would be implemented during the next 5 years, and the HVTL is scheduled for expansion from 2009 to 2011. Other projects in the vicinity of Alternative 2 do not have a socioeconomic impact relevant to the proposed Projects. The current schedule for the proposed Projects calls for construction beginning in August 2009, with an in-service date in the second quarter of 2010. Given the construction schedules, some overlap of the projects may occur, and contractors, laborers, and suppliers from two or more of the projects could be in the same area at the same time. However, given the current Projects schedules, it is unlikely that any of the projects' peak phases would overlap, and, that being the case, the additive impacts on infrastructure and local expenditures would be expected to be relatively small. The additional property taxes that would be expected from the proposed pipelines would result in a more noteworthy, longer-term cumulative benefit to the area.

Operation of the proposed pipeline would require up to six full-time new employees. These employees would be based at existing Applicant facilities in Clearbrook, Thief River Falls, Bemidji, or Superior, and these workers' needs for housing and goods in the area would benefit the local economy. Once constructed, the pipeline would generate property tax revenues for the states and counties it traversed for the life of the Projects. Occasionally these permanent workers would make trips to the maintained right-of-way, but this small increase in vehicle trips are not expected to impact local transportation systems.

Alternative 3

The cumulative socioeconomic effects would be similar to Alternative 2, as the route only deviates slightly to avoid the City of Cass Lake and crosses through more rural areas of the CNF and the LLR. Alternative 3 crosses through 0.52 more miles of the CNF, including 2.1 miles of experimental forest. This would have a minimal effect on property tax rates, but other economic benefits to local goods and service providers on account of this increase in local labor force would remain relatively the same.

Alternative 4

The cumulative socioeconomic effects would be similar to Alternatives 2 and 3, except that the Projects would avoid both the City of Cass Lake and the portion of experimental forest within the CNF that is crossed by Alternative 3. Alternative 4 crosses through 1.17 more miles of the CNF, which is primarily forested and not adjacent to an existing utility corridor (also known as greenfield construction). This would have a minimal effect on property tax rates, but other economic benefits to local goods and service providers on account of this increase in local labor force would remain relatively the same.

3.7.2 Other Disclosures – Environmental Justice

Executive Order 12898, which requires Federal Actions to address environmental justice in minority and low-income populations, was approved on February 11, 1994. The responsible official must consider an action's potential for demographic, geographic, economic, and human health risk factors when conducting and documenting a NEPA-related analysis.

The proposed Project area discussed in this document lies within the LLR, Hubbard, Cass County, and Itasca County, Minnesota. Under Executive Order Number 12898–Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, agencies are required to determine whether federal actions will have a disproportionate impact on low-income or minority populations of the affected area or the county are greater than twice the state percentage for low-income or minority populations, an assessment must be conducted. In Minnesota, twice the state percentage is 15.8 percent for low-income and 21.0 percent for minority populations. Although Cass County's percentages are (population is 13.6 percent low income and 13.5 percent minority) less than twice the state percentage for these factors; LLR's population is above the threshold for these factors [21.2 percent low income (1999 data) and 47.5 percent Indian. Further, the towns of Bena and Cass Lake have Native American populations in excess of 50 percent of the total population of those communities, as well as a significant percentage of persons who are below the poverty line (58% of persons in the case of Bena and 29% of persons in the case of Cass Lake) as reported in the EIS.

A portion of Projects area falls within the LLR boundary. The minority population in the vicinity of the Projects area is predominately Ojibwe Indian. The Native American communities associated with the Projects area include: Cass Lake, Bena, Ball Club, and Deer River. This document incorporates an analysis of issues, concerns, and effects that may be specific to Environmental Justice in the following ways:

- scoping of Ojibwe communities through news releases, letters, and several LIC and Division of Resource Management meetings;
- consultation by the lead federal agency with the Tribal Historic Preservation Office; and
- archaeological and traditional cultural property surveys (discussed in Section 3.4, Heritage Resources).

The EIS concludes that the Alberta Clipper Project could generate substantial adverse environmental or economic effects in the LLR communities, but further concludes that these adverse impacts are not expected to fall disproportionately on minority groups or low-income persons. The EIS further concludes that through various mitigation measures that it will implemented by Enbridge, the adverse impacts of the pipeline will be mitigated or minimized as applicable. In addition, the EIS addresses potential risks to health and safety resulting from construction and operation of the pipeline and again concludes that their will be no disproportionate impact to minority or low income persons and that adherence to required safety standards will reduce any risks below the level of significance.

The proposed activities would not result in demographic changes such as displacement of minorities or economic hardship such as an increase in taxes. In fact, if approved the proposed Projects would increase the amount of tax revenue available to Hubbard, Cass and Itasca Counties. The Projects alternatives would not have negative effects on public health and may have beneficial effects such as increased opportunities for firewood gathering or employment. None of the alternatives would impose a hardship on

minorities, low income people, or local communities and would not produce hazardous waste or conditions that might adversely effect local populations. Land uses could change within the new permanent pipeline right-of-way. Primarily, forested lands would be converted to open, herbaceous land cover types. The effects associated with this conversion are discussed in section 3.3, Vegetation and Wildlife. The proposed Projects would result in no direct, indirect, or cumulative effects associated with environmental justice.

Further, Enbridge has agreed to undertake certain mitigation measures specific to the LLR. These are described in Section 2.5 of this Appendix. These measures include considering and utilizing Native American laborers to the maximum extent possible on all aspects of the project based upon worker availability, worker skills, and the needs of the project.

3.8 SPECIAL STATUS SPECIES ANALYSIS

3.8.1 Scoping Issue 12 – Construction Impacts to Special Status Species

3.8.1.1 Description

Vegetation- and ground-disturbing projects such as pipeline construction have the potential to affect special status species (i.e., federally listed species, Regional Forester Sensitive species, or LLBO LLR Sensitive species) if present. A BA/BE has been prepared to discuss, in detail, the special status species potentially affected by the proposed Projects. Therefore, a general discussion of pipeline construction on special status species is presented.

3.8.1.2 Indicator

Impacts on special status species were evaluated based on the results of the BA/BE conducted for the Projects. The BA/BE analyzed results of field surveys and used GIS spatial analysis. Please note that while both the Applicant's proposed route (Alternative 2) and the alternative route adjacent to the existing Great Lakes Gas corridor (Alternative 3) were analyzed in the BA/BE, those routes are numbered differently in the BA/BE because the CNF does not require that a "No Action Alternative" be included in a BA/BE analysis. Both route alternatives are clearly labeled and discussed in the BA/BE.

3.8.1.3 Scope

The scope of the special status species discussion generally includes all lands associated with the proposed Projects. The specific survey corridor widths and locations for individual special status species are defined in the BA/BE, and may differ depending on individual species characteristics such as mobility and sensitivity (see section 1.5 of the BA/BE).

3.8.1.4 Affected Environment

The existing Applicant pipelines and alternatives pass through a variety of ecosystems along their length, crossing a variety of vegetation types and distinctive communities of plants and animals. Of the approximately 43.79 miles of length for the Projects, approximately 42.72 miles are on the LLR, and 34.11 miles within the CNF. Approximately 60 percent of the existing Applicant pipelines right-of-way is presently forested, and the remaining 40 percent is currently maintained as open right-of-way. The maintained pipeline corridor is a 100- to 125-foot-wide corridor, depending on the number and location of existing pipelines within the corridor. Dry mesic pine/oak forest is the predominant community type along the existing Applicant pipelines, and Alternatives 2, 3, and 4, followed by tamarack swamp (see table 3.3.2-2 in section 3.3 for Landscape Ecosystem Types crossed by each alternative). Several types of wetlands and small streams and open water areas are present in the Projects area. The existing pipeline right-of-way is maintained as grass/forb/shrub communities. The general Projects area is managed as commercial forestland, and the area is used for recreational activities and traditional gathering by the LLBO.

Several federal laws, including Section 7 of the Endangered Species Act (ESA), the National Forest Management Act, and the NEPA, define national policy to preserve and protect federally listed threatened and endangered species. The NFS Manual and NFS Handbook sets out guidelines for preserving National Forest Regional Forester Sensitive species (Chapters 2 and 3 of the Forest Plan address specific Sensitive species within the Forest). The NFS Manual states that Biological Evaluations are the means the NFS uses to review projects and document findings in order to ensure that NFS actions: 1) do not contribute to loss of viability of any native or desired non-native plant or animal species or contribute to a trend toward federal listing of any species; 2) comply with the requirements of the Endangered Species Act, which decrees that actions of federal agencies are not to jeopardize or adversely modify critical habitat or federally listed species; and 3) provide a process and standard to ensure that threatened, endangered, proposed, and specified National Forest Regionally Sensitive species receive full consideration in the decision-making process. The DRM also maintains a list of Endangered, Threatened, and Sensitive species that must be addressed within the boundaries of the LLR.

The BA/BE prepared for the Projects evaluates 88 species classified as federally threatened or endangered, Regional Forester Sensitive species, or DRM Sensitive species that are currently known to occur or have potential habitat present in the Projects area within the CNF/LLR Reservation. Table 2.3-1 in the BA/BE provides a list of these species. To document occurrences of special status species, several databases were searched, including the MDNR Natural Heritage database and the CNF Threatened, Endangered, and Sensitive Species database; in addition, personal communications with biologists at the CNF and DRM have also helped to identify species occurrences in the Projects area. The BA/BE does not evaluate 18 federally listed, Regional Forester Sensitive Species, or DRM species of concern for which a lack of suitable habitat and a lack of known occurrences in the Projects area was determined to exist.

Two federally listed species, the Canada lynx, *Lynx canadensis*, and gray wolf, *Canis lupus*, were identified as having potential habitat within the Projects area. No federally designated critical habitat occurs along any route alternative within the Projects area. In addition, field surveys were conducted for a number of Regional Forest Sensitive Species, and LLBO sensitive species and the CNF and DRM Biologists did have prior knowledge that several species may occur in the Projects area. The following surveys were performed in 2007 and 2008:

- Songbird surveys, Spring 2007 and Spring 2008 (along Alternative 2);
- Raptor surveys, Spring 2007, Spring 2008, and Summer 2008 (along Alternative 2); and
- Plant surveys, Spring/Summer 2007 and Spring/Summer 2008 (along Alternative 2; surveys were conducted for another proposed Projects and were recently made available for Alternatives 3 and 4).

An aerial stick nest survey for raptors was conducted to identify nests that may be occupied by breeding pairs of bald eagles, *Haliaeetus leucocephalus*, and other raptors. Potentially active nests would be avoided in accordance with the BA/BE and the Applicant's Raptor Nest Survey and Monitoring Plan (which includes pre-construction monitoring of raptor nests for activity). The surveys and results are described in detail in the BA/BE.

"Management indicators provide a means of monitoring and evaluating the effects of actions on biotic resources, including specific species, communities, habitats, and interrelationships among organisms" (CNF Forest Plan). The CNF selected 4 management indicator species to represent habitats and the assemblage of animals occurring on the LLR/CNF. Management Indicator Species are a requirement of the National Forest Management Act and are incorporated into the land and resource management plans of all national forests. Table 3.8.1-1 lists the management indicator species currently monitored in the CNF and the habitats the species inhabit.

Table 3.8.1-1 – Management Indicator Species

Common Name	Scientific Name	Vegetative Community
Bald eagle	*Haliaeetus leucocephalus*	Lake and Rivers
Gray wolf	*Canis lupus*	All Forested Habitats
Northern goshawk	*Accipiter gentiles*	Mature Deciduous and Coniferous Upland
White Pine	*Pinus strobes*	Mature Lowland Coniferous Forest

3.8.1.5 Direct and Indirect Effects

Comments were received during internal review that questioned the proposed Project's impacts regarding climate change and the Canada lynx. For a discussion regarding the Alberta Clipper project and climate change, see the EIS. Available peer-reviewed literature is limited for climate change research with direct links to specific species; assumptions cannot be made about the end use of the proposed Projects' product and its impacts to global climate. However, some generalizations can be made about fossil fuels impacts to certain natural habitats. According to the Intergovernmental Panel on Climate Change, boreal forests are one of the most endangered ecosystems due to climate change; boreal forests support lynx and their prey species, the snowshoe hare. It is likely that future forest management practices will consider the effects of climate change on predator-prey relationships within these habitats (USDA USFS, 2008). In addition, the expected warmer climate, shorter snow cover season, and changes to forest composition, are expected to have impacts to lynx populations in the upper Midwest (Natural Resources Research Institute, University of Minnesota 2003).

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no direct or indirect effects on federally listed threatened or endangered, Regional Forester Sensitive species, or LLBO Sensitive species would occur. The proposed pipeline would not be constructed and no disturbance would be required. The Applicant would continue to operate its existing pipelines and maintain its permanent right-of-way in accordance with existing arrangements with the LLR/CNF.

Alternative 2

The impacts of Alternative 2 on federally listed, Regional Forester Sensitive species, and DRM Sensitive species are discussed in detail in the BA/BE. A summary discussing some representative species can be found below.

Federally listed species

Canada lynx, *Lynx canadensis*: The BA/BE evaluated the potential for impacts to the Canada lynx in a manner consistent with the *Canada Lynx Conservation Assessment and Strategy*, concluding that the possibility is extremely remote that the Projects, under Alternative 2, would adversely affect Canada lynx habitat or affect the survival of the species due to the small number of acres of potential lynx habitat affected by the Projects in comparison to the total acres of available habitat (less than 0.1 percent of available habitat). While there could be some potential for disturbance to the lynx during the construction period, these effects would be temporary, localized, and would occur in an area already impacted by human activity. Indirect impacts resulting from changes in plant communities that may affect prey populations (mainly snowshoe hare and red squirrels) would be minor and temporary (i.e., until herbaceous and forested vegetation is restored). Further, these effects would be mostly beneficial over time in that removal of mature trees would enhance snowshoe hare habitat. While some individual conifer trees may be removed, the integrity of the conifer stands would remain sufficiently intact to provide red squirrel habitat. Indirect effects on lynx movement due to widening the existing utility/transportation corridor are also expected to be minor, as discussed in section 2.4.1.1 of the BA/BE.

Gray wolf, *Canis lupus*: See section 2.4.1.2 of the BA/BE for a detailed analysis of potential impacts to the gray wolf. The BA/BE concludes that the proposed Projects, if implemented using Alternative 2, is not likely to adversely affect any federally threatened or endangered species in the LLR/CNF.

Regional Forester Sensitive Species and LLBO Sensitive Species

In summary, impacts to RFSS and DRM listed species' populations are not expected to be significant due to the temporary nature of construction impacts. Right-of-way vegetation will be restored as per The Applicant's Revegetation and Restoration Monitoring Plan and further discussions with the CNF; and direct impacts to species such as heron rookeries, *Botrychium* species, and Canadian Yew will be avoided by modifying construction activities. Impacts to individuals of some species, such as the white pine, *Pinus strobus*, may occur, but populations within the CNF/LLR will not be affected. The potential impacts to individual species under Alternative 2 are discussed at length in section 2.4 of the BA/BE. A summary of effects determinations is included in table 3-1 of the BA/BE. Findings in the BA/BE concluded that activities may impact individuals or habitat, but are not likely to cause a trend toward federal listing or loss of viability to the species.

In order to reduce impacts to known sensitive species in the Projects area, the Applicant has agreed to particular mitigation measures. A summary of those mitigation measures is included in table 3.8.1-2, and in the Mitigation Summary Table attached to this environmental assessment (these do not include BMPs and revegetation conditions). These mitigation measures can also be found in the BA/BE, section 2.4.

Table 3.8.1-2 – Sensitive Species Mitigation Measures

Species	Regulatory Protection Status	Mitigation Measure
Gray wolf, *Canis lupus*	• LLBO Sensitive • CNF Management Indicator Species • MNDNR Species of Special Concern	• Avoid construction activity within 0.5 miles of a known den or rendezvous site during the period from March 1 through July 31 • Provide the Environmental Inspectors with copies of the WDNR Wolf Management Guidelines • Notify the appropriate agency if a wolf, den, or rendezvous site is sighted before or during construction
Canada lynx, *Lynx canadensis*	• LLBO Endangered • CNF Threatened	• Species not likely to be denning in project area; no impacts expected. • No mitigation required. See BA/BE for more details.
Franklin's ground squirrel, *Spermophilus franklinii*	• LLBO Sensitive • CNF Not Listed	• Potential habitat exists for the ground squirrel; no known occurrences and no impacts expected. • No mitigation required. See BA/BE for more details.
Northern goshawk, *Accipiter gentiles*	• LLBO Endangered • CNF Regional Forester's Sensitive Species	• Conduct pre-construction surveys for nest activity at previously identified nest sites • Minimize construction activities and do not clear trees within 860 feet of active nests
Red shouldered hawk, *Buteo lineatus*	• LLBO Threatened • CNF Regional Forester's Sensitive Species • MNDNR Species of Special Concern	• Conduct pre-construction surveys for nest activity at previously identified nest sites • Minimize construction activities and do not clear trees within 860 feet of active nests

Great gray owl, *Strix nebulosa*	• LLBO Threatened • CNF Regional Forester's Sensitive Species	• Conduct pre-construction surveys for nest activity at previously identified nest sites • Minimize construction activities and do not clear trees within 660 feet of active nests
Black-backed woodpecker, *Picoides arcticus*	• LLBO Threatened • CNF Regional Forester's Sensitive Species	• If construction activities occur between May through July in areas where woodpeckers were identified during call surveys, conduct nest occupancy surveys in these areas • Minimize construction activities and do not clear trees within 200 feet of active nests
Great blue heron, *Ardea herodias*	• LLBO Sensitive • CNF Species of Interest	• Restrict construction activities within 660 feet from active rookeries on CNF lands • A known rookery was identified within the right-of-way for Alternative 2, and the construction right-of-way and pipeline route would be modified to avoid taking of roost trees
Black tern, *Chlidonias niger*	• LLBO Sensitive • CNF Regional Forester's Sensitive Species	• Suitable nesting habitats present; to be surveyed prior to construction. • Negligible or improbable negative effect on individuals of the species. • See BA/BE for more details.
Bald eagle, *Haliaeetus leucocephalus*	• LLBO Threatened • CNF Management Indicator Species • MNDNR Species of Special Concern	• Conduct pre-construction surveys for nest activity at previously identified nest sites • Restrict construction activities within 330 feet of active nests, and only allow limited activity within 330-660 feet of active nests • A nest was identified within the right-of-way for Alternative 2, and the construction right-of-way and pipeline route would be modified to avoid taking of the nest tree
Osprey, *Pandion halietus*	• LLBO Sensitive • CNF Species of Interest	• Conduct pre-construction surveys for nest activity at previously identified nest sites • Restrict construction activities within 660 feet of active nests
Pugnose shiner, *Notropis anogenus*	• LLBO Sensitive • CNF Species of Interest	• Potential habitat exists for the shiner on Alternative 2 within two waterbodies; one waterbody is proposed to be crossed by HDD and the other is proposed to be crossed by open-cut method. • No in-stream impacts are expected. See BA/BE table 2.4.5-1 for details.
Greater redhorse, *Moxostoma valenciennesi*	• LLBO Sensitive	• Potential habitat exists for the redhorse on Alternative 2 within two waterbodies; both waterbodies are proposed to be crossed by HDD. • No in-stream impacts are expected. See BA/BE table 2.4.5-1 for details.
Vertree's caddisfly, *Caraclea vertreesi*	• CNF Regional Forester's Sensitive Species • MNDNR Species of Special Concern	• Potential habitat exists for the caddisfly on Alternative 2 within two waterbodies; both waterbodies are proposed to be crossed by HDD. • No in-stream impacts are expected. See BA/BE table 2.4.5-1 for details.

Botrychium species	Multiple Listings See BA/BE for details.	• The Applicant has developed a Botrychium Avoidance and Monitoring Plan for protected Botrychium species identified during survey within the project area. All Botrychium species will be avoided by construction activities; therefore, no impacts are expected. This plan will be submitted for agency approval and finalized prior to the start of construction.
Canada Yew, *Taxus Canadensis*	• LLBO Sensitive • CNF Regional Forester's Sensitive Species	• A Canada Yew Mitigation Plan will be finalized and approved by the LLBO and CNF prior to construction.
Blue beech/musclewood, *Carpinus caroliniana*	• LLBO Sensitive	• Known species in project area (3 locations at edge of CROW or outside CROW) • No plans for mitigation at this time.
Sweetgrass, *Hierochloe odorata*	• LLBO Sensitive	• Known species in project area (one population found in CROW but outside of LLR boundaries, and within CNF boundaries) • No mitigation required.
Lapland buttercup, *Ranunculus lapponicus*	• LLBO Threatened • MNDNR Species of Special Concern	• One population found, outside of CROW; no impacts anticipated. • No mitigation required.
Clustered bur-reed, *Sparganium glomeratum*	• LLBO Threatened • CNF Regional Forester's Sensitive Species • MNDNR Species of Special Concern	• Multiple populations in CROW on CNF and LLR boundaries. • The project may have a negative effect on individuals of this species; however, the status of this species' population will not be affected on LLR. See BA/BE for more details. • A *Sparganium* Mitigation Plan will be finalized and approved by the LLBO and CNF prior to construction.
Hiddenfruit bladderwort, *Utricularia geminiscapa*	• LLBO Threatened	• Species located during surveys near MP 982 outside of CROW; no impacts anticipated • No mitigation required.
Spathulate-leaved sundew, *Drosera intermedia*	• LLBO Sensitive	• Known species in project area (5 populations found, 2 outside of CROW with no impacts, 3 in CROW) • The project may have a negative effect on individuals; however populations will not be affected. See BA/BE for more details.
New England violet, *Viola novae-angliae*	• LLBO Sensitive	• Known species in project area (2 populations found, only one in CNF/LLR boundaries and in CROW) • The project may have a negative effect on individuals; however populations will not be affected. See BA/BE for more details.
Note, impacts to federal, state and tribal recognized sensitive species will be avoided or minimized in accordance with CNF/LLR revegetation information to be developed. Where avoidance and minimization methods described in the mitigation plans are not feasible, Enbridge would consult with the DRM and Forest Service prior to proceeding with pipeline construction.		

In order to conduct required aerial and visual inspection of the permanent right-of-way, to maintain a safe and apparent corridor, and to allow access for maintenance activities or emergencies, the Applicant must periodically clear vegetation from the permanent right-of-way. Clearing activities will not be conducted between April 15 and August 1 to avoid potential disturbance to wildlife nesting areas.

Alternative 3

Under Alternative 3, the impacts on federally listed threatened and endangered species, and on the majority of Regional Forester Sensitive species and LLBO Sensitive species, would be similar to those described for Alternative 2. Impacts from maintenance activities would generally be greater due to the lack of co-location with existing Applicant right-of-way. For species such as the northern goshawk, a detailed description of impacts to nesting, post-fledging, and foraging territories is included in section 2.4 of the BA/BE.

In order to reduce impacts to known sensitive species in the Projects area, the Applicant has agreed to specific mitigation measures (not including BMP's, and revegetation conditions). A summary of those mitigation measures is included in table 3.8.1-2, and in the Mitigation Summary Table attached to this environmental assessment. These mitigation measures can also be found in the BA/BE, section 2.4.

In order to conduct required aerial and visual inspection of the permanent right-of-way, to maintain a safe and apparent corridor, and to allow access for maintenance activities or emergencies, the Applicant must periodically clear vegetation from the permanent right-of-way. Clearing activities will not be conducted between April 15 and August 1 to avoid potential disturbance to wildlife nesting areas.

The Alternative 3 temporary right-of-way would potentially impact a CNF Goblin Fern (*Botrychium mormo*) study area. Ongoing research in this study area is investigating affects to *Botrychium mormo* due to changes in overstory vegetation and winter logging (CNF Fiscal Year 2007 Monitoring and Evaluation Report). The construction right-of-way could be configured to avoid direct impacts to the study area, but Forest Plan management guidelines recommend activities should be 250 feet from known populations of this species, with a minimum canopy closure of 70 percent maintained within this 250-foot buffer area, as *B. mormo* is a light sensitive species. Activities should also be conducted so they do not increase worm invasions in the area; worms cause damage to the plants, and can destroy a population. Vegetation removal for Alternative 3 may have indirect effects to *B. mormo*; overstory vegetation near the Goblin Fern study area may be cleared affecting the amount of shade.

Alternative 4

Under Alternative 4, the impacts on federally listed threatened and endangered species, and on the majority of Regional Forester Sensitive species, would be similar to those described for Alternative 3. Alternative 4 would be expected to have a similar impact to Alternative 3 because the route is the same, except for an approximately 6-mile-long greenfield route section around the CNF Experimental Forest. Due to the lack of co-location with an existing utility corridor for 6 miles, this route may have larger impacts on species affected by fragmentation, such as Canada lynx, gray wolves, northern goshawks, and red-backed salamanders.

In order to reduce impacts to known sensitive species in the Projects area, the Applicant has agreed to specific mitigation measures (not including BMP's, and revegetation conditions). A summary of those mitigation measures is included in table 3.8.1-2, and in the Mitigation Summary Table attached to this environmental assessment. These mitigation measures can also be found in the BA/BE, section 2.4.

In order to conduct required aerial and visual inspection of the permanent right-of-way, to maintain a safe and apparent corridor, and to allow access for maintenance activities or emergencies, the Applicant must periodically clear vegetation from the permanent right-of-way. Clearing activities will not be conducted between April 15 and August 1 to avoid potential disturbance to wildlife nesting areas.

The Alternative 4 temporary right-of-way would potentially impact a CNF Goblin Fern (*Botrychium mormo*) study area. Ongoing research in this study area is investigating affects to *Botrychium mormo* due to changes in overstory vegetation and winter logging (CNF Fiscal Year 2007 Monitoring and Evaluation Report). The construction right-of-way could be configured to avoid direct impacts to the study area, but Forest Plan management guidelines recommend activities should be 250 feet from known populations of this species, with a minimum canopy closure of 70 percent maintained within this 250-foot buffer area, as *B. mormo* is a light sensitive species. Activities should also be conducted so they do not increase worm invasions in the area; worms cause damage to the plants, and can destroy a population. Vegetation removal for Alternative 4 may have indirect effects to *B. mormo*; overstory vegetation near the Goblin Fern study area may be cleared affecting the amount of shade.

3.8.1.6 Cumulative Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no cumulative effects (in conjunction with past, present, or foreseeable future projects) on federally listed threatened or endangered, Regional Forester Sensitive species, or LLBO Sensitive species would occur. The proposed pipeline would not be constructed and no disturbance would be required. The Applicant would continue to operate its existing pipelines and maintain its permanent right-of-way in accordance with existing arrangements with the LLBO/CNF.

Alternative 2, Alternative 3, and Alternative 4

Construction of the proposed pipeline would potentially result in some cumulative impacts on special status species when considered in conjunction with past, present, or future projects including the construction of U.S. Highway 2, the BNSF Railroad, the existing Applicant pipelines, implementation of the Cuba Hill Project, Lower East Winnie Vegetation Management Project, Lydick RMP, Non-native Invasive Plants Project, and the 230kV HVTL. Many of these activities are being managed through implementation of the current Forest Plan directives to provide multiple uses and access within the CNF. A Biological Evaluation would be prepared for each of these projects (Cuba Hill has prepared a Biological Evaluation, August 2008).

All projects above, except the 230kV HVTL and Lydick RMP, could physically overlap with Alternatives 2, 3, and 4. The 230kV HVTL would overlap with Alternatives 3 and 4, and the Lydick RMP is within the proposed Projects vicinity, but would not overlap any of the alternatives.

The construction of the proposed pipeline would require that the existing pipeline corridor be widened by 140 feet during construction (and wider where extra workspaces are located). Following construction, 65 feet of that area would be restored to pre-construction condition (the temporary right-of-way would be revegetated with species similar to adjacent land, pre further discussions with the CNF and the Revegetation Plan), while up to 75 feet would be added to the existing permanent right-of-way (see figure 4 in Appendix 3) and maintained in a non-forested condition. The widening of the existing corridor, in conjunction with the other linear facilities such as the highway and the railroad, would cause expansion of open habitats due to the increased corridor width, however, the BA/BE concludes that the incremental increase of up to 75 feet would not likely constitute a barrier to the movement of federally listed predator species (see section 2.4.1 of the BA/BE for further discussion).

The HVTL is scheduled for construction in 2009 to 2011. The Projects current construction schedule calls for construction starting in spring of 2009, summer construction in 2009, and possible winter construction in 2009-2010, with an in-service date in the first quarter of 2010. Given the construction schedules, some overlap of the projects may occur which would result in increased construction-related disturbance at certain locations. along Alternatives 3 and 4. Alternative 2 would occur at approximately the same time, but the footprints of each project would not overlap. Construction of a 230kV HVTL adjacent to Alternative 3 and 4 would increase the existing utility line corridor within the forest, but would not increase fragmentation, except along the greenfield area of Alternative 4 where the route deviates from the existing utility corridor.

Where forest clearing was or is necessary for the construction of these facilities, and to the extent that the facilities displaced habitat or are maintained in an open and/or actively used condition, habitat for certain species has been altered or reduced. Where additional forest clearing is necessary for construction or operation of the proposed pipeline, there would be a temporary effect on the habitat. However, the BA/BE does not anticipate that the cumulative impacts on habitat would result in adverse impacts on special status species when the incremental and temporary effects on habitat are compared to the amount of available habitat in the Projects area.

Cumulative impacts due to vegetation management projects such as the Lower East Winnie Project and Cuba Hill Project would have the same impacts to Alternatives 2, 3, and 4. The footprints of the future projects within the proposed Projects area are shown on figures 23A and 23B (see Appendix 3). Additional fragmentation of large forested tracts will likely be the greatest impact to species present along the Projects corridor. The expansion of open habitats and reduction of forested habitat will create a wider corridor. Despite the probable alteration of forested habitats by foreseeable future projects, it is unlikely that the cumulative impacts from these projects would create conditions that prohibit species utilization, movements, or survival within the Projects area. Alternative 2, 3, or 4 is not expected to contribute to an adverse cumulative effect upon special status species. For example, cumulative effects on northern goshawk, *Accipiter gentiles*, are not likely to contribute to any negative trends for this species on the forest/reservation lands. Construction of these projects may have short-term negative effects on habitat for this species, but would not have an effect on population viabilities of northern goshawk within the forest/LLR boundaries.

Some maintenance work could be expected on some or all of the previously constructed facilities in the future, but the time, location, and magnitude of maintenance projects cannot be predicted. Should a maintenance project occur, it may require localized disturbance of habitat that could potentially affect special status species. Maintenance work would generally be expected to be infrequent, temporary, and smaller in scale than original construction, and therefore, the impacts would be expected to be relatively minor. Effects on special status species would be greatest where maintenance required the disturbance of non-mobile species (i.e., special status plants) or where the timing and location of the maintenance work could potentially disturb nesting birds.

Cumulative effects associated with pipeline maintenance may increase slightly with an additional pipeline once construction is complete. The time, location, duration, or magnitude of maintenance work at these locations is unforeseeable. Generally, pipeline maintenance is conducted in isolated locations where routine pipeline integrity tests indicate a pipe anomaly that should be evaluated and repaired, if necessary. Because such work would likely occur infrequently, and would likely be localized, temporary, and on a smaller scale than the proposed construction Projects, associated impacts would be expected to be minor. The greatest potential for pipeline maintenance activities to affect special status species would be in cases where the activities required disturbance of Regional Forester Sensitive plants or disturbance near birds during the nesting period. To avoid or minimize such impacts, the Applicant would check locations of required maintenance activities against known locations of special status species resulting from the Projects-related surveys and, to the extent applicable and practicable, would apply similar mitigation measures as those described for the proposed Projects construction.

3.9 SOILS ANALYSIS

3.9.1 Scoping Issue 13 - Sensitive Soils in Forested Areas

3.9.1.1 Description

Pipeline construction in forested areas may affect soils that are wind- or water-erodible, compaction-prone, droughty, hydric, or may affect prime farmland. Therefore, a general discussion of the effects of pipeline construction on soils, as well as preventative and mitigative measures to address these effects is presented as part of this environmental analysis.

3.9.1.2 Indicators

The forecasted effects on soils and tables in this environmental assessment were developed using the Soil Survey Geographic (SSURGO) Database Description. Field mapping methods using national standards are used to construct the soil maps in the SSURGO database. Mapping scales generally range from 1:12,000 to 1:63,360; SSURGO is the most detailed level of soil mapping offered by the USDA, Natural Resources Conservation Service (NRCS). This data was evaluated to determine the miles of soils that are crossed by the pipeline route alternatives and classified as wind- or water-erodible, droughty, hydric, compaction-prone, or prime farmland. Topsoil depth and slope class are also provided for each route alternative.

3.9.1.3 Scope

The scope of the soil characteristics analysis includes those portions of the proposed route on lands within the LLR/CNF.

3.9.1.4 Affected Environment

The SSURGO Database contains spatial data relating to the physical properties, chemical properties, and interpretive groupings of individual soil series in the State of Minnesota. The spatial data are contained in units, and collectively describe the soil series present in an area. Characteristics of the individual soil series present within a unit are statistically expanded to describe the entire unit. For this analysis, the frequency of occurrence of each individual soil series along the pipeline route within each unit was assumed to be the same as its percent composition within the unit. For example, if 10 miles of a unit are crossed and a component soil series comprises 20 percent of the area of the unit, it was assumed that two miles of that component soil series were crossed. This method is routinely used for pipeline projects. Tables 3.9.1-1, 3.9.1-2, and 3.9.1-3 summarize soil limitations and soil characteristics crossed by Alternative 2, 3, and 4.

Table 3.9.1-1 – Soil Limitations and Characteristics of Alternative 2 in miles

Highly Wind Erodible		Droughty		Hydric		Compaction Prone		Prime Farmland[A]	
26.70		20.00		10.47		9.95		3.68	
78.32%		**58.67%**		**78.32%**		**29.19%**		**10.79%**	
Topsoil Depth (inches)					**Slope Class (%)**				
0-6	**>6-12**	**>12-18**	**DOS[B]**	**SOS[C]**	**0**	**0-5**	**>5-8**	**>8-15**	**>15-30**
23.18	3.64	1.48	4.77	1.25	0.17	29.19	0	5.16	0
68.00%	**10.68%**	**4.34%**	**13.99%**	**3.67%**	**0.00%**	**0.50%**	**85.63%**	**0.00%**	**15.14%**

Source: USDA, 2008

[a] Does not include miles of land that would be Prime Farmland if drained.

[b] Deep organic soils

[c] Shallow organic soils

Table 3.9.1-2 – Soil Limitations and Characteristics of Alternative 3 in miles

Highly Wind Erodible		Droughty		Hydric		Compaction Prone		Prime Farmland[A]	
21.83		18.46		11.14		10.54		9.17	
63.07%		**53.34%**		**63.07%**		**30.45%**		**26.50%**	
Topsoil Depth (inches)					**Slope Class (%)**				
0-6	**>6-12**	**>12-18**	**DOS[B]**	**SOS[C]**	**0**	**0-5**	**>5-8**	**>8-15**	**>15-30**
18.04	3.3	6.38	5.65	2.23	0.14	32.21	0.01	3.58	0
52.12%	9.53%	18.43%	16.32%	6.44%	0.00%	0.40%	93.07%	0.03%	10.34%

Source: USDA, 2008

[a] Does not include miles of land that would be Prime Farmland if drained.

[b] Deep organic soils

[c] Shallow organic soils

Table 3.9.1-3 – Soil Limitations and Characteristics of Alternative 4 in miles

Highly Wind Erodible	Droughty	Hydric	Compaction Prone	Prime Farmland[A]
19.15	17.65	11.37	10.69	11.29
54.25%	**50.00%**	**54.25%**	**30.28%**	**31.98%**

Topsoil Depth (inches)					Slope Class (%)				
0-6	**>6-12**	**>12-18**	**DOS[B]**	**SOS[C]**	**0**	**0-5**	**>5-8**	**>8-15**	**>15-30**
15.92	3.65	9.24	6.53	1.38	0.14	32.10	0.33	3.58	3.58
45.10%	10.34%	26.18%	18.50%	3.91%	0.40%	90.93%	0.93%	10.14%	10.14%

Source: USDA, 2008

[a] Does not include miles of land that would be Prime Farmland if drained.

[b] Deep organic soils

[c] Shallow organic soils

Erosion is defined, in its most fundamental sense, as the detachment and transport of individual soil grains by wind or water. Erosion by wind is related to soil moisture, soil texture, organic matter content, soil structure, vegetative cover, and climate. Wind erosion often occurs on dry, fine sandy soils when vegetation cover is sparse and strong winds are prevalent.

Water erosion is related closely to a soil's infiltration capacity and the coherence of the soil particles that comprise the soil. Soil properties that influence water erosion include soil texture, percent organic matter, soil structure, soil infiltration capacity, and soil permeability. Soils containing high proportions of silt and very fine sand are most erodible. Well-drained and well-graded gravels and gravel sand mixtures with little or no silt are the least erodible soils. Water erosion is also influenced by slope length and gradient, as well as frequency, intensity and duration of rainfall and the amount of time bare soils are exposed. An analysis of the soil types crossed by the Projects and queries of the State Soil Geographic Database indicate that there are no soils crossed by the three Alternatives that are considered highly erodible by water.

Due to extended periods of saturation, hydric soils can be prone to compaction and rutting. If construction activities, particularly the operation of heavy equipment, occur when these soils are saturated, compaction and rutting could occur. Soil compaction is defined as the packing of soils by the application of loads or pressure, such as by the movement of heavy construction equipment over the soils. Soil compaction, like soil mixing, could affect soil productivity. Soil compaction has a restrictive action on water penetration, root development, and the rate of oxygen diffusion into soils. Low density and change of vegetation types may be an indirect effect of soil compaction. Soil characteristics that affect soil compaction include soil texture, soil moisture, and grain. While all soil types are susceptible to compaction, a non-hydric, somewhat poorly drained soil will also be especially susceptible to rutting if construction occurs when the upper layers of these soils are moist or near saturation.

The USDA defines prime farmland as "land that is best suited to food, feed, fiber, and oilseed crops" (Soil Survey Division Staff, 2008). Potential impacts on prime farmland from pipeline construction include those associated with the operation of construction equipment such as rutting or compaction. Other impacts include the loss or mixing of topsoil, obstruction, and/or damage to agricultural drainage or irrigation systems.

The prime farmland designation includes cultivated land, pasture, woodland, or other lands that are either used for food or fiber crops or are available for these uses. Urbanized land and open water are excluded from prime farmland. Several of the soils series affected by the Project are considered prime farmland.

Soils susceptible to drought include primarily coarse-textured soils that are drained moderately well to excessively. These soils can be more difficult to revegetate, particularly during prolonged dry periods.

3.9.1.5 Direct and Indirect Effects

Alternative 1

The No Action Alternative would result in no change to the existing environment and, as a result, no changes to soils would occur. The proposed pipeline would not be constructed and no disturbance would occur to soils. The Applicant's existing permanent right-of way would remain the same and activities previously undertaken in the Projects area, such as right-of-way and pipeline maintenance, would still be allowed pursuant to the existing Special Use Permit with the CNF.

Alternative 2

Construction of Alternative 2 would involve activities that have the potential to adversely affect soils, including clearing, grading, trenching, and backfilling. Potential effects include erosion due to the action of water or wind, especially on steep slopes and non-cohesive, sandy soils, and soil compaction and rutting due to heavy equipment traffic. Soil characteristics that contribute to these effects include high erodiblity, susceptibility to compaction, and droughtiness.

Alternative 2 crosses 26.70 miles of soils that are highly erodible by wind. This proposed route crosses a total of 10.47 miles of hydric soils and approximately 9.95 miles of the route have soils with a high potential for compaction. These compaction-prone soils are primarily located within wetland depressions containing mucky soils. Approximately 20.00 miles of Alternative 2 crosses soils classified as droughty, corresponding to sandy, upland soils. Soils that are considered prime farmland are approximately 3.68 miles of the route.

Although highly erodible soils are crossed by the proposed Projects, the likelihood of severe erosion is reduced because erosion control measures would be implemented during and after construction and the environmental setting of the Projects reduces the potential that the soils will be eroded. Wind erosion is not typically a major concern in forested areas as compared to cleared agricultural lands. The Projects would install erosion control devices such as slope breakers, silt fence, and straw bales along the construction right-of-way as described in section 2.4.2 of the EIS and in the Applicant's Revegetation and Restoration Management Plan. In addition, the Applicant would revegetate disturbed areas at a sufficient rate and with native plant species that are well adapted to the types of soils that would be exposed (see EIS section 2.4.2.10, Restoration and Revegetation). After vegetation has become established, erosion would no longer present a concern.

To minimize the potential for soil compaction to wetlands, construction equipment working in wetlands would be limited to that essential for right-of-way clearing, excavating the trench, fabricating and installing the pipeline, backfilling the trench, and restoring the right-of-way. Current construction schedule does allow for winter construction for portions of the Projects, at this time none of these portions fall within the boundaries of the CNF. In areas where there is no reasonable access to the right-of-way except through wetlands, equipment would be allowed to travel through wetlands only as absolutely necessary. In addition, low-ground weight equipment would be required or equipment would work off of mats as necessary to prevent rutting and compaction and reduce the penetration of compactive sources. Typical pipeline construction across wetlands is depicted in figure 12 of Appendix 3. Project construction would be suspended during extensive periods of significant precipitation as determined by the Projects Environmental Inspector and the CNF. Factors that would be considered when evaluating whether to suspend construction activity would include site-specific conditions, type of construction activity, and equipment types. Areas of compacted soils would be identified following construction by monitoring areas where vegetation is sparse after the first growing season as well as other highly compaction prone areas. To confirm that soils are compacted, the soil would be compared to similar soils outside of the construction right-of-way using a static, hand-held cone soil penetrometer. When proper topsoil segregation has been practiced, chlorosis, stunting, and drownouts are generally due to compaction. Areas that become compacted could be mechanically aerated using a deep chisel plow, depending on the location and severity of compaction. Otherwise, compacted areas would be reseeded and expected to recover. Shallow compaction would take several seasons of natural freeze/thaw cycles and wetting and drying. Deep compaction may take decades to recover.

The presence of droughty soils could increase the chance that revegetation efforts may fail in some areas along the pipeline. The Applicant would minimize the potential for problems by revegetating droughty areas using native species identified in consultation with local authorities as being adapted to the conditions and by applying and anchoring mulch as necessary in dry, sandy areas to conserve soil moisture. The Project soils would be considered restored when uniform vegetative cover has been established with a density of at least 70 percent of pre-disturbance levels.

Alternative 3

Alternative 3 would cross 21.83 miles of soils that are highly erodible by wind. This alternative route would cross a total of 11.14 miles of hydric soils and approximately 10.54 miles of the route have soils with a high potential for compaction. These compaction-prone soils are primarily located within wetland depressions containing mucky soils. Approximately 18.46 miles of Alternative 3 would cross soils classified as droughty, corresponding to sandy, upland soils. Soils that are considered prime farmland are approximately 9.17 miles of the route.

Mitigative measures would be similar to those described under Alternative 2.

Alternative 4

Alternative 4 would cross19.15 miles of soils that are highly erodible by wind. This alternative route would cross a total of 11.37 miles of hydric soils and approximately 10.69 miles of the route have soils with a high potential for compaction. These compaction-prone soils are primarily located within wetland depressions containing mucky soils. Approximately 17.65 miles of Alternative 4 would cross soils classified as droughty, corresponding to sandy, upland soils. Soils that are considered prime farmland are approximately 11.29 miles of the route.

3.9.1.6 Cumulative Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no cumulative effects to soils would occur.

Alternative 2

Construction of the proposed pipeline would not result in cumulative effects on soils when considered in conjunction with past construction projects. Compaction and rutting should be minimized and mitigated by implementing BMP's as described in section 2.4.2 of the EIS and in the Applicant's Revegetation and Restoration Management Plan. Construction of past projects has occurred at various times and the hazards of erosion have abated due to successful revegetation. In the event that revegetation was not successful monitoring and maintenance should be on going. Past utility projects, including the existing and proposed Applicant pipelines, have resulted or would result in primarily temporary impacts on soils. Road and railroad projects have resulted in permanent impacts on soils, including filling and ditching.

Construction of the pipeline would not add an impervious surface in the area and augment overland flow as would highway construction. Some maintenance work could be expected on some or all of these facilities in the future, but the time, location, and magnitude of the projects cannot be predicted. Should a maintenance issue arise, it may require soil-disturbing activities and increase the risk of erosion. Maintenance work would generally be expected to be subject to soil erosion and sediment control measures similar to those identified in section 2.4.7 of the BA/BE, and would be infrequent and smaller in scale than original construction. Therefore, the impacts would be expected to be relatively minor.

Proposed projects in the CNF that may affect soils include the existing Applicant pipelines, implementation of the Cuba Hill RMP, the Lower East Winnie Vegetation Management Project which includes harvest, conversion, and planting along the U.S. Highway 2 utility corridor and road decommissionings. The CNF plans to implement a non-native invasive plant management program in the spring or summer of 2009; however the Projects should have no effect on soils. The construction of a proposed 68 mile-long Bemidji – Grand Rapids 230kV HVTL may cause minor impacts to soils, however effects associated with transmission lines are minimal. Detailed construction plans of the HVTL are not available at this time and would be prepared by that project during the federal permitting and NEPA review process. The proposed Lydick RMP would occur in the vicinity but would not over lap the proposed Projects.

The LLBO/NFS has provided a list of known future projects that will intersect with Alternative 2. There are three clearing and thinning projects proposed that will intersect Alternative 2 a total of approximately 2,248.3 feet. CNF harvest and thinning activities are designed to avoid sensitive soils areas or steeper slopes. Mitigation measures such as winter harvest on wet and poorly drained soils will minimize erosion, rutting, and compaction. Some road decommissioning may reduce or eliminate ongoing sources of erosion; therefore, these projects will not contribute to cumulative effects to wetlands.

The Applicant's current construction schedule calls for construction beginning in August 2009, with an in-service date in the second quarter of 2010. Given the construction schedules, some overlap of projects may occur, increasing the area and duration of soil disturbance and the risk of erosion in the project area. However, given the current project schedules, it is unlikely that any of the Projects' peak phases would overlap, and, as such, the additive impacts of soil disturbances would be expected to be relatively small. It is expected these projects would also be subject to soil erosion and sediment control measures. In addition, each project is likely to involve less ground-disturbing activity than pipeline construction. Implementation of best management practices would further reduce cumulative effects associated with pipeline construction.

Alternative 3

The cumulative effects of the construction of Alternative 3 on soils would be similar to those described for Alternative 2. Both Alternatives would affect a similar distance of soils. The only notable difference in the miles affected is prime farmland and these impacts would be considered temporary.

Alternative 4

The cumulative effects of the construction of Alternative 4 on soils would be similar to those described for Alternative 2. Both Alternatives would affect a similar distance of soils. The only notable difference in the miles affected is prime farmland and these impacts would be considered temporary.

3.10 WETLANDS ANALYSIS

3.10.1 Scoping Issue 14 - Wetlands

3.10.1.1 Description

Groundwater and surface water movement in wetlands may be impeded across the pipeline either by compaction of the soils during construction or by the pipeline and/or excess backfill material after construction. Alterations of groundwater and surface water hydrology could change the type or total area of wetlands crossed by the proposed Projects.

Additionally, the Projects cross groundwater regions within LLR and CNR that are "more susceptible" to contamination as defined by MPCA (1989). Further, the DRM characterizes the hydrogeology underlying the LLR as a complex, multilayered ground water system with excellent to good hydrological connectivity. Recognizing the significance of this natural resource, best management practices for construction; spill prevention, containment and response; and maintenance will be implemented to minimize potential adverse impacts.

Also, Minnesota Department of Health (MDH) County Well Index public database indicated that no "potable" wells were within 100 feet of the proposed Project corridor on the LLR and CNF lands. However, because agency records may not completely identify privately-owned wells within LLR and CNR boundaries, property owners affected by the proposed Projects were surveyed by Enbridge's land agents. The land agents checklist included questions concerning property features that could potentially be affected by construction, and operation and maintenance of the pipeline. In regards to groundwater wells, the checklist specifically asked, "If any water supply wells were located within 100 feet of the newly proposed pipelines?" The property owner survey revealed one tract within the LLR, at MP 993.9, having close proximity to the proposed Projects corridor. To avoid impacting to this well in accordance with MDH rules, Chapter 4725, Enbridge properly abandoned the previously used well and installed a new well at a distance greater than the 100-foot requirement.

3.10.1.2 Indicators

The potential for changes to the type and total surface area of wetlands crossed by the proposed Projects were evaluated by quantifying the length (feet) and area (acres) crossed by construction and operation of the proposed pipeline.

3.10.1.3 Scope

The scope of the analysis is limited to wetlands within the pipeline construction corridor within the LLR and CNF along the proposed Projects.

3.10.1.4 Affected Environment

Presently, the Applicant maintains a cleared corridor over its existing pipelines within the Projects area. The width of this cleared corridor is typically 100 to 125 feet total, or 20 feet centered over an individual pipeline. Wetlands within the cleared corridor are typically vegetated with grasses, forbs, and shrubs. Some of these wetlands were forested before the existing pipelines were constructed but routine vegetation maintenance of the right-of-way has prevented re-establishment of trees within the corridor. Consequently, some of the wetlands that would be affected by the Projects have an open component *(i.e.*, not forested) within the existing corridor and a forested component outside of the corridor.

Wetlands crossed by the proposed route (Alternative 2) were delineated during the summers of 2007 and 2008 in accordance with the routine determination method specified in the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987). The delineated wetlands were also classified in accordance with the Cowardin wetland classification system (Cowardin et al., 1979). The Cowardin system was developed by the U.S. Fish and Wildlife Service for classifying different types of wetlands into distinct categories based on vegetation, soils, and hydrology. Wetlands delineated along the survey corridor in the LLR and CNF consist of palustrine scrub-shrub (PSS), palustrine forested (PFO), palustrine emergent (PEM), and palustrine unconsolidated bottom (PUB). Riverine systems were not delineated as wetlands because they are classified as deepwater habitats (see Cowardin et al., 1979), which are addressed in the Surface Waters section of this chapter. Alternative 2 would cross a total of approximately 16.38 miles of delineated wetlands with a total acreage of 262.48 acres within the LLR and CNF.

In order to better compare the alternative routes, NWI data has been included for Alternative 2. NWI maps are compiled through manual photo interpretation of aerial photography, supplemented by soil surveys and field checking of wetland photo signatures. Wetlands on NWI maps are classified in accordance with Cowardin et al. (1979). Table 3.10.1-1 provides a summary of the total length for each wetland type that would be crossed by the proposed Projects in the LLR and CNF by Alternative 2, 3, and 4.

Table 3.10.1-1 – Summary of Wetlands Affected by Construction of Alternatives

Wetland Type [a]	Alternative 2			Alternative 3	Alternative 4
	Delineated Length [b] LLR|CNF	Delineated Acres [c] LLR|CNF	NWI Length [b] LLR|CNF	NWI Length [b] LLR|CNF	NWI Length [b] LLR|CNF
Emergent	10.76| 9.94	169.95| 162.57	2.86| 3.11	9.24| 8.39	9.50|8.18
Scrub-Shrub	1.77| 1.15	25.13|15.35	4.98| 4.32	2.44| 2.02	2.84|2.28
Forested	3.68| 3.21	58.03| 47.90	4.65| 3.77	2.09| 1.63	2.83|2.18
Unconsolidated Bottom	0.18| 0.14	0.00| 0.00	0.08| 0.08	0.17| 0.17	0.09|0.09
Open Water	0.00| 0.00	0.00| 0.00	0.01| 0.01	0.00| 0.00	0.00| 0.00
Total LLR	16.39	253.11	12.58	13.94	15.26
Total CNF	14.44	225.82	11.29	12.21	12.73
Total Project	16.94	262.48	12.94	14.51	15.82

[a] Cowardin Classifications:
PEM: Palustrine Emergent
PSS: Palustrine Shrub-Scrub
PFO: Palustrine Forested
PUB: Palustrine Unconsolidated Bottom

[b] "Length (Miles)" refers only to the length in feet crossed by the centerline. Crossing length for wetlands not crossed by the centerline is 0 feet.

[c] "Total Wetland Acres" was calculated assuming a 125-foot-wide construction corridor in wetlands. Exact construction footprint and temporary workspaces have not been determined for Alternative 3 and 4.

Alternative 3

Wetlands crossed by Alternative 3 have not been field delineated. The best available wetland data is NWI maps. Table 3.10.1-1 provides a summary of NWI wetlands crossed in the LLR and the CNF, with a total wetland crossing length of approximately 14.51 miles. Because complete construction plans for Alternative 3 have not been determined, wetland acres cannot be calculated.

Alternative 4

Wetlands crossed by Alternative 4 have not been field delineated. The best available data is National Wetland Inventory (NWI) maps. NWI maps are compiled through manual photo interpretation of aerial photography, supplemented by soil surveys and field checking of wetland photo signatures. Wetlands on NWI maps are classified in accordance with Cowardin et al. (1979). Table 3.10.1-1 provides a summary of NWI wetlands crossed by Alternative 4 in the LLR and the CNF, with a total wetland crossing length of approximately 15.82 miles. Because complete construction plans for Alternative 4 have not been determined, wetland acres were not calculated.

3.10.1.5 Direct and Indirect Effects

Alternative 1

The No Action Alternative would result in no change to the Projects area from the existing condition, including no alterations to wetland vegetation or hydrology. Under this Alternative, the Applicant would not construct the proposed pipeline and no work in wetlands would be required. The Applicant's existing permanent right-of-way would remain the same and activities previously undertaken in the Projects area, such as right-of-way and pipeline maintenance, would still be conducted in accordance with the existing Special Use Permit from the CNF.

Alternative 2

Wetlands within the Projects area are abundant and their number and location make avoidance infeasible. None of the wetlands in the Projects area would be permanently filled or drained during construction. Approximately 262.48 acres of delineated wetlands would be directly affected by construction of Alternative 2 within LLR and CNF. Approximately 77 percent (201.64 acres) is emergent and scrub/shrub wetlands. Approximately 60.84 acres (23 percent) of delineated forested wetlands would also be affected by construction. Delineated wetland field survey data indicate the route crosses 14.43 miles of forested and emergent wetlands. Table 3.10.1-1 provides a summary of miles of delineated and NWI wetland types that would be affected by construction of Alternative 2 within the LLR and CNF.

It is estimated 182.02 acres of wetlands (136.57 acres of emergent; 32.87 acres of forested; and 12.57 acres of scrub-shrub) will be permanently impacted by the construction of Alternative 2 within the LLR and CNF. Of the 32.87 acres of permanently impacted forested wetlands, 6.37 acres are on LLR land; 1.75 acres are on CNF land; and 24.75 acres are within the boundary of both the LLR and the CNF. These forested wetlands will be cleared and maintained within the new permanent easement as non-forested wetlands. Mitigation for permanently impacted forested wetlands will be developed in accordance with Minnesota Revisor Wetland Standards and Mitigation regulations, Part 7050.0186.

The primary impact on wetlands would be the conversion of forested wetlands to open (emergent and scrub-shrub) wetlands. When clearing, the Applicant would cut woody vegetation flush with the surface of the ground except where necessary to provide a safe work surface and would leave the rootstock in place to facilitate revegetation of native species. Stump removal, grading, and excavation would be limited to the area directly over the trenchline, except in situations where safety-related constraints require stump removal in other areas. Clearing of trees would temporarily convert existing forested areas to open areas. Following construction, most forested wetlands would be allowed to regenerate to pre-construction forested conditions over several years, but wetlands that would be within the permanent right-of-way would be retained in an herbaceous state on a long-term basis. Scrub-shrub and emergent wetlands would be temporarily affected because the herbaceous and shrub communities would regenerate back to pre-construction conditions within a few growing seasons after construction.

In order to avoid or minimize rutting and soil compaction effects in wetlands, equipment operating in wetlands would be low-ground weight equipment or the equipment would operate on equipment mats as practicable. In addition, equipment working in wetlands would only be allowed to travel through wetlands as absolutely necessary and be limited to that essential for clearing, excavation, installation, backfilling, and restoration. Typical pipeline construction across wetlands is shown in figure 12 of Appendix 3. The Applicant's environmental inspector and the CNF inspector would have the authority to limit equipment access and order corrective actions to minimize impacts. Current construction schedule does allow for winter construction for portions of the Projects, at this time none of these portions fall within the boundaries of the CNF. The Applicant would also monitor wetlands for up to three years following construction for evidence of hydrologic impacts due to compaction. It is anticipated that compacted wetland soils hydrological characteristics will restore naturally through the seasonal freeze-thaw cycle. Where the CNF determines compaction has affected hydrology, the Applicant would be required implement corrective actions such as installation of drains across the compacted area.

Alternative 3

Wetlands within the Projects area are abundant and their number and location make avoidance infeasible. None of the wetlands in the Projects area would be permanently filled or drained during construction. Wetlands crossed by Alternative 3 have not been field delineated. Approximately 14.51 miles of NWI wetlands would be crossed by construction of Alternative 3 within the LLR and CNF. Table 3.10.1-1 provides a summary of NWI wetland types that would be affected by construction of Alternative 3 within the CNF.

At least 8.47 miles of Alternative 3 NWI wetlands are classified as emergent, scrub/shrub, open water, or unconsolidated bottom wetlands. These scrub-shrub and emergent wetlands would be temporarily affected because the herbaceous and shrub communities would regenerate back to pre-construction conditions within a few growing seasons after construction. Approximately 2.22 miles of forested and forested/emergent wetlands would be cleared during construction. Clearing of trees would temporarily convert existing forested areas to open areas. Following construction, most forested wetlands would be allowed to regenerate to pre-construction forested conditions over several years; however the area within the permanent right-of-way would be retained in an herbaceous state on a long-term basis to allow for monitoring and inspection of the pipeline.

Construction techniques as described under Alternative 2 would be implemented in order to avoid or minimize adverse impacts (i.e., rutting, draining, soil compaction) impacts to wetlands in accordance with Minnesota Reviser Wetland Standards and Mitigation regulations, Part 7050.0186.

Alternative 4

Wetlands within the Projects area are abundant and their number and location make avoidance infeasible. None of the wetlands in the Projects area would be permanently filled or drained during construction. Wetlands crossed by Alternative 4 have not been field delineated. Approximately 11.20 miles of NWI wetlands would be crossed by construction of Alternative 4. Table 3.10.1-1 provides a summary of NWI wetland types that would be affected by construction of Alternative 4 within the CNF.

At least 8.36 miles of Alternative 4 NWI wetlands are classified as emergent, scrub/shrub, open water or unconsolidated bottom wetlands. These scrub-shrub and emergent wetlands would be temporarily affected because the herbaceous and shrub communities would regenerate back to pre-construction conditions within a few growing seasons after construction. Approximately 2.38 miles of forested and forested/emergent wetlands would be cleared during construction. Clearing of trees would temporarily convert existing forested areas to open areas. Following construction, most forested wetlands would be allowed to regenerate to pre-construction forested conditions over several years; however the area within the permanent right-of-way would be retained in an herbaceous state on a long-term basis to allow for monitoring and inspection of the pipeline.

Construction techniques as described under Alternative 2 would be implemented in order to avoid or minimize adverse impacts (i.e., rutting, draining, soil compaction) impacts to wetlands in accordance with Minnesota Wetland Reviser Standards and Mitigation regulations, Part 7050.0186.

3.10.1.6 Cumulative Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no cumulative effects on wetlands would occur.

Alternative 2

Construction of Alternative 2 would contribute to the cumulative effects of past and future road, railroad, and utility projects on wetlands in the Projects area. The past utility projects, including the existing Applicant pipelines, have resulted in primarily temporary impacts on wetlands. Road and railroad projects have resulted in permanent impacts on wetlands, including filling and ditching.

There is evidence that past construction of U.S. Highway 2, the Burlington Northern – Santa Fe railroad, and the original the Applicant pipelines has affected the vegetation and hydrology of wetlands within the Projects area. A few areas along the U.S. Highway 2 corridor exhibit an obstructed flow of water as evidenced by dead trees within lowland conifer swamps. These impacts may be related in part to inadequate pipe burial, weighting, and backfilling methods. Construction practices when the previous pipelines were installed did not include modern construction techniques used to minimize impacts on wetlands such as matting and low ground-weight equipment and restoration of pre-construction topography. Despite

the old construction practices, it does not appear the pipelines have significantly reduced the total acreage of wetlands. However, due to right-of-way maintenance practices, forested wetlands within the right-of-way have been permanently converted to emergent and scrub-shrub wetlands.

A study conducted in 1984 by the University of Minnesota estimated that approximately 35,000 acres of wetlands have been lost in Cass County over the past century (University of Minnesota, 1984). Most of these wetland losses are most likely the result of logging, transportation, and development activities, including the construction of roads, railroads, and buildings. During this period, wetland vegetation has also undergone continuous change as a result of these activities. Roads and railroads constructed across wetlands have not only filled wetlands but have also blocked the flow of water through the wetlands, resulting in ponded water and dead trees in forested wetlands throughout the region. There is evidence that U.S. Highway 2 and the railroad near the proposed pipeline Projects have contributed to conifer die-offs in the Projects area.

Proposed projects on the LLR/CNF that may affect wetlands include the existing Applicant pipelines, implementation of the Cuba Hill RMP, the Lower East Winnie Vegetation Management Project which includes harvest, conversion, and planting along the U.S. Highway 2 utility corridor and road decommissionings. The CNF plans to implement a non-native invasive plant management program in the spring or summer of 2009. The construction of a proposed 68 mile-long Bemidji – Grand Rapids 230kV HVTL may cause minor impacts to wetlands, however wetland fill and type conversion associated with transmission lines is minimal. Detailed construction plans of the HVTL are not available at this time and would be prepared by that project during the federal permitting and NEPA review process. The proposed Lydick RMP would occur in the vicinity but would not over lap the proposed Projects. The NFS has provided a list of known future projects that will intersect with Alternative 2. There are three clearing and thinning projects proposed that will intersect Alternative 2 a total of approximately 2,248.3 feet. CNF harvest and decommissioning activities are designed to avoid impacts to wetlands and follow the Forest Plan Standards and Guidelines for riparian areas and wetlands, therefore, these projects will not contribute to cumulative effects to wetlands.

Future impacts on wetlands could occur as a result of ongoing pipeline and right-of-way maintenance, other projects adjacent to U.S. Highway 2. In most of these cases, impacts would not likely result in a substantial loss of wetlands, but rather would be limited primarily to a conversion of wetland types. If appropriate construction procedures and Best Management Practices are not followed during construction of these future projects, cumulative impacts on wetlands could increase, resulting in an overall degradation of wetland resources within the LLR and CNF. It is the Applicant's intent to avoid or minimize adverse impacts to wetlands where practical and in accordance with Minnesota Wetland Standards and Mitigation regulations (Part 7050.0186).

Alternative 3

The cumulative effects of the construction of Alternative 3 on wetlands would be similar to those described for Alternative 2. Both Alternatives would affect a similar amount of wetlands. The NFS has provided a list of known future projects that will intersect with Alternative 3. There is one clearing and thinning project proposed that will intersect Alternative 3 a total of approximately 59.1 feet. CNF harvest and decommissioning activities are designed to avoid impacts to wetlands and follow the Forest Plan Standards and Guidelines for riparian areas and wetlands, therefore, these projects will not contribute to cumulative effects to wetlands.

Alternative 4

The cumulative effects of the construction of Alternative 4 on wetlands would be similar to those described for Alternative 2. Both Alternatives would affect a similar amount of wetlands. The NFS has provided a list of future known projects that will intersect with Alternative 4. There are two clearing and thinning projects proposed that will intersect Alternative 4 a total of approximately 748 feet. CNF harvest and decommissioning activities are designed to avoid impacts to wetlands and follow the Forest Plan Standards and Guidelines for riparian areas and wetlands, therefore, these projects will not contribute to cumulative effects to wetlands.

3.11 SURFACE WATERS ANALYSIS

3.11.1 Scoping Issue 15 – Impacts to Surface Waters

3.11.1.1 Description

Pipeline construction may affect surface waters crossed by the pipeline. Therefore, a general discussion of the effects of pipeline construction on surface waters is presented as part of this environmental analysis.

3.11.1.2 Indicators

The effects of pipeline construction on surface waters were qualitatively evaluated based on the length and method of each crossing and the type of surface water crossed.

3.11.1.3 Scope

The scope of analysis includes surface waters crossed by the pipeline on Tribal, Federal, state, and private land within the CNF.

3.11.1.4 Affected Environment

Surface waters crossed by the preferred route (Alternative 2) were identified by desktop evaluations, and then ground truth. The initial review using NWI data showed seven waterbodies being crossed by the Alternative 2 route. Highlighted in table 3.11.1-1 are the seven NWI waterbodies crossed. A second evaluation using National Hydrography Database (NHD) information, as requested by the U.S. Army Corps of Engineers, followed by field surveys was performed to refine the NWI data. The NHD and field surveys revealed that the proposed Projects (Alternative 2) would cross 19 waterbodies. Five of the 19 waterbodies are designated as Minnesota Protected Waters: Pike's Bay Channel, the backwater bay of Upper Sucker Lake, the Mississippi River (crossed three times), Ball Club River Secondary Channel and Ball Club River. Pike's Bay Channel and the Mississippi River are classified as navigable Section 10 waters. Field surveys are pending on three waterbodies identified by NHD as being crossed by Alternative 2: NHD963, NHD987 and NHD992.

Alternative 2 route crossings of state designated "protected" waterbodies are proposed to be crossed using the HDD crossing method (see figure 11). Installation of the pipelines via the HDD technique would avoid disturbance of the river banks and beds, and would not disrupt navigation. Tables 3.11.1-1, 3.11.1-2, and 3.11.1-3 provides the name, location, state status, proposed crossing method, and fishery classification of surface waters crossed by the Projects alternatives.

Table 3.11.1-1 – Surface Waters Crossed within the Proposed Project –Alternative 2

Name	Location (MP)	State of Minnesota Protected Water	Fishery Type	Crossing Method Crude Oil / Diluent [a]
Cass Lake-Pike's Bay Channel [b]	955.8	√	Warmwater	HDD / HDD
NHD963 [c]	963.5		Warmwater	
Upper Sucker Lake [b]	964.2	√	Warmwater	PP / GB
Unnamed Tributary	967.8		Warmwater	DC / DC
Portage Creek [b]	968.1		Warmwater	PP / GB
Unnamed [b]	975.0		Warmwater	PP / PP
Bear Brook [b]	979.4		Warmwater	PP / PP
Channel	980.9		Warmwater	PP / PP
Unnamed Stream b	982.2		Warmwater	DC / DC
Mississippi River (Crossing A) [b]	986.0	√	Warmwater	HDD / HDD
Mississippi River (Crossing B)	986.1	√	Warmwater	HDD / HDD
Mississippi River (Crossing C)	986.1	√	Warmwater	HDD / HDD

NHD987 [c]	987.9		Warmwater	
Ball Club River Secondary Channel	989.4	√	Warmwater	HDD / HDD
Ball Club River	989.5	√	Warmwater	HDD / HDD
Unnamed Stream	991.5		Warmwater	DC / DC
NHD992 [c]	992.9		Warmwater	
Roadside Ditch	993.9			RB / GB
Unnamed Stream	994.2		Warmwater	DC / DC

[a] Waterbody Crossing Method
HDD = Horizontal Direction Drill
PP = Push-Pull
GB = Guided Bore
DC = Dry Crossing (Dam and Pump or Flume)
RB = Road Bore
[b] Waterbody identified by NWI only
[c] NHD waterbody field survey pending

Based on NWI data, Alternative 3 would cross eight waterbodies within the boundaries of the CNF. The unnamed stream at MP 1.5, Sucker Creek at MP 8.8, and the Mississippi River are all Minnesota Protected Waters. The Mississippi River would be crossed using the HDD crossing method (see figure 11). All other waterbodies are proposed to be crossed by open cut methods (see figures 8-10). Table 3.11.1-2 provides the name, location, state status, proposed crossing method, and fishery classification of surface waters crossed by Alternative 3.

Table 3.11.1-2 – Surface Waters Crossed within the Proposed Project – Alternative 3

Name	Location (MP) [a]	State of Minnesota Protected Water	Fishery Type	Crossing Method
Unnamed Stream	1.5	√	Warmwater	Open Cut
Sucker Creek	8.8	√	Warmwater	Open Cut
Unnamed Stream	9.4		Warmwater	Open Cut
Portage Creek	14.6		Warmwater	Open Cut
Unknown	20.6		Warmwater	Open Cut
Bear Brook	24.3		Warmwater	Open Cut
Unnamed Stream	27.1		Warmwater	Open Cut
Mississippi River	30.9	√	Warmwater	HDD [b]

[a] MPs have been assigned for Alternative 3 crossing the CNF for reference purposes. These MPs do not correspond to those assigned for the proposed route.
[b] Horizontal Direction Drill

Based on NWI data, Alternative 4 would cross seven waterbodies within the boundaries of the CNF. Sucker Creek at MP 13.6 and the Mississippi Rivers are Minnesota Protected Waters. The Mississippi River would be crossed using the HDD crossing method (see figure 11). All other waterbodies are proposed to be crossed by open cut methods (see figures 8-10). Table 3.11.1-3 provides the name, location, state status, proposed crossing method, and fishery classification of surface waters crossed by Alternative 4.

Table 3.11.1-3 – Surface Waters Crossed within the Proposed Project – Alternative 4

Name	Location (MP) [a]	State of Minnesota Protected Water	Fishery Type	Crossing Method
Sucker Creek	13.6	√	Warmwater	Open Cut
Unnamed Stream	14.2		Warmwater	Open Cut
Portage Creek	19.5		Warmwater	Open Cut
Unknown	25.5		Warmwater	Open Cut

Bear Brook	29.2		Warmwater	Open Cut
Unnamed Stream	31.9		Warmwater	Open Cut
Mississippi River	35.8	√	Warmwater	HDD [b]

[a] MPs have been assigned for Alternative 4 crossing the CNF for reference purposes. These MPs do not correspond to those assigned for the proposed route.

[b] Horizontal Direction Drill

3.11.1.5 Direct and Indirect Effects

Alternative 1

The No Action Alternative would result in no change to the Projects area from the existing condition, including no alterations to surface waters and associated fishery resources. Under this Alternative, the proposed pipeline would not be constructed and no disturbance to surface waters would be required. The Applicant's existing permanent right-of-way would remain the same and activities previously undertaken in the Projects area, such as right-of-way and pipeline maintenance, would still be conducted in accordance with the existing easement on the LLR, and Special Use Permit with the CNF.

Alternative 2

Within the LLR and CNF Alternative 2 would result in temporary and minor effects on surface waters and fishery resources for 19 waterbodies. Alternative 2 may also have temporary impacts on wild rice populations at two waterbodies. At non-HDD crossings, temporary clearing along the stream banks necessary for construction, approximately 125 feet wide, would result in removal of canopy cover, which could adversely affect streams through increased water temperature. Increased stream temperatures could stimulate algae growth, reduce dissolved oxygen concentrations, affect the metabolic rate of aquatic organisms, alter the timing of fish migrations, and impact the incubation and development of eggs. The removal of canopy cover could also reduce the production of large woody and leafy debris, which provides important fish habitat and food for many aquatic species. Pike's Bay Channel, backwater bay to Upper Sucker Lake, Bear Brook, and Mississippi River do not have significant woody canopy cover, as they are bordered by scrub-shrub and emergent wetland vegetation. The tributary to Portage Lake at MP 967.8 does not have canopy cover over the existing maintained corridor where the stream is currently impounded by a beaver dam; however, it does have canopy cover south of the existing maintained corridor where the stream meanders through a forested area to Portage Lake.

The Applicant has recently adopted a voluntary program at the request of the MDNR to re-establish shallow-root native woody vegetation along riparian corridors. The re-establishment would occur across the entire existing and new right-of-way from the top of the bank back 50 feet on both sides. The Applicant would continue to remove woody vegetation over a 10 foot strip centered over each pipeline, for pipeline maintenance and safety, and would be able to remove vegetation at their discretion once it exceeds 15 feet in height. This re-vegetation is expected to mitigate any bank erosion, stream temperature increase or wildlife habitat concerns.

Grading and other ground-disturbing activities within and adjacent to the surface waters, particularly associated with installing bridges for construction, would expose soil to erosion and increase the potential for in-stream sedimentation and turbidity. Sedimentation occurs when soil particles enter surface waters and settle onto the streambed. Sedimentation can congest and plug streams and can cover habitat critical to fish and other aquatic organisms. Turbidity is murky, cloudy water caused by temporarily suspended soil particles before they settle to the bottom. Turbid water can burden fish by obstructing their gills, inhibiting their sight, and disrupting their feeding patterns.

No sedimentation is expected to occur in the Pike's Bay Channel, Mississippi River, Ball Club River Secondary Channel or Ball Club River due to the proposed crossing method (HDD), and there is little potential for disruption to boat traffic during the pipe installation. At non-HDD streams, some sediments, primarily the fine-grained silt and clay-sized particles present in Pike's Bay Channel bottom, would be resuspended into the water during the trenching activities. This would result in cloudy water in the vicinity of the crossing location until the sediments resettle to the bottom of the waterbody over the course of several hours or several days depending on the particle size and the flow of the water. Based upon past pipeline experience, this effect is short-term and does not result in long-term adverse impacts. Fish that may be present in Pike's Bay Channel would be expected to temporarily relocate during the disturbance.

Boaters use the Pike Bay Channel as a throughway to access both Pike Bay and Cass Lake. The Projects should not result in any disruption to boat traffic. The Applicant has estimated that the time required to cross Pike's Bay Channel could be several days, and that boat traffic would be allowed through Pike's Bay Channel during the construction period.

In order to minimize the potential for impacts from sediment and turbidity at non-HDD crossings, the Project would wait to cut woody vegetation within 50 feet of waterbodies until no more than 24 hours prior to trenching and would leave grassy vegetation and rootstock intact to provide a natural sediment filter strip until just before construction across the waterbody. The Projects would be allowed to install temporary bridges to allow construction equipment to cross the streams. Temporary bridges typically used for pipeline construction is shown figures 6 and 7 of Appendix 3.

The Projects would be required to install sediment barriers, such as silt fence and/or straw bale structures, across the full right-of-way width at all approaches to waterbodies and maintain the structures until the stream banks are revegetated. The barriers may be removed during active construction, but would be replaced each night and during precipitation events. Figures 17 and 18 describe typical installation methods for silt fences and straw bales.

The company would construct across streams only during low-flow periods and during non-spawning/non-migration periods, as practical, and would complete in-stream construction within 48 hours if practical. Spoils excavated from the trench would be stored in a straw bale/silt fence containment structure located a minimum of 50 feet from the water's edge. Stream bank restoration would begin immediately after backfilling and include restoration of original stream bank contours and stabilization of the banks with erosion control matting as necessary. Typical waterbody crossing methods (wet trench, dam and pump, and rock flume) are describe in figures 8-10 of Appendix 3. In addition, temporary slope breakers would be installed at steep approaches to streams where runoff is expected to pose an erosion hazard (see figures 13 and 14).

If dewatering is necessary during construction of the pipeline, the Projects would be required to direct all dewatering operations to a straw bale filter structure and/or geotextile filter bag located back from the edge of waterbodies. Typical dewatering measures are shown in figures 19 and 20 of Appendix 3.

The Projects would dispose of all excess spoil, vegetative debris, and all other construction-related waste following construction. No waste would be allowed to remain in waterbodies or natural drainage ways. In order to prevent contamination of surface waters from fuels, lubricants, and other hazardous materials used during construction, the Projects would implement the Spill Prevention, Containment, and Countermeasures Plan.

Alternative 3

Within the CNF Alternative 3 would result in temporary and minor effects on surface waters and fishery resources for eight waterbodies. Under Alternative 3, effects on surface waters and fisheries would be similar to Alternative 2 except that the Mississippi River would be the only HDD crossing. All other surface waters crossed within Alternative 3 would be crossed using the open cut method. Construction techniques would be as described under Alternative 2.

Alternative 4

Within the CNF Alternative 4 would result in temporary and minor effects on surface waters and fishery resources for seven waterbodies. Under Alternative 4, effects on surface waters and fisheries would be similar to Alternative 2 except that the Mississippi River would be the only HDD crossing. All other surface waters crossed within Alternative 4 would be crossed using the open cut method. Construction techniques would be as described under Alternative 2.

3.11.1.6 Cumulative Effects

Alternative 1

The No Action Alternative proposes no change to the Projects area from the existing condition and, as a result, no cumulative effects on surface waters would occur.

Alternative 2

Cumulative impacts on surface waters as the result of construction of Alternative 2 would be minimal when considered in conjunction with other past road, railroad, and utility projects constructed in the Projects area. In the case of past projects, some ground disturbances adjacent to the surface waters, and subsequent erosion and sedimentation, most likely did occur, but impacts were temporary as evidenced by the existing stabilized environments at each waterbody. There are no impacts to surface waters as the result of ongoing operation and maintenance activities.

Proposed projects in the CNF that cross surface waters include the existing Applicant pipelines, implementation of the Cuba Hill RMP, the Lower East Winnie Vegetation Management Project which includes harvest, conversion and planting along the U.S. Highway 2 utility corridor and road decommissionings. The construction of a proposed 68 mile-long Bemidji – Grand Rapids 230kV HVTL may cause temporary impacts to surface waters however long-term effects associated with transmission lines is minimal. Detailed construction plans of the HVTL are not available at this time and would be prepared by that project during the federal permitting and NEPA review process. The proposed Lydick RMP would occur in the vicinity but would not over lap the proposed Projects. The NFS has provided a list of known future projects that will intersect with Alternative 2. There are three clearing and thinning projects proposed that will intersect Alternative 2 a total of approximately 2,248.3 feet. CNF harvest and decommissioning activities are designed to avoid impacts to wetlands and surface waters and follow the Forest Plan Standards and Guidelines for riparian areas and wetlands, therefore, these projects will not contribute to cumulative effects to surface waters.

The NFS has provided a list of known future projects that will intersect with Alternative 2. There are three clearing and thinning projects proposed that will intersect Alternative 2 a total of approximately 2,248.3 feet. In all these cases, impacts on surface waters are not likely to result in long-term sediment or turbidity that would adversely affect surface waters and associated fishery resources. Project design, following the CNF Forest Plan standards and guidelines as well as the implementation of Best Management Practices, will protect riparian areas and surface waters.

Alternative 3

Cumulative impacts on surface waters as the result of construction of Alternative 3 would be minimal when considered in conjunction with other past road, railroad, and utility projects constructed in the Projects area. In the case of past projects, some ground disturbances adjacent to the surface waters, and subsequent erosion and sedimentation, most likely did occur, but impacts were temporary as evidenced by the existing stabilized environments at each waterbody. The NFS has provided a list of known future projects that will intersect with Alternative 3. There is one clearing and thinning project proposed that will intersect Alternative 3 a total of approximately 59.1 feet. In all these cases, impacts on surface waters are not likely to result in long-term sediment or turbidity that would adversely affect surface waters and associated fishery resources. Project design, following the CNF Forest Plan standards and guidelines as well as the implementation of Best Management Practices, will protect riparian areas and surface waters.

Alternative 4

Cumulative impacts on surface waters as the result of construction of Alternative 4 would be minimal when considered in conjunction with other past road, railroad, and utility projects constructed in the Projects area. In the case of past projects, some ground disturbances adjacent to the surface waters, and subsequent erosion and sedimentation, most likely did occur, but impacts were temporary as evidenced by the existing stabilized environments at each waterbody. The NFS has provided a list of future known projects that will intersect with Alternative 4. There are two clearing and thinning projects proposed that will intersect Alternative 4 a total of approximately 748 feet. In all these cases, impacts on surface waters are not likely to result in long-term sediment or turbidity that would adversely affect surface waters and associated fishery resources. Project design, following the CNF Forest Plan standards and guidelines as well as the implementation of Best Management Practices, will protect riparian areas and surface waters.

4 LIST OF PREPARERS

LLBO DRM Environmental Review Team

Bruce Johnson, DRM Director
Gina Lemon, Tribal Historic Preservation Officer
Levi Brown, Environmental Program Director
Susan Kedzie, Botanist, Invasive Species Program Coordinator
Steve Mortensen, Fish and Wildlife Biologist
Brandy Toft, Air Quality Specialist
Sam Malloy, Water Quality Specialist
Rebecca Knowles, Plant Ecologist
Keith Karnes, Forest Program Director
Jeff Harper, Water Resources, Wetland Specialist

CNF – Interdisciplinary Review Team

Sonja Hoie, Recreation Program Manager (Core Team Member)
Sharon Klinkhammer, NEPA Coordinator (Core Team Member)
Andrea LeVasseur, Forest Archaeologist (Core Team Member)
Dennis Parker, Technical Team Leader
Luke Rutten, Hydrologist (Core Team Member)
Greg Smith, Lands Program Manager
Cathy Thompson, Realty Specialist (Lead Team Member)
Todd Tisler, Wildlife Biologist (Core Team Member)
Tracy Beck and Carolyn Upton, District Ranger, Walker District,

Natural Resource Group, L.L.C. - Preparers

Tim Andersen, Project Manager
Amanda Bohnenblust, Roads and Trails, Aesthetics
Glen Champion, Invasive Species/Noxious Weeds
Daniel Flo, Task Manager, Project Purpose, Alternatives
Sara Throndson, Soils, Wetlands, Surface Waters
Kim Jessen, Document Specialist
Jeremy Pincoske, Cultural Resources
Seija Rahkola, Socioeconomics, Recreation
Joe Reinemann, Project Principal
Tracy Szela, Special Status Species
Leslie TeWinkel, Special Status Species
Dan Thompson, Vegetation and Wildlife, Special Status Species

Graham Environmental Services, Inc. - Preparer

Scott Krych, Biologist, Special Status Species, Wildlife Movement

This page intentionally left blank.

APPENDIX 1 – REFERENCES

Academy of Natural Sciences. 2001. Marine Oil Spills. http://www.acnatsci.org/erd/ea/marine_oil.html?clkd=iwm

Askins, R.A., M.J. Philbrick, and D.S. Sugeno 1987. Relationship between the regional abundance of forest and the composition of forest bird communities. Biol. Conserv. 39:129-152.

Askins, R. 1994. Open corridors in a heavily forested landscape: impact on interior birds. Wild. Soc. Bull. 22:339-347.

Beldon, B.C. and B.W. Hagedorn. 1993 Feasibility of translocating panthers into northern Florida. Journal of Wildlife Management 57:388-397.

Brittell, J.D., Poelker, R.J., S.J. Sweeney, and others. 1989. Native cats of Washington. Unpublished Report, Washington Department of Wildlife. Olympia, WA. 169pp.

Brody, A.J., and M.P. Pelton. 1989. Effects of roads on black bear movements in western North Carolina. Wildlife Society Bulletin 17:5-10.

Cass County Sheriff's Office. 2008. www.co.cass.mn.us/sheriff/sheriff_home.html

Cass Lake Chamber of Commerce Website. 2008. Events Calendar. http://www.casslake.com/event_calendar.html

Chasko, G.G., and J.E. Gates. 1982. Avian habitat suitability along a transmission-line corridor in an oak-hickory forest region. Wildlife Monographs 82. 41pp.

Chazdon, R.L. 2008. Beyond Deforestation: Restoring Forests and Ecosystem Services on Degraded Lands. Science. June 13; 320(5882): 1458-1460.

Chen, J., J.F. Franklin, and T.A. Spies. 1995. Growing-season Microclimatic Gradients from Clearcut Edges into Old-growth Douglas-Fir Forests. Ecological Applications. 5(1): 74-86.

Chippewa National Forest. 2001. Recreational Motor Vehicles (RMV) Policies and Revision Update, ReMap Meeting July 18, Chippewa National Forest. USDA Forest Service. Eastern Region. Unpub. document

Chippewa National Forest. July, 2004. Land and Resource Management Plan, Chippewa National Forest. USDA Forest Service. Eastern Region. Unpub. document

Chippewa National Forest. Chippewa National Forest Website. Accessed August 2008. http://www.fs.fed.us/r9/chippewa/

City Data.com. 2008. Onboard Informatics. http://www.city-data.com.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Prepared for the US Department of the Interior, Fish and Wildlife Service.

Derleth, E.L., D.G. McAuley, and T.J. Dwyer. 1989. Avian community response to small-scale habitat disturbance in Maine. Canadian Journal of Zoology 67; 385-390.

Donovan, T.M., P.W. Jones, E.M. Ann, and F.R. Thompson. 1997. Variation in Local-Scale Edge Effects: Mechanisms and Landscape Context. Ecology. 78(7): 2064-2075.

Doperalski, Mark, Kristen J. Bastis, Jeanne-Marie Mark, Saleh Van Erem, and Miranda Van Vleet. 2008. *Phase I and II Cultural Resources Survey for Enbridge Pipelines' Southern Lights Diluent and Alberta Clipper Pipeline Projects, Clearwater, Beltrami, Hubbard, Cass, Itasca, Aitkin, St. Louis, and Carlton Counties, Minnesota.* The 106 Group Ltd., St. Paul, Minnesota. Submitted to Natural Resource Croup, LLC, Minneapolis, Minnesota.

Enbridge Energy, Limited Partnership. 2004. Chippewa National Forest Pipeline Operations and Maintenance Plan, Revision 1. Unpub. document.

Enbridge Pipeline Company. 2001. Crude Oil Release in Chippewa National Forest (MP 955 – MP 974). Table provided 8/23/01 by S. Lounsbury (Enbridge Pipeline Company) to B. Johnsen (Natural Resource Group).

Fedstats. 2008. www.fedstats.gov/qf/states.html

Ferris, C.R. 1979. Effects of interstate 95 on breeding birds in northern Maine. Journal of Wildlife Management. 43(2); 421-427.

Freetly, J. 2001. E-mail message from John Freetly of the Chippewa National Forest to John Muehlhaussen of Natural Resource Group, Inc. on September 7, 2001.

Frair, J.L. 1999. Crossing paths; gray wolves and highways in the Minnesota-Wisconsin border region. University of Wisconsin-Stevens Point M.S. thesis. 56 pp.

Fuller, T.K. 1989. Population dynamics of wolves in north-central Minnesota. Wildlife Monographs 105:1-41.

Garshelis, D.L., and K.V. Noyce. 2008. Ecology and Population Dynamics of Black Bears in Minnesota. Minnesota Department of Natural Resources Annual Report. Available online at: http://files.dnr.state.mn.us/publications/wildlife/research2007/23_bear_annual_report.pdf.

Gehring, T.M. 1995. Winter wolf movements in northwestern Wisconsin and east-central Minnesota; a quantitative approach. University of Wisconsin-Stevens Point M.S. thesis. 132pp.

Gibeau, M., and K. Heuer. 1996 Effects of transportation corridors on large carnivores in the Bow River Valley, Alberta. Pages 67-79 *In* Proc. Florida Department of Transportation/General Highway Administration Transportation-Related Wildlife Mortality Seminar. Orlando, Florida.

Great Times North Cass County, Minnesota. 2001. Health Care Services. http://greattimesnorth.com/co_busb.htm#Healthpercent20Carepercent20Services.

Gregg, L. 1984. Population ecology of woodcock in Wisconsin. Tech Bull. No. 144. Wis. DNR.

Harris, L. D. 1984. The fragmented forest, island biogeography theory and biotic diversity. Univ. Chicago Press. 211 pp.

Hayden, T.J., R.L. Clawson, and J. Faaborg. 1985. Estimates of minimum area requirements for Missouri forest birds. Biological Sciences. Pages 11-21.

Heiker, M. 2001. Telephone communication on February 26, 2001 between R. Hargrove (Natural Resource Group, Inc.) and M. Heiker (Chippewa National Forest – Recreation Specialist).

Hiawatha National Forest. 2000. Environmental Assessment, Great Lakes Gas Transmission Limited Partnership, Sault Looping Project.

Hubbard County Sheriff's Office. 2007. http://www.co.hubbard.mn.us/Sheriff/patrol.htm

Itasca County Sheriff's Office. 2008. www.co.itasca.mn.us/Sheriff/Gov_shf.htm

Jaako Pöyry Consulting, Inc. 1994. Final Generic Environmental Impact Statement Study on Timber Harvesting and Forest Management in Minnesota. Prepared for Minnesota Environmental Quality Board. April 1994.

Kluth, Rose A. 2001. *A Phase II Evaluation of Sites 21-CA-569, 21-CA-571, 21-CA-572, 21-CA-573, 21-CA-575, Cass Lake Loop Project Area, Lakehead Pipe Line Company, Inc., Cass County, Minnesota.* Leech Lake Heritage Sites Program, Cass Lake, Minnesota. Submitted to Natural Resource Group, Inc., Minneapolis, Minnesota.

Kohn, B., J. Frair, D. Unger, T. Gehring, D. Shelley, E. Anderson, P. Keenlance, 2000. Impacts of a highway expansion project on wolves in northwestern Wisconsin. Wisconsin Department of Natural Resources Report. 14 pp.

Kroodsma, R. L. 1982. Edge effect on breeding forest birds along a power-line corridor. Journal of Applied Ecology. 19: 361-370.

Leech Lake Reservation. 2009. Wild Rice Bed Harvest Notice. www.lldrm.org/assets/wildriceopen.pdf

Leech Lake Tourism Bureau Website. 2008. Calendar of Events. http://www.leechlake.org/events.htm

Lovallo, M.J. and E.M. Anderson. 1996. Bobcat movements and home ranges relative to roads in Wisconsin. Wildlife Society Bulletin 24 (1):71-76.

MacArthur, R.H. and J.W. MacArthur. 1961. On Bird Species Diversity. Ecology. 42: 594-598

Mathisen, J. E. 1988. Integrating wildlife habitat objectives with silvicultural prescriptions. IN Integrating Forest Mngt.For Wild. & Fish. USFS. Gen. Tech. Rpt. NC-122.

Mathisen, J. E. 1990. Northern hardwoods, wildlife and biodiversity. Paper presented at Northern Hardwood Workshop, Bemidji, Minnesota. Mimeo.

Mathisen, J. E. 1990. Assessing vertebrate diversity in a forest management situation. Paper presented at the 52nd Midwest Wl Conf. Minneapolis, Minnesota.

Mathisen, J. E. 1983. Wildlife values and management of gravel pits in forest ecosystems. Transp. Research Record 913, Nat. Res. Council, Nat. Acad. of Sciences.

Mathisen, J. E. 1985. Applying a home grown data base. Habitat Futures. USDA Forest Service.

Mauer, T. A. R., Mary J. (1995). Element Stewardship Abstract for Centaurea maculosa - Spotted Knapweed. Arlington, VA, The Nature Conservancy.

Mech. L.D. 1989. Wolf population survival in an area of high road density. American Midland Naturalist 121, 387-389.

Minnesota Department of Natural Resources. 2007. Canada Lynx Sightings in Minnesota (March 2000-November 14, 2006). Minnesota Department of Natural Resources. Available online at: http://www.dnr.state.mn.us/eco/nhnrp/research/lynx_sightings.html.

Minnesota Department of Natural Resources. 2008. Native Plant Communities Classification Tables: Upland Forests and Woodlands. Available online at: http://www.dnr.state.mn.us/npc/uplandforest.html.

Minnesota Department of Natural Resources. 2008-2009. Off-Highway Vehicles, Regulations 2008-09. http://files.dnr.state.mn.us/rlp/regulations/ohv/ohv_regs.pdf

Minnesota Department of Natural Resources. 2009. Invasive Terrestrial Plants. Website accessed March 2009. http://www.dnr.state.mn.us/invasives/terrestrialplants/index.html

Minnesota Department of Trade and Economic Development. 2008. Community Profile of the City of Cass Lake. http://www.mnpro.com/details.cfm

Minnesota Department of Transportation. 2008. Web Site: www.dot.state.tda.fnlstf00.pdf.

Minnesota Department of Transportation. 2008. Website: http://www.dot.state.mn.us/traffic/data/maps/thcountymapdex.html

Minnesota Department of Transportation – Office of Pipeline Safety. 2008. Website: http://primis.phmsa.dot.gov/comm/reports/safety/PSI.html?nocache=8253

Minnesota Geologic Survey. 2001. Minnesota at a Glance- Earthquakes in Minnesota. http//www.geo.umn.edu/mgs/rptlist.html#glance.

Minnesota Geologic Survey. 2000. Geologic Map of Minnesota Bedrock Geology. State Map Series S-20

Minnesota Geologic Survey. 1979 Hydrogeologic Map of Minnesota – Quaternary Hydrogeology. State Map Series S-6.

Minnesota House of Representatives Research Department. 2007, Fourth Edition. Indians, Indian Tribes, and State Government.

Minnesota State Historic Preservation Office. 2000. Letter dated August 23, 2000 from B. Bloomberg (Deputy State Historic Preservation Officer) to J. Berkin (Natural Resource Group, Inc.).

Minnesota Indian Affairs Council. 2001. http://www.indians.state.mn.us/leech.html

Minnesota Forest Resources Council, 1999. Sustaining Minnesota Forest Resources: Voluntary Site-Level Forest Management Guidelines for Landowners, Loggers, and Resource Managers, Minnesota Forest Resources Council, St. Paul, Minnesota.

Minnesota Tourism Office. 2008. Minnesota Information. http:///www.exploreminnesota.com/lodging/index.aspx.

MPCA, 2001. Telephone conversation between Mitch Shields of Natural Resource Group, Inc. and Miriam Horneff of the Minnesota Pollution Control Agency on March 1, 2001.

Mortensen, C. E. 2000. Weeds of the Northern Lakes States. U.S. Department of Agriculture and Leech Lake Reservation.

Mott, Floyd. 2001. Personal Communication between Bill Johnsen of Natural Resource Group, Inc. and Floyd Mott of Enbridge Pipeline Company.

My Fishing Pals Website. 2008. Minnesota Fishing Tournaments and Events. http://myfishingpals.com/Fishing-Tournaments-Events.taf

Naney, R. 1991. USDA Forest Service Region One. Lynx, Fisher, and Wolverine coordination meeting.

National Oceanic and Atmospheric Administration. 2001. What's the Story on Oil Spills? http://www.nwn.noaa.gov/sites/hazmat/kids/spills.html?clkd=iwm

Natural Resource Engineering Company. 2001. Shallow Sediment Quality Investigation: Cass Lake / Pike Bay Channel, Cass Lake, Minnesota. August, 2001.

Natural Resources Research Institute, University of Minnesota. 2003. International Conference Focuses on Issues for Conservation. Press Release. Available online at: www.d.umn.edu/unirel/homepage/07/lynx.html.

NatureServe Explorer. 2008. Species Report. Available online at: http://www.natureserve.org/explorer/

Nordrum, S. 2001. Personal communication on March 26, 2001, between B. Johnsen (Natural Resource Group, Inc.) and S. Nordrum (Leech Lake Band of Ojibwe – Division of Resource Management).

Overton, E. B., Sharp, W.D., Roberts, P. 1994. Basic Environmental Toxicology, Toxicity of Petroleum. Edited by Cockerham & Shane.

Palik, B. 2008. Potential Impacts of Proposed Utility Rights-of-Ways on the Pike Bay Experimental Forest. Prepared by Brian Palik for the Northern Research Station, US Forest Service. May 2, 2008.

Parker, T.H., B.M. Stansberry, C.D. Becker, and P.S. Gipson. 2005. Edge and Area Effects on the Occurrence of Migrant Forest Songbirds. Conservation Biology. 19 (4): 1157-1167.

Reese, K.P. and J.T. Ratti. 1988. Edge Effect: A Concept Under Scrutiny. Transactions of the North American Wildlife and Natural Resources Conference. 53(127-136).

Pevar, S.L. 1992. An American Civil Liberties Union Handbook. The Rights of Indian and Tribes, the Basic ALCU Guide to Indian and Tribal Rights (2nd ed.) Southern Illinois University Press: Carbondale and Edwardsville.

Robbins, C. S. 1979. Effect of forest fragmentation on bird populations. IN Management of NC Forests for Nongame Birds, USDA FS Gen Tech Rpt NC-51.

Robbins, C.S., D. Bystrak, and P.H. Geissler. 1986. The breeding bird survey; its first 15 years, 1965-1979. U.S. Fish Wildlife Service Resource Publication 157. 196pp.

Robinson, S.K. 1988. Reappraisal of the costs and benefits of habitat heterogeneity for nongame wildlife. North American Wildlife and Natural Resource Conference 53; 145-155.

Ruediger, B. 1996. The relationship between rare carnivores and highways. Pages 24-38 *In* G. Evink, D.Ziegler, P. Garret, and J. Berry (eds). Transportation and wildlife; reducing wildlife mortality/improving wildlife passageways across transportation corridors. Proc. Transportation-Related Wildlife Mortality Seminar, 30 April-2 May 1996, Orlando, FL. Florida Dept. Trans/Fed. Highway Admin.

Sauer, J. R., J. E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966 - 2007. Version 5.15.2008. USGS Patuxent Wildlife Research Center, Laurel, MD. Available online at: http://www.mbr-pwrc.usgs.gov/bbs/bbs.html.

Small, M.F., and M.L. Hunter. 1988. Forest fragmentation and avian predation in forested landscapes. Oecologia 76; 62-64.

Thiel, R.P. 1985. Relationship between road densities and wildlife habitat suitability in Wisconsin. American Midland Naturalist 113:404-407.

Thompson, F.R., III, W.D. Dijak, T.G. Kulowiec, and D.A. Hamilton. 1992. Breeding bird populations in Missouri Ozark forests with and without clearcutting. Journal of Wildlife Management. 56; 23-29.

Tribal Historic Preservation Office report. Leech Lake Tribal Historic Preservation Office. 2001. *A Traditional Cultural Property Survey of the Lakehead Pipe Line Cass Lake Loop from Cass Lake to Bena, Cass*

County, Minnesota. Leech Lake Tribal Historic Preservation Office, Cass Lake, Minnesota. Submitted to Natural Resources Group, Inc., Minneapolis, Minnesota.

U.S. Census Bureau. 2008. Cass County QuickFacts from the US Census Bureau. http://quickfacts.census.gov/qfd/states/27/27021.html

U.S. Census Bureau. 2007. Hubbard County QuickFacts from the US Census Bureau. http://quickfacts.census.gov/qfd/states/27/27057.html

U.S. Census Bureau. 2002. Hubbard County Economic Census. http://factfinder.census.gov/servlet/SAFFEconFacts?_event=Search&geo_id=01000US&_geoContext=01000US&_street=&_county=hubbard+county&_cityTown=hubbard+county&_state=04000US27&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=bg&pgsl=010&_submenuId=business_0&ds_name=ECN_2002_SAFF&_ci_nbr=null&qr_name=&reg=&_keyword=&_industry=

U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Series Descriptions. http://www.statlab.iastate.edu/soils/soildiv/

U.S. Department of Agriculture. 1997. Soil Survey of Cass County, Minnesota.

U.S. Department of Agriculture, Natural Resources Conservation Service. 2008. State Soils Geographic (STATSGO) Database. Data use Information. USDA – NRCS National Soil Survey Center Miscellaneous Publication Number 1492. U.S. Government Printing Office.

U.S. Department of Transportation. 2001. Office of Pipeline Safety – Pipeline Statistics. http://ops.dot.gov/stats.htm

U.S. Fed Stats. 2008. Cass County, Minnesota. http://www.fedstats.gov/qf/states/27/27021.html

U.S. Fed Stats. 2006. Hubbbard County, Minnesota. http://www.fedstats.gov/qf/states/27/27057.html

U.S. General Accounting Office. 2001. Pipeline Safety, The Office of Pipeline Safety is Changing How it Oversees the Pipeline Industry. GAO/RCED-00-128.

U.S. Geologic Survey. 1997. Landslide Overview Map of the Conterminous United States- National Landslide Hazards Map. Open File Report 97-0289.

U.S. Geologic Survey. 1996. Hydrogeology and Ground-Water Quality of Glacial-Drift Aquifers, Leech Lake Indian Reservation, North-Central Minnesota. Water-Resources Investigations Report 95-4077.

U.S. Geologic Survey. 1992. Ground Water Atlas of the United States – Segment 9. Hydrologic Investigations Atlas 730-J.

University of Minnesota. 1984. Growing Energy Crops on Minnesota's Wetlands: The Land Use Perspective, Center for Urban and Regional Affairs, Publ. CURA 94-3.

Welsh, C., and W.M. Healy. 1993. Effect of even-aged timber management on bird species diversity and composition in northern hardwoods of New Hampshire. Wildlife Society Bulletin. 21; 143-154.

Wilcove, D.S. 1985. Nest predation in forest tracts and the decline of migratory songbirds. Ecology 66; 1,211-1,214.

Wilcove, D.S., and S.K. Robinson. 1990. The impact of forest fragmentation on bird communities in eastern North America. Pages 319-331 in A.Keast, ed. Biogeography and ecology of forest bird communities. SPB Academic Publishing, The Hague, Netherlands.

APPENDIX 2 – COMMENTS RAISED DURING SCOPING

COMMENTS RAISED BY THE MINNESOTA DEPARTMENT OF NATURAL RESOURCES

Comments raised in a September 24, 2007 letter from the Minnesota DNR to the U.S. Department of State and forwarded by e-mail to the Chippewa National Forest

- Because a wide corridor would become even wider as a result of this project, an analysis of cumulative impacts, and mitigation for these impacts, should be an important element of federal environmental review. While constructing a new pipeline along an existing corridor can result in less impact than a newly constructed corridor; shifting land uses, regulatory changes, and new environmental conflicts can occur even along an existing corridor, and should be described during environmental review.
  - *This comment is addressed throughout the Environmental Appendix and the Environmental Impact Statement.*
- River corridors lined with trees and shrubs provide high value fish and wildlife habitat. Best Management Practices (BMPs) have been developed to retain these values.
  - *This comment is addressed within the Environmental Appendix, Issue 15 of Section 3.11 on Impacts to Surface Waters, with additional information provided in Section 2. 7 on Mitigation Measures.*
- Many prey species avoid open areas because of exposure to predators. Therefore, removal of woody vegetation directly degrades this habitat value.
  - *This comment is addressed within the Environmental Appendix, Issue 15 of Section 3.11 on Impacts to Surface Waters.*
- Woody vegetation along riverbanks can also provide shade that maintains cooler stream temperatures, which is important for cold-water fisheries such as trout streams.
  - *This comment is addressed within the Environmental Appendix, Issue 15 of Section 3.11 on Impacts to Surface Waters.*
- The conservative estimate for post-construction, semi-permanent corridor width noted in the application is 250 feet. For the Alberta Clipper project, there are 64 perennial and 88 interment streams crossed. This would result in 6 miles and 8.3 miles, respectively, of cumulative loss of woody vegetation on riverbanks.
  - *This comment addresses the entire Alberta Clipper Project. Waterbodies crossed within the Chippewa National Forest are addressed within the Environmental Appendix, Issue 15 of Section 3.11 on Impacts to Surface Waters.*
- Woody vegetation provides significantly better stream bank stability during high river flows than do native grasses. In fact, normal river restoration BMPs involve planting woody vegetation (such as willows) instead of rock rip rap because trees and shrubs can provide better stability than rip-rap and have positive habitat values.
  - *This comment is addressed within the Environmental Appendix, Issue 15 of Section 3.11 on Impacts to Surface Waters.*
- Adding pipelines to an existing pipeline corridor increases the likelihood of crossing streams at an angle or at meanders. As noted in the Enbridge documents, crossing a stream at a perpendicular angle is the lowest impact approach. The MDNR has noted a number of locations where new pipelines are likely to cross at an oblique angle, at or near a stream meander.
  - *This comment is addressed within the Environmental Appendix, Issue 15 of Section 3.11 on Impacts to Surface Waters, with additional information provided in Section 2.3 on Waterbody Crossing Procedures.*
- Studies indicate that soil compaction from the kind of heavy equipment used in pipeline construction and routing is estimated to last 200-300 years, and creates an essentially permanent condition in high clay soils. Soil degradation from compaction can result in establishment and proliferation of invasive non-native species, since a number of these species do well in poor soil areas.
  - *This comment is addressed within the Environmental Appendix, Issue 13 of Section 3.9 on Sensitive Soils in Forested Areas, with additional information in Section 2.7 on Mitigation Measures.*
- The types of Wetlands that appear to be most affected by large-diameter pipeline construction (including the Enbridge corridor proposed for expansion) in northern Minnesota include: (1) Ecologically complex Wetlands, such as spring-fed Wetlands where there is groundwater discharge in channels through the wetland, as well as laterally under the wetland surface and to adjacent streams; (2) Wetlands with high species diversity of native plants and deep organic soils; (3) Wetlands that are sloped where it is difficult to return to pre-construction contours (often these are spring-fed Wetlands); and (4) Wetland complexes that have a stream as an integral part of the ecological feature, such as trout streams through groundwater discharge zones.
  - *This comment is addressed within the Environmental Appendix, Issue 14 of Section 3.10 on Wetlands, with additional information provided in Section 2.3 on Wetland Crossing Procedures.*

COMMENTS RAISED BY THE MINNESOTA DEPARTMENT OF NATURAL RESOURCES

- As pipelines expand in forested areas, these habitats are converted to open land dominated by grasses. The larger the contiguous area of opening, it is more likely that open country wildlife species would become established within the forest area. Some wildlife species benefit from these changes, but others, such as native songbirds dependent on mature forest habitat, suffer some losses.
  - *This comment is addressed within the Environmental Appendix, Issues 5 and 6 of Section 3.3 on Wildlife Movement and Forest Conversion, with additional information on Construction Impacts to Special Status Species provided in Issue 12 of Section 3.8.*
- Long-term conversion of Minnesota forest land to open areas likely means merchantable timber can no longer be produced.
  - *This comment is addressed within the Environmental Appendix, Issue 6 of Section 3.3 on Forest Conversion.*
- Some small trout streams in heavily vegetated areas are not capable of handling sediment, since they normally carry very little sediment. In this case, if pipeline construction mobilizes extra sediment from excavation of its bed and banks, or if it receives a burst of sediment from the construction right-of-way during a large rain event, channel modifications can occur for some distance downstream. This could be a serious, long-term impact.
  - *This comment is addressed within the Environmental Appendix, Section 2.3 on Wetland Crossing Procedures and Soil Erosion and Sediment Control.*
- Rare species and plant communities [See attached information sheet].
  - *This comment is addressed within the Environmental Appendix, Issue 12 of Section 3.8 on Construction Impacts to Special Status Species.*
- There are several characteristics of pipeline construction that enhance the spread of invasive exotic species. These include: (1) Extensive deep excavation over the trench and on side-hill areas from construction of the work pad, as well as the extensive and extended soil exposure during the construction season; (2) Soil compaction degrading quality of soil is conducive to invasion of non-native species. Many of the most problematic non-native species are adapted to invasion in areas of exposed soil, or areas of poor soil such as where topsoil has become buried or where there is compaction; and (3) Lack of corridor maintenance practices after the construction period in areas where poor soils prevent or reduce the creation of a good cover of native species.
  - *This comment is addressed within the Environmental Appendix, Issue 6 of Section 3.3 on the Spread of Noxious Weeds.*
- Increased ATV traffic from easy access to pipeline corridors may prevent revegetation growth at sensitive sites and lead to trespass problems.
  - *This comment is addressed within the Environmental Appendix, Issue 3 of Section 3.2 on Increased Opportunities for Off-Road Vehicle Access.*
- Pipeline construction and operation effects on MDNR working lands (e.g. Forestry practices).
  - *This comment is addressed within the Environmental Appendix, Issue 6 of Section 3.3 on Forest Conversion.*
- Extent to which gravel deposits along the corridor are available for extraction after pipeline construction.
  - *This comment is addressed within the Environmental Appendix, Section 2.3 on Typical Construction and Restoration Procedures.*
- Impacts related to recreational use conflicts (e.g. big game hunting).
  - *This comment is addressed within the Environmental Appendix, Issue 10 in Section 3.6 on Recreational Use and Experience. Additional information provided in Issue 9 of Section 3.5 on Affects to Scenic Quality and Landscape Character; Issue 4 of Section 3.2 outlining the Effects on Local Transportation; and Issue 5 in Section 3.3 on Wildlife Movement.*
- Crossing techniques. Impacts to sensitive rivers can be avoided by using Horizontal Directional Drilling (HDD) water body crossing techniques. It is especially important on this project to analyze this major mitigation measure in detail because there are two pipelines involved.
  - *This comment is addressed within the Environmental Appendix, Issue 15 of Section 3.11 on Impacts to Surface Waters, with additional information in Section 2. 3 on Waterbody Crossing Procedures.*
- Impacts associated with transferring water across major drainage divides, including the risk of transferring organisms not known to occur in the receiving basin.
  - *This comment is addressed within the Environmental Appendix, Issue 15 of Section 3.11 on Impacts to Surface Waters.*

COMMENTS RAISED BY THE MINNESOTA DEPARTMENT OF NATURAL RESOURCES

- Potential impacts of a diluent leak or rupture.
  - *This comment is addressed within the Environmental Appendix, Issue 1 outlined in Section 3.1 on the Potential For Pipeline Rupture, with additional information provided in Section 2.4.11 detailing spill prevention, containment, and countermeasures.*
- Potential for mobilizing toxic materials during excavation of the pipeline route at the St. Regis Paper Company superfund Site (near City of Cass Lake, Cass Co.).
  - *This comment is addressed within the Environmental Appendix, Issue 2 of Section 3.1 on St. Regis Superfund Site Contamination.*
- Cumulative impacts of constructing two new pipeline corridors adjacent to existing pipeline corridors, including estimates of additional widening when deviating from minimum corridor width.
  - *This comment is addressed within the Environmental Appendix, Issue 5 of Section 3.3 on Wildlife Movement, with additional information provided in Section 2.6 on a comparison of route alternatives.*

APPENDIX 3 – FIGURES

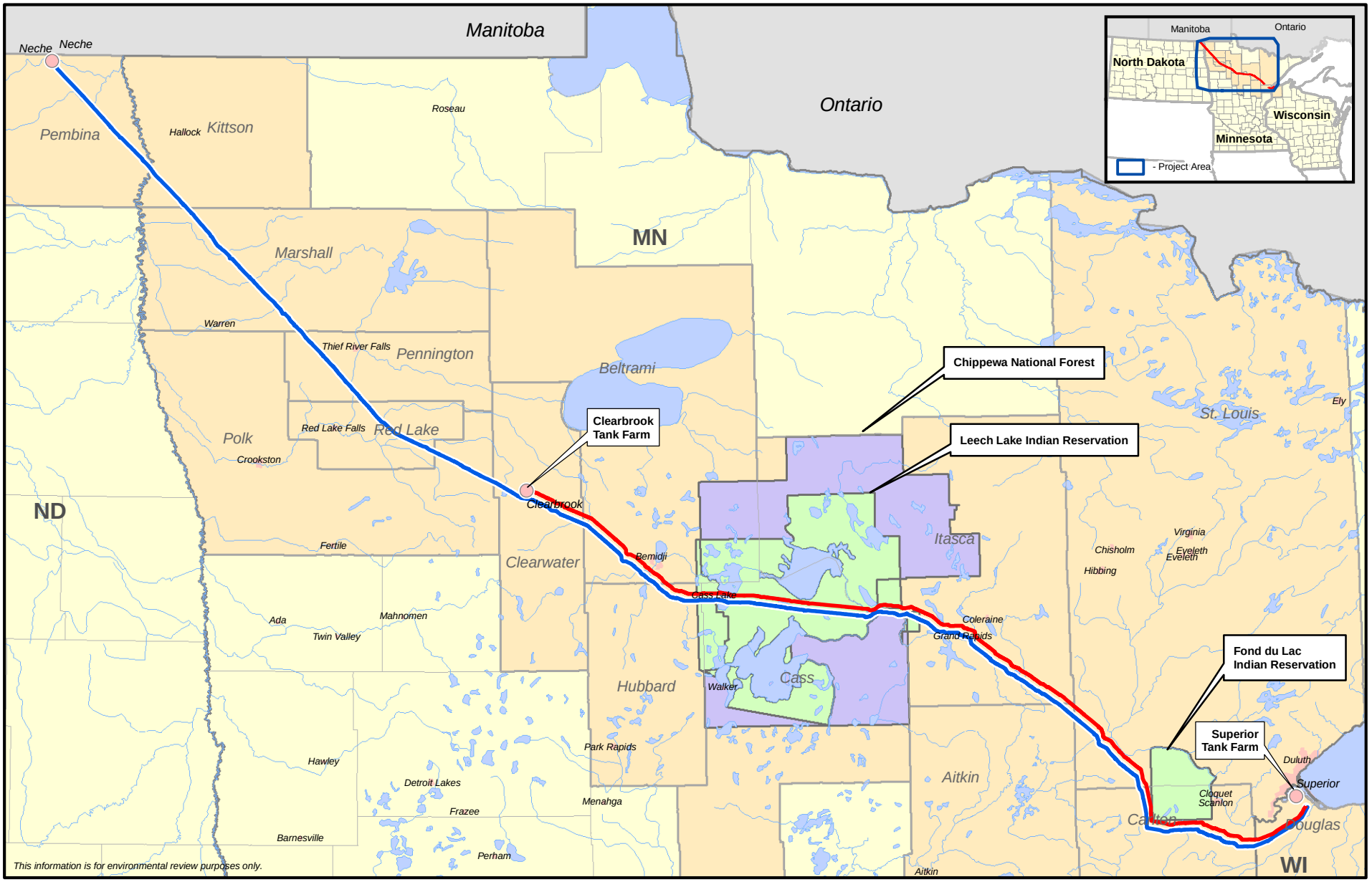


Figure 1

Enbridge Expansion Projects

Alberta Clipper and Southern Lights Diluent Projects

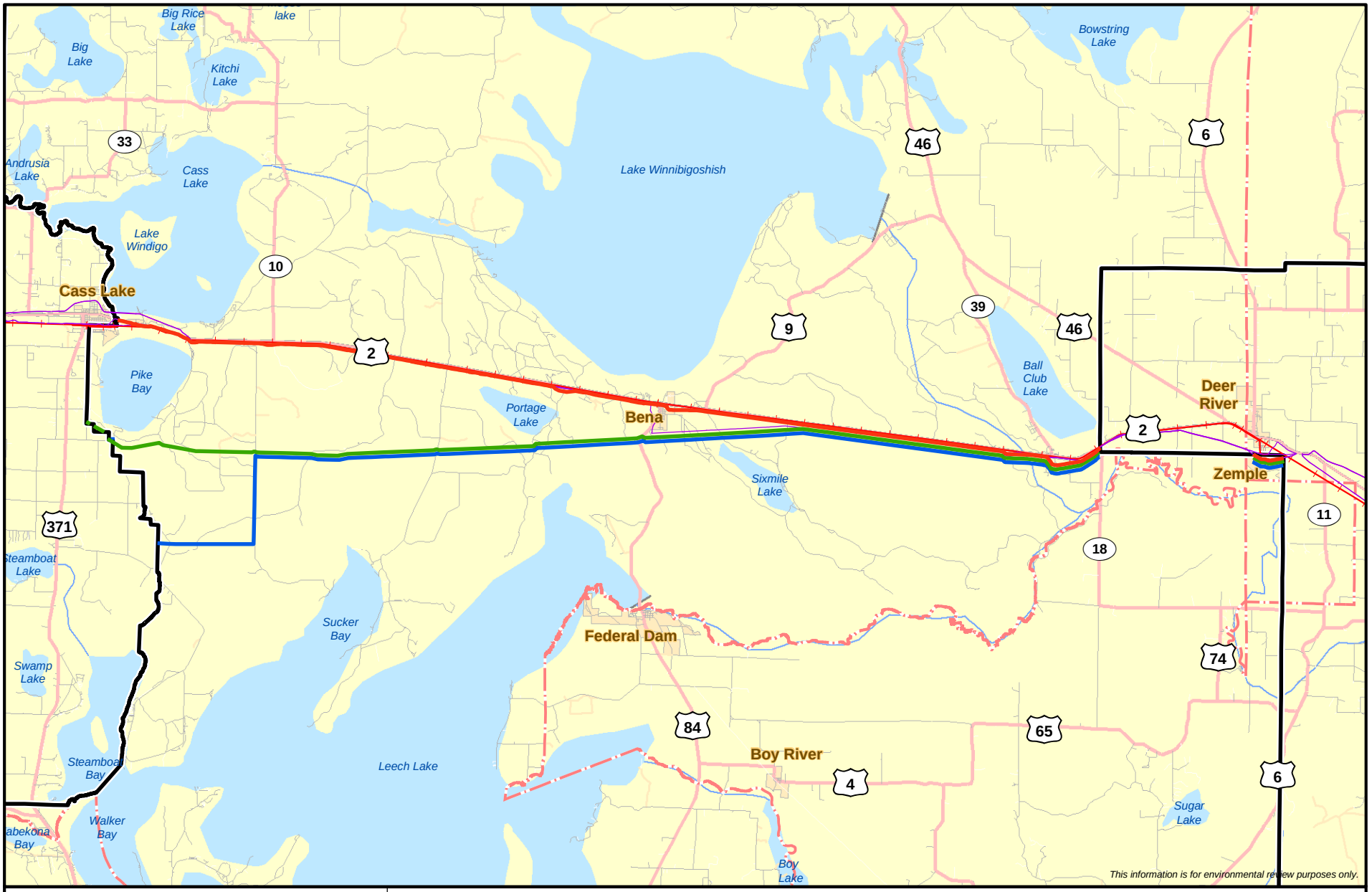


Figure 2
Project Location in Chippewa National Forest

M:\Clients\D-F\EEL\Alberta_Clipper_ArcGIS\2008\08\CNF\OV_CNF2_no_topo.mxd	1:285,000	DATE: 11/04/08	REVISED: 11/04/08	DRAWN BY: KJAnderson

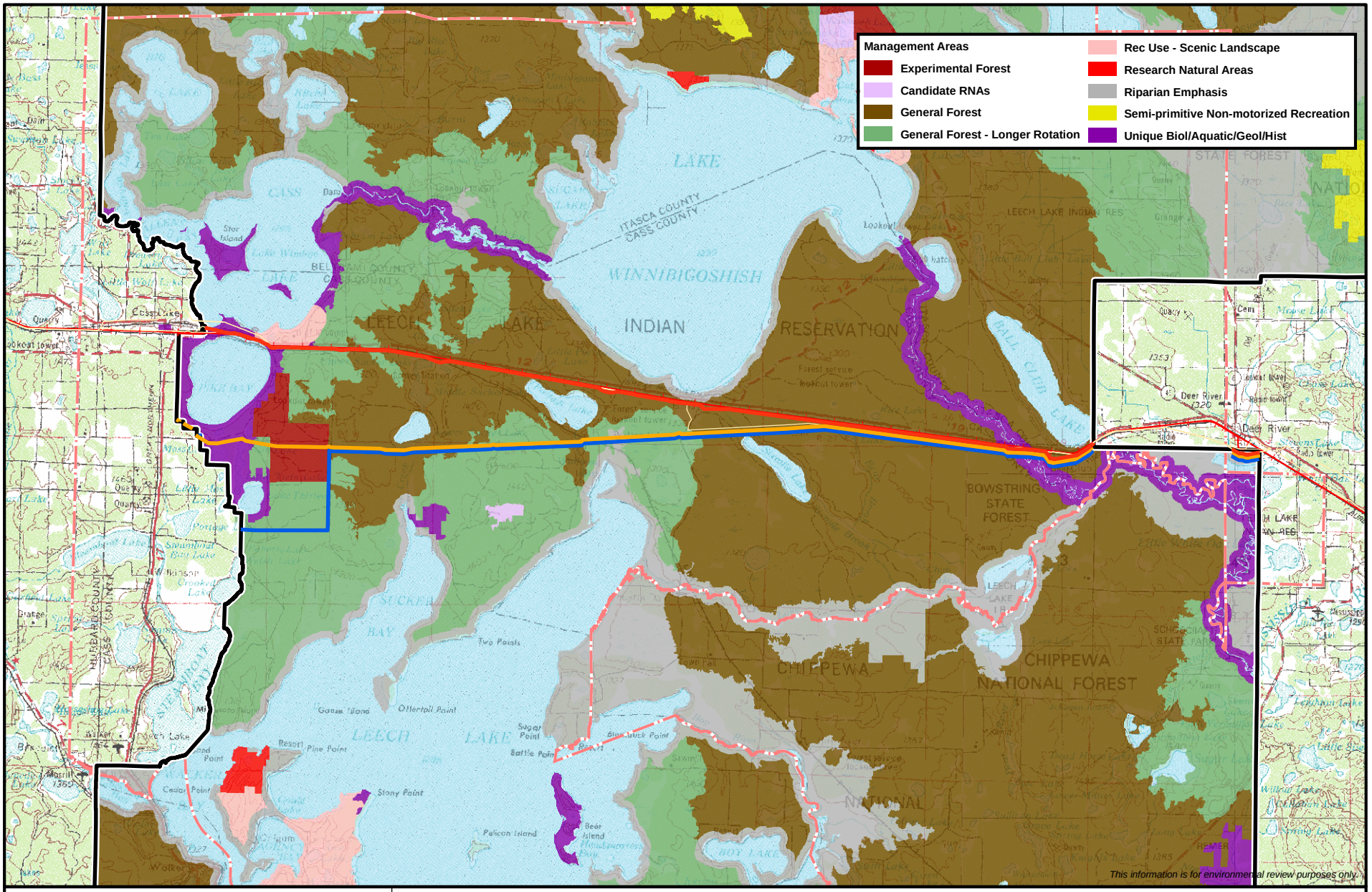
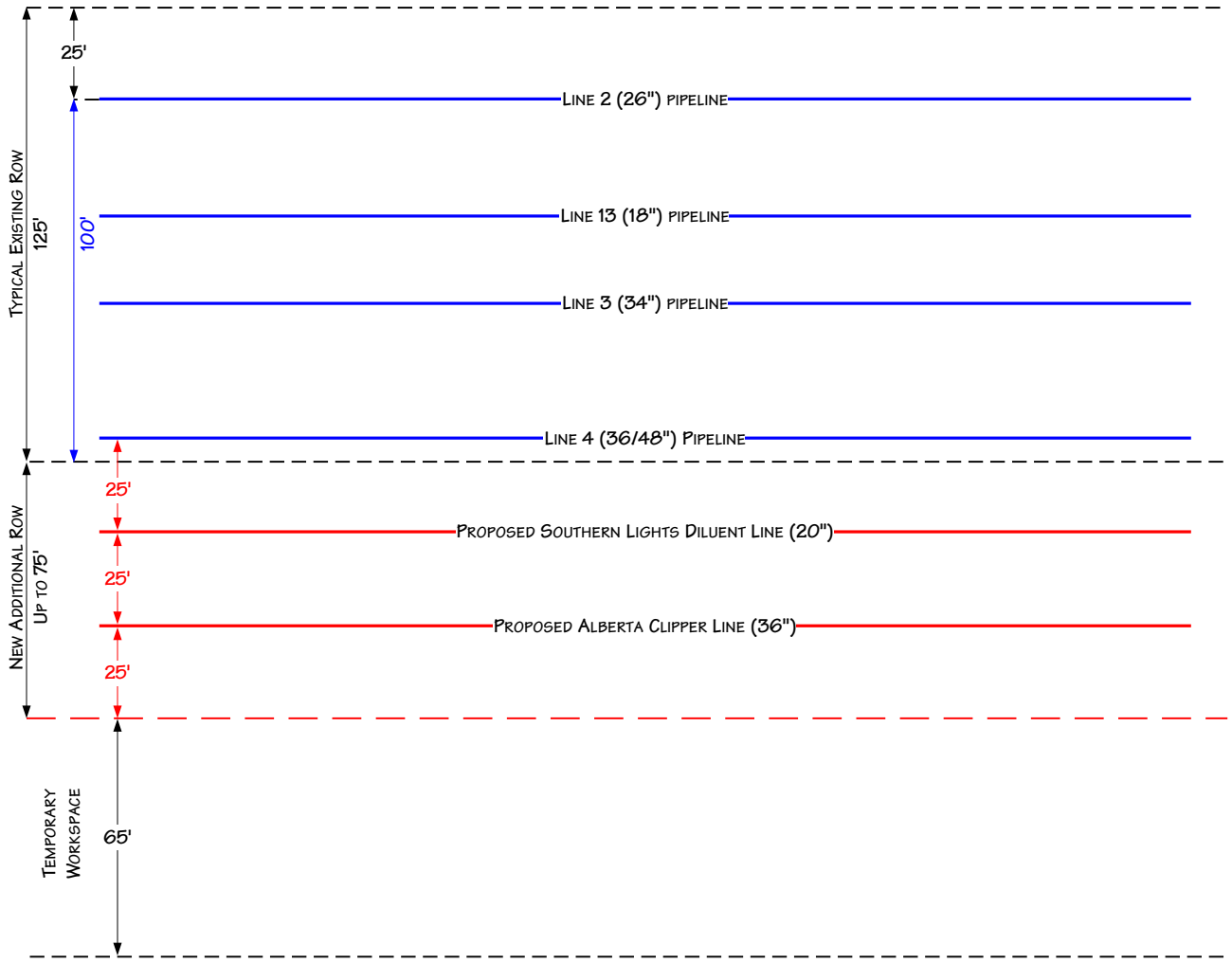


Figure 3
Management Areas Crossed

M:\Clients\D-F\EEL\Alberta_Clipper_ArcGIS\2008\08\CNF\OV_CNF.mxd | 1:315,000 | DATE: 08/07/08 | REVISED: 10/27/08 | DRAWN BY: KJAnderson



- Typical existing ROW boundary defined by location of northern most pipeline: 25 feet to the north and 100 feet to the south.
- Because pipeline spacing varies due to construction requirements at the time of installation, the distance between the southern most line and southern existing ROW boundary may vary between 0 and 35 feet.
- New additional ROW requirements for the Alberta Clipper and Southern Lights Diluent Projects will vary along the proposed route from Clearbrook, MN to MN-WI border. These ROW requirements will depend on the location of Enbridge's southern most existing line and the existing ROW boundary. Enbridge will need up to 75 feet of additional permanent ROW for the Alberta Clipper and Southern Lights Diluent Pipelines which is necessary to allow for approximately 25-foot spacing between the Southern Lights Diluent and Alberta Clipper Projects, while also allowing for a buffer to the southernmost permanent ROW boundary.
- Temporary workspace adjacent to new additional ROW will be required to install the pipeline(s). Typically 65' in width and the length of the ROW will be rented from landowners. Additional temporary workspace at civil and environmental crossings of up to 75' in width and up to 300' in length on each side of the crossing will be rented.

For environmental review purposes only.

Figure 4
Alberta Clipper and Southern Lights Diluent Projects
Typical Right-of-Way Configuration

DATE: 8/9/2006
REVISED: 11/10/2008
SCALE: NTS
DRAWN BY: MHN6795
K:\335\ROW_CONFIG_TYPICALS\AC_SL_ROW.VSD

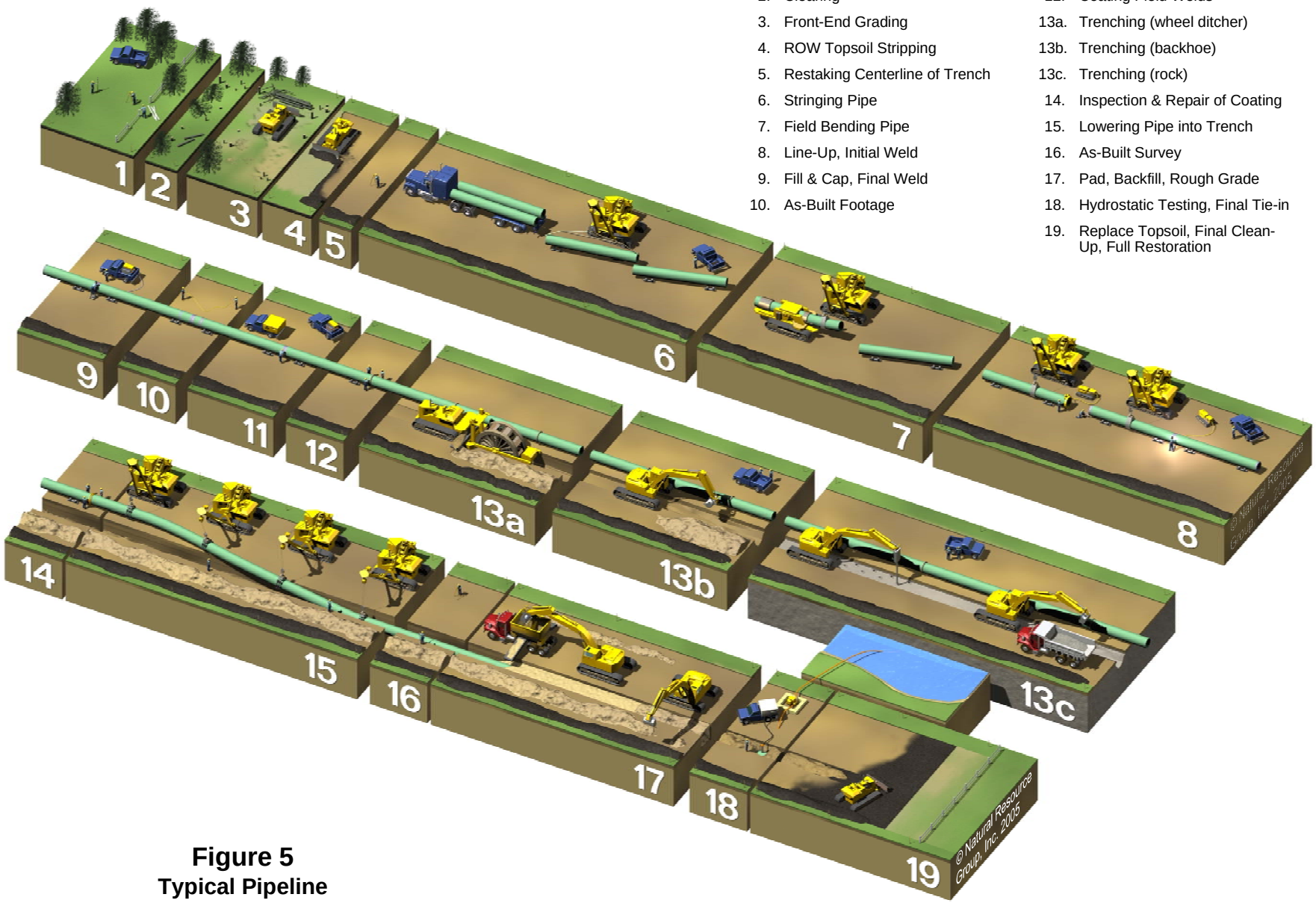
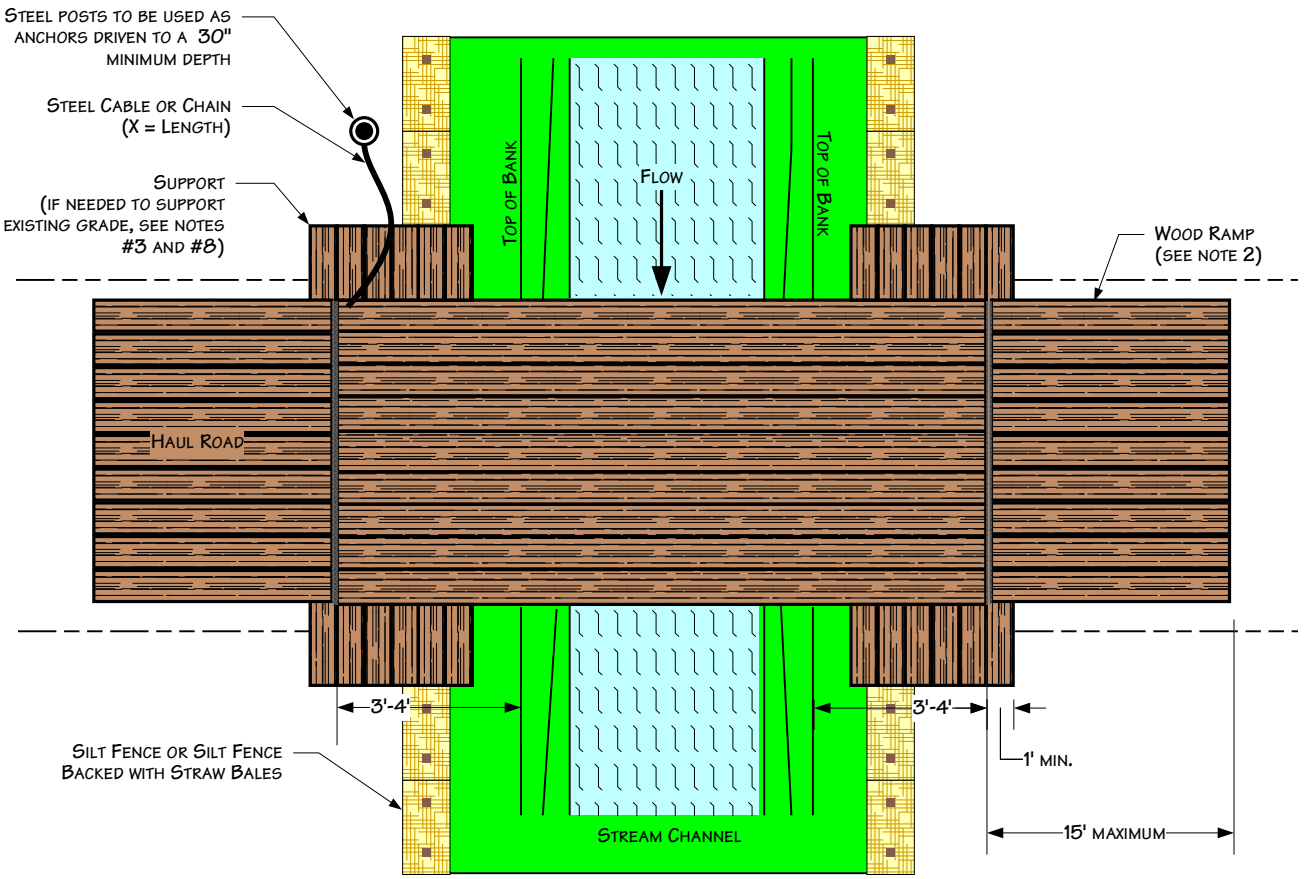


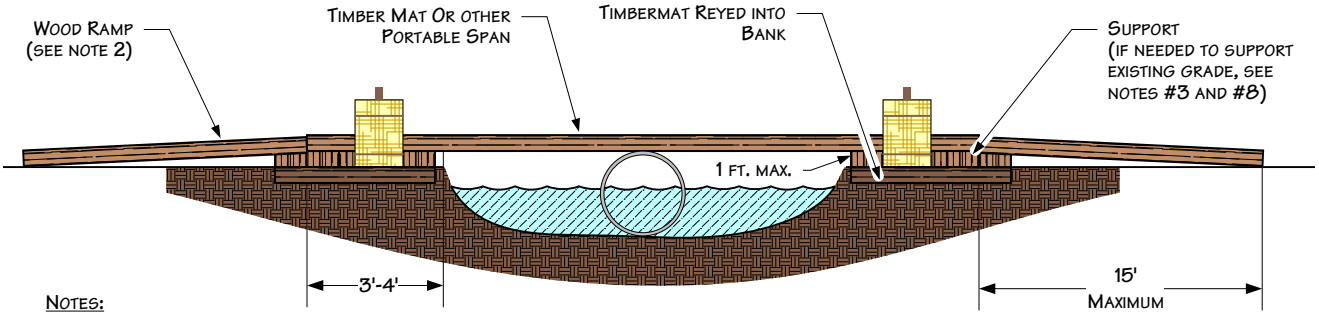
Figure 5
Typical Pipeline Construction Sequence

K:\6741\TYPICALS\PERSPECTIVES\STAGES.VSD

Plan View



Profile View



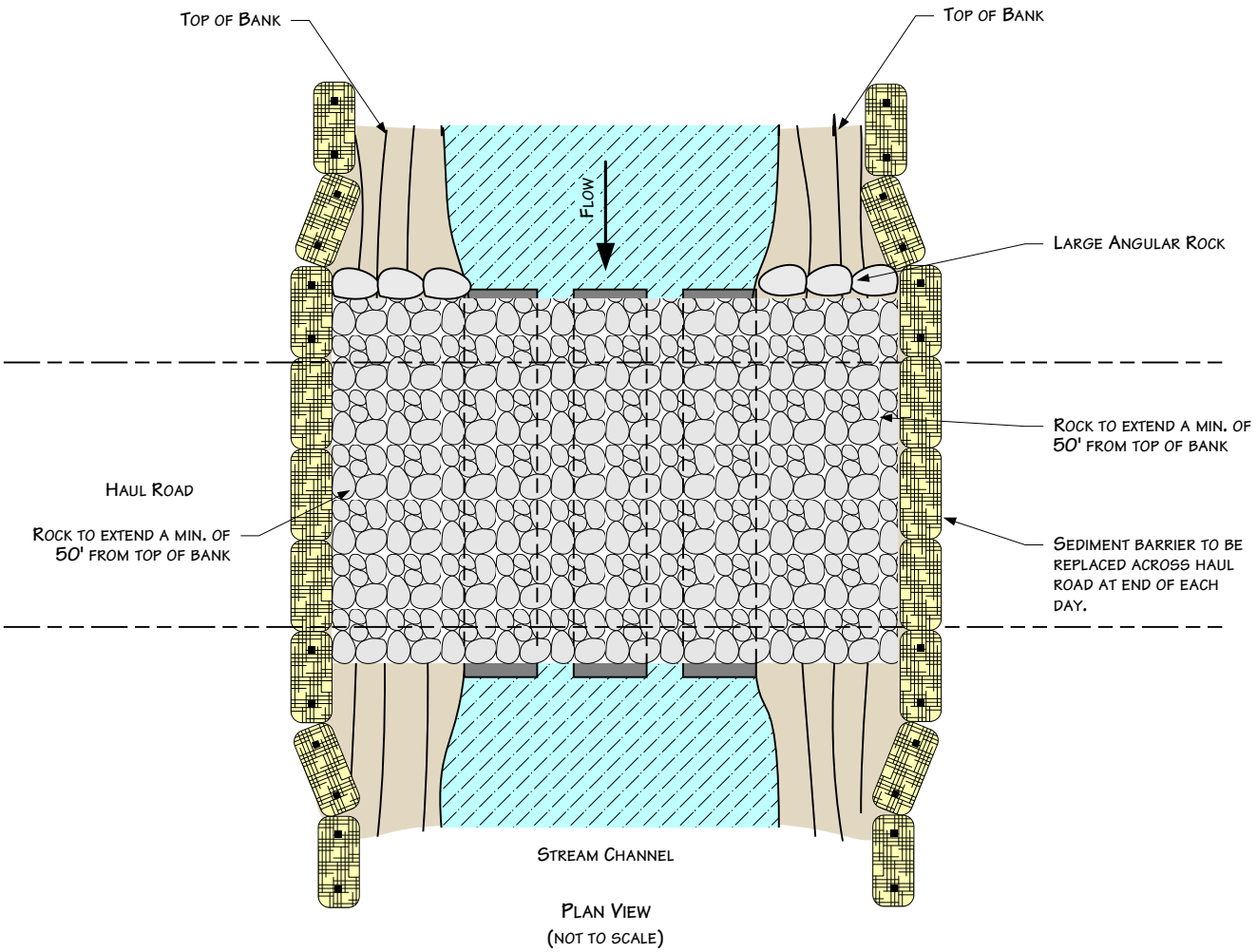
Notes:

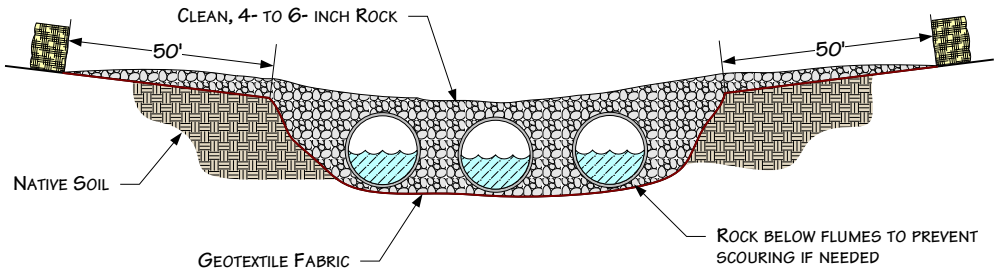
1. Inspect bridge opening periodically and following rainfalls of over ½". Remove any debris restricting flow and deposit it at an upland site outside of floodplain.
2. If physical circumstances prohibit wood or metal ramps, earthen ramps may be used as approved.
3. Inspect bridge elevation so bridge remains supported above high bank and does not sink into bank.
4. The culvert support must be anchored to the stream bottom and may not be supported with fill.
5. Earthen ramp cannot be taller than 1' and cannot extend for more than 15' on either side of the crossing.
6. The bridge must span from top of bank to top of bank.
7. The bridge must be firmly anchored to prevent it from being transported downstream during high flow.
8. Additional support must be added on top of bank and under span if initial support starts to settle.
9. Erosion and sedimentation control measures shall be inspected and maintained in accordance with the company's Environmental Mitigation Plan

For environmental review purposes only.

Figure 6
Typical Span Type Bridge With or Without Instream Support

DATE:	3/11/2003
REVISED:	11/10/2008
SCALE:	NTS
DRAWN BY:	KMK6792
	K:\335\2006-135\060\2.5.VSD



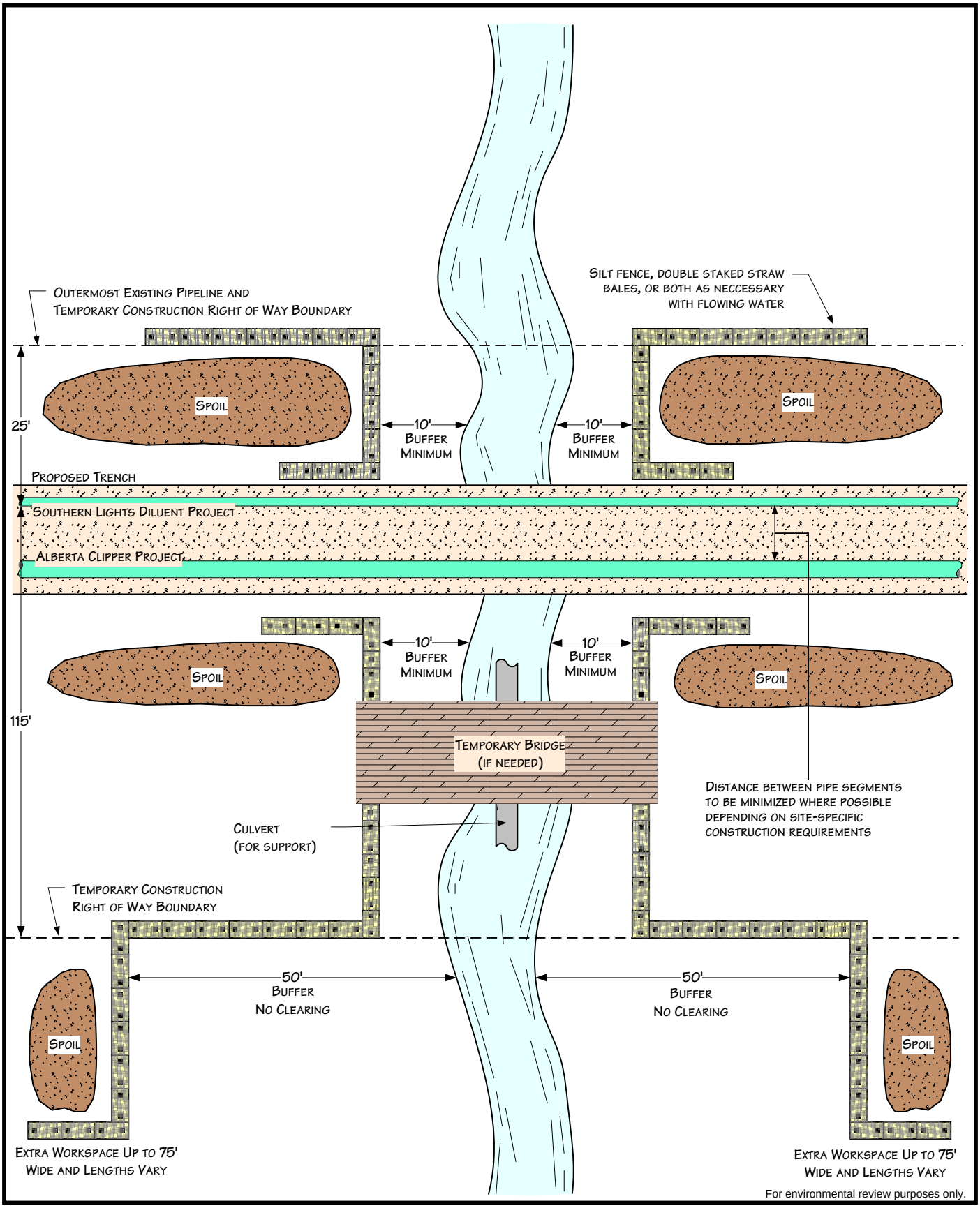


NOTES:

1. Steel flume pipe(s) sized to allow for stream flow and equipment load.
2. Straw bales shall be placed across bridge entrance every night.
3. Additional information included on other Drawings.

For environmental review purposes only.

	Figure 7 **Typical Rock Flume Bridge**	DATE: 5/25/2001 REVISED: 12/21/05 SCALE: NTS DRAWN BY: KMKENDALL K:\335\2006-135\060\2.6.VSD

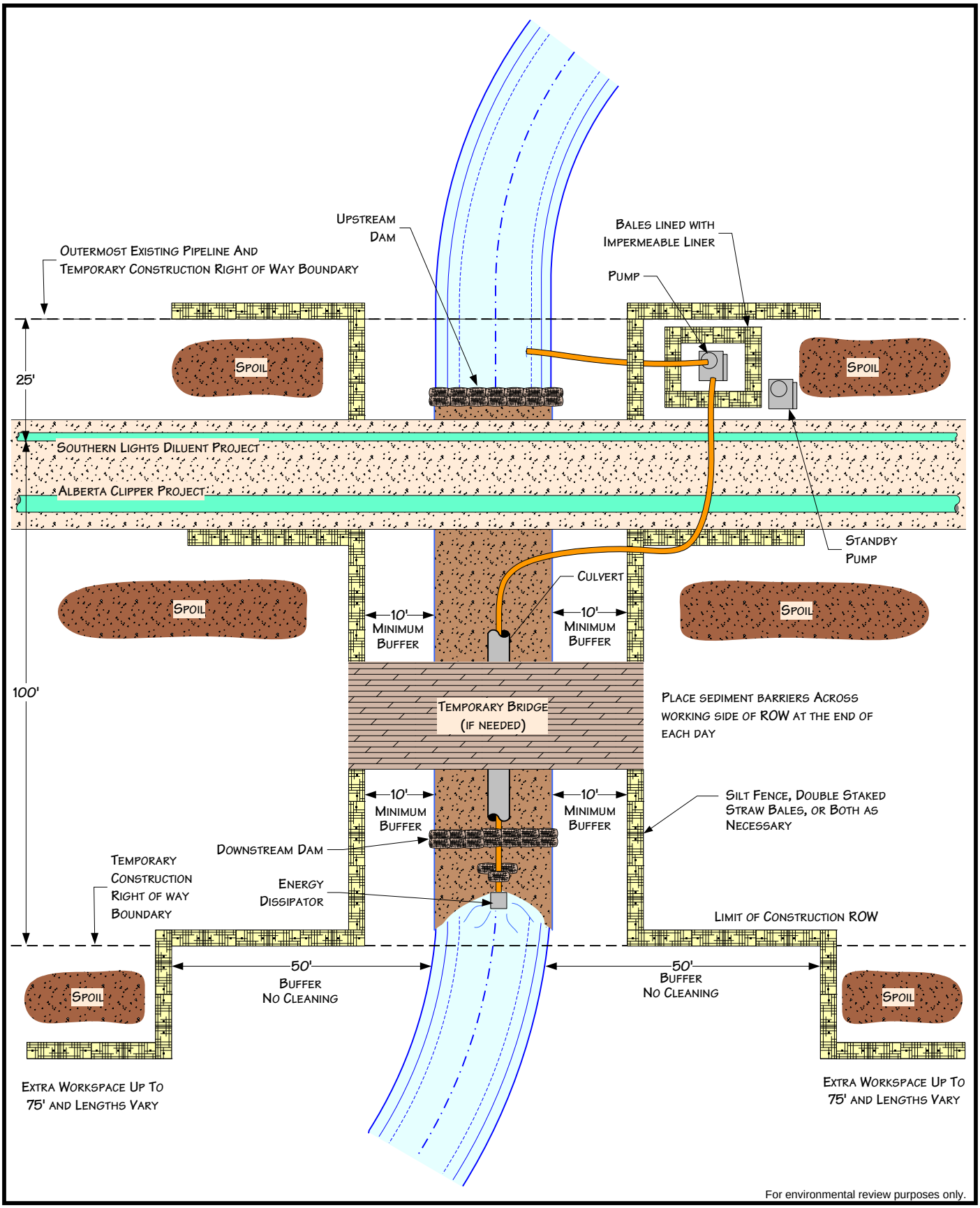


For environmental review purposes only.

Figure 8
Typical Waterbody Crossing
Wet Trench Method
(Clearbrook, MN to Superior, WI)

DATE:	11/29/2005
REVISED:	10/24/08
SCALE:	NTS
DRAWN BY:	KJA

K:\335\ALBERTA\2006-135\400\OPEN_CUT.VSD

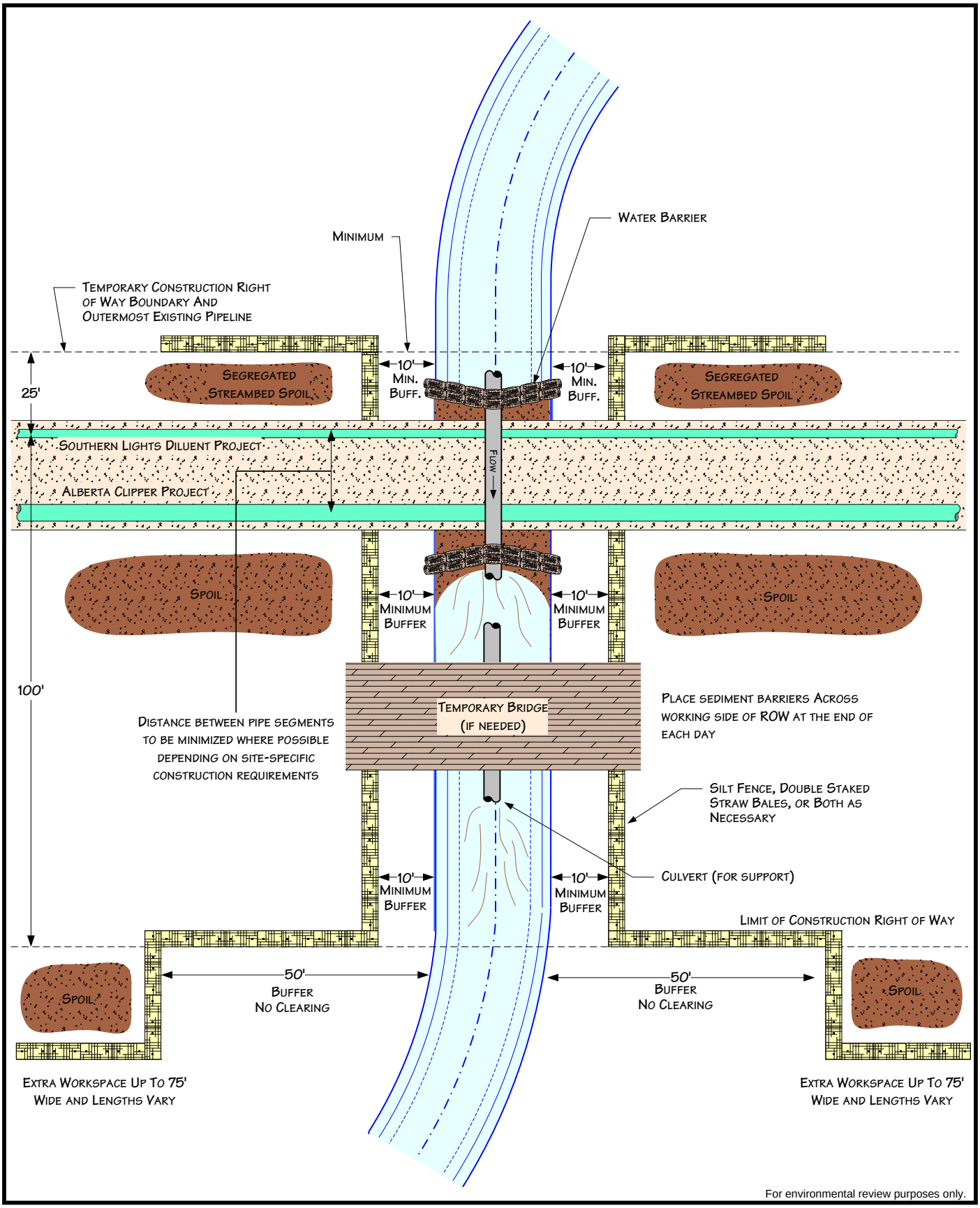


For environmental review purposes only.

Figure 9
Typical Waterbody Crossing Dam and Pump Method
(Clearbrook, MN to Superior, WI)

DATE:	11/29/2005
REVISED:	10/31/08
SCALE:	NTS
DRAWN BY:	KJA

K:\335\ALBERTA\2006-135\400\DAM_PUMP.VSD

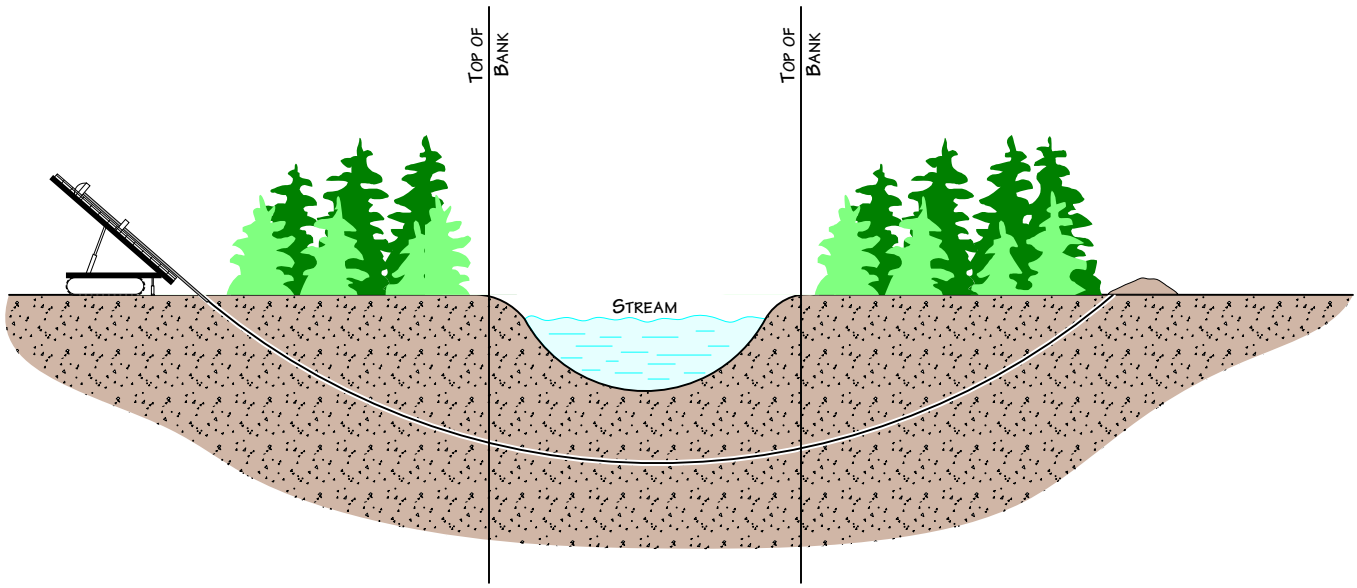


For environmental review purposes only.

Figure 10
Typical Waterbody Crossing
Flume Method
(Clearbrook, MN to Superior, WI)

DATE:	11/29/2005
REVISED:	10/31/08
SCALE:	NTS
DRAWN BY:	KJA

K:\335\ALBERTA\2006-135\400\FLUME.VSD



For environmental review purposes only.

Figure 11
Typical Waterbody Crossing
Directional Drill Method

DATE:	7/14/2000
REVISED:	12/21/05
SCALE:	NTS
DRAWN BY:	KMKENDALL
	K:\335\2006-135\060\2.4.VSD

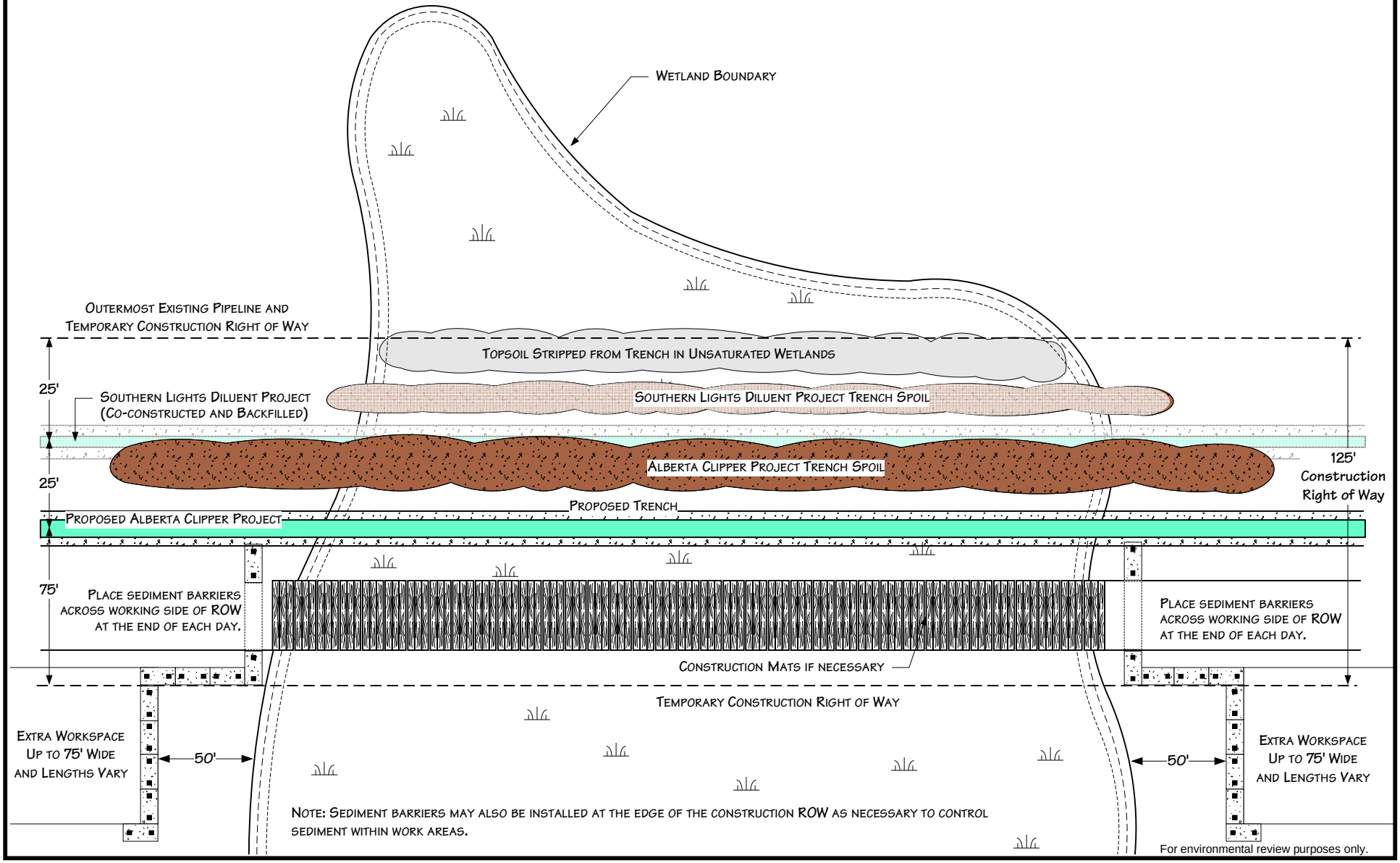
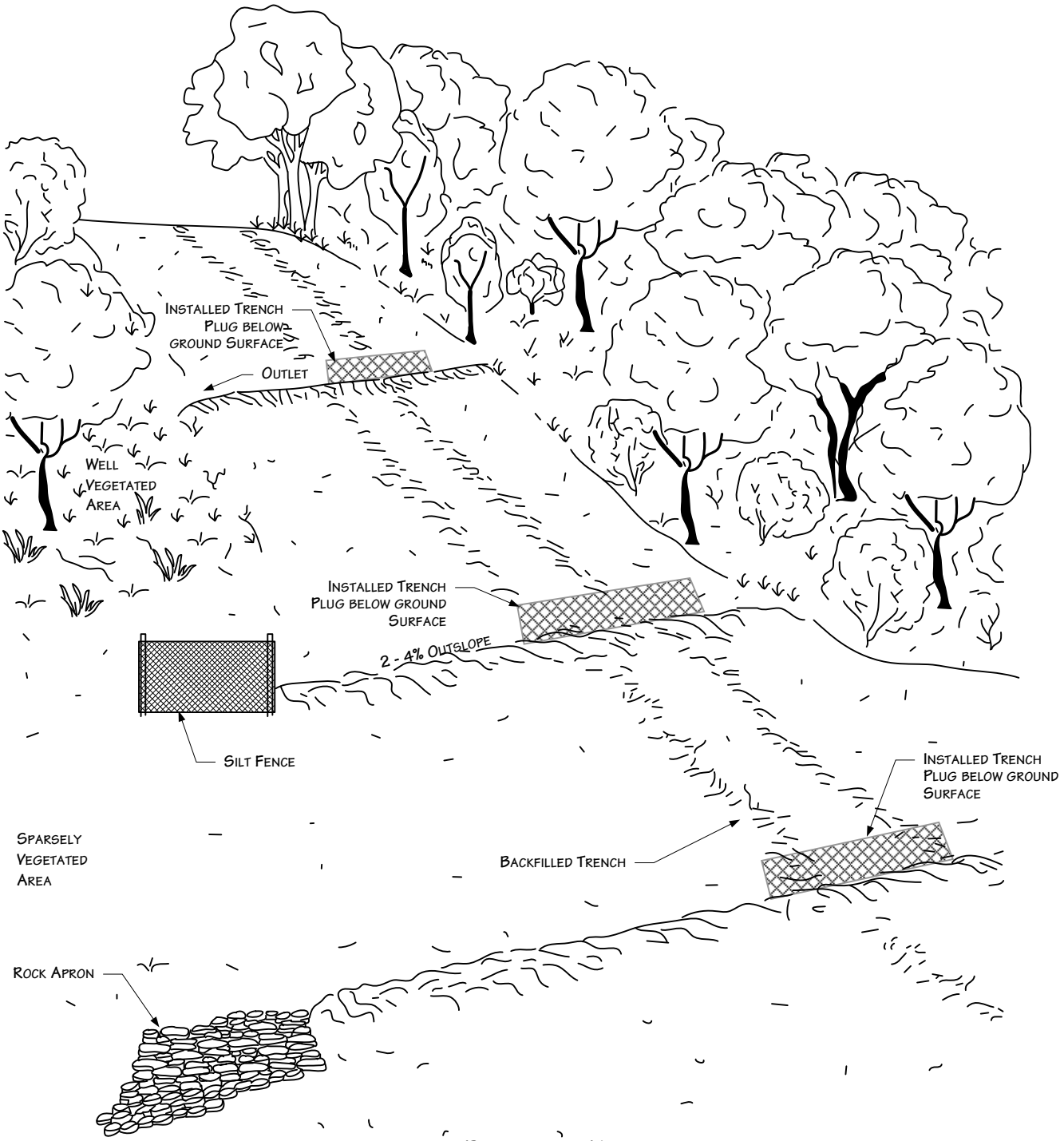


Figure 12
Typical Wetland Crossing Method
(Clearbrook, MN to Superior, WI)

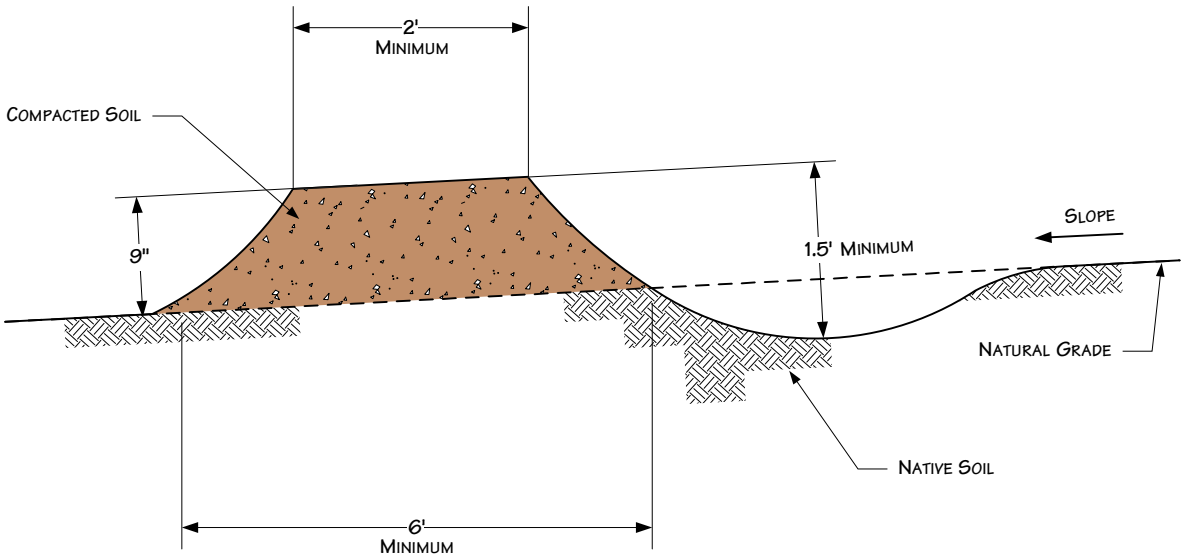
DATE:	5/25/2001
REVISED:	10/24/08
SCALE:	NTS
DRAWN BY:	KMKENDALL
K:\335\ALBERTA\2006-135\400\WETX2.VSD	



PERSPECTIVE VIEW
(NOT TO SCALE)

For environmental review purposes only.

	Figure 13 **Permanent Slope Breakers - Perspective View**	DATE: 5/25/2001 REVISED: 10/24/08 SCALE: NTS DRAWN BY: KMKENDALL K:\335\ALBERTA\2006-135\400\7.1.VSD



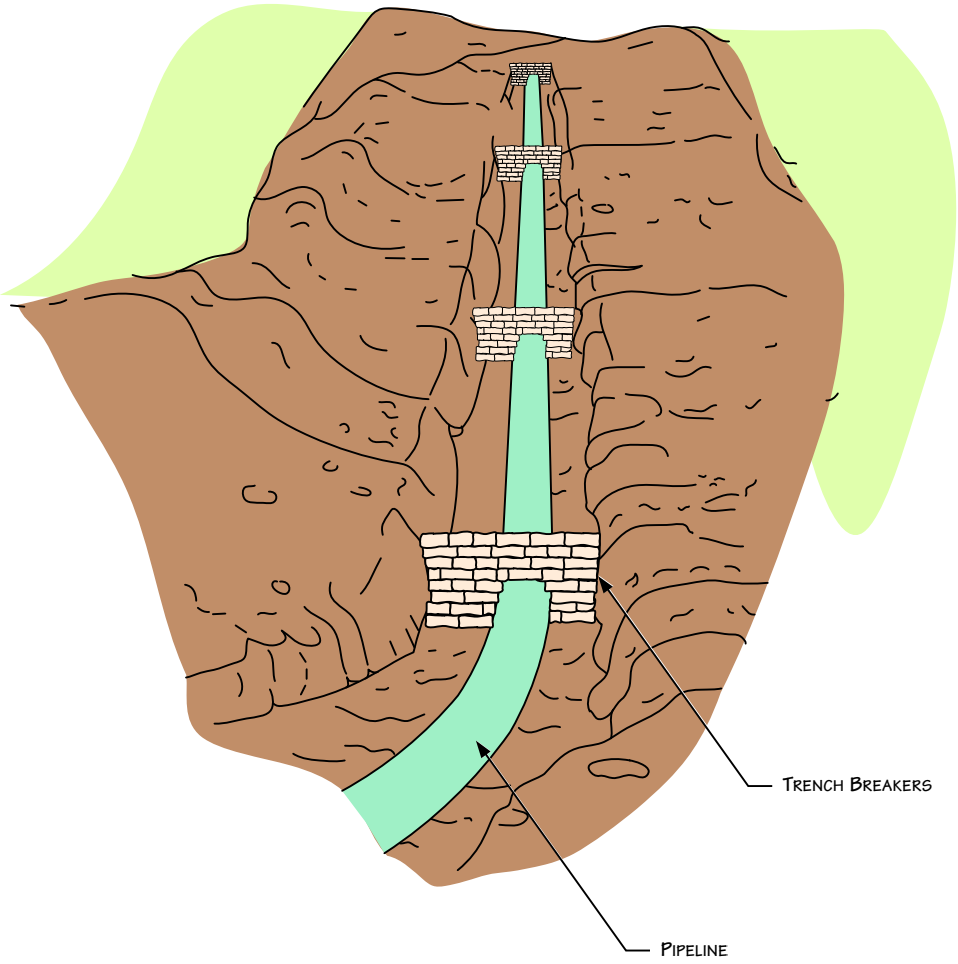
NOTES

1. Berms shall be constructed with 2 to 8 percent outslope.
2. Berms shall be outleted to well vegetated stable areas, silt fences, straw/hay bales or rock aprons.
3. Berms shall be spaced as described in construction specifications.
4. Additional information included on other drawings.

For environmental review purposes only.

Figure 14
Typical Temporary or Permanent Berms
Elevation View

DATE: 5/25/2001
REVISED: 10/24/08
SCALE: NTS
DRAWN BY: KMKENDALL
K:\335\ALBERTA\2006-135\400\ 1.6.VSD



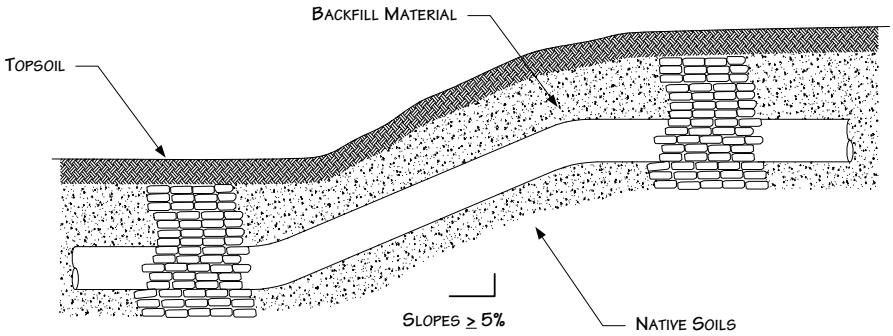
NOTES

1. BAGS WILL NOT BE FILLED WITH TOPSOIL.
2. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS.

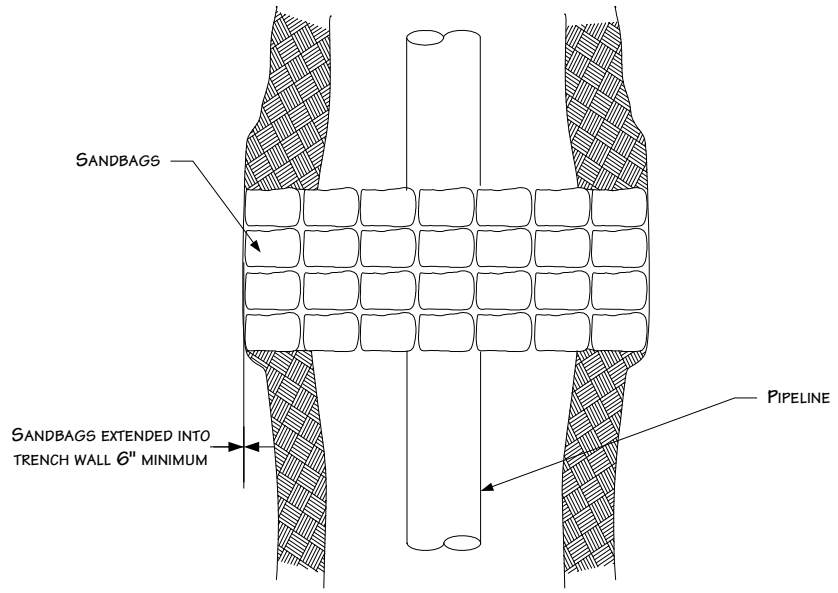
For environmental review purposes only.

Figure 15
Typical Trench Breakers - Perspective View

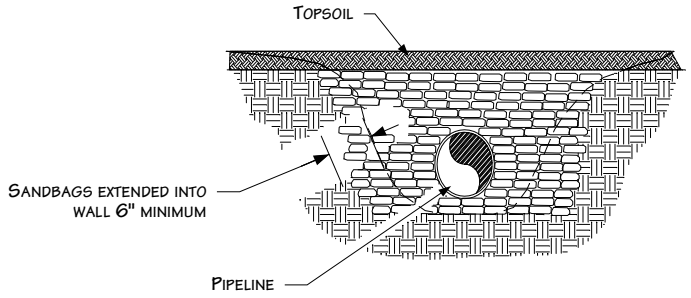
DATE: 5/25/2001
REVISED: 10/24/08
SCALE: NTS
DRAWN BY: KMKENDALL
K:\335\ALBERTA\2006-135\400\ 1.9.VSD



Profile View
(Not to Scale)



Plan View
(Not to Scale)



Face View
(Not to Scale)

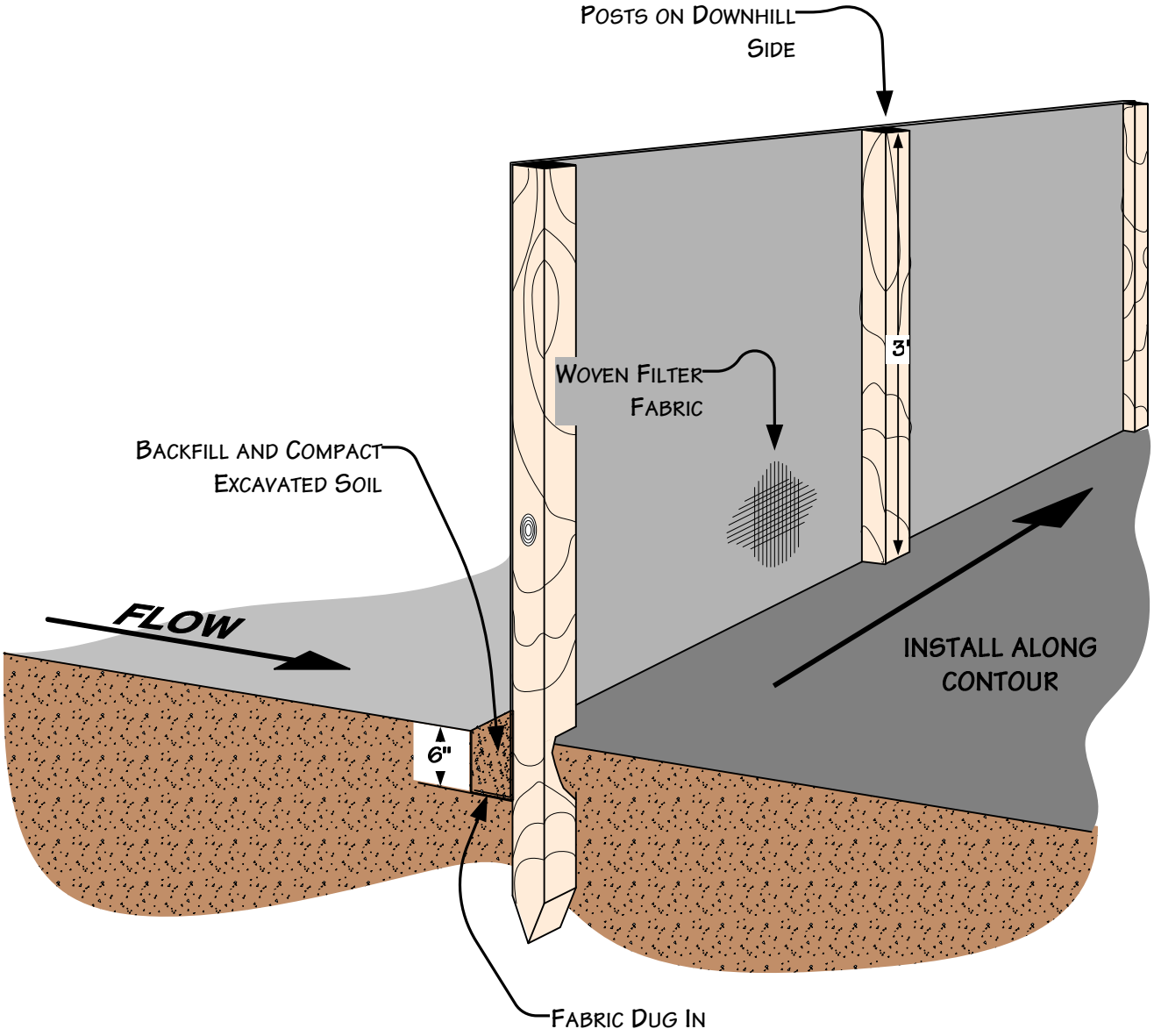
Notes

1. Bags will not be filled with topsoil
2. Additional information included on other drawings

For environmental review purposes only.

Figure 16
Typical Trench Breakers - Plan & Profile Views

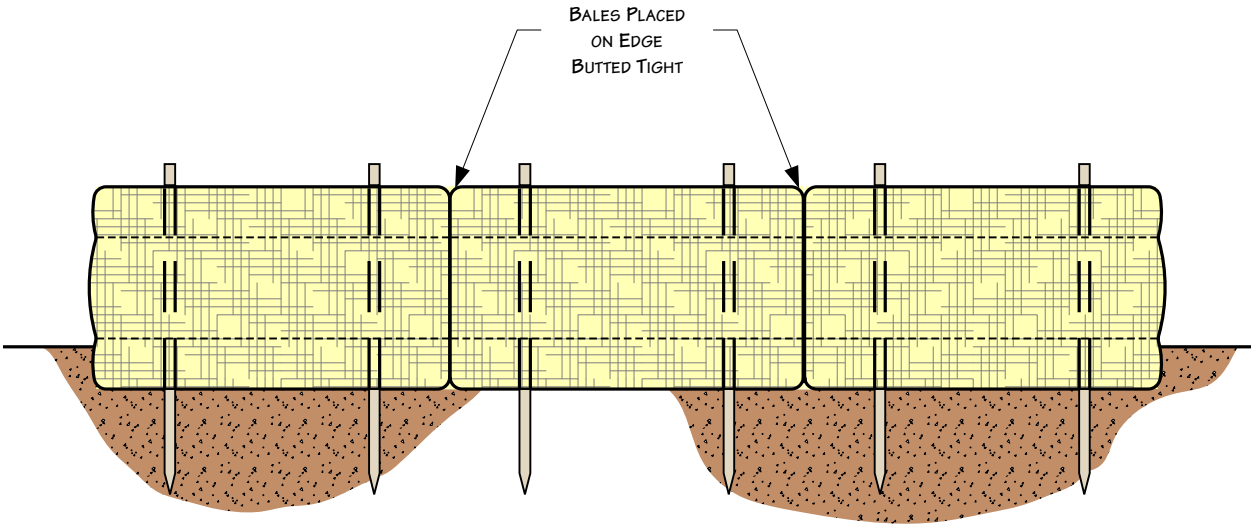
DATE: 11/15/2000
REVISED: 5/19/05
SCALE: NTS
DRAWN BY: KMKENDALL
K:\335\2006-135\060\ TRENCHBR2.VSD

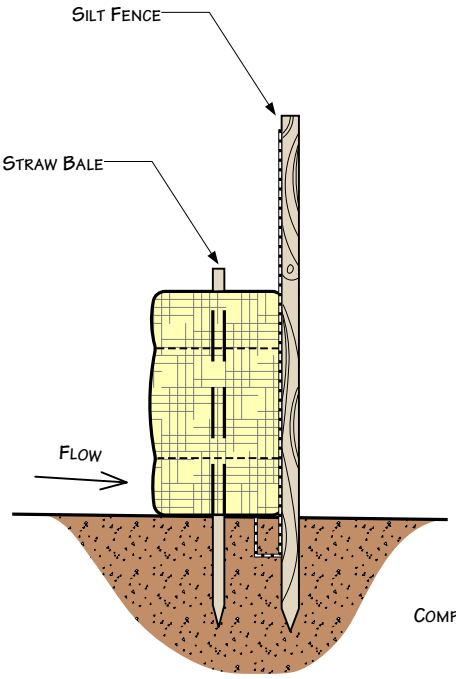


For environmental review purposes only.

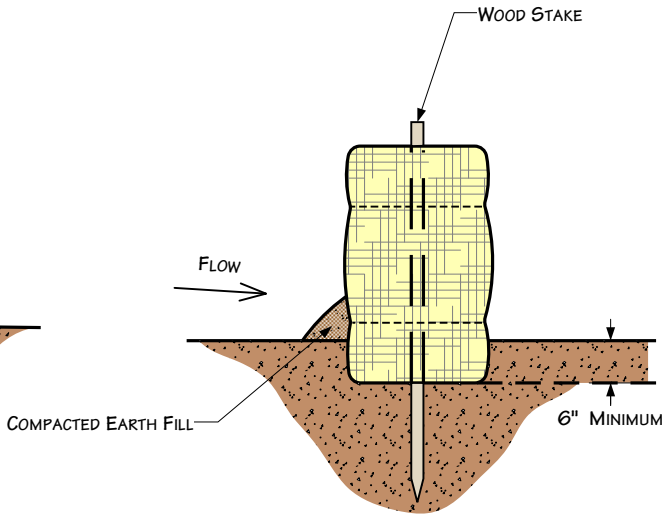
Figure 17
Typical Silt Fence Installation

DATE:	5/25/2001
REVISED:	08/02/06
SCALE:	NTS
DRAWN BY:	KMKENDALL
K:\335\2006-135\060\1.7.VSD	





Straw/Hay Bales & Silt Fence



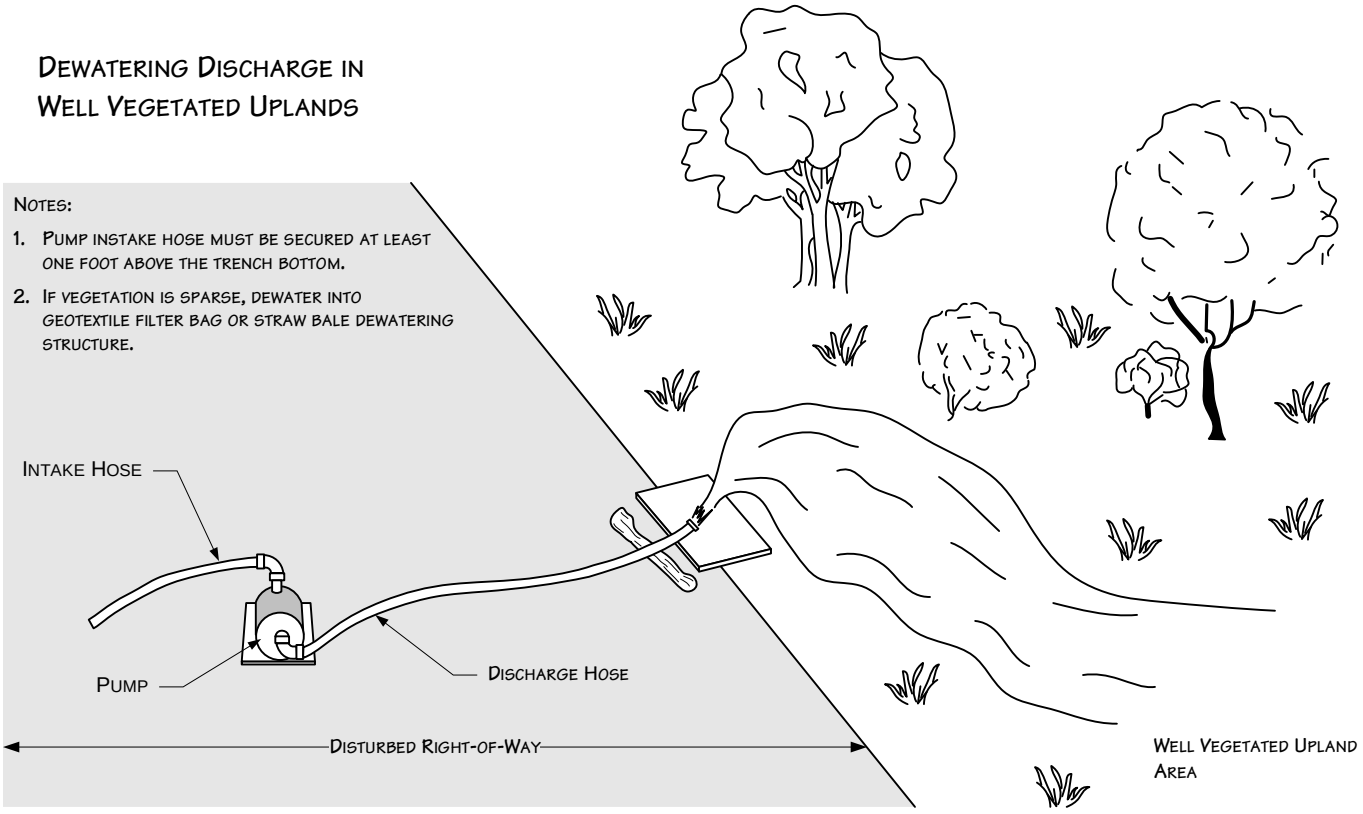
Straw/Hay Bales Only

For environmental review purposes only.

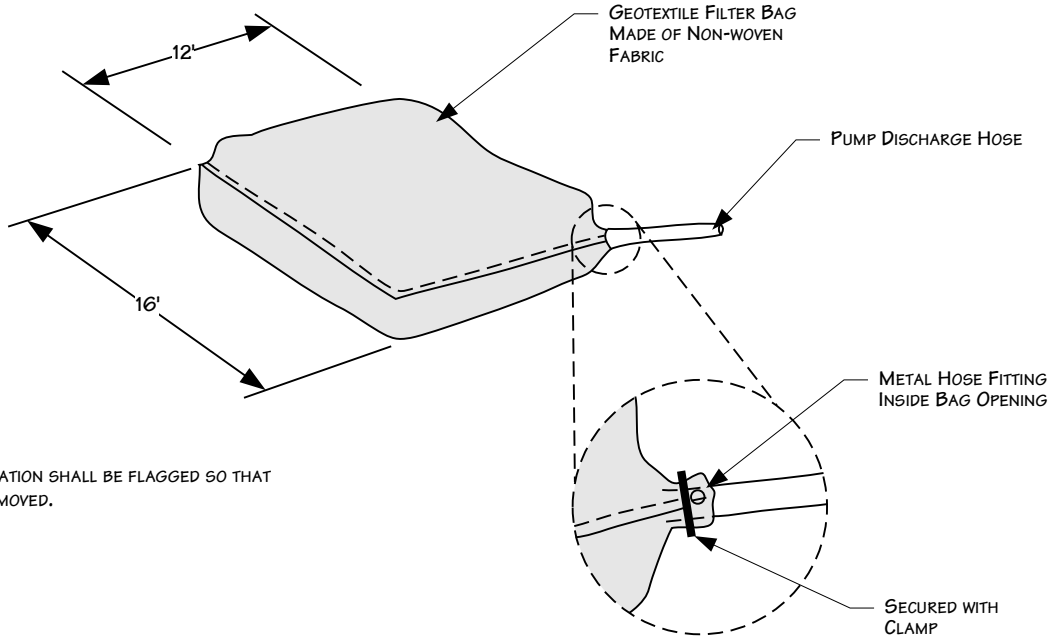
Figure 18
Typical Straw Bale Installation

DATE:	5/25/01
REVISED:	11/10/08
SCALE:	Not to Scale
DRAWN BY:	KMKENDALL
K:\335\2006-135\060\1.8.VSD	

Dewatering Discharge in Well Vegetated Uplands



Geotextile Filter Bag



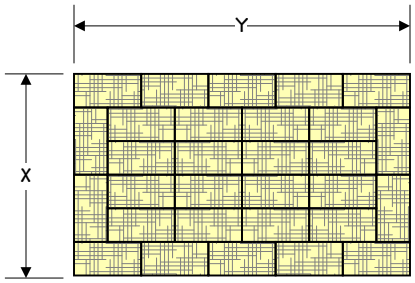
Note:

1. Filter bag location shall be flagged so that bag can be removed.

For environmental review purposes only.

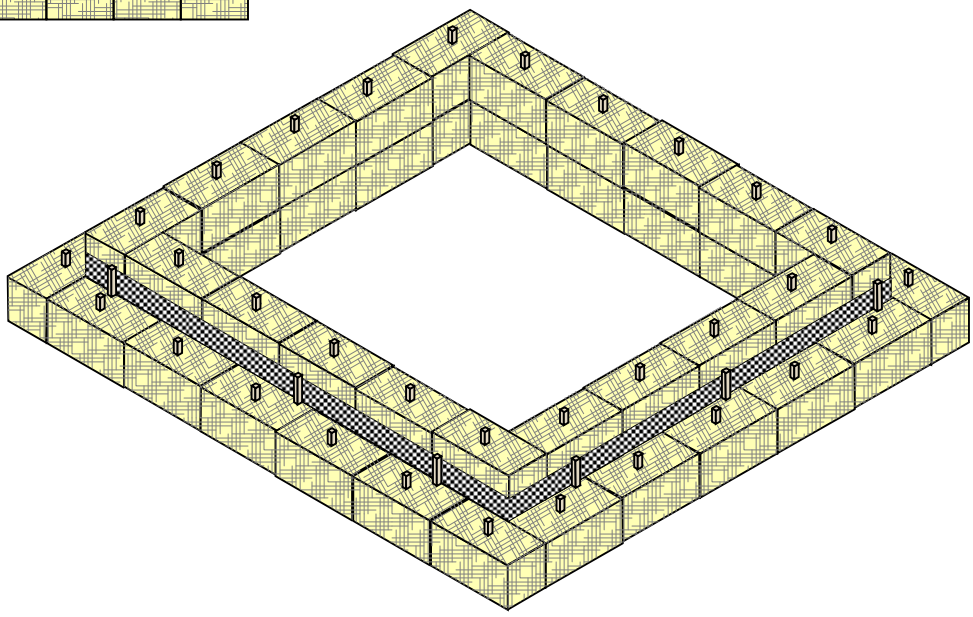
Figure 19
Typical Dewatering Measures

DATE:	5/25/2001
REVISED:	12/21/05
SCALE:	NTS
DRAWN BY:	KMKENDALL
K:\335\2006-135\060\2.7.VSD	

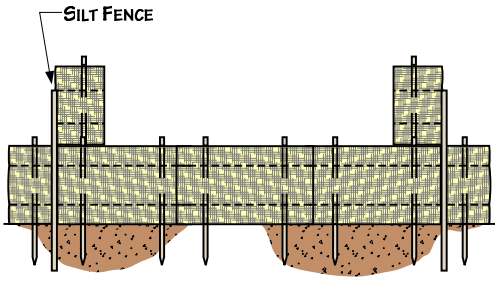


Notes

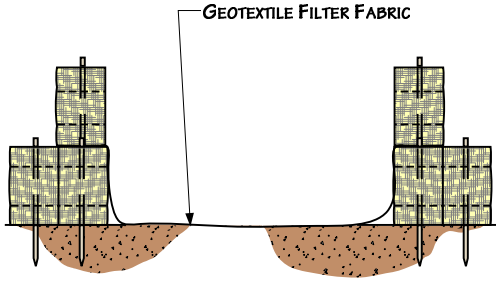
1. Arrange the straw bales to the X and Y dimensions as specificied below.
2. If bottom of structure is not lined with straw bales (Option 1), line entire structure with geotextile filter fabric.



Perspective View



Option 1



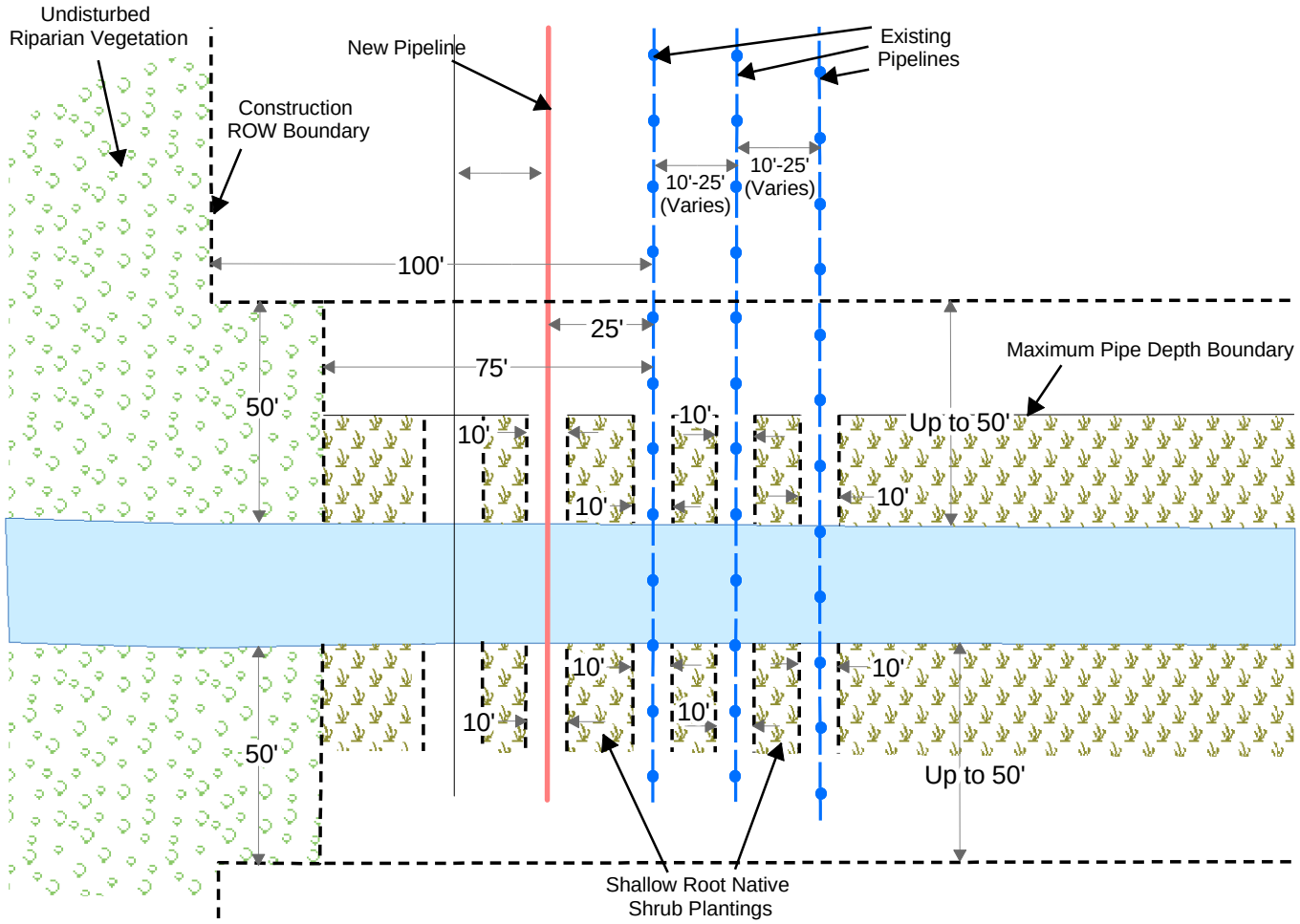
Option 2

Minimum Sump Dimensions (feet)		Maximum Pumping Rate
X	Y	Gallons per Minute
10	20	300
15	20	350
20	20	400
20	25	450
25	25	500
25	30	550
30	30	660

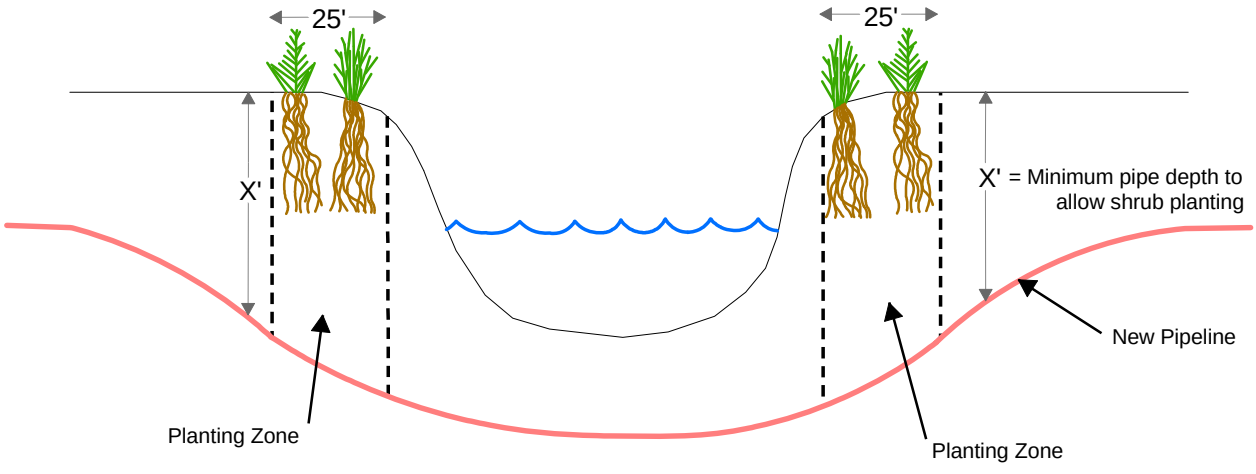
For environmental review purposes only.

Figure 20
Typical Straw-Bale Dewatering Structure

DATE:	5/25/2001
REVISED:	05/29/02
SCALE:	NTS
DRAWN BY:	KMKENDALL
K:\335\2006-135\060\2.8.VSD	



Plan View

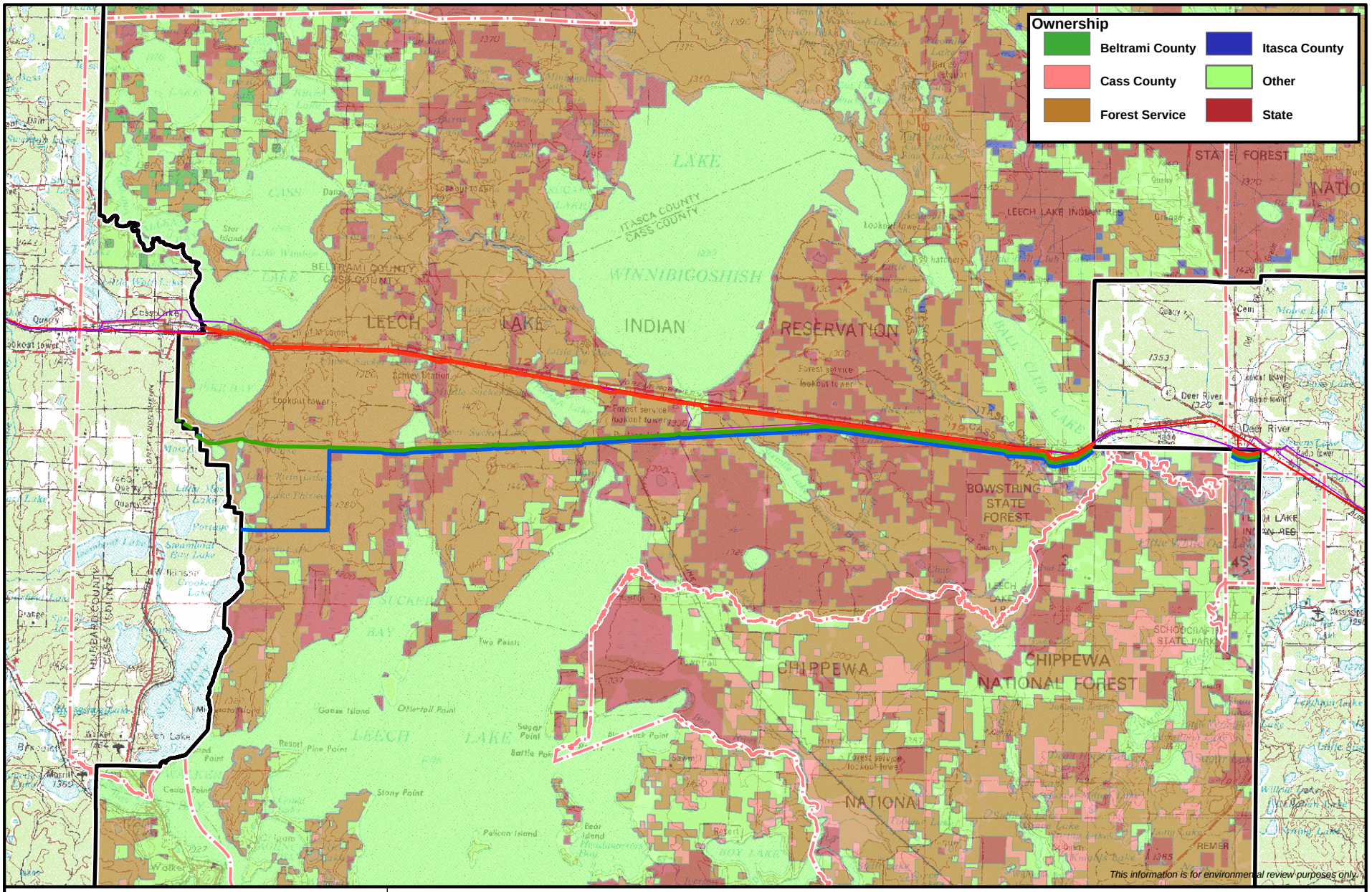


Profile

This information is for environmental review purposes only.

Figure 21 - Stream Crossing Replanting-Typical

M:\Clients\D-F\EEL\SLP_ArcGIS\2008\01\Forest_Crossing_Drawings_EEL_SLP_Drawings.mxd	DATE: 01/28/08	REVISED: 06/25/08	DRAWN BY: MLTEICHERT



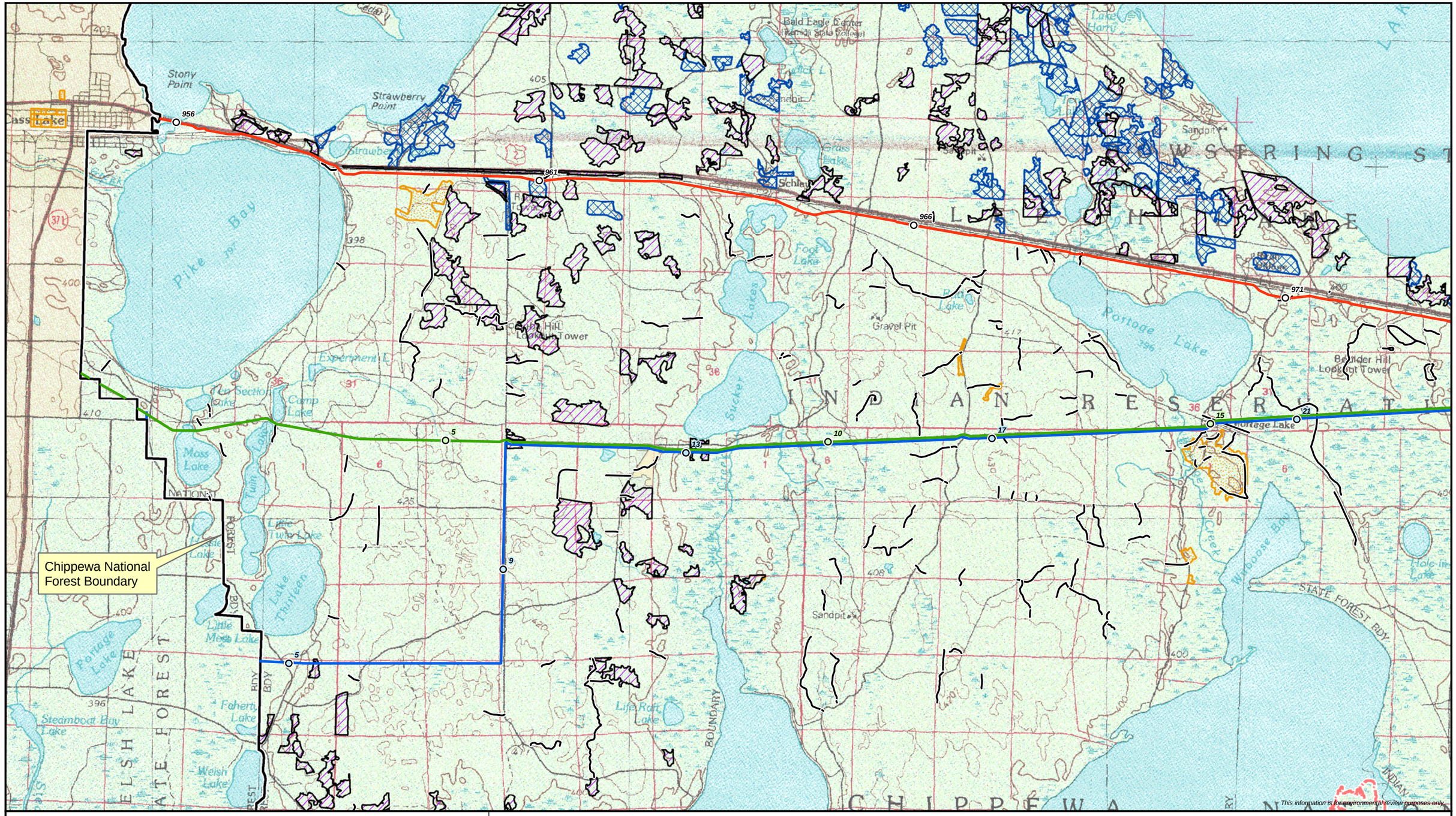
Alternative 2
Alternative 3
Alternative 4
Existing Enbridge Pipelines
Railroad
National Forest Boundary
Indian Reservation Boundary

0 5 10 Miles

N

Figure 22
Land Ownership in Project Area

M:\Clients\D-F\EEL\Alberta_Clipper_ArcGIS\2008\08\CNF\OV_CNF22.mxd | 1:315,000 | DATE: 10/24/08 | REVISED: 10/27/08 | DRAWN BY: KJAnderson



Alternative 2 Milepost
Alternative 2
Alternative 3 Milepost
Alternative 3
Alternative 4 Milepost
Alternative 4
Future Project
Unaccomplished Project
Accomplished Project
Decommissioned Road
General Area of CNF Goblin Fern Study

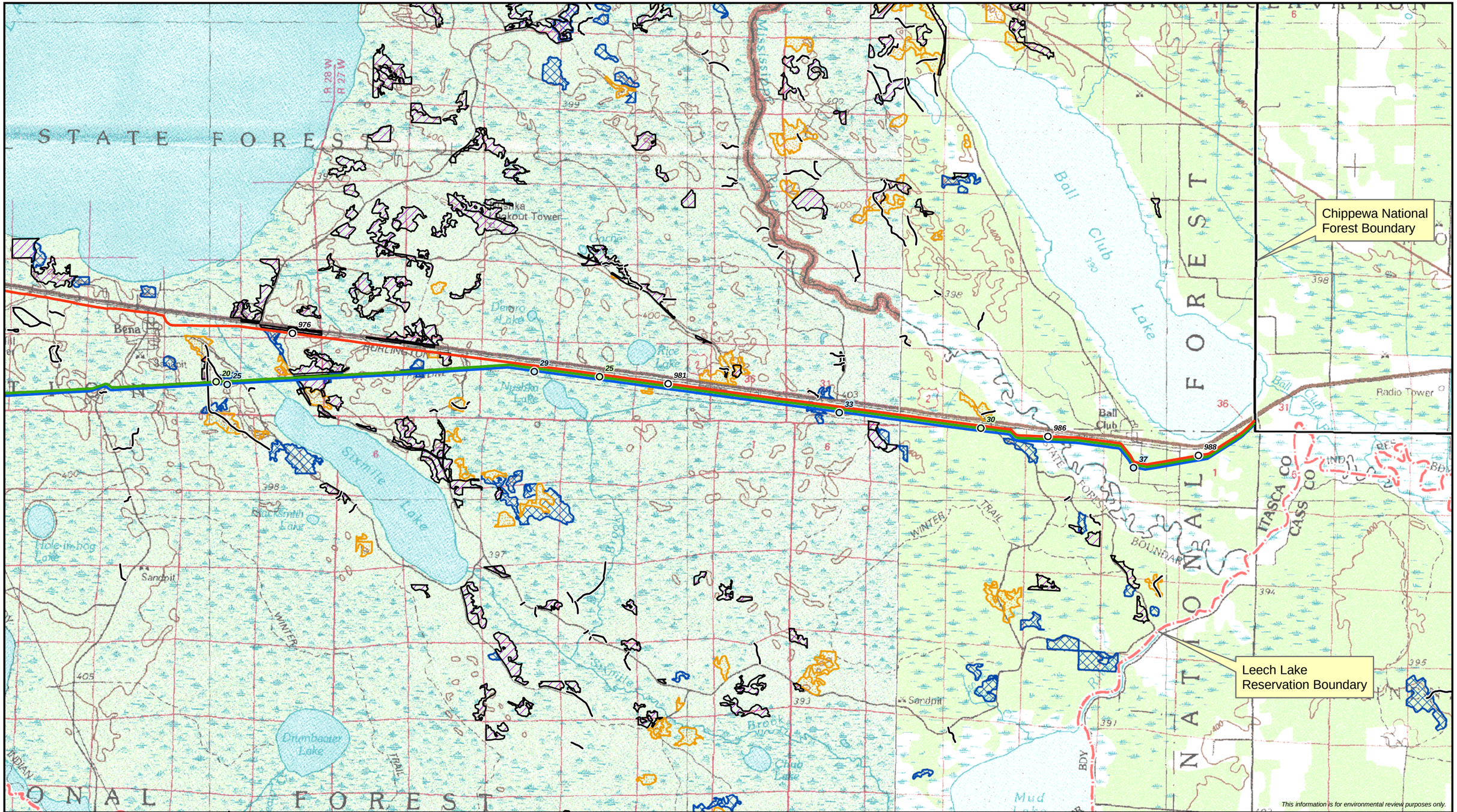
0 2,500 5,000 Feet

N

Figure 23A
Other Forest Service Projects

M:\Clients\D-F\EEL\Alberta_Clipper_ArcGIS\2008\10\CNF_Alternatives\CNF_Alternatives_10232008\Calcs.mxd

DATE: 10/23/08 | REVISED: 11/10/08 | DRAWN BY: KJAnderson



Alternative 2 Milepost
Alternative 2
Alternative 3 Milepost
Alternative 3
Alternative 4 Milepost
Alternative 4
Future Project
Unaccomplished Project
Accomplished Project
Decommissioned Road

0 2,500 5,000 Feet

N

Figure 23B
Other Forest Service Projects

M:\Clients\D-F\EEL\Alberta_Clipper_ArcGIS\2008\10\CNF_Alternatives\CNF_Alternatives_10232008\Calcs.mxd

DATE: 10/23/08 | REVISED: 10/27/08 | DRAWN BY: KJAnderson

APPENDIX 4 – CUMULATIVE EFFECTS SUMMARY MATRIX

Table 1: Cumulative Effects Summary: CNF Projects Potentially Crossed by the Proposed Projects within the Chippewa National Forest

CNF Project and Type of Activity		Alternative 2 Total Crossing Length: 34.09 Total Impacted Acres: 566.36
Accomplished Projects		
	Commercial Thinning	MP 975.63 – 975.84 (3.56 acres)
	Stand Clear Cutting	MP 982.85 – 982.89 (0.73 acres)
	Subtotal Acres	4.29 acres
Future Projects		
Cuba Hill RMP	Harvest by type – single tree selection	MP 961.34 – 961.39 (0.21 acres)
	Harvest by type - single tree selection	
	Harvest by type - single tree selection	
	Subtotal Acres	0.21 acres
Lower E. Winnie VMP	Harvest – Stand Clearcutting	MP 977.95 – 978.1 (2.36 acres)
	Subtotal Acres	2.36 acres
Non-native species	Spotted Knapweed Removal	MP 956.90 – 958.03 (6.67 acres)
	Canadian Thistle Removal	
	Common Tansy Removal	
	Common Tansy Removal	
	Canadian Thistle Removal	
	Bull Thistle and Canadian Thistle Removal	
	Common Tansy and Bull Thistle Removal	
	Canadian Thistle and Bull Thistle Removal	
	Spotted Knapweed Removal	
	Spotted Knapweed Removal	
	Canadian Thistle Removal	
	Spotted Knapweed Removal	
	Spotted Knapweed Removal	
	Spotted Knapweed and Common Tansy Removal	
	Common Tansy Removal	
	Common Tansy, Spotted Knapweed, and Leafy Spurge Removal	MP 985.20 – 985.22 (0.13)
	Spotted knapweed and Leafy Spurge Removal	MP 985.22 – 985.24 (0.03)
	Subtotal	6.83 acres
	Road Decommissioning Forest Road 2927A	
	Road Decommissioning Forest Road 2131B	
	Road Decommissioning Forest Road 2140	
	Road Decommissioning Forest Road 2140A	

Table 2: Cumulative Effects Summary: CNF Projects Potentially Adjacent to the Proposed Projects within the Chippewa National Forest

CNF Project and Type of Activity		Alternative 2 Total Crossing Length: 34.09 Total Impacted Acres: 566.36
Accomplished Projects		
	Commercial Thinning	MP 960.29
	Commercial Thinning	MP 960.97
	Stand Clearcutting	MP 982.86
	Commercial Thinning	
	Commercial Thinning	
	Commercial Thinning	
Future Projects		
Cuba Hill RMP	Harvest by age – Clearcut w/reserves	
	Harvest by age – Clearcut w/reserves	
	Harvest by Age – Lop and Scatter of Natural Fuels	
Lower E. Winnie VMP	Harvest – Commercial Thinning	
Non-native species	Canada Thistle removal	MP 960.27
	Spotted Knapweed removal	MP 975.60
	Leafy Spurge removal	MP 985.22
	Common Tansy and Spotted Knapweed removal	MP 985.24
	Spotted Knapweed removal	MP 985.25
	Spotted Knapweed Removal	MP 985.30
	Common Tansy and Spotted Knapweed removal	MP 985.35
	Spotted Knapweed removal	MP 985.36
	Common Tansy Removal	
	Canadian Thistle Removal	
	Common Tansy removal	
	Common Tansy and Spotted Knapweed Removal	
	Common Tansy Removal	
	Spotted Knapweed Removal	
	Spotted Knapweed Removal	
	Spotted Knapweed Removal	
	Leafy Spurge Removal	
	Spotted Knapweed Removal	
	Common Tansy and Spotted Knapweed Removal	
	Road Decommissioning Forest Road 2133	MP 967.77