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BIOLOGICAL EVALUATION / BIOLOGICAL ASSESSMENT

ENBRIDGE ENERGY SOUTHERN LIGHTS PROJECT

Prepared by

Graham Environmental Services, Inc.

and

NATURAL RESOURCE GROUP

April 2009
This Biological Assessment/Biological Evaluation was prepared pursuant to the National Environmental Policy Act, National Forest Management Act, Endangered Species Act and other applicable laws and regulations. For additional information, please contact the team leader for the Enbridge Energy Southern Lights projects:

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<td>Appendix F</td>
<td>Songbird Survey, Spring 2008</td>
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<td>Appendix G</td>
<td>Rare Plant Survey, 2007</td>
</tr>
<tr>
<td>Appendix H</td>
<td>Rare Plant Survey, 2008</td>
</tr>
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1.0 INTRODUCTION

1.1 PURPOSE AND DECISION

A wide variety of federal legislative actions, including Section 7 of the Endangered Species Act (ESA), the National Forest Management Act, and the National Environmental Policy Act define national policy to preserve and protect federally listed threatened and endangered species, and Forest Service regionally listed sensitive species (Regional Forester’s Sensitive Species) when managing public lands. The Leech Lake Band of Ojibwe, Division of Resource Management (LLBO DRM) also maintains a list of sensitive species that must be addressed on lands within the reservation boundaries. To meet the intent of such legislation, biological assessments or evaluations are required as part of the environmental analysis for all planned, funded, or permitted federal activities. Within Forest Service guidelines (Forest Service Manual (FSM) 2672.41) biological evaluations are the means the Forest Service uses to review projects and document findings in order to:

- ensure that Forest Service actions 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;
- comply with the requirements of the ESA that actions of federal agencies not jeopardize or adversely modify habitat or federally listed species; and
- provide a process and standard by which to ensure that federally listed threatened, endangered, proposed, and sensitive species receive full consideration in the decision-making process.

Specifically, the ESA requires a determination be made as to whether a federal action may affect a federally listed species. Whenever a situation arises where a federal activity may affect a federally listed species (regardless whether the effect is adverse, discountable, insignificant, or beneficial), consultation with the U.S. Fish and Wildlife Service (FWS) is required.

The FSM requires the Forest Service to address the viability of regionally listed sensitive species to avoid any impacts that may cause a trend towards listing. For Regionally listed sensitive species a determination is made as to whether the action will likely have “no impact”, “beneficial impact”, “may impact individuals but not likely cause a trend to federal listing or loss of viability”, or “likely to result in a trend to federal listing or loss of viability.”

Biological Assessments (BA) are only expressly required to document effects on federal threatened, endangered, and sensitive (TES) species, this combination Biological Assessment/Biological Evaluation also addresses state-listed, regional foresters sensitive species, and tribally listed species. The Chippewa National Forest (CNF) is also committed to providing and protecting habitat for state of Minnesota threatened, endangered, and special concern species (Chippewa National Forest Land and Resource Plan p.2-7 Cooperative Management). This document also addresses tribally listed sensitive species to cover the provisions of the Leech Lake Band.

The purpose of this analysis is to examine the probable environmental consequences of the Proposed Action, Alternative Actions, and other appropriate project related affects.

This Biological Assessment / Biological Evaluation (BA/BE) is a supplement to the Enbridge Energy Southern Lights Project Environmental Impact Statement (EIS). This BA/BE provides the Deciding Official information necessary to make an informed decision regarding the potential risks and benefits.
posed by the project on federal, Forest Service, LLBO DRM, and state-listed plants and animals and their habitat. If a decision is made that proceeding with the pipeline expansion activities is the best means for addressing resource needs in the Northern Minnesota Drift and Lake Plains Section of the Laurentian Mixed Forest Province, the decision will identify what activities are appropriate, where and how they will occur, and why other options were not selected.

1.2 PROJECT DESCRIPTION

Enbridge is planning to increase its ability to provide additional supplies of petroleum to markets in the United States and Canada in response to customer requests and marketplace demands. To fulfill this goal, Enbridge has embarked upon an expansion program involving multiple pipeline projects to increase its transportation capacity. The Enbridge Expansion Program is specifically designed to increase petroleum transportation services from the increasingly accessible oil sands supply in the western Canadian basin to refineries in the American Midwest and eastern Canada. Enbridge proposes to construct and operate a petroleum pipeline and related facilities from Hardisty, Alberta, Canada, to Superior, Wisconsin. This project, known as the Alberta Clipper Project, will have the capacity to deliver 450,000 barrels per day (bpd) of petroleum from a supply hub near Hardisty, Alberta to a terminal in Superior, Wisconsin, with a delivery connection at Clearbrook, Minnesota.

Enbridge is proposing to construct and operate another project, the Southern Lights Diluent Project, which consists of a new 20-inch-diameter, 189-mile-long pipeline between Superior, Wisconsin and Clearbrook, Minnesota. The new pipeline would 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. This project will be co-constructed with the Alberta Clipper Project and will be included in the scope of the Special Use Permit amendment that is being sought from the Chippewa National Forest (CNF) and the Right-of-Way Easement for the Leech Lake Band of Ojibwe (LLBO). The Southern Lights Diluent Project will connect to another Enbridge project, the Southern Lights Reversal Project, at Enbridge’s terminal at Clearbrook, Minnesota. Due to the general co-location and co-construction of Alberta Clipper and Southern Lights Diluent in the same project footprint, environmental impacts associated with both projects will be addressed together during the EIS process.

The two projects subject to Special Use Permit and Right-of-Way Easement requirements (Alberta Clipper Project and Southern Lights Diluent Project) have independent utility, independent commercial in-service dates and different ending points. Table 1.2-1 summarizes the two projects planned within the Alberta Clipper Project footprint in the Chippewa National Forest.

<table>
<thead>
<tr>
<th>Start Location</th>
<th>End Location</th>
<th>Project Name</th>
<th>Combined Easement Subject to SUP</th>
<th>Project Description</th>
<th>In-Service Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>US-Canada Border near Neche, ND</td>
<td>Superior, WI</td>
<td>Alberta Clipper Project</td>
<td>Yes</td>
<td>New 36-inch-diameter petroleum pipeline</td>
<td>December 2009</td>
</tr>
<tr>
<td>Superior, WI</td>
<td>Clearbrook, MN</td>
<td>Southern Lights Diluent Project</td>
<td>Yes</td>
<td>New 20-inch-diameter diluent pipeline</td>
<td>July 2010</td>
</tr>
</tbody>
</table>

A general location map depicting the project route is included on figure 1.2-1. Detailed route maps of the project and a digital shapefile of the proposed route have been provided to CNF and LLBO staff.
This information is for environmental review purposes only.
The Alberta Clipper Project will generally be collocated with or adjacent to Enbridge pipelines through North Dakota, Minnesota, and Wisconsin, including within the CNF and Leech Lake Reservation (LLR). The Alberta Clipper Project will entail construction and operation of the following:

- approximately 326 miles of new 36-inch-diameter underground petroleum pipeline on or adjacent to Enbridge right-of-way from near Neche, North Dakota at the United States-Canada border in Pembina County, North Dakota (milepost (MP) 773.7) to Enbridge’s Superior terminal in Douglas County, Wisconsin (MP 1098.1). The CNF/LLBO portion of the project would extend approximately from MP D955.7 near Cass Lake to MP D995.3 near Deer River (approximately 34.1 miles). Note that mileposts denoted in this document are location references only and should not be used as a definitive measurement of the pipeline. Mileposts were originally established in 1949 when the first pipeline was constructed. Pipelines installed adjacent to or within this corridor share the milepost reference system. Mileposts designated with a letter "D" identify locations where the proposed alignment deviates from the original corridor. In these instances, the proposed alignment is adjacent to Enbridge pipeline(s), but on another corridor.

- new pumping units within the Enbridge pump station sites at Viking, Minnesota (MP 848.2), Clearbrook, Minnesota (MP 909.5) and Deer River, Minnesota (MP D996.0).

- new piping, manifold, pig receiver, four booster pumps, and five new storage tanks (200,000 barrels (bbls) each) at the Superior, Wisconsin terminal; and

- mainline valves at major waterbody crossings and over the length of the project route.

The Southern Lights Diluent Project will be co-constructed with the Alberta Clipper Project from Superior, Wisconsin to Clearbrook, Minnesota. The Southern Lights Diluent Project will require the construction of the following:

- approximately 188.6 miles of new 20-inch-diameter underground petroleum pipeline generally on or adjacent to Enbridge right-of-way from Enbridge’s Superior terminal in Douglas County, Wisconsin (MP 1098.1) to Enbridge’s Clearbrook terminal in Clearwater County, Minnesota (MP 909.5). The CNF portion of the project would include the same mileposts and length as the Alberta Clipper Project;

- new pumping units within the Enbridge Clearbrook terminal;

- new piping and pig receiver at the Clearbrook terminal; and

- mainline valves at major waterbody crossings and over the length of the project route.

The Alberta Clipper and Southern Lights Diluent Projects will largely follow the Enbridge right-of-way along the entire route in Minnesota, including the CNF/LLR. The projects will cross portions of the following counties: in North Dakota, Pembina County; in Minnesota, Kittson, Marshall, Pennington, Red Lake, Polk, Clearwater, Beltrami, Hubbard, Cass, Itasca, Aitkin, St, Louis, and Carlton Counties; in Wisconsin, Douglas County. The projects will also bisect the Leech Lake Indian Reservation.

Enbridge proposes to begin construction of the projects in early 2009, once all permits are in hand. Construction will occur over approximately 10 months, with an in-service date on or before December 31, 2009 for the Alberta Clipper Project and an in-service date on or before July 1, 2010 for the Southern Lights Diluent Project.
1.2.1 Wetland Construction Techniques

Pipeline construction in wetlands will consist of clearing, trenching, dewatering, installation, backfilling, final grading, cleanup, and revegetation. However, due to the unstable nature of some wetland soils, construction activities may differ somewhat from those described for typical upland areas. Construction activities will be minimized in wetlands and/or special construction techniques will be used to minimize the disturbance to plants and soils and to protect wetland hydrology.

Clearing the construction right-of-way in wetlands will be similar to clearing in uplands. For construction to proceed, obstructions (e.g., trees, brush, and logs) need to be removed. Typically, low ground pressure equipment will be used, limiting disturbance to the wetland. When clearing in wetlands, the following restrictions apply:

1. The construction right-of-way width in wetlands will typically be limited to 125-feet or less.

2. Staging areas, additional spoil storage areas, and other additional extra workspace areas (EWS) will typically be located in upland areas at least 50-feet away from wetland boundaries where topographic conditions permit. If topographic conditions do not permit a 50-foot setback, then these areas will be located as far away from the wetland as is practicable. Vegetation will not be cleared between these areas and the wetland in any event. This requirement will not apply where a wetland occurs within the extra workspace for a stream crossing. The size of these additional workspace areas will be limited to the minimum needed to construct the wetland crossing. Vegetation and trees within wetlands will be cut off at ground level, leaving existing root systems intact; clearing debris will generally be removed from the wetland for disposal. Chips, hydro-axe debris, or similar can be left in the wetland if spread evenly in the right-of-way up to a depth not to exceed 1 inch in thickness and in a manner which will allow for normal revegetation.

3. Grading activities will be confined to the area of the trench. Grading outside the trench is only permitted where required to ensure safety and restore contours after backfilling the trench. Sedimentation control practices (e.g., silt fence, straw bales, etc.) will be installed and maintained in proper working order to prevent the flow of sediment into wetlands from spoil piles or sloped approaches that may be adjacent to wetlands.

4. Tree stumps, brush riprap, imported soil, and rock fill will not be brought in to stabilize the right-of-way in wetlands. Where a wetland cannot support construction equipment, and low-ground-weight equipment is not used, construction activities will be accomplished from timber construction mats. The contractor is responsible for having a sufficient number of construction mats to perform the work. Timber riprap (also known as corduroy road) cannot be used without prior written approval from the company and the appropriate regulatory agencies. Pre-existing corduroy roads in wetlands may be used but, may not be improved, maintained, restored, or replaced without site-specific authorization from applicable agencies. Subsoil from the pipeline trench within the immediate wetland may be placed on top of equipment mats for additional stabilization. Timber mats are the only materials that can be brought into a wetland and placed on the working side. Timber mats may be placed over the ditch line to facilitate trench excavation. All timber mats, construction debris, and larger vegetative debris will be removed during cleanup of wetlands.
5. Excavation of the pipeline trench in wetlands typically will be accomplished using backhoe excavators. The duration of open trench will be minimized to the extent possible, but typically not longer than 24-hours.

6. Normally in wetland areas without standing water or saturated soils, up to one foot of topsoil will be stripped from the trench line and stockpiled separate from trench spoil. The organic soil segregation methods/locations in wetlands are based on wetland saturation conditions. Where standing water is present, organic soil segregation is not practical.

7. Where the pipeline trench has the potential to partially drain a wetland, trench breakers will be installed as necessary to maintain original wetland hydrology.

8. If the wetland right-of-way is stable (dry work area or construction mats), the pipe may be strung, welded, and lowered into the trench as in upland areas. Supplemental equipment supports, such as timber mats, will be used in wetlands to provide temporary portable support for heavy construction equipment to reduce ground pressure and minimize soil compaction and/or soil mixing.

9. Large wetlands with standing water and saturated soils cannot be crossed with typical crossing methods. In these areas, the pipeline will be assembled in an adjacent upland area and positioned into the trench using the “push-pull” and/or "float" techniques. Usually this fabrication requires use of extra temporary workspace adjacent to the right-of-way. The trench will be dug by backhoes supported on timber mats. The prefabricated section of pipeline will then be pushed-pulled into position or floated across the wetland. When the pipeline is in position, floats, if used, will be removed and the pipeline will sink into position. The trench will then be backfilled and the original contours will be restored by a backhoe working from construction mats.

10. During backfilling of wetland areas, subsoil material removed from the trench during construction will be restored so that no excessive crown remains. After the trench has been backfilled with subsoil to the appropriate elevation, topsoil will be re-spread over the disturbed areas. Segregated topsoil will not be used as padding and will be returned to its original horizon over the backfilled trench.

Cleanup and rough grading activities may take place simultaneously. Cleanup typically will involve removing construction debris and replacing fences removed during construction. Rough grading will include restoring original contours and installing or repairing temporary erosion control measures. Temporary slope breakers (waterbars) will be installed near the boundary between the wetland and adjacent sloped approaches to prevent sediment flow into the wetland. Every effort will be made to begin cleanup and rough grading (including installation of temporary erosion control measures) as soon as practical after the trench is backfilled, weather permitting.

Unsaturated wetlands will be revegetated with annual rye unless standing water is prevalent or unless permanent planting or seeding with native wetland vegetation is required. No fertilizer, lime, or mulch will be applied in wetlands.

Additional information regarding construction practices can be found in the Environmental Mitigation Plan and Revegetation and Restoration Monitoring Plan in the EIS.
1.3 PROJECT PURPOSE AND NEED

The purpose of the Alberta Clipper Project is to transport petroleum from existing Enbridge 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 increasing supplies of crude oil produced in western Canada. To meet this anticipated demand, the Alberta Clipper Project will provide up to 450,000 bpd of crude oil capacity from Alberta’s oil sands. The capacity provided by this new pipeline would provide independent utility to Enbridge 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 Enbridge’s Superior, Wisconsin breakout tanks for subsequent delivery to interconnected Enbridge 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 Enbridge 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 United States dependence on foreign offshore oil through increased access to stable, secure Canadian crude oil supplies; and
- demonstrated shipper interest in an overall Enbridge system expansion.

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 Enbridge pipeline system of 180,000 bpd;
- enable recycling of diluent between 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 Stated 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.

1.4 SITE LOCATION AND MANAGEMENT DIRECTION

The portion of the Alberta Clipper and Southern Lights Diluent Projects (projects) which would be located in the CNF/ LLR is situated between portions of Cass Lake Township and Ball Club Township (encompassing portions of Townships 145 and 144, Ranges 31, 30, 29, 28, 27, and 26). The project would enter the CNF/LLR near Cass Lake (Reservation boundary is a few miles west of Cass Lake) near the Pike Bay Channel and roughly parallels the Highway 2/Burlington Northern Santa Fe (BNSF) railroad.
rights-of-ways until it exits the CNF/LLBO near Deer River at the Mississippi River crossing just west of the town of Ball Club (figure 1.4-1). The project corridor is generally defined as a 140-foot wide corridor south of the southernmost existing Enbridge line. A total of 579 acres within the CNF would be affected by permanent and temporary easements for the construction improvements proposed within the project area.

1.5 HABITATS PRESENT

This analysis pertains to habitats present within the surveyed project area (surveys were conducted on either side of the existing pipeline, centered on the proposed alignment within the Chippewa National Forest and LLR boundaries), immediately adjacent to the project area, and in down-slope wetlands and streams that may be affected by project activities. Survey distances from the proposed alignment varied depending upon the species being evaluated. Survey areas for species with relatively large home ranges such as Northern Goshawk included habitats within 1000 feet while species with smaller home ranges such as bay-breasted warbler included areas to within 300 feet of the proposed alignment. The project area consists of 9 Landscape Ecosystem types along the 34 miles of project corridor (figure 1.4-1). Landscape Ecosystem types are ecological areas derived from a combination of individual or groupings of native plant communities, ecological systems, and Terrestrial Ecological Unit Inventories at the landtype and ecological landtype scales. Each Landscape Ecosystem type is characterized by its dominant vegetation communities and patterns. Landscape Ecosystem types were taken from CNF classifications and are the basis for identifying opportunities to begin moving vegetation from existing conditions (Year 2003) toward long-term desired conditions (Year 2013). The Landscape Ecosystems present in the project area are listed in table 1.5-1.
Figure 1.4-1  Landscape Ecosystem Types (LES) Crossed by the Alberta Clipper and Southern Lights Diluent Projects
### Purpose of This Document

This purpose of this document is fourfold: (1) it contains the Biological Assessment for federally listed species under the Endangered Species Act; (2) it serves as the Biological Evaluation for the Forest Service and as such makes determinations of the project’s effect on federally listed species (i.e., in this BA/BE, the Canada lynx) and Regional Forester's Sensitive Species (RFSS); (3) it reviews species that are listed as Endangered or Threatened as designated by the Minnesota Department of Natural Resources (MDNR); and (4) it review species that are listed as Endangered, Threatened, or Sensitive as designated by the LLBO.

As a Biological Assessment (BA), this document assesses the effects of the proposed action on federally listed species that occur along the entire project route, including North Dakota, Minnesota, and Wisconsin (50 CFR §402.12(f)).

As a Biological Evaluation (BE), this document is written to "review all Forest Service planned, funded, and executed, or permitted programs and activities for possible effects on Threatened, Endangered, or Sensitive species" (USDA Forest Service Manual (FSM) sections 2670.3, 2670.5 (3), 2672.4). The terms Endangered and Threatened refer to those species covered by the federal Endangered Species Act of 1973, as amended. Sensitive species refer to RFSS and include "those plant and animal species identified by a Regional Forester for which population viability is a concern (FSM 2670.5).” In addition, this BE addresses LLBO tribally-listed TES species.

Information regarding species reviewed in this document was obtained through the cooperation of the U.S. Fish and Wildlife Service (FWS), CNF, MDNR, and LLBO.

### Alternatives Considered

A rational and responsible route selection process for new project facilities involves consideration of environmental, engineering, and economic factors in a multi-disciplinary and iterative fashion. Enbridge currently operates pipeline facilities across North America. This system provides for a relatively direct route to transport petroleum between supply regions in Canada and the Midwestern United States and eastern Ontario. The existing Enbridge pipeline system provides significant opportunities for collocating on or adjacent to existing Enbridge rights-of-way.
In developing its project route, Enbridge studied a variety of alternatives for routing the proposed facilities. These alternatives consist of system alternatives, route alternatives, and route variations. Enbridge evaluated and compared several factors, including ability to meet project objectives, technical and economic feasibility, and potential environmental impacts for each alternative. The following sections describe Enbridge’s process for selecting the preferred route and provide an analysis of the alternatives.

1.7.1 System Alternatives - Proposed Actions

1.7.1.1 Alberta Clipper Project

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 project. Although it is feasible to move some portion of the increased volumes from Canada through the Enbridge Pipelines (North Dakota) L.L.C. system (“Enbridge North Dakota System”) to Clearbrook, Minnesota through what is known as the “Portal Link” crossing the international border, the Enbridge North Dakota System is currently at full capacity and will 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 Enbridge North Dakota System. The TransCanada Keystone Pipeline, LLC (Keystone) is proposing the construction of a new, 1,833-mile-long pipeline from Alberta, through North Dakota, South Dakota and on to Patoka, Illinois. The Keystone Pipeline is not a system alternative as the proposed pipeline does not connect directly to the Minnesota, Wisconsin and greater Chicago area markets that the Enbridge Mainline 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 Enbridge system enables collocation and use of existing infrastructure. Therefore, it is not advantageous to consider a greenfield pipeline to achieve the objectives of the Alberta Clipper Project.

Enbridge evaluated the following possible system alternatives:

- expanding Enbridge’s pipeline system by constructing additional pump stations that provide additional horsepower, and constructing additional loops to the existing mainlines along the existing route; and
- trucking delivery of petroleum supplies from Canada to Superior, Wisconsin.

1.7.1.2 Southern Lights Diluent Project

Enbridge has 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) utilizing existing pipeline assets to the extent feasible to minimize the impact of pipeline construction on 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 utilized in the oil sands projects, and d) meeting shipper requirements and industry need in a timely manner.

Enbridge identified and proposed to Canadian producers an opportunity to reverse an existing Enbridge 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 Enbridge’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; and
- trucking delivery of diluent supplies from Chicago to Clearbrook.

1.7.1.3 Expanding Existing Enbridge Facilities

Alberta Clipper Project

In the United States, the Enbridge 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 Enbridge 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. 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 alternatives would not meet the objective of expanding current delivery capacity of Canadian petroleum to customers receiving service from Enbridge’s Superior, Wisconsin tankage facility. Additional take-away capacity at the Superior, Wisconsin tankage terminal would not be realized by these alternatives.

Southern Lights Diluent Project

The Enbridge system does not contain any discrete 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.

1.7.1.4 Trucking

Alberta Clipper Project

As an alternative to the Alberta Clipper Project, Enbridge 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. 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 bbls of petroleum. Truck frequency for 450,000 bpd on a per annum basis would require 3,000 trucks (assuming 1 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. 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.

**Southern Lights Diluent Project**

With the trucking alternative applied to the Southern Lights Diluent Project, Enbridge could also transport diluent supplies from its Superior, WI tankage facility to the Clearbrook, 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 2 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. 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.

### 1.7.2 Route Alternatives

Enbridge conducted extensive surveys and research to identify the optimal route for the project. Typically, the safest and least environmentally damaging route is within an existing right-of-way. Enbridge’s Lakehead pipeline system provides some opportunities to use existing right-of-way and significant opportunities for collocation with the project. Maximizing use of this Enbridge right-of-way for the project will decrease both environmental and land acquisition costs. However, in some cases, it may be advantageous to deviate from an existing right-of-way in congested or environmentally sensitive areas.

Enbridge identified and evaluated several options for routing its projects. These studies were designed to define a pipeline route that achieves respective project objectives, is technologically and economically feasible to construct, and minimizes impacts on landowners and the environment. The following sections provide a general discussion of the route selection process and an analysis of the route alternative evaluated for the projects in the CNF area.

#### 1.7.2.1 Initial Route Selection Process

During initial route studies, Enbridge determined that the new pipeline should parallel the existing system from Neche, North Dakota to Superior, Wisconsin. However, the Enbridge right-of-way from Neche to Superior already contains multiple pipelines, and in some instances feature crossings, workspace, or right-of-way is constrained by the presence and proximity of these multiple existing pipelines. Enbridge assessed the pipeline route from Neche to Superior with the intent of maximizing use of existing Enbridge right-of-way to the extent feasible while identifying specific areas where collocation may not be feasible.

The first step in the pipeline route selection process consisted of collecting publicly available environmental data to identify routing constraints. The sources of data consisted primarily of GIS digital information layers including United States Geological Survey (USGS) topographic maps; USGS land use database; U.S. Department of Agriculture (USDA) Farm Service Agency 2003 and 2005 aerial photography; National Wetlands Inventory (NWI) maps; MDNR county biological survey maps; MDNR Natural Heritage Information System database; Minnesota Department of Transportation (MDOT) highway maps; USDA State Soil Geographic Database (STATSGO); USDA Soil Survey Geographic Database (SSURGO); and other natural feature databases obtained from the “data deli” on the MDNR
website. Enbridge also consulted with the North Dakota Game and Fish Department and the MDNR to identify other environmental routing constraints that may not be included in these publicly available data.

The next step involved mapping selected layers of the collected GIS data on 1:24,000-scale USGS topographic maps to identify the locations of environmental constraints within the study area. Existing major utility corridors also were identified for potential use in collocation. Utilizing the existing Enbridge right-of-way between Neche and Superior was determined to be the initial preferred route. The Alberta Clipper Project would be located generally on or immediately adjacent to the southwestern edge of the existing right-of-way.

1.7.2.2 Refined Route Selection Process

Enbridge conducted a number of route reconnaissance efforts to further examine specific areas of concern identified during the desktop review. During the field review, the pipeline route was examined and adjustments were made to avoid or minimize potential impact on sensitive environmental features, adjust for preferred construction alignment, or to accommodate landowner concerns. Further refinement of the pipeline route was completed as detailed engineering design efforts lead to identifying specific facility modifications or additions.

Preferred Alternative (alternative 1)

The Alberta Clipper Project would typically be installed parallel with and immediately adjacent to Enbridge’s existing pipeline system from the United States - Canada border to the Superior tankage facility. Enbridge’s existing pipeline right-of-way provides for collocation and use of existing right-of-way, but in some locations it may not be feasible to use existing right-of-way because of congestion, poor crossing conditions, or other constraints. Enbridge completed the pipeline route refinement process after engineering, environmental, and landowner issues were identified and addressed.

Great Lakes Gas Route Alternative (alternative 2)

Enbridge conducted a detailed quantitative analysis of environmental impacts along the proposed and alternative route in the CNF area. This analysis used the same sources of publicly available environmental data described previously, supplemented by field reviews and additional GIS data provided by CNF staff. The analysis primarily focused on land use issues and wetland and waterbody crossings. In total, Enbridge identified and compared a variety of factors for each route, including total length, proximity to an existing right-of-way, NWI-mapped wetlands and forested 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, Enbridge identified one major route alternative in the CNF area for the Alberta Clipper Project: the Great Lakes Gas Alternative. As a result of Enbridge’s comprehensive analysis, the Great Lakes Gas Alternative was not adopted as the preferred route.

The Great Lakes Gas Alternative would depart from the existing Enbridge pipeline corridor at MP D946 west of Steamboat Road 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 1.7.2-1). The Great Lakes Gas Alternative would present a major system deviation from the existing Enbridge pipeline corridors for the entire 32 miles along the Enbridge/U.S. Highway 2 corridor. This alternative route would rejoin a combined Enbridge and Great Lakes Gas Transmission right-of-way south of the village of Bena at approximate MP 974. From MP 974 the Great Lakes Alternative would cross under all existing Enbridge and Great Lakes Gas Transmission pipelines to be on the north side of the corridor and continue east until just east of Six Mile Lake Road at MP 978.2.
The preferred alternative would travel directly offset and parallel the south side of an existing Enbridge pipeline corridor from MP D946 just west of Steamboat Road east to MP 978.2 just east of Six Mile Lake Road for approximately 34.6 miles. The proposed route and Great Lakes Gas Alternative would each lie entirely adjacent and offset of existing pipeline rights-of-way except for an approximate 1,000 foot section of greenfield route at the eastern end of the proposed route.

The preferred alternative would cross 1,314 feet less of NWI-mapped wetlands, an additional 10.4 miles of highly wind erodible soils, and 10.3 miles less prime farmland soils when compared to the Great Lakes Gas Alternative. The Great Lakes Gas Alternative would cross 3.8 miles of additional forest land, an additional 2.9 miles of agricultural land, and another 3,697 feet of hydric soils compared to the proposed route. The Great Lakes Gas Alternative would also cross 687 additional feet of open water and two additional perennial waterbodies than the proposed route.

Enbridge prefers to co-construct Alberta Clipper and Southern Lights Diluent adjacent to the existing Enbridge right-of-way, rather than along the Great Lakes Gas Transmission alternative route, based largely on the following factors:

- Less forest clearing along Enbridge route
- Fewer stream crossings along Enbridge route
- Less open water crossed along Enbridge route
- Enbridge route avoids area of significant biodiversity along GLGT route, as discussed with Leech Lake Band
- Existing landowners familiar with Enbridge, rather than 59 new landowners
- Some existing easements in place, rather than 100 percent new easements
- Collocation of Enbridge lines facilitates operations and maintenance activities including aerial patrol, corrosion control measurement, and vegetation clearing
- Overall minimization of environmental and other impacts through collocation with existing Enbridge system
- Future pumping facilities would be accommodated at an existing Enbridge site in Cass Lake, rather than construction at a new site as would be required along GLGT
- Proximity of existing Enbridge corridor to U.S. Highway 2 provides better access for construction and operation
Figure 1.7.2-1  Project Map Showing Cumulative Effects Boundary and Route Alternatives.
In summary, the preferred alternative route offers a familiar and consistent route corridor adjacent to an existing Enbridge pipeline system, and a route that traverses less open water, fewer wetlands, less prime farmland, fewer forest lands and less agricultural land than the alternative. Table 1.7.2-1 provides a comparison of environmental features for the two routes.

<table>
<thead>
<tr>
<th>Environmental Features</th>
<th>Unit</th>
<th>Alt. 1 - Preferred Alternative</th>
<th>Alt. 2 – Great Lakes Gas Pipeline Route Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>miles</td>
<td>34.1</td>
<td>34.6</td>
</tr>
<tr>
<td>Adjacent to Existing Right-of-Way</td>
<td>feet</td>
<td>167,690</td>
<td>171,600</td>
</tr>
<tr>
<td>Greenfield Route</td>
<td>feet</td>
<td>1,000</td>
<td>0</td>
</tr>
<tr>
<td>NWI-mapped Wetlands Crossed</td>
<td>feet</td>
<td>32,086</td>
<td>33,400</td>
</tr>
<tr>
<td>Highly Wind Erodible Soils</td>
<td>feet</td>
<td>136,224</td>
<td>81,312</td>
</tr>
<tr>
<td>Shallow Bedrock</td>
<td>feet</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hydric Soils</td>
<td>feet</td>
<td>29,568</td>
<td>33,264</td>
</tr>
<tr>
<td>Prime Farmland Soils</td>
<td>miles</td>
<td>3.9</td>
<td>14.2</td>
</tr>
<tr>
<td>Forest Land Affected</td>
<td>miles</td>
<td>15.3</td>
<td>19.1</td>
</tr>
<tr>
<td>Agricultural Land Affected</td>
<td>miles</td>
<td>1.0</td>
<td>3.9</td>
</tr>
<tr>
<td>Herbaceous Land Affected</td>
<td>miles</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>Open Water Crossed</td>
<td>feet</td>
<td>211</td>
<td>898</td>
</tr>
<tr>
<td>Intermittent Waterbodies Crossed</td>
<td>no.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Perennial Waterbodies Crossed</td>
<td>no.</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Railroad Crossings</td>
<td>no.</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Interstate and Highway Crossings</td>
<td>no.</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

* Route characteristics that were not significantly different were not included in this comparison.

b Indicates length of the pipeline route where project would cross soils with a wind erodible index of a potential for a loss of 134 to 310 tons per acre per year.

2.0 ENDANGERED, THREATENED, AND SENSITIVE SPECIES EVALUATION PROCESS

TES evaluated in the Enbridge Alberta Clipper and Southern Lights Diluent BA/BE are those species that:

- are documented within the analysis area;
- have suitable habitat within the analysis area; or
- may be affected by project activities.

Species presence in or near the analysis area was determined based on the following information:

- Minnesota Natural Heritage element occurrence records (EOR’s) database review dated October 3, 2006; May 25, 2007; and November 3, 2008.
- CNF forest biologist’s data for species with known or potential habitat within the project area.
• LLBO DRM biologist data for species with known or potential habitat within the project area (Species List).

• Consulting with individuals in the private and public sector who are knowledgeable about the area and its flora and/or fauna.

• Review of available publications and materials (See references in Section 4.0, Literature Cited).

Presence/absence data were also collected using site specific surveys and field inspection of the project area as follows:


• Stick Nest Surveys for raptor species, conducted in May 2008, by Graham Environmental Services (Appendix C).

• Enbridge Energy Alberta Clipper and Southern Lights Diluent Project Chippewa National Forest, Leech Lake Band of Ojibwe, Great Gray Owl and Spruce Grouse Survey, site specific surveys conducted the week of April 7, 2008, by Graham Environmental Services (Appendix D).

• Enbridge Energy Alberta Clipper and Southern Lights Diluent Project Chippewa National Forest, Leech Lake Band of Ojibwe, Songbird Survey, site specific surveys conducted between June 1 and June 16, 2007, by Graham Environmental Services (Appendix E).


• Chippewa National Forest, Rare Plant Surveys, site specific botanical surveys conducted on May, June & August of 2007, by Midwest Natural Resources (Appendix G).

• Chippewa National Forest, Rare Plant Surveys, site specific botanical surveys conducted 2008, by Midwest Natural Resources (Appendix H).

• Rare Plant survey results were obtained from the CapX Project along the GLGT Alternative. Site specific botanical surveys conducted in 2008, by Graham Environmental Services. GIS shapefile data publicly available.

2.1 SURVEY RESULTS

Table 2.1-1 is a summary of survey results conducted in 2007 and 2008 along Alternative 1 (see Appendices A through G for full reports). Available survey data from the CapX proposed project was
also used for review of Alternative 2; as of October 2008, only plant survey data and bird observations (but not official surveys) are publicly available. Surveys were conducted at a similar time of year as the alternative 1 surveys, but were conducted along a 1000 to 1200 foot-wide survey corridor. Target species lists for the CapX surveys were based on the CNF 2006 RFSS Species list, and LLBO January 2007 Sensitive Species list. Best available data from the CNF and LLBO was also used for route reviews.

A negative survey does not preclude a species from being evaluated if there is suitable habitat present. In addition, for most species it is difficult to conclude they are not present based on a one-time survey of the area. The BA/BE must address the impacts of the project on a species’ habitat, whether or not it is currently occupied. Survey data are most useful for designing a project to mitigate the negative effects on individuals, such as a nest site or plant population that has a distinct boundary.

<table>
<thead>
<tr>
<th>Species or Group Reference</th>
<th>Alternative Surveyed</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goshawk, Red-shouldered Hawk Survey – Spring 2007</td>
<td>Appendix A</td>
<td>1 Negative for target species</td>
</tr>
<tr>
<td>Goshawk, Red-shouldered Hawk Survey – Spring 2008</td>
<td>Appendix B</td>
<td>1 Negative for target species</td>
</tr>
<tr>
<td>Stick Nest Surveys, Raptors- 2008</td>
<td>Appendix C</td>
<td>1 Locations of active and inactive raptor stick nests</td>
</tr>
<tr>
<td>Great Gray Owl and Spruce Grouse Survey - 2008</td>
<td>Appendix D</td>
<td>1 Negative for target species</td>
</tr>
<tr>
<td>Songbird Survey – Spring 2008</td>
<td>Appendix F</td>
<td>1 LeConte’s Sparrow, Olive-sided Flycatcher, Black Tern, Connecticut Warbler, Great Blue Heron, Golden-winged Warbler</td>
</tr>
<tr>
<td>Plant Survey –2007</td>
<td>Appendix G</td>
<td>1 Locations for Botrychium minganense, Carpinus caroliniana, Drosera intermedia, Hierochloe odorata, Pinus strobus, Ranunculus lapponicus, Sparganium glomeratum, Viola nova-angliae, and Torreyochloa pallida found along the Enbridge project corridor.</td>
</tr>
<tr>
<td>Plant Survey –2008</td>
<td>Appendix H</td>
<td>1 Locations for Artemisia ludoviciana, Botrychium dissectum, Botrychium minganense, Botrychium simplex, Ranunculus gmelinii, Sparganium glomeratum, Taxus canadensis found along the Enbridge project corridor.</td>
</tr>
<tr>
<td>Rare Plants - 2008</td>
<td>Report not available; shapefile data used for review</td>
<td>2 Locations for Ulmus americana, Botrychium pallidum, Botrychium minganense, Botrychium simplex, Utricularia gibba, Torreyochloa pallida, Carpinus caroliniana, Botrychium lanceolatum, Botrychium mormo, Taxus canadensis, Botrychium dissectum found along GLGT Alternative</td>
</tr>
</tbody>
</table>

2.2 AFFECTED ENVIRONMENT

The “affected environment” for purposes of the analyses in this BA/BE includes all areas that would be physically affected by construction of the pipeline (e.g. right-of-way clearing and construction, extra workspaces). The term “project area” is used to include those areas in the affected environment, as well as activities associated with pipeline construction that may not have a physical impact to habitat (e.g. access roads, travel or hauling routes).
2.3 SPECIES EVALUATION PROCESS

The “analysis area” is defined as the area in which activities associated with the proposed project could potentially have a direct, indirect, or foreseeable cumulative effect upon the species or habitat in which the species may occur.

The “cumulative effects boundary” is the area where analysis for a particular species is attenuated to the point that no effect can be measured and defines the limits of the “analysis area.” There are two cumulative effects boundaries utilized in this document. The cumulative effects boundary for the Canada lynx, within the CNF, is specifically defined by the Lynx Analysis Unit (LAU) boundaries within the Forest/LLR. Cumulative effects for the lynx outside of the CNF/LLR, along the entire project route from North Dakota, through Minnesota, into Wisconsin, are based on “those effects of future state or private activities, not involving federal actions, which are reasonably certain to occur within the action area…” (50 CFR 402.02). The remaining species are evaluated based upon home ranges that fall within a given Landscape Ecosystem intersecting the project route and are depicted in figure 1.4-1.

Based on the previously described desktop research and field surveys, species not known to occur, and without suitable habitat, were removed from further analysis and not addressed further (table 2.3-1). All remaining species were analyzed according to each agency’s policies as follows:

2.3.1 Federal Threatened and Endangered Species

Section 3 of the Endangered Species Act of 1973 defines endangered species as “any species that is in danger of extinction throughout all or a significant portion of its range” and a threatened species as “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”

Relative to species listed under the Endangered Species Act of 1973 (ESA), as amended, Biological Assessments must arrive at 1 of 3 possible determinations: 1) “no effect”, 2) “not likely to adversely affect” (which includes beneficial, insignificant, and discountable effects), or 3) “likely to adversely affect.” If a “likely to adversely affect” determination is made relative to a listed species, formal consultation must be initiated with US Fish and Wildlife Service under section 7 of ESA. An adverse effect is one in which an individual of a listed species is likely to be exposed to the action or its environmental consequences and will respond in a negative manner to the exposure. Effects determination for federal Threatened and Endangered Species were made within the project’s affected environment; the affected environment is the geographic extent of environmental changes (i.e., the physical, chemical and biotic effects) that will result directly and indirectly from the action.

2.3.2 U.S. Forest Service’s Regional Forester’s Sensitive Species

This BE uses the Regional Forester’s Sensitive Species from the Eastern Region of the Forest Service as the basis for its Forest Service sensitive species list. Species documented or likely to occur within the respective forest proclamation boundary need to be considered. Taxa are categorized as “likely to occur” on the CNF if their range includes the CNF, their preferred habitat is present, and occurrences are known in the general vicinity of the Forest.

Relative to Regional Forester's Sensitive Species (RFSS), Biological Evaluations must arrive at a finding of effects on each species’ population viability. The finding must be 1 of the 3 following statements: 1) “no impact” (which may include beneficial impacts), 2) “may impact individuals of a species but not likely to cause a trend to federal listing or a loss of viability”, or 3) “likely to result in a trend to federal listing or loss of viability.” The direct and indirect effect analyses are conducted at the scale of the
project area and the immediate vicinity. Cumulative effects are evaluated at the level of the analysis area (figure 1.7.2-1).
<table>
<thead>
<tr>
<th>Scientific Name / Common Name</th>
<th>CNF Status</th>
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<th>Habitat Summary</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Federally Threatened and Endangered Species</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><em>Lynx canadensis</em> Canada lynx (ESA Threatened)</td>
<td>T</td>
<td>None</td>
<td>E</td>
<td>Variety of habitats, adequate prey, low human disturbance.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Charadrius melodus</em> Piping Plover (ESA Endangered)</td>
<td>None</td>
<td>E</td>
<td>E</td>
<td>Sandy beaches and sparsely vegetated shores and islands. Migrants only: no known nesting occurrences.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><em>Platanthera praeclara</em> Western prairie fringed orchid (ESA Threatened)</td>
<td>None</td>
<td>E</td>
<td>None</td>
<td>Mesic to wet prairie and meadows</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><em>Canis lupus</em> Gray Wolf</td>
<td>MIS</td>
<td>SC</td>
<td>S</td>
<td>Large tracts of wild land with adequate prey (white tailed deer, moose, and beaver). Variety of habitats, adequate prey, low human disturbance.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Dendroica kirtlandii</em> Kirtland's Warbler (ESA Endangered)</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Large tracts of young jack pine forests</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><em>Hesperia dacotae</em> Dakota skipper (ESA Candidate)</td>
<td>None</td>
<td>T</td>
<td>None</td>
<td>Native prairie, tallgrass and mixed grass prairie</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>CNF, MDNR, and LLBO Listed Species</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Accipiter gentilis</em> Northern goshawk</td>
<td>RFSS</td>
<td>None</td>
<td>E</td>
<td>Large tracts of older trees with closed canopy and open understory.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Ammodramus henslowii</em> Henslow’s sparrow</td>
<td>None</td>
<td>E</td>
<td>E</td>
<td>Grasslands, weedy meadows, shrubby fields, overgrown pasture.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><em>Ammodramus leconteii</em> LeConte’s sparrow</td>
<td>RFSS</td>
<td>None</td>
<td>S</td>
<td>Level lowlands and uplands with dense, tall, grass/sedge vegetation and thick ground litter.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Anodramus nelsoni</em> Nelson’s sharp-tailed sparrow</td>
<td>RFSS</td>
<td>SC</td>
<td>None</td>
<td>Large wet meadows, marshes, and open peatlands dominated by sedges.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Ardea herodias</em> Great blue heron</td>
<td>None (SI)</td>
<td>None</td>
<td>S</td>
<td>River, lake edges, marshes, saltwater shores, swamps and mature forests or woodlots</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Asio flammeus</em> Short-eared owl</td>
<td>None</td>
<td>SC</td>
<td>S</td>
<td>Large grasslands, marshes, open peatlands, fields.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Scientific Name / Common Name</td>
<td>CNF Status</td>
<td>MDNR Status</td>
<td>LLBO Status</td>
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<td>-------------------------</td>
</tr>
<tr>
<td><em>Botaurus lentiginosus</em></td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Sedge/cattail wetlands.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Buteo lineatus</em> Red-shouldered hawk</td>
<td>RFSS</td>
<td>SC</td>
<td>T</td>
<td>Large tracts of mature, deciduous, and mixed riparian forest habitats with a preference for bottomlands and wooded margins near marshes.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Chlidonias niger</em> Black tern</td>
<td>RFSS</td>
<td>None</td>
<td>S</td>
<td>Floating aquatic vegetation mat around lakes.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Contopus cooperi</em> Olive-sided flycatcher</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Snags, low density conifer lowlands, riverine/riparian areas.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Coturnix noveboracensis</em> Yellow rail</td>
<td>RFSS</td>
<td>SC</td>
<td>T</td>
<td>Lowland sedge meadows with specific characteristics such as overhead mat of dead sedge.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><em>Cygnus buccinator</em> Trumpeter swan</td>
<td>RFSS</td>
<td>T</td>
<td>E</td>
<td>Small ponds and lakes or bays with extensive beds of cattails, bulrushes, sedges, and/or horsetail.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Dendroica caerulescens</em> Black-throat blue warbler</td>
<td>RFSS</td>
<td>None</td>
<td>S</td>
<td>Large contiguous mature forests, probably associated with small gaps and a well developed shrub understory.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Dendroica castanea</em> Bay-breasted warbler</td>
<td>RFSS</td>
<td>None</td>
<td>S</td>
<td>Upland and lowland spruce/fir forests.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Falcipennis canadensis</em> Spruce grouse</td>
<td>RFSS</td>
<td>None</td>
<td>None</td>
<td>Coniferous forests of jack pine, black spruce and tamarack: habitat always includes short needle component and branches that extend to the ground.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Falco peregrinus</em> Peregrine falcon</td>
<td>None</td>
<td>T</td>
<td>None</td>
<td>Historically, nested on cliff ledges along the Mississippi and St. Croix rivers and in the Boundary Waters Canoe Area.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><em>Grus canadensis</em> Sandhill crane</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Large open fields, sedge meadows and shallow wetlands.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Haliaeetus leucocephalus</em> Bald Eagle</td>
<td>MIS</td>
<td>SC</td>
<td>T</td>
<td>Large trees near streams and lakes.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Lanius ludovicianus</em> Loggerhead shrike</td>
<td>None</td>
<td>T</td>
<td>None</td>
<td>Open country and dry upland prairie where hedgerows, shrubs, and small trees grow. Road ditches and fencerows in open country.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><em>Larus argentatus</em> Herring gull</td>
<td>None</td>
<td>None</td>
<td>T</td>
<td>Oceans, bays, estuaries, beaches, fields, inland lakes, reservoirs, and rivers.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><em>Larus pipixcan</em> Franklin’s gull</td>
<td>None</td>
<td>SC</td>
<td>S</td>
<td>Nests in freshwater marshes, shores of inland lakes, in prairies and grasslands.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><em>Oporornis agilis</em> Connecticut warbler</td>
<td>RFSS</td>
<td>None</td>
<td>S</td>
<td>Jack pine or lowland conifer with a thick ericaceous understory. Occurs in many other habitats.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Scientific Name / Common Name</td>
<td>CNF Status</td>
<td>MDNR Status</td>
<td>LLBO Status</td>
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<td>---------------------------</td>
<td></td>
</tr>
<tr>
<td>Pandion haliaetus Osprey</td>
<td>None (SI)</td>
<td>None</td>
<td>S</td>
<td>Lakes, rivers, and coastal waters with adequate supplies of fish.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Pelecanus erythrorhynchos American white pelican</td>
<td>None</td>
<td>SC</td>
<td>S</td>
<td>Large, shallow bodies of water that are rich in fish, in both treeless and forested country. The nesting site, usually a flat, bare island, is isolated from human disturbances.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Phalaropus tricolor Wilson's phalarope</td>
<td>RFSS</td>
<td>T</td>
<td>S</td>
<td>Vernal ponds, small ponds, and large, open wet meadows.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Podiceps auritus Horned grebe</td>
<td>RFSS</td>
<td>None</td>
<td>T</td>
<td>Mature coniferous forests with snags. Areas infested with wood boring beetle larvae.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Rallus elegans King rail</td>
<td>None</td>
<td>E</td>
<td>E</td>
<td>Sedge and cattail marshes.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Sterna forsteri Forester's tern</td>
<td>None</td>
<td>SC</td>
<td>S</td>
<td>Large marshes, with extensive areas of emergent vegetation.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Sterna hirundo Common tern</td>
<td>None</td>
<td>T</td>
<td>T</td>
<td>Sparsely vegetated islands in large lakes.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Strix nebulosa Great gray owl</td>
<td>RFSS</td>
<td>None</td>
<td>T</td>
<td>Mature black ash, black spruce, tamarack forest on wet soil near open foraging areas.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Tympanuchus phasianellus Sharp-tailed grouse</td>
<td>RFSS</td>
<td>None</td>
<td>None</td>
<td>Brushland complexes (&gt;5,000 acres) with open areas, brush, and small trees. Large, open agricultural hay or pasture with associated brush habitat.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Hemidactylium scutatum Four-toed salamander</td>
<td>RFSS</td>
<td>SC</td>
<td>S</td>
<td>Adults live under or among sphagnum mosses in swamps, boggy streams, and wet wooded or open areas near ponds or quiet, mossy or grassy/sedge dominated pools.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Plethodon cinereus Red-backed salamander</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Deciduous woods with thick leaf litter and many decaying logs or stumps.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Rana clamitans Green frog</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Habitats surrounding inlands waters.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Felis concolor Mountain lion</td>
<td>None</td>
<td>SC</td>
<td>E</td>
<td>Broad spectrum of habitats with abundant prey.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Martes americana Pine marten</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Coniferous forests.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
### TABLE 2.3-1
Threatened, Endangered, and Sensitive Species Considered for Evaluation in this BA/BE

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Microtus ochrogaster</strong></td>
<td>None</td>
<td>SC</td>
<td>S</td>
<td>Dry, upland prairie. Occasionally jack pine woods.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Myotis septentrionalis</strong></td>
<td>None</td>
<td>SC</td>
<td>S</td>
<td>Caves, sand mines, deep iron mines in winter. In summer, associated with forested habitats, where it forages for insects over trees, ponds, and streams. Day roosts may be under tree bark, in buildings, and behind signs and shutters of buildings.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Phenacomys intermedius</strong></td>
<td>None</td>
<td>SC</td>
<td>S</td>
<td>Coniferous forests, forest borders, heath shrublands, willow thickets. Rocky hillsides, and moist meadows.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Spermophilus franklinii</strong></td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Densely vegetated areas, often the transition between wood and grassland.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Synaptomys borealis</strong></td>
<td>RFSS</td>
<td>SC</td>
<td>S</td>
<td>Forest, brushland or clearcuts with Vaccinium spp. and rocks.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Rattlesnakes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Emydoidea blandingii</strong></td>
<td>RFSS</td>
<td>T</td>
<td>T</td>
<td>Upland &amp; lowland habitats w/ suitable shade and insects forage. Riparian habitats w/ open sandy areas for nesting.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Heterodon platirhinos</strong></td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Open, sandy woodlands.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Heterodon nasicus</strong></td>
<td>None (S)</td>
<td>SC</td>
<td>None</td>
<td>Open, sandy woodlands.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Fish</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Etheostoma microperca</strong></td>
<td>RFSS</td>
<td>SC</td>
<td>None</td>
<td>Warm, mid-sized, low-gradient streams with sections of higher gradient reaches suitable for spawning. Juveniles require organically enriched sandy substrate.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Moxostoma valenciennesi</strong></td>
<td>None (S)</td>
<td>None</td>
<td>S</td>
<td>Large lakes and rivers in the Hudson Bay drainage of the Chippewa NF.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Notropis anogenus</strong></td>
<td>RFSS</td>
<td>SC</td>
<td>S</td>
<td>Large Lakes such as Cass possibly others.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Mollusks</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lasmigona compressa</strong></td>
<td>RFSS</td>
<td>SC</td>
<td>S</td>
<td>Headwaters of larger rivers. Mississippi river and tributaries. Pike Bay channel.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
### TABLE 2.3-1
Threatened, Endangered, and Sensitive Species Considered for Evaluation in this BA/BE *

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<th>Evaluated Species in BA/BE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Lasmigona costata</em></td>
<td>RFSS</td>
<td>SC</td>
<td>None</td>
<td>Headwaters of larger rivers. Mississippi river and tributaries. Pike Bay channel.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Ligumia recta</em></td>
<td>RFSS</td>
<td>SC</td>
<td>S</td>
<td>Medium to large rivers.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Insects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ceraclea vertreesi</em></td>
<td>RFSS</td>
<td>SC</td>
<td>None</td>
<td>Clear water with gravel or sandy bottom.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Erebia discoidalis</em></td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Moist prairies, grassy areas, bog margins.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Oeneis jutta ascerta</em></td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Black spruce bogs.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Higher Plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Arethusa bulbosa</em></td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Sphagnum bogs and swamps.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Botrychium dissectum</em></td>
<td>None</td>
<td>None</td>
<td>T</td>
<td>Bottoms, ravines, dry woods, brushy areas, paths.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Botrychium lanceolatum</em></td>
<td>RFSS</td>
<td>T</td>
<td>T</td>
<td>Shaded woods, Hardwood uplands and lowlands.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Botrychium minganense</em></td>
<td>None</td>
<td>SC</td>
<td>T</td>
<td>Northern hardwoods.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Botrychium mormo</em></td>
<td>RFSS</td>
<td>SC</td>
<td>E</td>
<td>Mesic deciduous forest with thick leaf layer, open understory.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Botrychium oneidense</em></td>
<td>RFSS</td>
<td>E</td>
<td>E</td>
<td>Northern hardwoods, especially near ephemeral pools.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Botrychium pallidum</em></td>
<td>RFSS</td>
<td>E</td>
<td>T</td>
<td>Northern hardwoods, open areas, disturbed habitats, log landings, roadsides, dunes, sandy gravel pits.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Botrychium rugulosum</em></td>
<td>RFSS</td>
<td>T</td>
<td>T</td>
<td>Dry areas w/ short grass, bracken, sweet fern, jack pine, red pine, aspen/aspen, open areas within these types. Ephemeral pools in pines, spruce, birch/aspen, with pH near neutral.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Botrychium simplex</em></td>
<td>RFSS</td>
<td>SC</td>
<td>T</td>
<td>Northern hardwoods, open areas, moist places.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Calypso bulbosa</em></td>
<td>RFSS</td>
<td>None</td>
<td>T</td>
<td>Lowland coniferous forest; white pine or cedar lowland; cool, mossy, heavily shaded cedar swamps.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
## TABLE 2.3-1
Threatened, Endangered, and Sensitive Species Considered for Evaluation in this BA/BE *

<table>
<thead>
<tr>
<th>Scientific Name / Common Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td><em>Carpinus caroliniana</em>&lt;br&gt;Blue beech</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Eastern mixed hardwood forests, hardwood swamps on mineral soils or muck: rich, wet-mesic sites.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Carya cordiformis</em>&lt;br&gt;Bitternut hickory</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Well-drained floodplains and moist upland forests.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Celtis occidentalis</em>&lt;br&gt;Hackberry</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Floodplain, lakeshore, and mesic upland forests.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Comptonia peregrina</em>&lt;br&gt;Sweet fern</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Openings in coniferous forest in well-drained dry, acid, sandy or gravelly soils.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Cypripedium anetinum</em>&lt;br&gt;Ram's-head ladieslipper</td>
<td>RFSS</td>
<td>T</td>
<td>T</td>
<td>Forest, bogs, acidic; bedrock; shorelines-interdunal areas; wide variety of forested habitats.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Drosera intermedia</em>&lt;br&gt;Spatulate-leaved sundew</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Bogs, fens, and moist, acidic, sandy soils: often in standing water.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Dryopteris goldiana</em>&lt;br&gt;Goldie’s fern</td>
<td>RFSS</td>
<td>SC</td>
<td>T</td>
<td>Northern hardwoods, lowland hardwoods.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Eleocharis olivacea</em>&lt;br&gt;Olivaceous spike-rush</td>
<td>RFSS</td>
<td>T</td>
<td>T</td>
<td>Bogs, lakes, streams, and shoreline.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Eleocharis quinqueflora</em>&lt;br&gt;Few-flowered spike-rush</td>
<td>RFSS</td>
<td>SC</td>
<td>S</td>
<td>Bogs, lakes, streams, and shoreline.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Erythronium albidum</em>&lt;br&gt;White trout-lily</td>
<td>RFSS</td>
<td>None</td>
<td>T</td>
<td>Northern hardwoods by large lakes.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><em>Gymnocarpium robertianum</em>&lt;br&gt;Limestone oak fern</td>
<td>RFSS</td>
<td>None</td>
<td>S</td>
<td>Lowland conifer.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Hierochloe odorata</em>&lt;br&gt;Sweet grass</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Wet meadow, low prairies, marsh edges, bogs, shaded streambanks, lakeshores, trail edges.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Juglans cinerea</em>&lt;br&gt;Butternut</td>
<td>None</td>
<td>SC</td>
<td>S</td>
<td>Northern hardwoods.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Listera auriculata</em>&lt;br&gt;Auricled twayblade</td>
<td>None (S)</td>
<td>E</td>
<td>None</td>
<td>Lowland hardwoods, lowland conifer.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Malaxis monophyllus</em>&lt;br&gt;var.brachypoda&lt;br&gt;White adder’s-mouth</td>
<td>RFSS</td>
<td>SC</td>
<td>T</td>
<td>Lowland hardwoods and conifers.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Malaxis paludosa</em>&lt;br&gt;Bog adder’s-mouth</td>
<td>None</td>
<td>E</td>
<td>E</td>
<td>Lowland conifer.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Mitchella repens</em>&lt;br&gt;Partridge-berry</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Dry or moist forest.</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
TABLE 2.3-1
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<tr>
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<th>MDNR Status</th>
<th>LLBO Status</th>
<th>Habitat Summary</th>
<th>Potential Species Presence</th>
<th>Evaluated Species in BA/BE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Najas gracillima</em> Slender naiad</td>
<td>None</td>
<td>SC</td>
<td>None</td>
<td>Soft-water lakes and ponds.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><em>Nymphaea leibergii</em> Dwarf water-lily</td>
<td>None (S)</td>
<td>T</td>
<td>None</td>
<td>Lakes, streams, and shorelines.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Orobanche uniflora</em> One-flowered broomrape</td>
<td>RFSS</td>
<td>SC</td>
<td>T</td>
<td>Northern hardwoods, lowland conifers, upland/lowland transitions.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Pinus strobus</em> White pine</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Well-drained soils and a cool, humid climate.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Platanthera clavellata</em> Club-spur orchid</td>
<td>RFSS</td>
<td>SC</td>
<td>T</td>
<td>Bog mats, sphagnum, stunted conifer swamp, mixed spruce tamarack. Sandy wet depressions in jack pine barrens.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Platanthera flava var. herbiola</em> Tubercled rein-orchid</td>
<td>None (S)</td>
<td>E</td>
<td>None</td>
<td>Moist grassy or sedge-dominated meadows, brushy transitions on calcareous or circumneutral soils.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Polemonium occidentale</em> Western Jacob’s ladder</td>
<td>None</td>
<td>E</td>
<td>None</td>
<td>Lowland conifer.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Ranunculus lapponicus</em> Lapland buttercup</td>
<td>None (S)</td>
<td>SC</td>
<td>T</td>
<td>Moss hummocks in lowland conifer swamps.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Sparganium glomeratum</em> Northern bur-reed</td>
<td>RFSS</td>
<td>SC</td>
<td>T</td>
<td>Sedge meadow and shallow marsh; floating bog mats; emergent wetlands.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Subularia aquatica</em> Aowwort</td>
<td>None (S)</td>
<td>T</td>
<td>None</td>
<td>Beach zone of sandy nutrient-poor lakes. Shallow lake margins. Submerged or emerged, or stranded.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Taxus canadensis</em> Canada yew</td>
<td>RFSS</td>
<td>None</td>
<td>S</td>
<td>Rich mixed forest; banks of ravines. Wide variety, forests, swamps, uplands.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Torreyochloa pallida</em> Torrey’s manna-grass</td>
<td>None</td>
<td>SC</td>
<td>None</td>
<td>Lowland conifer, lakes, streams, and shoreline.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Ulmus americana</em> American elm</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Moist soil conditions, especially valleys and floodplains: in mixed hardwood forests.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Ulmus rubra</em> Slippery elm</td>
<td>None</td>
<td>None</td>
<td>T</td>
<td>Well-drained floodplain forests and moist upland forests.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><em>Utricularia geminiscapa</em> Hiddenfruit bladderwort</td>
<td>None</td>
<td>None</td>
<td>T</td>
<td>Shallow pools and bogs.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Utricularia gibba</em> Humped bladderwort</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Exposed shores, lakes, ponds, rivers, streams, marshes, and fens.</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
**TABLE 2.3-1**

<table>
<thead>
<tr>
<th>Scientific Name / Common Name</th>
<th>CNF Status</th>
<th>MDNR Status</th>
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<th>Habitat Summary</th>
<th>Potential Habitat Present</th>
<th>Known Species Presence</th>
<th>Evaluated Species in BA/BE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Utricularia purpurea</em></td>
<td>None (S)</td>
<td>SC</td>
<td>S</td>
<td>Shallow lakes, ponds.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Purple bladderwort</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Viola novae-angliae</em></td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>Dry mesic forests.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>New England Violet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Waldsteinia fragarioides</em></td>
<td>None</td>
<td>SC</td>
<td>S</td>
<td>Near conifer or oak forest on sandy soils.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Barren Strawberry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Species with shaded rows satisfied the criteria necessary for analysis in this BE (i.e., suitable habitat or known species presence). Status abbreviations: T = Threatened, E = Endangered, RFSS = Regional Forester’s Sensitive Species, S = Sensitive, X = Extirpated, SC = Special Concern, SI = Species of Interest, MIS = Management Indicator Species.

b Only species listed as RFSS are noted as such; species listed in the CNF as Sensitive or Species of Interest noted as no status, per CNF guidance.

c Known occurrences include those from project related surveys, historic records, agency records, and personal communications with agency personnel within the cumulative effects boundary.

d On September 30, 2008 a court hearing placed the Great Lakes Distinct Population Segment (DPS) of the gray wolf back under ESA protection. It is listed as endangered in Wisconsin and threatened in Minnesota. On January 14, 2009, the Great Lakes DPS of the gray wolf was removed from the Endangered Species List by the FWS.
2.3.3 MDNR Threatened and Endangered Species

Minnesota Statutes 84.0985, Subp. 3 defines endangered and threatened species as follows:

- Endangered: the species is threatened with extinction throughout all or a significant portion of its range,
- Threatened: the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and
- Individuals of species listed as Threatened or Endangered by the state of Minnesota may not be taken, imported, transported, or sold; no protections are in place for species of concern.

2.3.4 LLBO Threatened, Endangered, and Sensitive Species

The LLBO regulate TES species through the Leech Lake Conservation Code Chapter III General Offences Section 1 (2) Taking, assisting in the taking, possession or transporting of any wild animal, fish, or plant which have been determined to be a Sensitive, Threatened, or Endangered species by the Leech Lake Division of Resource Management (DRM) or USFWS.

In order for the LLDRM to list a species as TES within the LLR boundaries, one or more of the following criteria must be met:

- The species is known to exist on the reservation at the present time.
- The species is known to have historically been present on the reservation.
- The reservation is within the range of the species and suitable habitat is found on the reservation.

Listing categories:

- E—Endangered—A species is listed as endangered when it is likely to become extinct or extirpated from the reservation unless measures are taken to protect it and/or its habitat.
- T—Threatened—A threatened species is one that is likely to become endangered or extirpated from the reservation unless measures are taken to protect it and/or its habitat.
- S—Sensitive—A sensitive species is one that is likely to become threatened or endangered unless measures are taken to protect it and/or its habitat.
- X—Extirpated
- EX—Extinct

It is a violation of the Leech Lake Conservation Code (currently under revision, and being finalized) to take, assist in the taking of, possess or transport any wild animal, fish, or plant which has been determined Threatened or Endangered (and for some Sensitive species, under certain circumstances) by the LLDRM or USFWS. In addition, a species that is listed as sensitive may be afforded the same protection as a threatened or endangered if a population of that species or its habitat is found to be an important location
2.4 SPECIES DESCRIPTIONS AND EFFECTS ANALYSIS

This section below includes descriptions of species for analysis and habitat requirements, direct and indirect effects of each alternative, cumulative effects of the alternatives, and risk assessment determinations. Separate determinations of effects are made for each agency that provides the species statutory protection, as described above. Risk assessments consider two factors: the consequences of adverse or beneficial effects on the population or habitat, and the likelihood or probability that these effects would occur. These factors are used to arrive at determinations, which are given in the sections below and summarized in table 3-1. All federally-listed species which may occur in the project area are described and analyzed along the entire project route; in North Dakota, Minnesota, and Wisconsin, as well as specifically in the CNF/LLR boundaries. All other non federally-listed species are described and analyzed within the CNF/LLR boundaries.

As stated in section 4.14.3.12 of the Environmental Impact Statement: at the current time, no rules or regulations have been promulgated by any federal or state agency to define as “significant” any source of greenhouse gas emissions. There are also no currently applicable facility-specific emission limitations or caps for greenhouse gas emissions. Thus, there is no regulatory or guidance mechanism for determining standards of significance for greenhouse gas impacts. According to the Association of Environmental Professionals, there are currently no published thresholds or recommended methodologies for determining the significance of a project’s potential cumulative contribution to global climate change (Hendrix et al., 2007). Even very large individual projects do not generate sufficient greenhouse gas emissions to individually influence global climate change. Nevertheless, the cumulative effects of greenhouse gases have been determined to have led to climate change on a global scale, which is considered to be a significant cumulative effect. A project contributes to this impact by its incremental contribution, combined with the cumulative increase of all other sources of greenhouse gases.

2.4.1 Mammals

2.4.1.1 Canada Lynx (Lynx canadensis)

ESA, CNF, State, Leech Lake Reservation Status: In 2000, the Contiguous U.S. Distinct Population Segment (DPS) of the Canada lynx was listed under the ESA as “Threatened”. The MDNR is proposing to change the status of the lynx to special concern, it currently has no status. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the lynx as “Endangered” and notes that this species is believed to be extirpated due to over-harvest and habitat loss. Wisconsin Department of Natural Resources lists the lynx as a Protected Wild Animal; North Dakota Game and Fish defers to the federal listing status.

Implementation of the Forest Plan requires the promotion of Canada lynx conservation measures on all National Forest System Lands. This includes (1) implementation of lynx recovery and conservation measures, (2) ESA Section 7 consultation and coordination with U.S. Fish and Wildlife Service, (3) implementation of a lynx recovery plan once it is developed, (4) identification of Lynx Analysis Units (LAUs), (see figure 2.4.1-1) (5) implement procedural guidance from the Lynx Conservation Assessment and Strategy (Ruediger, et al. 2000) (LCAS) that reduces lynx mortality from shooting, trapping, highway crossings, and increases lynx dispersal and movements by reducing fragmentation and increasing connectivity. Figure 2.4.1-1 shows the LAUs within the proposed project area.
The Forest Plan Standards and Guidelines section within the CNF’s Forest Plan provide direction for the management of TES species at several levels. The first level provides General Direction for the management of all TES species on CNF lands. The associated objectives for wildlife (O-WL’s) are landscape level (or coarse filter) management strategies that address species’ needs through integrated resource management at large landscape scales.

The second level includes management direction specific to each species listed as TES and RFSS. These objectives (O-WL’s) use site-level (or fine filter) management strategies that manage high quality potential habitat and occupied habitat of sensitive species.

In addition to landscape-level (coarse filter) and site-level (fine filter) objectives for wildlife, the CNF Forest Plan also describes guidelines and standards for lynx management (G-WL’s and S-WL’s, respectively).
Figure 2.4.1-1  Project Map Showing Cumulative Effects Boundary, Lynx Analysis Units, and Lynx Habitat.
General Direction

O-WL-1 (Objective-Wildlife-1) Populations: Provide ecological conditions to sustain viable populations of native and desired non-native species and to achieve objectives for management indicator species and management indicator habitats.

O-WL-2 Habitats: Move terrestrial and aquatic habitats in the direction of desired conditions and objectives for all native and desired non-native wildlife.

O-WL-17 Maintain, protect, or improve habitat for all sensitive species. Meeting this objective will involve two basic and complementary strategies that would be implemented based on species’ habitat requirements and distribution, individual site conditions, expected management impacts, and other multiple use objectives. These strategies include:

- Landscape level (or coarse filter) management strategies: Addressing species’ needs through integrated resource management at large landscape scales including, but not limited to: Landscape Ecosystem or Landtype scales for vegetation and management indicator habitat objectives; watersheds for aquatic riparian condition objectives; and Management Areas for desired or acceptable levels of human uses.

- Site-level (or fine filter) management strategies: Addressing species’ needs by managing specifically for high quality potential habitat or known locations of sensitive species.

Specific to the Canada lynx the following Forest Plan Objectives apply.

O-WL-8 Promote the conservation and recovery of Canada lynx and its habitat.

O-WL-9 In LAUs on National Forest Service (NFS) land, manage vegetation to retain, improve, or develop habitat characteristics suitable for snowshoe hare and other important alternate prey in sufficient amounts and distributions so that availability of prey is not limiting lynx recovery.

O-WL-11 Maintain and, where necessary and feasible, restore sufficient habitat connectivity to reduce mortality related to roads and to allow lynx to disperse within and between LAUs on NFS land.

O-WL-12 Through partnerships with other agencies and landowners, participate in cooperative efforts to identify, map, and maintain or restore, where feasible, linkage areas that provide habitat connectivity sufficient to allow lynx to disperse between disjunct blocks of lynx habitat at larger landscape scales (for example, among National Forests in the Great Lakes region).

O-WL-13 Maintain or improve the natural competitive advantage of Canada lynx in deep snow conditions. Snow compacting activities (such as snowmobiling, snowshoeing, skiing, dog sledding) are planned and accommodated in areas best suited to the activity while maintaining large, interconnected areas of habitat with little or no snow-compacting, recreational activities.

Standards and Guidelines for the Canada Lynx as they relate to this project are as follows.

G-WL-3 Limit disturbance within each LAU on NFS land as follows: if more than 30 percent of the total lynx habitat (all ownerships) within an LAU is currently in unsuitable condition, no further reduction of suitable conditions should occur as a result of vegetation management activities by the NFS.
S-WL-2 In LAUs on NFS land allow no net increase in groomed or designated over-the-snow trail routes unless the designation effectively consolidates use and improves lynx habitat through a net reduction of compacted snow areas.

**Species Biology and General Habitat Requirements:** Lynx are found in northern climates, and are known in Alaska, Canada, Rocky Mountain states, northern Great Lakes region, and northern New England. Historic and current records indicate this species occurs in Minnesota and Wisconsin in the upper Midwest; it is unknown in North Dakota (Wydeven, et al, 2004; NatureServe, 2008). Accounts of lynx breeding activity is known in Minnesota, and one report in Wisconsin (winter 2003-2004) indicated that breeding activity may have occurred in Vilas County, Wisconsin, though further survey is required to confirm breeding activity in Wisconsin (Wydeven, et al, 2004). Relatively little is known concerning the distribution and habitat associations of Canada lynx in northeastern Minnesota. However, recent studies by the USDA Cooperative Fish and Wildlife Research Unit and the Natural Resources Research Institute (NRRI) have gathered additional information on the occurrence, habitats, and home ranges of this species since 2000. The lynx is an uncommon, solitary animal, which is near the limit of its range in Minnesota and on the CNF/LLR. Lynx live in boreal and mixed coniferous-deciduous forests with estimated home ranges varying from 20 to 47 square miles in Minnesota (Mech, 1980). However, recent lynx studies have suggested that in Minnesota, lynx ranges may be larger than other reported home range sizes (NRRI Technical Report No. NRRI/TR-2006-16). McKelvey, et al. (2000) divides Canada lynx populations in the 48 contiguous states into the western Great Lakes population, eastern U.S. population, and the western U.S. population. Historically, Minnesota had the highest numbers of lynx in the western Great Lakes population. Harvest data document the persistence of a lynx population in Minnesota through most of the 20th century (Henderson, 1978; Loch and Lindquist, unpubl. manuscript). However, it is unknown whether individual lynx persist within Minnesota during lows in lynx-hare cycles or whether they are a result of recolonization from Canadian populations (Moen et al, 2005). Lynx are found in boreal forests, always associated with their primary prey, the snowshoe hare (Moen et al, 2005). They are rare in areas densely populated by humans (Hazard, 1982). There is no reliable population estimate for Minnesota, but available information indicates that it is extremely low (USFWS, 1998). Minnesota DNR data shows a significant drop in lynx numbers through trapping records in the last 20 years.

Mature forests with downed logs and windfalls provide cover for natal dens, escape, and protection from severe weather. Early successional forest stages provide habitat for the lynx’s primary prey, the snowshoe hare. Hare populations are highest in lowland conifer forests, forests with dense shrub layers, and in 20 year old stands with overhead cover (Jaakko Poyry Consulting, 1992). A 2006 NRRI study indicates that four cover types were the primary habitats utilized the most by lynx being tracked in the study; upland shrub, lowland deciduous shrub, lowland black spruce, and aspen/white birch.

At the southern periphery of its range, low recruitment may be typical of lynx population because habitat conditions are marginal (Koehler, 1990). Some timber management, fire suppression, and grazing practices may temporarily reduce prey population, leading to low kitten survival. Conversion of native vegetation communities to forest types that are less suitable or unsuitable as lynx habitat may also decrease prey populations. Road and trail access and recreational uses that result in snow compaction may allow ingress of coyotes into lynx habitat, thereby increasing competition for limited winter prey resources (Buskirk et al., 2000).

The LCAS guide management activities that could affect lynx denning and foraging habitat. Both foraging and denning habitat characteristics occur in the forest surrounding the project area. However, the presence of the existing road allows the possibility of human incursions, which makes the area less suitable for lynx at present. Also, the cleared rights-of-way, forest roads, and trails would tend to encourage wolf, coyote, bobcat, (and cougar, if present) incursions during winter, which would also make the area less suitable for lynx.
Rangewide Distribution/Status

**Distribution within Minnesota:** The Canada lynx had been thought to be extirpated from Minnesota in the early 1990’s, but video documentation, sightings, and DNA evidence documented the presence of Canada lynx in Minnesota in 2000. The verification of Canada lynx presence within Minnesota has led to recent non-random hair snagging studies within the Superior National Forest, lynx tracking studies, and lynx capture and release studies by NRRI. The capture and release studies utilize GPS technology to track habitat use, home range, den site selection, and reproductive success. Based upon recent radio and GPS tracking studies, northeastern Minnesota has seen significant activity since studies began by the USDA Forest Service and Minnesota Cooperative Fish and Wildlife Research Unit in 2003 (Moen et al., 2004). NRRI summary reports indicate that since 2002, over 70 lynx were identified from DNA analysis. Most of these lynx were located in Saint Louis, Lake, and Cook counties. The MDNR has tracked Canada lynx sightings all over the state and has summarized its findings on their website. MDNR records indicate that nine of the thirteen counties crossed by the Enbridge Energy Alberta Clipper and Southern Lights Diluent Project have records of Canada lynx. Marshall County has three “unverified” and one “verified” records in the eastern half of the county. Clearwater County has three “probable” records and one “verified” record within its boundaries. One of the “probable” records is within 20 miles of the Enbridge corridor. Beltrami County has three “unverified”, two “probable”, and one “verified” records located north of the project limits. Hubbard County has six “unverified” and four “probable” records south of the proposed project. Cass County has eleven “unverified” and two “probable” records. Itasca has six “unverified” records, seven “probable”, and one “verified” records of lynx. Aitkin has five “unverified” and four “probable” records of lynx within its boundaries. Carlton County has four “unverified”, three “probable” records and evidence of reproduction that occur within 10 miles of the proposed project corridor. Saint Louis County has the highest incidence of lynx records of all Minnesota Counties with 113 records of “unverified”, “probable”, “verified”, and evidence of reproduction within the county boundaries. Many of these records occur south of the proposed Enbridge lines and indicate that this species does cross the existing pipeline corridor and Highway 2 despite frequent human use.

**Distribution within the CNF/LLR:** The MDNR information indicates that there have been 5 “probable” sightings and 4 “unverified” sightings within the CNF proclamation boundaries. Three additional “verified” sightings occurred west of, or just beyond CNF proclamation boundaries, indicating that Canada lynx occur in the vicinity of the CNF.

**Distribution/Status in Affected environment:** The closest lynx sighting documented by the MDNR lynx reporting summary indicates that one “probable” and one “unverified” sighting have occurred within 3-5 miles of the project area.

**Risk Factors:** Based upon the LCAS, risk factors include replacement of older forests with early successional stages and emphasis on pulpwood production favoring lynx competitors, such as coyotes and bobcats. Although lynx are protected, accidental trapping, illegal shooting, trains, and vehicle traffic have been documented as mortality factors within Minnesota. The LCAS indicates that road and other human encroachments are also risk factors for lynx. 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 Forest Service, 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 (NRRI, UMN press release, 2003). Factors affecting lynx mortality (i.e., competition and predation as influenced by human activities) and lynx movements (i.e., highways and utility corridors) are relevant to this project.
**Direct Effects**

The direct effects of pipeline construction across Minnesota will include clearing of wooded and shrubby habitats adjacent to the existing pipeline corridor. Clearing of these habitats will not directly affect any known denning areas but will widen the existing corridor eliminating habitats that could be used for hunting or shelter. However, direct effects on individual lynx are unlikely given that lynx are unlikely to use an area while pipeline construction is taking place. Noise and human traffic are not conducive to lynx use and project-related activities are likely to keep this species away from construction activities during the placement of the pipe. However, this noise and traffic is ameliorated by existing forest and shrub habitats which absorb most of the noise associated with the construction of a pipeline. Once the pipeline is in place human activity levels are likely to revert to existing levels. These assumptions are supported by the fact that existing road densities within the project area will not be increased and the management of adjacent lands will not be increased or decreased by the pipeline construction. In addition, the pipelines will cross few if any significantly large areas of remote habitat. The location of the pipeline within the transition zone between the boreal forest to the north and hardwood forests to the south, make habitat conditions for Canada lynx marginal across most of the project area.

Effects on habitat are related to alterations in vegetation structure for lynx and their prey, primarily snowshoe hare. The time it takes for vegetation to develop varies, depending upon factors such as site productivity, climatic conditions, and forest type. It generally takes 3 to 12 years after timber removal by natural or human means to regenerate to heights sufficient to extend above average winter snow levels and create year round habitat for snowshoe hare.

Denning habitat for the lynx may also be reduced unless sufficient amounts of coarse woody debris are left on site to provide future den sites.

For purposes of this analysis, unsuitable habitat is that which is capable of producing lynx foraging or denning habitat; but which, at its present stage of development, does not have the necessary vegetation composition, structure, and/or density to support lynx and snowshoe hare populations during all seasons. Such unsuitable habitat in the project area is dominated by regenerating stands less than 10 years old, older northern hardwood stands lacking sufficient understory development, and large maintained openings. These habitat types are characteristic of most areas in Pembina County, North Dakota; Kittson, Marshall, Pennington, Red Lake, Clearwater, Beltrami, Hubbard, Cass, and Itasca counties, Minnesota where no records of reproduction occurs. Portions of Saint Louis and Carlton counties contain habitats that are known to harbor reproducing lynx and habitats in these areas are considered capable of producing lynx foraging and denning habitat. Only perennial lakes, rivers, permanent fields and developed areas are not considered potential lynx habitat.

Within the CNF/LLR, the LCAS states that no more than 30 percent of lynx habitat within the LAU may be in an unsuitable condition at any given time. Considering all ownership within the LAU, it is estimated that no more than 0.003 percent of LAU 10 and 15 will be unsuitable as lynx habitat following project implementation under the Preferred and Great Lakes Gas Alternatives. Impacts from either alternative would not reach the 30 percent threshold.

**Alternative 1 – Preferred Alternative**

Under the Preferred Alternative, the width of the Enbridge right-of-way will increase by 140 feet temporarily and 75-105 feet permanently. The primary effect of clearing additional right-of-way from existing forest and brush habitat would be to further disrupt habitat connectivity. The presence of existing collocated facilities adjacent to the 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. Alternative 1 may
cause alterations to movements of lynx and its prey, the snowshoe hare, particularly until construction ceases along the affected environment. The Preferred Alternative would alter habitat within LAUs 10 and 15 by 342 acres (0.003 percent) temporarily and 181 acres (0.002 percent) permanently (see Table 2.4.1-1).

The added width to the brush/grassland areas would diminish suitable snowshoe hare habitat for up to 12 years while sufficient cover regenerates, temporarily reducing lynx foraging habitat. Depending upon the maintenance regime adopted to keep the project right-of-way clear of vegetation, the additional clearing could alter the amount of foraging habitat permanently. Widening the existing right-of-way by 140 feet temporarily and 75 feet permanently could be detrimental to lynx movements because additional clearing reduces habitat connectivity. However, given the documented lynx movements across the current road/railroad/pipeline corridor, the additional 75 feet of permanent right-of-way is not likely to prohibit lynx movements or be a negative permanent impact.

The temporary presence of human activities such as the use of heavy machinery during the construction of the pipelines would compact snow providing a competitive advantage to species such as bobcats, coyotes, and wolves. If these activities occurred over the long-term these activities could lead to increased starvation or direct mortality of lynx (LCAS, 2000). However, these activities would only be present during the early winter of 2009 and are not likely to affect the survival of individual lynx or populations that may or may not occur in LAU 10 or 15.

**Alternative 2 – Great Lakes Gas Alternative**

Alternative 2 would remove 322 acres of habitat within LAU 10 and 15. This area would eliminate all forested and brush habitats that lynx could use as cover or hunting. As a portion of this cleared area returns to brushy habitats lynx could again use a portion for hunting. The primary effect of clearing an additional 75-105 feet of right-of-way of forest and brush habitat would be to disrupt habitat connectivity. The corridor along Alternative 2 is not as wide as the existing corridor in Alternative 1 and adjacent lands are dominated by forest, brushland, and wetlands. Highways/railroads, and other pipeline corridors are present along only the eastern 10 miles of Alternative 2. These existing collocated facilities at the eastern end of Alternative 2 also have not limited lynx movements in the recent past (MDNR, 2007). Whatever the limiting crossing thresholds are for the lynx, the majority of this alternative would have less impact to lynx movements due to the same size footprint adjacent to a smaller existing corridor.

The added width to the brush/grassland areas would diminish suitable snowshoe hare habitat for up to 12 years while sufficient cover regenerates temporarily reducing lynx foraging habitat. Depending upon the maintenance regime adopted to keep the project right-of-way clear of vegetation, the additional clearing could alter the amount foraging habitat permanently. Widening the existing right-of-way by 140 feet temporarily and 75 feet permanently could be detrimental to lynx movements because additional clearing reduces habitat connectivity. However, given the documented lynx movements across the current road/railroad/pipeline corridor, the additional 75-105 feet of permanent right-of-way is not likely to prohibit lynx movements or be a negative permanent impact.

The temporary presence of human activities such as the use of heavy machinery during the construction of the pipelines would compact snow providing a competitive advantage to species such as bobcats, coyotes, and wolves. If these activities occurred over the long-term these activities could lead to increased starvation or direct mortality of lynx (LCAS, 2000). However, these activities would only be present during the winter of 2008 and are not likely to affect the survival of individual lynx or populations that may or may not occur in LAU 10 or 15.

Table 2.4.1-1 presents a summary of LAU impacts.
### TABLE 2.4.1-1
Lynx Analysis Unit Impact Summary

<table>
<thead>
<tr>
<th>Lynx Analysis Unit (LAU)</th>
<th>Alt. 1 - Acres (and relative percent) of Habitat Alteration</th>
<th>Alt. 2 - Acres (and relative percent) of Habitat Alteration</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAU 10 (49,817 acres)</td>
<td>169 (0.003)</td>
<td>158 (0.003)</td>
</tr>
<tr>
<td>LAU 15 (53,277 acres)</td>
<td>174 (0.003)</td>
<td>164 (0.003)</td>
</tr>
<tr>
<td>Total (103,094 acres)</td>
<td>342</td>
<td>322</td>
</tr>
</tbody>
</table>

**Cumulative Effects**

Historic effects to forested habitats include timber harvest, timber management, construction of utility corridors, roads, creation of campgrounds, trails, forest fires, insect infestations, disease, and historic logging. These activities have all had a cumulative effect on the character of the existing forest across the entire state of Minnesota. Many of these activities are being managed through implementation of the current CNF Forest Plan directives to provide multiple uses and access within the CNF. Other areas are managed by state and private entities without regard to multiple use or management of the lynx.

Foreseeable effects are likely to include timber management, road construction and construction of additional utility corridors throughout the state. However, the exact location and scope of these projects is unknown. Additional fragmentation of large forested tracts will likely be the greatest impact to habitats present along the project corridor. The expansion of open habitats and reduction of forested habitat will create a wider corridor. Additional fragmentation of large forested tracts could also occur if collocation with existing corridors does not work. Despite the probable alteration of forested habitats by foreseeable future projects, it is unlikely that an additional corridor through unbroken forest or collocation with existing corridors would create conditions that prohibit lynx utilization, movements or its survival within the state. Most of the records within the state occur north of the existing and proposed corridors with the most active portions of the state occur within the arrowhead region of Minnesota. The presence of records south of the existing corridors and US Highway 2 corridor has not prohibited lynx travel or in some instances reproduction. The expansion of the Enbridge corridor is not likely to affect lynx travel or reproduction in the future. Within the CNF/LLR, it is known that the CapX 2020 transmission line is likely to cross the CNF/LLR near the Alberta Clipper and Southern Lights Diluent Projects or the Great Lakes Gas Alternative. However, the final route is yet to be determined. This project would create an additional 125 foot corridor to construct electric transmission lines from Bemidji to Grand Rapids. Additional fragmentation of large forested tracts will likely be the greatest impact to habitats present within the CNF depending upon where the line is eventually constructed. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. Additional fragmentation of large forested tracts could also occur if collocation with existing corridors does not work. Despite the probable alteration of forested habitats by foreseeable future projects, it is unlikely that an additional corridor through unbroken forest or collocation with existing corridors would create conditions that prohibit lynx utilization, movements or its survival within the forest.

Based upon known past, present, and foreseeable effects on private, state, and federal lands, Alternative 1 is not expected to contribute to an adverse cumulative effect upon Canada lynx or their habitat. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon Canada lynx or their habitat. Alternative 2 is unlikely to contribute to any negative trends occurring on the forest. The regenerating portions of the corridor could attract prey species for these predators. This alternative would have short-term negative effects on habitat for the Canada lynx, but would not have an effect on population viabilities or affect breeding populations of the lynx within the forest.
Determination of Effects

In sum, the project affects 0.003 percent of lynx habitat in the LAU, disturbance due to the project will be limited to one year, Canada lynx habitat conditions in the affected environment are marginal in part due to the existing road densities, and the previously existing right-of-way did not block movement. Based on these reasons and other reasons outlined in the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

ESA/USFWS: The project is not likely to adversely affect the Canada lynx.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

MDNR: The project will have a negligible or improbable negative effect on individuals of the species.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on the LLR will not be affected.

2.4.1.2 Gray Wolf or Eastern Timber Wolf (Canis lupus)

ESA, CNF, Minnesota, Leech Lake Reservation Status: The Western Great Lakes Distinct Population Segment (DPS) of the gray wolf was delisted in March 2007 from the ESA “Threatened” status. It was re-listed September 29, 2008 as “threatened” in Minnesota and “endangered” in Wisconsin. The Western Great Lakes DPS of the gray wolf was removed from the Endangered Species List on January 14, 2009. The gray wolf is listed as “endangered” in North Dakota, but is not listed in Pembina County, ND. The proposed project does not cross any designated critical habitat for the gray wolf.

The MDNR currently lists the gray wolf as Special Concern but has proposed delisting this species altogether due to forest recovery goals being exceeded (a 2007-2008 study estimated the gray wolf population was over 2,900 in northern Minnesota).

The Leech Lake Reservation Sensitive Species List (March 2008) ranks the gray wolf as “Sensitive” and notes that this species is “recovering and scheduled for eventual delisting; close monitoring will be needed.”

The CNF ranks the gray wolf as a Management Indicator Species.

With the exception of Forest Plan Objective, Standard, and Guideline for gray wolf G-WL-10, which would protect known active den sites, Forest Plan goals have been met or are no longer in effect. Forest Plan objectives, standards and guidelines for the gray wolf are:

General Direction

General Forest Plan directives are the same for gray wolf as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17 (see Canada lynx analysis).

Specific to the gray wolf the following Forest Plan Objectives apply.

O-WL-16 Promote the conservation and recovery of the gray wolf. Population goal minimum: contribution to state-wide goal of 1250-1400.

S-WL-4 Management activities for the gray wolf will be governed by the Recovery Plan for Eastern Timber Wolf (USFWS, 1992).
G-WL-10 Provide for the protection of known active gray wolf den sites during denning season.

**Species Biology and General Habitat Requirements:** Across most of the Western Great Lakes DPS, the principal prey of the gray wolf is white-tailed deer and to a lesser extent, moose. In summer, wolves supplement their diet with beaver and other prey (USFWS, 1992). Most wolves live in family packs consisting of two to eight members. Each pack inhabits an area of 20 to 214 square miles or more and tends to be territorial (USFWS, 1992). The *Recovery Plan for Eastern Timber Wolf* (USFWS, 1992) identifies five main factors which are essential to the long-term survival of this species. These factors are; 1) large tracts of wild land with low human densities and minimal accessibility by humans, 2) ecologically sound management, 3) availability of adequate wild prey, 4) adequate understanding of wolf ecology and management, and 5) maintenance of populations that are either free of, or resistant to, parasites and diseases new to wolves, or are large enough to successfully contend with their adverse effects.

**Rangewide Distribution/Status**

Gray wolves once ranged from coast to coast and from Alaska to Mexico in North America. They were only absent from the East and the Southeast, which were occupied by red wolves (*Canis rufus*), and from the large deserts in the southwestern states. By the early 20th century, government-sponsored predator control programs and declines in prey brought gray wolves to near extinction in the lower 48 States. The Western Great Lakes DPS encompasses the entire states of Minnesota, Michigan, and Wisconsin; the part of North Dakota north and east of the Missouri River upstream as far as Lake Sakakawea and east of U.S. Highway 83 to the Canadian border; the part of South Dakota north and east of the Missouri River; the parts of Iowa, Illinois and Indiana that are north of Interstate 80; and the part of Ohio north of I-80 and west of the Maumee River at Toledo. The DPS also includes all the areas currently occupied by wolf packs in Minnesota, Michigan, and Wisconsin, as well as nearby areas in these states in which wolf packs may become established in the future. The DPS also includes surrounding areas into which wolves may disperse but are not likely to establish persistent packs (USFWS website).

**Distribution in Minnesota and Wisconsin:**

Currently, wolves in Minnesota range over 27,000 square miles in northern Minnesota with the largest concentrations centered in Itasca, St. Louis, and Koochiching Counties (Erb, 2008). In Wisconsin, wolves range across the state with highest concentrations being in the far north. As of 2008, the statewide populations for Minnesota and Wisconsin were estimated at 2,922 and 537, respectively.

**Distribution within the CNF/LLR:** Wolves occur in packs throughout the CNF and LLR; most of northeastern Minnesota has been a stronghold for this species since the 1980s. Packs of wolves have also been extending south and west from their typical habitats in northeast and north-central Minnesota. Wolves have been in a state of population recovery in northern Minnesota as a result of management dictated by the *Recovery Plan for the Eastern Timber Wolf* (USFWS, 1992) and because there is a large prey base in the region.

**Occurrence within Project Area:** Wolf packs are known to occur along the length of the project area, based upon observations by CNF, Tribal biologists, DNR biologists, and other researchers in Minnesota and Wisconsin. Den sites or rendezvous may occur within the project area due to the ample evidence of wolf usage of the area, e.g. sightings by LLBO, CNF staff as well as tracks, scat, etc. (pers. comm. CNF and LLBO biologists). However, den and rendezvous sites are not tracked by the CNF, LLBO, MDNR< or FWS in Minnesota. Population levels of the gray wolf have been increasing project wide in recent years and are thought to be stable within the CNF/LLR and expanding to other parts of the state..

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Consultation with the WDNR’s wolf biologist, Mr. Wydeven, determined that there are no den or rendezvous sites along the route in Wisconsin. Mr. Wydeven provided a list of wolf pack territories and identified portions of the pipeline route that cross these territories so that Enbridge would be aware of where undocumented wolf dens could potentially occur. Based on the information provided by Mr. Wydeven, the route crosses the territories of at least one wolf pack in Douglas County. Updated information from WDNR winter wolf surveys in 2008/2009 will be obtained prior to construction.

**Risk factors:** Risk factors for the gray wolf include illegal and accidental killing by humans, availability of prey species, road density, human presence, and parasites and diseases. Factors presented in the *Recovery Plan for Eastern Timber Wolf* that are relevant to evaluation of effects of this project include; (1) large tracts of wild land with low human densities and minimal accessibility by humans, (2) ecologically sound management, (3) and availability of prey. Human densities and accessibility increase the chances that deliberate or accidental killing of wolves could occur. The types of human activity present near the alternatives’ corridors include; recreational OHV use, hunting, fishing, bicycling, hiking, and general travel from campgrounds, homes, cabins, and small communities. The levels of human activity along the alternatives are at levels that increase the possibility of human-wolf encounters.

**Direct Effects**

The direct effects of pipeline construction will include clearing of forested habitats adjacent to the existing pipeline corridor. Direct effects on individual wolves are unlikely given that wolves are unlikely to use an area while pipeline construction is taking place. Noise and human traffic are not conducive to wolf use and project-related activities are likely to keep this species away from construction activities during the placement of the pipe. Outside of the construction corridor, noise will be ameliorated by existing forest and shrub habitats which absorb most of the noise associated with the construction of a pipeline. Once the pipeline is in place human activity levels are likely to revert to existing levels. These assumptions are supported by the fact that existing road densities within the project area will not be increased and the management of adjacent lands will not be increased or decreased by the pipeline construction. In addition, the pipelines will cross few if any significantly large areas of remote habitat.

Most of the proposed pipeline corridor will pass through known gray wolf range. According to the FWS, if construction occurs near a den or rendezvous site during the critical period of the breeding cycle (between January and July), it may affect the wolf’s reproductive success. Enbridge consulted with WDNR to determine the location of wolf dens and rendezvous sites near the pipeline route (MDNR does not maintain this information). Enbridge consulted with WDNR to discuss the potential for the project to affect gray wolves and to obtain the most current information about wolf locations in the vicinity of the project in Wisconsin. The WDNR’s 1999 Wisconsin Wolf Management Plan and guidelines are designed to protect wolf dens and rendezvous sites.

In accordance with these guidelines, Enbridge will

- Avoid construction activity within 0.5 mile of a known den or rendezvous site during the period from March 1 through July 31 in Minnesota or Wisconsin.

In addition, Enbridge will:

1) provide its Environmental Inspectors with copies of the wolf management guidelines, which describe how wolf dens and rendezvous sites would appear in the field, and
2) notify the FWS and the MDNR or WDNR immediately if Environmental Inspectors or other project personnel observe any wolves or possible dens or rendezvous sites prior to or during construction.

Indirect Effects

Alternative 1 and 2—Preferred Alternative and Great Lakes Gas Alternative

Alternatives 1 and 2 may cause temporary alterations to movements of wolves particularly until construction ceases along the project area. Under the Preferred Alternative, the width of the Enbridge right-of-way will increase by 140 feet temporarily and 75-105 feet permanently. Although the added width may further deter these species from crossing the road/railroad/pipeline corridor, the presence of wolves within the project area suggests that wolves have adapted to the current corridor of Highway 2, the BNSF, and the Enbridge right-of-way. The increased corridor width may attract deer that would feed on the regenerating vegetation within the cleared corridor and may be used by wolves to hunt deer and small mammals.

Cumulative Effects

All Alternatives

Historic effects to forested habitats include timber harvest, timber management, construction of utility corridors, roads, creation of campgrounds, trails, forest fires, insect infestations, disease, and historic logging. These activities have all had a cumulative effect on the character of the existing forest. Many of these activities are being managed through implementation of the current Forest Plan directives to provide multiple uses and access within the CNF.

Foreseeable effects are likely to include timber management, road construction and construction of additional utility corridors through the forest. However, the exact location and scope of these projects is unknown. It is known that the CapX 2020 transmission line is likely to cross the CNF/LLR near the Alberta Clipper and Southern Lights Diluent Projects or the Great Lakes Gas Alternative. However, the exact route is yet to be determined. This project would create an additional 125 foot corridor to construct electric transmission lines from Bemidji to Grand Rapids. Additional fragmentation of large forested tracts will likely be the greatest impact to habitats present within the CNF/LLR depending upon where the line is eventually constructed. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. Additional fragmentation of large forested tracts could also occur if co-location with existing corridors does not work. Despite the probable alteration of forested habitats by foreseeable future projects, it is unlikely that an additional corridor through unbroken forest or co-location with existing corridors would create conditions that prohibit gray wolf use, movements or its survival within the forest.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon gray wolves or habitat. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon gray wolves or their habitat. Alternatives 1 or 2 are unlikely to contribute to any negative trends occurring on the forest. The regenerating portions of the corridor could attract prey species for these predators. There would be short-term negative effects on habitat for this species, but either alternative would not have an effect on population viabilities of wolves within the forest.
Determination of Effects

The primary impacts for alternatives 1 and 2 will be an increased level of human activity during the construction phase and increased width of the permanent right of way. These activities are not likely to significantly increase impacts on wolves over and above the effects from existing corridors and roads, which have not blocked wolf movement in the area. The presence of wolves near Highway 2 and the existing right-of-way suggest that the wolf has adapted to this environment.

The expansion of the permanent right of way could carry potential benefits for wolves. Clearing of forest to accommodate new pipeline construction may decrease cover within the analysis area. The greatest effects would occur within areas that currently contain forested or shrubby habitat. The permanent right-of-way post-construction of the two pipelines would be revegetated and be maintained as brush and grass habitat that could be utilized by white-tailed deer for foraging. These areas may increase utilization by wolves due to the increased use by its prey.

In summary, there may be potential for disturbance during construction, but these effects would be temporary. Impacts from the increased ROW will not be significantly greater than the existing environment where numerous pipeline, road, railroad and, powerline corridors already exist, and with existing human activity. Any effect on individual wolves would be either beneficial (increased numbers of prey), insignificant (temporary increase in human activity and increased permanent ROW width of 75-105 ft), or discountable (illegal or accidental killing). Neither of the proposed alternatives is likely to adversely impact the gray wolf.

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

ESA/USFWS: This project is not likely to adversely affect the gray wolf.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

MDNR: The project will have a negligible or improbable negative effect on individuals of the species.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on the LLR will not be affected.

2.4.1.3 Cougar, Mountain Lion (*Felis concolor*)

CNF, Minnesota, Leech Lake Reservation Status: The MDNR currently lists the cougar as Special Concern. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the cougar as “Endangered” and notes that this species is “occasionally reported, presence on reservation unknown.”

The CNF has no designation for the cougar and there are no Forest Plan objectives or management guidelines for this species.

General Habitat Requirements: In Minnesota, the mountain lion requires relatively contiguous forest areas of between 390 and 850 square miles (Beir, 1993). Coffin and Pfannmuller (1988) describe typical habitat as open woodlands, forest-prairie edges, swamps and watercourses. The MDNR receives numerous reports of cougars every year. However, little is known concerning the distribution of this species in Minnesota or on the CNF/LLR.
**Distribution within the CNF/LLR:** Cougars are at the periphery of their current range in the National Forests of Minnesota. CNF database records indicate that there are three historic and current records of cougars within the CNF/LLBO; one of these records occurs within the cumulative effects boundary.

**Occurrence within Project Area:** There are no records of cougars within the project area; historically this area was within their range. However, due to the cougar’s large home ranges, they could occur within the project area.

**Risk factors:** Risk factors for the cougar are difficult to establish due to limited data on this species in Minnesota. However, risks are probably associated with competition with other large predators such as gray wolves and coyotes, human activity, and prey densities.

**Direct Effects**

**All Alternatives**

It is unlikely that either of the alternatives would have a significant impact on habitat suitability or survival of this species due to the low number of cougars in the CNF/LLR and the relatively small number of acres involved with the construction of these projects when compared to the total acres of habitat available on the CNF/LLR. Changes in plant communities that may affect prey populations would be temporary. Current forest management practices benefit the white-tailed deer, the primary prey species for cougars.

While there may be some potential for disturbance during construction, these effects would be temporary and would occur in an environment where numerous pipeline corridors, road corridors, railroad corridors, powerline corridors, and general human activity is high. Neither of the proposed alternatives are likely to impact the ability of cougars to travel across the project corridors.

**Indirect Effects**

Clearing of additional forest to accommodate pipeline construction may decrease cover within the analysis area. The greatest effects would occur within areas that currently contain forested or shrubby habitat. These areas would become open land for a time with the construction of the two pipelines. These areas would be revegetated and over several years become brush and grass habitats that could be utilized by white-tailed deer as foraging habitat. These areas may temporarily increase utilization by cougars for a time due to the increased use by its prey. The additional width of pipeline right-of-way will augment grassy or shrubby habitat regardless of which alternative is chosen.

**Cumulative Effects**

**All Alternatives**

Historic effects to forested habitats include timber harvest, timber management, construction of utility corridors, roads, creation of campgrounds, trails, forest fires, insect infestations, disease, and historic logging. These activities have all had a cumulative effect on the character of the existing forest. Many of these activities are being managed through implementation of the current Forest Plan directives to provide multiple uses and access within the CNF.

Foreseeable effects are likely to include timber management, road construction and construction of additional utility corridors through the forest. However, the exact location and scope of these projects is unknown. It is known that the CapX 2020 transmission line is likely to cross the CNF/LLR near the
Alberta Clipper and Southern Lights Diluent Projects or the Great Lakes Gas Alternative. However, the exact route is yet to be determined. This project would create an additional 125 foot corridor to construct electric transmission lines from Bemidji to Grand Rapids. Additional fragmentation of large forested tracts will likely be the greatest impact to habitats present within the CNF/LLR depending upon where the line is eventually constructed. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. Additional fragmentation of large forested tracts could also occur if co-location with existing corridors does not work. Despite the probable alteration of forested habitats by foreseeable future projects, it is unlikely that an additional corridor through unbroken forest or co-location with existing corridors would create conditions that prohibit cougar movements or its survival within the forest.

Based upon known past, present, and foreseeable effects, the Alternative 1 is not expected to contribute to an adverse cumulative effect upon cougars or habitat. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon cougars or their habitat. Alternatives 1 and 2 are unlikely to contribute to any negative trends occurring on the forest. The regenerating portions of the corridor could attract prey species for these predators. There would be short-term negative effects on habitat for this species, but would not have an effect on population viabilities of cougars within the forest.

Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

MDNR: The project will have a negligible or improbable negative effect on individuals of the species.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.1.4 Franklin’s Ground Squirrel (Spermophilus franklinii)

CNF, Minnesota, Leech Lake Reservation Status: The Franklin’s ground squirrel has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the Franklin’s ground squirrel as “Sensitive” and notes that this species is “rare on reservation, populations isolated.”

The National Forest has no designation for the Franklin’s ground squirrel and there are no Forest Plan objectives or management guidelines for this species.

General Habitat Requirements: Franklin’s ground squirrel is a semi-colonial species associated with northern tallgrass prairie; it prefers brushy and partly wooded areas, as well as prairie edges, rather than open prairie (Hazard, 1982). It is known to be omnivorous and feeds on invertebrates, small vertebrates, seeds, and other vegetation. Hazard (1982) also states that it has “a tolerance for people that have made it a common mammal in campsites, state parks, and open dumps.”

Distribution within the CNF/LLR: Specimen collections indicate that Franklin’s ground squirrel ranges throughout Minnesota. This species is not tracked by the CNF but is known to occur in the Norway Beach Campgrounds and on tribal lands in Bena. Both of these locations are in close proximity to the project.
**Occurrence within Project Area:** The Franklin’s ground squirrel is known to occur in close proximity to the project and is likely to occur within the project area where sandy soils and semi open habitats are found.

**Risk Factors:** Due to the small isolated populations, risk factors include disease, catastrophic events, and human extermination.

**Direct Effects**

**Alternative 1 – Preferred Alternative**

Franklin’s ground squirrel habitat occurs near the existing right-of-way but the Alberta Clipper and Southern Lights Diluent Projects area is not open enough to provide adequate breeding habitat. Clearing of additional forest would create additional temporary grassland or sporadic brushy habitat that this species prefers.

**Alternative 2 – Great Lakes Gas Alternative**

Habitat for this species is generally not available along the Great Lakes Gas Alternative. This corridor is characterized as a shrub and grassy habitat that is surrounded by forest. This species is a grassland species that does not occur in forested habitats. The Great Lakes Gas Alternative is also further from the known populations of Franklin’s ground squirrels on the CNF and LLBO.

**Indirect Effects**

Clearing of additional forest to accommodate pipeline construction may temporarily increase habitat opportunities for Franklin’s ground squirrel within the analysis area. The greatest effects would occur within areas that currently contain open grassy habitat. These grassy areas would be augmented by the construction of additional pipeline right-of-way. The additional width of pipeline right-of-way will augment grassy or shrubby habitat regardless of which alternative is chosen.

**Cumulative Effects**

**All Alternatives**

Cumulative effects for the Franklin’s ground squirrel were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities convert forested areas to open grassy habitats preferred by this species. Cumulative effects of known past, present, and foreseeable actions are the same for Franklin’s ground squirrel as those described in the cumulative effects section for cougar.

Despite the probable alteration of forested habitats by known past, present, and foreseeable future projects, it is unlikely that an additional corridor through unbroken forest or co-location with existing corridors would create conditions that prohibit the Franklin’s ground squirrel survival within the forest. Neither of the proposed alternatives are likely to impact the ability of Franklin’s ground squirrel to travel across or utilize project corridors. The direct effect of other projects on Franklin’s ground squirrel habitat is minimal. The additional clearing for construction of a transmission line will increase the amount of grassland habitat. However, it is thought that these grassland habitats would not be utilized by Franklin’s ground squirrel due to the proximity of forested habitats.

Based upon known past, present, and foreseeable effects, the Alternative 1 is not expected to contribute to an adverse cumulative effect upon the Franklin’s ground squirrel or habitat. Activities proposed in
Alternative 2 are not likely to contribute to an adverse cumulative effect upon Franklin’s ground squirrel or their habitat. Alternatives 1 and 2 are unlikely to contribute to any negative trends occurring on the forest.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determination of effects for Alternatives 1 and 2.

**LLBO:** The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

### 2.4.1.5 Pine Martin (*Martes americana*)

**CNF, Minnesota, Leech Lake Reservation Status:** The pine martin has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the pine martin as “Sensitive” and notes that this species is “Extirpated due to over-harvest and habitat loss, if a resident population ever existed; rare visitor.”

The National Forest has no designation for the pine martin and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** The pine martin is a species found in mature, dense conifer forests or mixed conifer-hardwood forests. They prefer woods with a mixture of conifers and deciduous trees including hemlock, white pine, yellow birch, maple, fir, and spruce. One critical element to the survival of this species is the presence of many large limbs and fallen trees in the understory, known as coarse woody debris (Wisconsin DNR website). This largely nocturnal mammal is known to be opportunistic and their diet includes a variety of small- to medium-sized mammals, some birds, insects, and various fruits and berries (Marshall, 1946; Cowan and Mackay, 1950; Quick, 1955; Murie, 1961; Weckwerth and Hawley, 1962; Koehler and Hornocker, 1977; Northcott, 1977).

**Distribution within the CNF/LLR:** Specimen collections indicate that the core of the pine martin’s range in Minnesota is located in the northeastern part of the state, primarily in Lake, Cook, and Saint Louis Counties. This species is not tracked by the CNF, but small numbers are harvested by state and tribal trappers each year within the CNF and Leech Lake Reservation.

**Occurrence within Project Area:** The pine martin is not known to occur within the project area but is thought to be a likely visitor or occupant.

**Risk Factors:** Risk factors include trapping over-harvest, forest fragmentation, and habitat destruction by logging.

**Direct Effects**

**All Alternatives**

Suitable pine martin habitats occur along the Preferred Alternative where forest with abundant brush and woody debris occur. Portions of these habitats would be altered in the project area where forest is cleared to create additional right-of-way. Impacts would be similar on Alternatives 1 and 2; the removal of suitable habitat is not expected to have an impact on this species.
It is unlikely that either of the alternatives would have a significant impact on habitat suitability or survival of this species due to the relatively small number of acres involved with the construction of these projects when compared to the total acres of habitat available on the CNF/LLR.

**Indirect Effects**

Clearing of additional forest to accommodate pipeline construction within suitable forest types may affect long-term habitat opportunities for pine martins within the analysis area. The additional width of pipeline right-of-way will temporarily alter forested habitats within the temporary workspace and change the character of forest to shrub/grassland along the permanent right-of-way regardless of which alternative is chosen. The co-location of the Highway 2/BNSF/Enbridge corridors creates a wider footprint that has much more human activity than corridors that reach into the less fragmented portions of the CNF.

**Cumulative Effects**

**All Alternatives**

Cumulative effects for the pine martin were evaluated on public lands that lie within the analysis area. The CNF/LLR provides some suitable habitat but may be at the limit of this species range. Cumulative effects of known past, present, and foreseeable actions are the same for pine martin as those described in the cumulative effects section for cougar.

Despite the probable alteration of forested habitats by known past, present, and foreseeable future projects, it is unlikely that an additional corridor through unbroken forest or co-location with existing corridors would create conditions that prohibit the pine martin survival within the forest. Neither of the proposed alternatives are likely to impact the ability of pine martin to travel across or utilize suitable habitat adjacent to project corridors. The direct effect of other projects on pine martin habitat is minimal. The additional clearing for construction of a transmission line will alter forest habitats utilized by this species. However, due to the relatively small number of acres involved with the construction of these projects when compared to the total acres of habitat available on the CNF/LLR it is unlikely that the projects would have a negative effect on this species.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determination of effects for Alternatives 1 and 2.

**LLBO:** The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.1.6  **Heather vole (Phenacomys intermedius)**

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR currently lists the heather vole as “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) ranks the heather vole as “Sensitive” and notes that this species’ “Present distribution on reservation unknown.”

The National Forest has no designation for the heather vole and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** The heather vole is generally associated with boreal and coniferous forests of the north. It is known to occupy a variety of wooded and open habitats. It probably does not
occupy stands vegetated only by grass, and it is generally associated with ericaceous shrubs (i.e., heath-like shrubs that require an acid soil) (Hazard, 1982).

**Distribution within the CNF/LLR:** This species is not tracked by the CNF and no documentation is available for the heather vole on forest lands.

**Occurrence within Project Area:** The heather vole is not known to occur within the project area. However, potential habitat exists for the heather vole within the CNF/LLR.

**Risk Factors:** Risk factors include habitat destruction, elimination of ericaceous species, and successional changes to habitat.

**Direct Effects**

**All Alternatives**

Heather vole habitat occurs along the existing right-of-way in wetlands dominated by ericaceous shrubs and forested areas where boreal species are dominant. Numerous ericaceous dominated wetlands are crossed by the existing right-of-way on both Alternative 1 and 2, and many of these wetlands have a canopy dominated by spruce and tamarack with understory characteristics suitable to support this species. Clearing for additional right-of-way could reduce the ericaceous habitat temporarily until ericaceous species re-colonize cleared areas.

**Indirect Effects**

The clearing of additional wetland forest with an ericaceous understory would temporarily impact the amount of forested habitat available while temporarily creating additional open habitats. As time progresses these alterations would revert to habitats similar to those currently present along the existing right-of-way. These temporal impacts are not expected to permanently negatively impact individual heather voles or their population.

**Cumulative Effects**

**All Alternatives**

Cumulative effects for the heather vole were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities convert forested wetlands with ericaceous understories to open wet meadow habitats. Cumulative effects of known past, present, and foreseeable actions are the same for heather vole as those described in the cumulative effects section for cougar.

Despite the probable alteration of ericaceous habitats by known past, present, and foreseeable future projects, it is unlikely that an additional corridor through forested or ericaceous shrub dominated wetlands or co-location with existing corridors would create conditions that prohibit the heather vole survival within the forest. Neither of the proposed alternatives are likely to impact the ability of heather vole to travel across or utilize project corridors in suitable habitats. The direct effect of other projects on heather vole habitat is minimal. The additional clearing for construction of a transmission line will temporarily alter ericaceous shrub habitats but these shrubs are likely to re-colonize the temporary work areas once the project is completed.

Based upon known past, present, and foreseeable effects, the Alternative 1 is not expected to contribute to an adverse cumulative effect upon the heather vole or habitat. Activities proposed in Alternative 2 are not
likely to contribute to an adverse cumulative effect upon heather vole or their habitat. Alternatives 1 and 2 are unlikely to contribute to any negative trends occurring on the forest. There are no significant cumulative effects identified for the heather vole.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

**LLBO:** The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

### 2.4.1.7 Northern myotis (*Myotis septentrionalis*)

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR currently lists the northern myotis as “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) ranks the northern myotis as “Sensitive” and notes that this species’ “Present distribution on reservation unknown.”

The National Forest has no designation for the northern myotis and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** The northern myotis is found in heavily forested areas throughout its range. These bats roost singly or in small groups in buildings, under shingles of buildings, under exfoliating tree bark, and in caves and mines. During summer, northern myotis occupies a variety of day and night roosts. It favors trees roosts, although individuals have been found in human-made structures (Barbour and Davis, 1969). Sexes roost separately, and reproductive females form small maternity colonies of <60 individuals. Maternity groups roost in trees, under shingles, and in buildings (Brandon, 1961; Clark et al., 1987; Foster and Kurta, 1999; Mumford and Cope, 1964; Naorsen and Brigham, 1993; Sasse and Pekins, 1996).

**Distribution within the CNF/LLR:** This species is not tracked by the CNF and no documentation is available for the northern myotis on forest lands.

**Occurrence within Project Area:** The northern myotis is not known to occur within the project area. However, potential habitat is known to occur in forested lands within the project area.

**Risk Factors:** Risk factors include habitat destruction, and elimination of roost trees and/or hibernacula.

**Direct Effects**

**All Alternatives**

Suitable northern myotis habitats may occur along the Preferred Alternative where dead and dying trees with exfoliating bark occur. Portions of these habitats would be altered in the project area where these trees are cleared to create additional right-of-way. However, remaining adjacent forested habitats may harbor suitable roost trees allowing individuals to utilize these areas during temporary impacts due to construction. Impacts would be similar for both alternatives 1 and 2; the removal of this habitat is not expected to have an impact on this species. There are no known hibernacula in the forest.
**Indirect Effects**

It is unlikely that either of the alternatives would have a significant impact on habitat suitability or survival of this species due to the relatively small number of acres involved with the construction of these projects when compared to the total acres of habitat available on the CNF/LLR.

**Cumulative Effects**

*All Alternatives*

Cumulative effects for the northern myotis were evaluated on public lands that lie within the analysis area. The CNF/LLR provides an abundance of suitable habitat and clearing for a pipeline would not significantly reduce the amount of available habitat. Cumulative effects of known past, present, and foreseeable actions are the same for northern myotis as those described in the cumulative effects section for cougar.

Despite the probable alteration of forested habitats by known past, present, and foreseeable future projects, it is unlikely that an additional corridor through unbroken forest or co-location with existing corridors would create conditions that prohibit the northern myotis survival within the forest. Based upon known past, present, and foreseeable effects, the Alternative 1 is not expected to contribute to an adverse cumulative effect upon the northern myotis or its habitat. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon northern myotis or their habitat. Alternatives 1 and 2 are unlikely to contribute to any negative trends occurring on the forest.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

**LLBO:** The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

**2.4.2 Birds**

**2.4.2.1 Northern Goshawk (*Accipiter gentiles*)**

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR currently does not list the northern goshawk as a species of concern but has proposed to change its status to “Special Concern” (recent surveys in northern Minnesota estimate 25-30 active nests per year). The Leech Lake Reservation Sensitive Species List (March 2008) ranks the northern goshawk as “Endangered” and notes a recent decline in population and low population levels.

The CNF ranks the northern goshawk as a RFSS and a species of Management Concern that is associated with Upland Mature/Old Forest and Mature/Old Aspen/Birch Forest Management Indicator Habitats it is also utilized as a key indicator for size and amount of large forest patches. It also provides the following information for management of this species on their lands. General Forest Plan directives are the same for northern goshawk as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17.

Specific to the northern goshawk the following Forest Plan Objectives apply.
O-WL-32: Provide habitat for population goal minimum: 20-30 breeding pairs.

S-WL-8: At northern goshawk nest sites with an existing nest structure, prohibit or minimize, to the extent practical, activities that may disturb nesting pairs during nesting season (March 1 – August 30) and to the extent practical, provide the following conditions in an area of 50 acres minimum (860 ft. radius):

- Maintain, protect, or enhance high quality habitat conditions: 100 percent mature forest (>50 years old) with continuous forest canopy (>90 percent canopy closure) and large trees with large branches capable of supporting nests

G-WL-24: Within northern goshawk post-fledging areas, minimize activities, to the extent practical, that may disturb nesting pairs during nesting season (March 1 – August 30) and, to the extent practical, within a 500 acre area encompassing all known nest areas within the territory:

- Maintain suitable habitat conditions on a minimum of 60 percent of the upland forested areas in post-fledging areas. Suitable habitat: jack pine and spruce/fir forest types >25 years and all other forest types: 50 years with semi-closed to closed canopy (>70 percent). Aspen and birch forest types 25-50 years may be considered suitable if field review verifies that foraging habitat trees average 50 feet tall and canopy closure is 50-70 percent or greater.

General Habitat Requirements: General habitat characteristics from the few quantitative studies undertaken in Minnesota indicate that northern goshawks utilize old growth and mature forest stands for breeding and hunting. Boal et al. (2001) found that “foraging male goshawks demonstrated a clear preference to forage in old (>50 yrs) early successional upland hardwood (e.g., aspen, birch) stands, mature (>50 yrs) late successional upland conifers (e.g., red pine, white pine), and mature (>25) early successional upland conifer (e.g., balsam fir, jack pine).” Apfelbaum and Seelbach (1983) found that goshawks nested in 20 tree species, with deciduous trees reported nine times as often as conifers in the Midwest. A variety of trees were used for nesting including aspen (Populus spp.), maple (Acer spp.), birch (Betula spp.), white pine (Pinus strobus), basswood (Tilia americana), and bur oak (Quercus macrocarpa). Nest trees tend to be large diameter (over 14” diameter breast height (dbh)) that average 39 feet in height within forests with canopy closure ranging from 60 percent to 90.62 percent (Martell and Dick, 1996).

This species appears to be uncommon in Minnesota and there are concerns about its population status throughout the Great Lakes states. There are approximately 80 known nesting territories or previously occupied territories in Minnesota. The goshawk is a territorial species that exhibits strong nest site fidelity and may use a nesting area for decades (Ottawa National Forest, 1995). Boal et al. (2001) also documented male goshawks remaining in Minnesota throughout the year. The diet of the goshawk is primarily composed of moderate sized birds and mammals. Primary prey items on the CNF and LLR include red squirrels and eastern chipmunks (Boal et al., 2001).

In the CNF, some nest sites are ephemeral and pairs may not nest every year, but there are examples of breeding pairs or territories being continuously active for consecutive years (J. Gallagher, personal communication). Nesting territories that are active during one year are found to be inactive in subsequent years and new nest territories are discovered. Boal et al. (2001) found that northern goshawks occupy nesting territories but do not nest in some years, so an inactive nest does not necessarily mean that the territory is abandoned. Given the year to year variability of active nest sites, it is not clear whether these fluctuations represent population variation or variation in nesting characteristics of the northern goshawk.

For analysis purposes, there are three components to goshawk habitat (USDA FS 2004b: p. 3.3.6-2):
Nesting habitat is used for courtship and breeding, nesting, provisioning of young until fledged, and security for the female while nesting. It consists of the forest immediately around the nest tree or trees. This habitat is typically mature (>50 years), closed canopy forest with few to no openings, in aspen, northern hardwood, or pine forest types.

Post-fledging habitat is used for provisioning the young after fledging until dispersal occurs, security for the fledged young, foraging for the adult female during nesting, and territory defense. Post-fledging habitat typically surrounds the nesting habitat. It usually has similar characteristics to the nesting habitat, but may be partly lowland forest types.

Forest areas closest to the nest, such as the nest and post-fledging habitat zones are the most heavily utilized areas by goshawks for hunting and provisioning the young (Boal et al., 2001).

Foraging habitat consists of the goshawks nesting home range. It is used for foraging by the male during nesting to feed himself and his mate, and after hatching, the young. Goshawks hunt in a variety of forest types, but tend to select foraging habitat that has a higher density of trees, higher canopy closure and trees of larger diameter at breast height than may be randomly present (Beier and Drennan, 1997; Doyle and Smith, 1994; Bright-Smith and Mannan, 1994; Hargis et al., 1994). Foraging habitat in Minnesota has been defined by radio telemetry data as mature forest stands with a moderately closed to closed canopy on upland landforms (Boal et al. 2001).

Telemetry data in Minnesota suggest that home ranges for goshawk pairs average approximately 15,948 acres in size (Boal et al. 2001). Home range in this context is synonymous with foraging habitat. The appropriate scale for analysis of alternatives for goshawk habitat is at the home range, or foraging habitat scale. As described above, foraging habitat is a combination of mature forest, stand complexity, early seral and young forest, and open habitats. The relative abundance of these elements and how they are spatially arranged on the landscape are integral to defining the quality and quantity of goshawk habitat.

Williamson et al. (2001) described suitable habitat conditions and recommended thresholds for the CNF for the three habitat components (nesting habitat, post-fledging habitat, and foraging habitat) based on Boal et al. (2001) and other peer reviewed literature.

Examining nesting, post-fledging, and foraging habitat parameters allows progress towards general species habitat (i.e., O-WL-1, O-WL-2, O-WL-17), and those specific to the northern goshawk (i.e., O-WL-32) to be quantified and evaluated at several scales. In its role as a Management Indicator Species, habitat parameters for the northern goshawk, especially amounts of foraging habitat, represent conditions for many other species with similar habitat conditions.

CNF stand shapefiles were analyzed for suitable goshawk habitat using information documented in Species Profile and Effects Analysis Protocol for the Northern Goshawk on the Chippewa National Forest 12/18/01, Survey Screening Criteria: Regional Forester’s Sensitive Species of Chippewa National Forest March 2007, data compiled using an Arcview™ dashboard tool developed by the CNF for calculating goshawk home ranges, shapefiles of proposed alternatives, and information gathered during field surveys for Northern Goshawk and Red-shouldered hawks conducted during the spring of 2007. Comprehensive digital stand data was projected into the GIS using Arc Map™ (figure 2.4.2-1). The CNF screening protocol for goshawks was then used to sort stands according to type and age allowing the user to eliminate stands that currently do not fulfill one of the goshawk’s primary life requirements see figure 2.4.2-2. Spatial information on recorded goshawk nest sites was then added to the GIS and buffers were applied to represent nest site habitat, post-fledging habitat, and foraging habitat (figure 2.4.2-3). The dashboard tool was then used to calculate acreages for each habitat condition. Acreage for each habitat
component was compiled by intersecting project footprint shapefiles (figure 2.4.2-4) with goshawk territory habitats and listed in Table 2.4.2-1.

**Distribution within the CNF/LLR:** Northern goshawks are found throughout the CNF/LLR at low densities. CNF database records contain 105 historic and current records of goshawks and 18 known territories within the cumulative effects boundaries on the CNF, however, no known nesting territories exist within 1000 feet of the project area. The 18 historic nest territories located within the cumulative effects boundaries were recorded between 1998 and 2006 and two of these nests were described as active in 2007.

**Occurrence within Project Area:** Seven known northern goshawk territories occur near enough to the Alberta Clipper and Southern Lights Diluent Projects corridor to intersect the project area with one of the home range parameters. Although no nesting territories intersect the project area, known foraging habitats do overlap the project area. None of these territories were documented as active during 2007 and this species was not detected during the goshawk surveys conducted for this project. Therefore, although breeding pairs may not be affected, it is likely that suitable foraging areas at historic home ranges may be affected by the project. During 2007 and 2008 surveys, no birds were seen or responded to calls. See Appendices A, B, and C for field survey reports on habitat occupancy and nests within the CNF/LLR.

**Risk Factors:** Risk factors include forest fragmentation and isolation of primary habitats, cutting, and regeneration in nesting areas that result in vegetative simplification, predation by other raptors such as great-horned owls and red-tailed hawks, and predation by fishers. Human disturbance at the nest site may result in nest failure and abandonment (Crocker-Bedford, 1990).
<table>
<thead>
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<th>Figure 2.4.2-1 Digital Stand Data</th>
<th>Figure 2.4.2-2 Goshawk Stands</th>
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<tr>
<td>Depicts the forest stand layer</td>
<td>Goshawk Stands (green) Filtering the stand layer eliminates stands without minimum life requirements for goshawks.</td>
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<td><img src="image1" alt="Digital Stand Data" /></td>
<td><img src="image2" alt="Goshawk Stands" /></td>
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<th>Figure 2.4.2-3 Known Nest Habitat, Post-Fledged Habitat, and Forage Habitat</th>
<th>Figure 2.4.2-4 Suitable Acres Crossed by the Project</th>
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<td>Overlaying the known nest habitat (shaded blue), post-fledging habitat (shaded purple), and forage habitat (outlined in red).</td>
<td>Overlaying project footprint on territory allows calculation of suitable acres crossed by project.</td>
</tr>
<tr>
<td><img src="image3" alt="Known Nest Habitat, Post-Fledged Habitat, and Forage Habitat" /></td>
<td><img src="image4" alt="Suitable Acres Crossed by the Project" /></td>
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Direct Effects

Table 2.4.2-1 provides the direct effects to the northern goshawk home ranges.

### Table 2.4.2-1: Direct Effects to Northern Goshawk Home Ranges

<table>
<thead>
<tr>
<th>Goshawk Nest Territory Name</th>
<th>Habitat Parameter</th>
<th>Forest Service Lands</th>
<th>Alternative 1 - Habitat Crossing Impacted (acres impacted by alternative and percent existing habitat remaining)</th>
<th>Alternative 2 - Habitat Crossing Impacted (acres impacted by alternative and percent existing habitat remaining)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Habitat Parameter</td>
<td>Historic Habitat (acres)</td>
<td>Available Existing Habitat (acres)</td>
<td>% Suitable Habitat</td>
</tr>
<tr>
<td>East Banks</td>
<td>Nest</td>
<td>51</td>
<td>41</td>
<td>80.3*</td>
</tr>
<tr>
<td>Post-fledging</td>
<td>250</td>
<td>120</td>
<td>48.0*</td>
<td></td>
</tr>
<tr>
<td>Foraging</td>
<td>5,066</td>
<td>2,685</td>
<td>53.0</td>
<td>22.8 (52.5)</td>
</tr>
<tr>
<td>Grass Lake</td>
<td>Nest</td>
<td>71</td>
<td>56</td>
<td>78.8*</td>
</tr>
<tr>
<td>Post-fledging</td>
<td>320</td>
<td>119</td>
<td>37.2*</td>
<td></td>
</tr>
<tr>
<td>Foraging</td>
<td>9,852</td>
<td>3,104</td>
<td>31.5*</td>
<td>27.0 (32.1)</td>
</tr>
<tr>
<td>Ketchum</td>
<td>Nest</td>
<td>48</td>
<td>34</td>
<td>70.8*</td>
</tr>
<tr>
<td>Post-fledging</td>
<td>459</td>
<td>192</td>
<td>41.8*</td>
<td></td>
</tr>
<tr>
<td>Foraging</td>
<td>10,221</td>
<td>5,052</td>
<td>49.4</td>
<td>16.9 (49.3)</td>
</tr>
<tr>
<td>Ottertail</td>
<td>Nest</td>
<td>47</td>
<td>41</td>
<td>87.2*</td>
</tr>
<tr>
<td>Post-fledging</td>
<td>362</td>
<td>303</td>
<td>83.7</td>
<td></td>
</tr>
<tr>
<td>Foraging</td>
<td>8,734</td>
<td>5,875</td>
<td>67.0</td>
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<tr>
<td>Pipeline</td>
<td>Nest</td>
<td>50</td>
<td>38</td>
<td>76.0*</td>
</tr>
<tr>
<td>Post-fledging</td>
<td>251</td>
<td>133</td>
<td>53.0*</td>
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</tr>
<tr>
<td>Foraging</td>
<td>5,707</td>
<td>3,310</td>
<td>58.0</td>
<td>27.5 (57.5)</td>
</tr>
<tr>
<td>Portage Lake</td>
<td>Nest</td>
<td>50</td>
<td>23</td>
<td>46.0*</td>
</tr>
<tr>
<td>Post-fledging</td>
<td>412</td>
<td>148</td>
<td>35.9*</td>
<td></td>
</tr>
<tr>
<td>Foraging</td>
<td>10,747</td>
<td>4,410</td>
<td>41.0</td>
<td>31.8 (40.7)</td>
</tr>
<tr>
<td>Sucker Lake</td>
<td>Nest</td>
<td>74</td>
<td>70</td>
<td>94.6*</td>
</tr>
<tr>
<td>Post-fledging</td>
<td>353</td>
<td>331</td>
<td>93.8</td>
<td></td>
</tr>
<tr>
<td>Foraging</td>
<td>9,752</td>
<td>6,119</td>
<td>62.7</td>
<td></td>
</tr>
<tr>
<td>Waboose Bay</td>
<td>Nest</td>
<td>50</td>
<td>43</td>
<td>86.0*</td>
</tr>
<tr>
<td>Post-fledging</td>
<td>206</td>
<td>168</td>
<td>81.6</td>
<td></td>
</tr>
<tr>
<td>Foraging</td>
<td>5,155</td>
<td>2,654</td>
<td>51.5</td>
<td></td>
</tr>
</tbody>
</table>

nc = no change

* Clearing for the 20-inch Southern Lights Diluent project and the 36-inch Alberta Clipper project will require removing herbaceous and forested habitat south of existing Enbridge line for 140 feet. Some of this area is already maintained right-of-way and is kept free of woody vegetation. In addition, forested areas adjacent to the existing right-of-way vary in distance from the existing line. Goshawk habitat impacts were calculated based upon a 140 foot right-of-way even though these acreages will be less in reality.

** To meet Forest Plan objectives for the Northern Goshawk recommended amounts of home range parameters are as follows:
- Nest Area: Maintain suitable conditions on 100 percent of the 50 acre area (e.g., closed canopy mature forest).
- Post-fledging Area: Maintain suitable conditions on 60 percent of the 500 acre area (e.g., closed canopy mature forest).
- Foraging Area: Maintain 40 percent of the foraging area (average size 16,000 acres) in minimally suitable condition.

Those marked with an * do not meet minimum requirements under existing conditions.
Only one of the goshawk territories within the analysis area has existing conditions that meet amounts thought to be needed to allow breeding goshawks to provision their young, provide for secure foraging habitat and to provide secure nesting habitat (Table 2.4.2-1).

Alternative 1 – Preferred Alternative

Five documented nest sites occur near enough to this alternative to have some part of the foraging/home range directly affected by the proposed action. East-Banks, Grass Lake, Pipeline, Portage Lake, and Ketchum goshawk foraging territories intersect the Alberta Clipper and Southern Lights Diluent Projects corridor. No nest site or post-fledging habitat zones will be affected by clearing for the proposed action.

Under this alternative, conditions for nest sites and post-fledging areas on the East-Banks, Grass Lake, Pipeline, Portage Lake, and Ketchum home ranges would remain at current levels and no direct impacts to these habitats would occur. However, approximately 22.8 acres on the East Banks, 27 acres on the Grass Lake, 16.9 acres on the Ketchum, 27.5 acres on the Pipeline, and 31.8 acres on the Portage Lake territories foraging habitat would be altered adjacent to the existing Highway 2, BNSF railroad, and Enbridge pipeline corridors (see Table 2.4.2-1).

Foraging habitat is the only home range parameter impacted under this alternative within the East-Banks, Grass Lake, Ketchum, Pipeline, and Portage Lake territories. Foraging habitat for East-Banks, Grass Lake, Ketchum, Pipeline, and Portage Lake territories is decreased from existing levels by (0.5, 0.6, 0.1, 0.5, and 0.3 percent, respectively). Critical thresholds for nesting, post-fledging, and foraging will be maintained for all territories, except Grass Lake which does not meet the critical threshold as it currently exists for foraging. Temporary loss of foraging habitat during construction may also be diminished by the presence of suitable habitat in adjacent or overlapping territories.

To minimize impacts on nesting northern goshawks before and during construction of the project, Enbridge has agreed to implement the following measures:

- Raptor stick nest surveys were conducted in 2008 (see Appendix C). Approximately 2 weeks ahead of construction, ground surveys would be conducted to determine activity of identified nests from the stick nest surveys. If a nest is identified as active, appropriate restrictions would be placed on construction activities. The CNF and LLBO biologist would be notified at that time.

- Minimize construction activities, and do not clear trees within 860 feet of active nests (nesting period is approximately March 1 through August 30).

Alternative 2 – Great Lakes Gas Alternative

Seven documented nest sites occur near enough to this alternative to have some part of the foraging/home range directly affected by the proposed action. East-Banks, Ottertail, Pipeline, Portage Lake, Sucker Lake, Waboose Bay, and Ketchum goshawk foraging territories intersect this alternative of the Alberta Clipper and Southern Lights Diluent Projects corridor. The Sucker Lake and Ketchum post-fledging territories would also be impacted in this alternative. No nest site habitat zones will be affected by clearing for this alternative. None of the territories affected by this alternative meet nest habitat target levels.

Under this alternative, conditions for nest sites and post-fledging areas on the East-Banks, Ottertail, Pipeline, Portage Lake, and Waboose Bay home ranges would remain at current levels and no direct impacts to this habitat parameter would occur. However, approximately 22.8 acres on East Banks, 33.7
acres on Ottertail, 28.3 acres on Waboose Bay, 27.5 acres on Pipeline, and 45.9 acres on the Portage Lake territories foraging habitat would be altered adjacent to the existing Great Lakes Gas pipeline corridor.

The Great Lakes Gas Alternative would also impact post-fledging habitat at the Sucker Lake and Ketchum territories. Under this alternative approximately 8.9 acres at the Sucker Lake territory and 9.5 acres at the Ketchum territory would be altered. This represents a habitat reduction of 2.6 percent and 2.0 percent, respectively. Ketchum territory’s post-fledging parameter is currently below the critical threshold of 60%. Conditions at the Sucker Lake territory would remain well above the target of 60% for post-fledging habitat.

Foraging habitat is the only home range parameter impacted under this alternative within the East-Banks, Ottertail, Pipeline, Portage Lake, and Waboose Bay territories. Foraging habitat for East-Banks, Ottertail, Pipeline, Portage Lake, and Waboose Bay territories is decreased further from target levels by (0.5, 0.1, 0.8, 0.4, and 0.6 percent, respectively). Critical thresholds for nesting, post-fledging, and foraging will be maintained for all territories, except Grass Lake which does not meet the critical threshold as it currently exists for foraging. Loss of foraging habitat may also be diminished by the presence of suitable habitat in adjacent or overlapping territories.

Indirect Effects

All Alternatives

Clearing of additional forest to accommodate pipeline construction within suitable forest types may affect long-term habitat opportunities for northern goshawks within the analysis area. The greatest impacts would occur within areas that currently contain the most acreage of suitable habitat such as those between Pike Bay and Portage Lake along the Great Lakes Gas Alternative. The additional width of pipeline right-of-way will further fragment forested habitats regardless of which alternative is chosen. However, the existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors creates an area with much more human activity than corridors that reach into the less fragmented portions of the CNF.

Cumulative Effects

Cumulative effects for the northern goshawk were evaluated on public lands for seven northern goshawk territories that have one or more home range parameters that intersect the Alberta Clipper and Southern Lights Diluent Projects route or alternative (Table 2.4.2-1).

All Alternatives

Historic effects to forested habitats include timber harvest, timber management, construction of utility corridors, roads, creation of campgrounds, trails, forest fires, insect infestations, disease, and historic logging. These activities have all had a cumulative effect on the character of the existing forest. Many of these activities are being managed through implementation of the current Forest Plan directives to provide multiple uses and access within the CNF.

Foreseeable effects are likely to include timber management, road construction and construction of additional utility corridors through the forest. However, the exact location and scope of these projects is unknown. It is known that the CapX 2020 transmission line is likely to cross the CNF/LLR near the Alberta Clipper and Southern Lights Diluent Projects or the Great Lakes Gas Alternative. However, the exact route is yet to be determined. This project would create an additional 125 foot corridor to construct
electric transmission lines from Bemidji to Grand Rapids. Additional fragmentation of large forested tracts will likely be the greatest impact to habitats present within the CNF/LLR depending upon where the line is eventually constructed. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. Additional fragmentation of large forested tracts could also occur if co-location with existing corridors does not work. Despite the probable alteration of forested habitats by foreseeable future projects, the amount of clearing would be similar to those calculated for both alternatives and suitable acreage would likely be maintained if the ultimate corridor does not impact nest habitat.

Due to a trend toward fragmentation, development, road building, widening the existing Highway 2/BNSF/Enbridge/powerline corridor, and timber harvest on the forest over many decades, mature forest habitat characteristics (e.g. forest with greater than 70 percent canopy closure, branches capable of supporting large nest structures, canopy tree stem density ranging from 230 to 420 stems/acre) may be limiting to these species. The project area in question would result in additional loss of mature forest habitat under Alternative 1 and should another corridor be constructed additional losses to available goshawk habitat would be expected. Activities that further fragment mature forest types can affect long-term habitat suitability by changing forest type, age, and structure. However, Alternative 2 will require higher amounts of additional clearing of forested areas due to the narrower corridor and higher percentage of mature forest and large patch characteristics described above.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon northern goshawks or home range habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon northern goshawks or their habitat. Alternatives 1 or 2 are unlikely to contribute to any negative trends occurring on the forest. Alternative 1 or 2 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. Given the current management direction of the CNF for this species, it is unlikely that enough suitable northern goshawk habitat will be removed to negatively effect this species’ survival in the forest.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

**CNF:** The project will not likely cause a trend to federal listing or loss of viability for the species.

**LLBO:** The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

### 2.4.2.2 Red-shouldered Hawk (*Buteo lineatus*)

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR currently lists the red-shouldered hawk as a species of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) ranks the red-shouldered hawk as “Threatened” and notes an affinity to large blocks of old forest for nesting.

The CNF designates the red-shouldered hawk as a Regional Foresters Sensitive Species and a species of Management Concern that is associated with Upland Mature/Old Forest. It also provides the following information for management of this species on their lands. General Forest Plan directives are the same
for red-shouldered hawk as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17.

Specific to the red-shouldered hawk the following Forest Plan Objectives apply.

G-WL-13: At red-shouldered hawk nest sites with an existing nest provide the following conditions in an area of 50 acres minimum (860 ft. radius):

a. Maintain, protect, or enhance high quality habitat conditions to extent practical: 100 percent mature forest (>50 years old) with continuous forest canopy (>90 percent canopy closure) and large trees with large branches capable of supporting nest.

b. Allow only those management activities that are expected to maintain, protect, or enhance nesting area habitat.

c. Minimize activities that may disturb nesting pairs are during nesting season (April 1 – August 15).

G-WL-14: Within red-shouldered hawk breeding territory (approximately 600 acres around a nest site):

a. Maintain, protect, or enhance high quality habitat conditions to the extent practical: ensure mature upland forest conditions (>50 years old or greater) on a minimum of 90 percent of the suitable and potentially suitable habitat acres.

b. Management activity should not reduce canopy closure to less than 70 percent.

c. Minimize activities that may disturb nesting pairs during nesting season (April 1 – August 15).

General Habitat Requirements: Red-shouldered hawks require a substantial food base, and at least during the breeding season they are distinctly territorial. The red-shouldered hawk is associated with mixed coniferous-deciduous woodlands, moist hardwood forests, swamps, river bottomlands, and wooded marsh openings, with the borders of lakes and streams or other wetlands being especially favored habitat (Johnsgard, 1990). Widespread destruction and fragmentation of riparian habitats has forced this species to rely on upland forests to a greater extent (Ebbers, 1991a). In such areas, human-made grasslands may replace wetlands as hunting habitat (Ebbers, 1991a).

Nesting habitat is characterized by taller than average closed canopy trees with well developed crowns. American beech and sugar maple are frequently selected for nesting, where the nest is usually built in a secure crotch of a large-diameter tree situated well below the canopy (Ebbers, 1991a). Morris and Lemon (1983) found that red-shouldered hawk nests were typically found in mature deciduous forest stands dominated by sugar maple and American beech and characterized by mature trees and a reduced understory. A two-year study located 20 red-shouldered hawk nests on the CNF. These nests occurred in closed-canopy mature northern hardwoods (17 nests) or mature aspen (3 nests) interspersed with wetlands (McLeod and Anderson, 1997).

Home ranges for the red-shouldered hawk are smaller when compared to those of the northern goshawk. In Michigan, Craighead and Craighead (1956) found that mean breeding home ranges were 63 hectares, but varied from 7.7 to 155 hectares.
**Distribution within the CNF/LLR:** Red-shouldered hawks are at the northern periphery of their range in the National Forests of Minnesota, Wisconsin, and Michigan (USFS, 2002). Much of this species’ former habitat in southern Minnesota was destroyed or fragmented by human development, logging, and agriculture (USFS, 2004). There are presently about 429 known or suspected nesting sites in Minnesota; a majority of these sites are located within just a few meta-populations (USFS, 2004). One of these meta-populations occurs on the Ottertail Peninsula of Leech Lake within the CNF/LLR. However, red-shouldered hawks are found throughout the CNF/LLR at low densities. CNF database records indicate that there are approximately 49 historic and current records of red-shouldered hawk nests and 18 known territories within the cumulative effects boundaries on the CNF/LLR. The 18 historic nest territories located within the cumulative effects boundaries were recorded from 1994 through 2006 with updates occurring in 2005 and 2006. Only one of these territories was described as active in 2007.

**Occurrence within Project Area:** This species was not detected during the red shouldered hawk surveys conducted along the existing Enbridge corridor for this project in 2007 and 2008 and there are no known records within the project area. See Appendices A, B, and C for field survey reports on habitat occupancy and nests within the CNF/LLR.

**Risk Factors:** A conservation assessment was prepared for the red-shouldered hawks in the National Forests of the North Central states (USFS, 2002). Red-shouldered hawks are believed to have been one of the most common hawks in its historic range prior to 1900. Logging conducted during the 1800’s and early 1900’s appears to be the cause of declines in red-shouldered hawk populations throughout the north central states. Breeding bird survey data also indicates a population decline of between 65 percent and 95 percent in the Great Lakes States between 1950 and 1970 (TNC, 1992). Habitat loss, loss of mature forest conditions, human disturbance, predation, and competition with red-tailed hawks appear to be the cause of this decline. Risk factors are forest fragmentation and isolation of primary habitats, cutting and regeneration in nesting areas that result in vegetative simplification, predation by other raptors such as great-horned owls and red-tailed hawks. Human disturbance at the nest site may result in nest failure and abandonment.

**Direct Effects**

Table 2.4.2-2 presents the direct effects on red-shouldered hawk breeding territories.

<table>
<thead>
<tr>
<th>Red-shouldered Nest Territory Name</th>
<th>Habitat Area (acres and Percent of existing habitat)</th>
<th>Alternative 1 - Habitat Crossing Impacted (acres and percent of existing habitat)</th>
<th>Alternative 2 - Habitat Crossing Impacted (acres and percent of existing habitat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#2001 Nest</td>
<td>Nest: 428 (71)</td>
<td>nc</td>
<td>(19.9) Overlaps with territory #2002</td>
</tr>
<tr>
<td>#2001 Breeding Territory</td>
<td></td>
<td>nc</td>
<td></td>
</tr>
<tr>
<td>#2002 Nest</td>
<td>Nest: 491 (82)</td>
<td>nc</td>
<td>(19.9) Overlaps with territory #2001</td>
</tr>
<tr>
<td>#2002 Breeding Territory</td>
<td></td>
<td>nc</td>
<td></td>
</tr>
<tr>
<td>#2024 Nest</td>
<td>Nest: 177 (29.5)</td>
<td>nc</td>
<td>10.2</td>
</tr>
<tr>
<td>#2024 Breeding Territory</td>
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<td>nc</td>
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</table>

nc=no change

To meet Forest Plan objectives for the Red-shouldered Hawk recommended amounts of home range parameters are as follows:

- Nest Area: Maintain suitable conditions on 90 percent of the 50-acre area (e.g., closed canopy mature deciduous forest).
- Breeding Territory: Maintain suitable conditions on 70 percent of the 600-acre area (e.g., closed canopy mature deciduous forest).
Alternative 1 – Preferred Alternative

No documented nest sites or 600-acre breeding territories occur within 1000 feet of the proposed action and the nearest known nesting occurrence lies 6512 feet south of the existing corridor. However, suitable forest habitat is intersected by the Alberta Clipper and Southern Lights Diluent Projects and 65.3 acres of mature forest habitat would be removed during the construction of this alternative.

To minimize impacts on nesting red-shouldered hawks before and during construction of the project, Enbridge has agreed to implement the following measures:

- Raptor stick nest surveys were conducted in 2008 (see Appendix C). Approximately 2 weeks ahead of construction, ground surveys would be conducted to determine activity of identified nests from the stick nest surveys. If a nest is identified as active, appropriate restrictions would be placed on construction activities. The CNF and LLBO biologist would be notified at that time.

- Minimize construction activities, and do not clear trees within 860 feet of active nests (nesting period is approximately April 1 through August 15).

Alternative 2 – Great Lakes Gas Alternative

Three documented 600-acre breeding territories occur within the Great Lakes Gas Alternative and five occur within 1000 feet of the existing pipeline corridor. No nest habitat would be affected by this alternative. CNF records indicate that several of these 600-acre breeding territories are no longer active but the density of occurrences in this area indicates that suitable nesting habitat is abundant.

Under this alternative, approximately 165.8 acres of suitable closed canopy mature forest habitat would be removed during pipeline construction for this alternative. Red-shouldered hawk habitat occurs within mature northern hardwoods, lowland hardwoods, and aspen forest of suitable age classes. The western portion of the Great Lakes Gas Alternative crosses one of the largest contiguous tracts of mature northern hardwood tracts on the CNF. When all suitable red-shouldered hawk habitats are combined, this area of the CNF is one of four contiguous forest patches 5000 acres or larger. Activities that fragment mature forest types can affect long-term habitat suitability by changing forest type, age, and structure.

The CNF provides important hardwood habitat for red-shouldered hawks. Within the western half of the Great Lakes Gas Alternative, Mesic Northern Hardwoods and Boreal Hardwood Conifer are the dominant Landscape Ecosystem type. The majority of Landscape Ecosystem types within the preferred alternative are classified as Dry Mesic Pine, Tamarack Swamp, and Dry Mesic Pine types. Large patches of hardwood-dominated forest are particularly important to the red-shouldered hawk.

Indirect Effects

Clearing of additional forest to accommodate pipeline construction within suitable forest types may affect long-term habitat opportunities for red-shouldered hawk within the analysis area. The greatest impacts would occur within areas that currently contain the most acreage of suitable habitat such as those between Pike Bay and Portage Lake along the Great Lakes Gas Alternative. The additional width of pipeline right-of-way will further fragment forested habitats regardless of which alternative is chosen. However, the existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors greatly reduces the project’s impact.
Cumulative Effects

Cumulative effects were evaluated on public lands for three red-shouldered hawk territories that have one or more breeding territory parameters that intersect the Alberta Clipper and Southern Lights Diluent Projects route or alternative (Table 2.4.2-2).

All Alternatives

Historic effects to forested habitats include timber harvest, timber management, construction of utility corridors, roads, creation of campgrounds, trails, forest fires, insect infestations, disease, and historic logging. These activities have all had a cumulative effect on the character of the existing forest. Many of these activities are being managed through implementation of the current Forest Plan directives to provide multiple uses and access within the CNF.

Foreseeable effects are likely to include timber management, road construction and construction of additional utility corridors through the forest. However, the exact location and scope of these projects is unknown. It is known that the CapX 2020 transmission line is likely to cross the CNF/LLR near the Alberta Clipper and Southern Lights Diluent Projects or the Great Lakes Gas Alternative. However, the exact route is yet to be determined. This project would create an additional 125 foot corridor to construct electric transmission lines from Bemidji to Grand Rapids. Additional fragmentation of large forested tracts will likely be the greatest impact to habitats present within the CNF/LLR depending upon where the line is eventually constructed. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. Additional fragmentation of large forested tracts could also occur if co-location with existing corridors does not work. Despite the probable alteration of forested habitats by foreseeable future projects, the amount of clearing would be similar to those calculated for both alternatives and suitable acreage would likely be maintained if the ultimate corridor does not impact nest habitat.

Due to a trend toward fragmentation, development, road building, widening the existing Highway 2/BNSF/Enbridge/powerline corridor, and timber harvest on the forest over many decades, mature forest habitat characteristics (e.g. mature deciduous forest with canopy closure, branches capable of supporting large nest structures) may be limiting to these species. The project area in question would result in additional loss of forested habitat under Alternative 1. However, Alternative 2 will impact more acreage of historic breeding habitats, require higher amounts additional clearing of forested areas due to the narrower corridor, further fragment an important mature contiguous hardwood forest, and impact an area with higher historic nest densities than the preferred alternative. Forest regeneration that provides mature forest conditions is not likely to regenerate in the short term thus reducing available habitat for these species.

Based upon known past, present, and foreseeable effects, the Alternative 1 is not expected to contribute to an adverse cumulative effect upon red-shouldered hawk or home range habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon red-shouldered hawk or their habitat. Alternatives 1 or 2 are unlikely to contribute to any negative trends occurring on the forest. Alternative 1 or 2 may have short-term negative effects on habitat for this species, but would not have an effect on population viabilities of red-shouldered hawk within the forest. Given the current management direction of the CNF for this species, it is unlikely that enough suitable red-shouldered hawk habitat will be removed to negatively effect this species survival in the forest.
Determinations of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.2.3 Great Gray Owl (Strix nebulosa)

CNF, Minnesota, Leech Lake Reservation Status: The great gray owl has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the great gray owl as “Threatened” and notes several active nests on the reservation.

The CNF designates the great gray owl as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for great gray owl as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17.

Specific to the great gray owl the following Forest Plan Objectives apply.

O-WL-20: In known or good potential breeding habitat, maintain or restore high quality habitat conditions: Mature (>50 years old), dense, upland forest nesting habitat within ½ to 1/1/2 miles of areas with a sufficient network of lowland conifer forest, bog, and non-forest foraging habitat.

G-WL-15: Allow, to the extent practical, only activities that protect maintain, or enhance site conditions within 660 feet of a known nest site.

G-WL-16: Minimize activities that may disturb nesting pairs during nesting season (March 1 – June 1).

General Habitat Requirements: Great gray owls utilize dense boreal forest conifers, stands of aspen, and other hardwoods within or adjacent to lowland tracts for nesting, and a variety of open habitats (meadows, fields) for foraging (NRRI, 2001). The NRRI suggest that this species is likely a permanent resident, but rare nesting species in Minnesota counties that have extensive coniferous vegetation such as black spruce and tamarack peatlands, extensive upland coniferous forests, and black ash wetlands. Suitable habitat consists of 30-300 acre patches of dense, mature, and old-aged aspen and mixed conifer stands adjacent or within 1-3 km of open to park-like areas utilized for foraging (Nero, 1987). In winter these owls often move out of forested habitats to hunt in open fields with scattered trees, scrub patches, weedy areas, and fencerows. The great gray owl is a small mammal specialist, utilizing primarily microtine voles (meadow voles, red-backed voles). As a result, the species is prone to conspicuous large-scale movements when small mammal populations crash. The great gray owl initiates its courtship calling in February and March (depending upon latitude), and generally uses the abandoned nests of crows, ravens, and raptors (commonly inactive goshawk nests) for establishing new nest sites (NRRI, 2001; J. Gallagher, personal communication).

Distribution within the CNF/LLR: The species is found from central Alaska to the Canadian/United States border and southeast to south-central Ontario and the Great Lakes (McPeek and Adams, 1994). Great gray owls are at the southern periphery of their range in the National Forests of Minnesota. Great gray owls are known to breed within the CNF and 5 nest records have been documented within CNF.
proclamation boundaries (CNF database, 2007). Great gray owl habitat occurs within the eastern end of the analysis area and all of the CNF nest records are known to occur in lowland conifer habitat from this area. LLBO records document two nests in mixed boreal conifer uplands on the Reservation.

**Occurrence within Project Area:** The project area is within the range of the species and abundant lowland habitat with adjacent coniferous and coniferous-deciduous upland occurs in the immediate vicinity of the project area. Great gray owl habitat occurs within the eastern end of the analysis area and all of the nest records are known to occur in lowland conifer habitat from this area. Within the LLR there are 2 nest records in old upland hardwood/conifer mixed forest near the proposed affected environment (LLBO, personal communication). Within the LLR there are 2 nest records in old upland hardwood/conifer mixed forest near the proposed action area (LLBO, personal communication). Surveys did not identify any nests or birds within the project area. See Appendices C and D for field survey reports on habitat occupancy and nests within the CNF/LLR.

**Risk Factors:** Risk factors include removal of lowland forest through logging or loss of lowland forest habitat due to alteration of hydrology, reforestation of open areas that served as foraging habitat, and removal of snags and coarse woody debris.

**Direct Effects**

Table 2.4.2-3 presents the effects of the proposed alternatives on the great gray owl potential nesting habitat.

<table>
<thead>
<tr>
<th>TABLE 2.4.2-3</th>
<th>Acres of Great Gray Owl (GGO) Potential Nesting Habitat a Affected By Proposed Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forested Type and Age</td>
<td>Alternative 1 - (acres of impacted GGO stands)</td>
</tr>
<tr>
<td>Lowland conifers, at least pole-sized, that 10 are in a continuous block of at least 40 acres; or 2) comprise 30 percent of the area within 0.5 miles (approximately 160 acres)</td>
<td>168</td>
</tr>
<tr>
<td>Cumulative Effects Boundary</td>
<td>43,203 acres in Cumulative Effects Boundary</td>
</tr>
<tr>
<td>Total</td>
<td>168</td>
</tr>
</tbody>
</table>

**Alternative 1 – Preferred Alternative**

Known great gray owl nest sites were buffered with 660 foot radius in order to calculate potential impacts from construction of the preferred alternative. None of the documented breeding territories will be directly affected by proposed construction activities. The nearest documented territory lies 1.09 miles from the clearing limits proposed in the Preferred Alternative. However, suitable nesting habitat is abundant along the eastern 1/3 of the Alberta Clipper and Southern Lights Diluent Projects, but surveys in 2008 were negative for great gray owls.

To minimize impacts on nesting great gray owls before and during construction of the project, Enbridge has agreed to implement the following measures:

- Raptor stick nest surveys were conducted in 2008 (see Appendix C). Approximately 2 weeks ahead of construction, ground surveys would be conducted to determine activity of identified nests from the stick nest surveys. If a nest is identified as active, appropriate restrictions would be placed on construction activities. The CNF and LLBO biologist would be notified at that time.
Biological Assessment / Biological Evaluation  
Enbridge Energy Southern Lights Project

- Minimize construction activities within 660 feet of active nests (nesting period is approximately March 1 through June 1).

Alternative 2 – Great Lakes Gas Alternative

None of the documented 660 foot radius nest territories occur within the Great Lakes Gas Alternative. No nest areas would be affected by this alternative. CNF records indicate that additional data is pending. However, suitable nesting habitat is abundant along the eastern 1/3of the Alberta Clipper and Southern Lights Diluent Projects and surveys will be conducted in 2008 to determine if any of these habitats are occupied.

Indirect Effects

Clearing of additional forest to accommodate pipeline construction within suitable forest types may affect long-term habitat opportunities for great gray owl within the analysis area. The greatest impacts would occur within areas that currently contain the most acreage of suitable habitat such as those between Portage Lake and the Mississippi River along the Great Lakes Gas Alternative. The additional width of pipeline right-of-way will further fragment forested habitats regardless of which alternative is chosen. However, the existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors greatly reduces the project’s impact.

Cumulative Effects

Cumulative effects were evaluated on public lands for great gray owl territories that lie within the analysis area. Timber harvest, road construction, or activities that fragment suitable habitat may affect the breeding success of individual great gray owls.

It is believed that the limiting factor for this species is probably more closely tied to stand structure than the forest type and age (USDA FS 2004d). The east-central portion of the CNF provides important combinations of upland nesting habitat, lowland conifer habitat, and dry mesic pine/oak and tamarack swamp habitat for great gray owls. Within the east-central half of both the Preferred Alternative and the Great Lakes Gas Alternative, Dry Mesic Pine/Oak and Tamarack Swamp are the dominant LES. All of the known breeding territories occur on Dry Mesic Pine/Oak types next to Tamarack Swamp.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors.

The project area in question would result in additional loss of lowland conifer habitat under Alternative 1 and 2. However, Alternative 2 will require higher amounts additional clearing of forested areas due to the narrower corridor, further fragmenting mature contiguous hardwood forest habitat than the preferred alternative.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon great gray owls or foraging habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon great gray owls or their habitat. Alternative 1 or 2 may have short-term negative effects on habitat for this species, but would not have an effect on population viabilities of great gray owls within the forest. Given the current management
direction of the CNF for this species, it is unlikely that enough suitable great gray owls’ habitat will be removed to negatively effect this species survival in the forest.

Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.2.4 Olive-sided Flycatcher (Contopus cooperi)

CNF, Minnesota, Leech Lake Reservation Status: The olive-sided flycatcher has no state status, the Leech Lake Reservation Sensitive Species List (March 2008) does not list the olive-sided flycatcher as a species of concern.

The CNF has no designation for the olive-sided flycatcher; however, specific to the olive-sided flycatcher the following Forest Plan Objectives apply:

O-WL-27: Maintain, protect, or improve quality nesting and foraging habitat: variety of boreal forests (generally 10-20 percent canopy cover) including uplands, lowlands, edges, and beaver meadows with a preponderance of standing live or dead large trees used for perching and foraging, especially spruce or tamarack. High association with riparian and riverine areas.

General Habitat Requirements: The olive-sided flycatcher is a regular breeding resident in the northeastern and north-central regions of Minnesota (Janssen, 1987). Olive-sided flycatchers breeding habitat consists of a variety of boreal forests including uplands, lowlands, edges, beaver meadow, and recently logged and burned areas (Roberts, 1932; Green and Niemi, 1978; Niemi and Pfannmuller, 1979; Brewer et al., 1991). They favor forest edges or other areas with sparse trees, snags, or other suitable perches that are used to forage for insects (Wright, 1997; Altman, 1999). The edges of clear-cuts with standing dead trees can also provide habitat for olive-sided flycatchers, particularly when lowland coniferous forest remains nearby. Most nesting sites contain dead standing trees, which are used as singing and feeding perches, and are bordered by forest (Peterson, 1988). Preferred nesting trees are coniferous species where the nest is constructed on a horizontal limb far from the trunk (Altman and Sallabanks, 2000). The forests surrounding the project corridor provide suitable habitat for the olive-sided flycatcher.

Distribution within the CNF/LLR: This species is known to occur throughout the CNF/LLR within coniferous uplands near black spruce or tamarack bogs. According to CNF database records there are approximately 31 historic and current records of olive-sided flycatcher on the CNF and 8 known territories within the cumulative effects boundaries.

Occurrence within Project Area: This species was observed at 11 locations between Bena and the Mississippi River during songbird surveys conducted during 2007 and 2008. See Appendices E and F for field survey reports on habitat occupancy. These birds were identified within 300 feet of the Alternative 1 corridor and breeding is inferred from the presence of territorial males defending territory from other male birds, observation of copulation, or the presence of females near singing males and suitable nesting habitat. The east-central portion of the CNF/LLR provides important combinations of upland nesting
habitat and semi-open lowland conifer habitat utilized for foraging by olive-sided flycatchers. Within the east-central half of both the Preferred Alternative and the Great Lakes Gas Alternative, Dry Mesic Pine/Oak and Tamarack Swamp are the dominant LES. All of the documented occurrences were within Dry Mesic Pine/Oak or Tamarack Swamp types.

**Risk Factors:** Risk factors include reforestation, suppression of forest fires, and loss of habitat.

**Direct Effects**

Table 2.4.2-4 presents the effects of the proposed alternatives on the olive-sided flycatcher habitat.

<table>
<thead>
<tr>
<th>TABLE 2.4.2-4</th>
<th>Acres of Olive-Sided Flycatcher (OSF) Habitat Affected By Proposed Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alternative 1 - (acres of impacted OSF stands)</td>
</tr>
<tr>
<td>Forested Type and Age</td>
<td>3.12</td>
</tr>
<tr>
<td>Forested stands greater than 40 years of age; or open stand surrounded by forested stands greater than 40 years old adjacent to at least 30 acres of open habitat. = 113,777 acres within Cumulative Effects Boundary</td>
<td>3.12</td>
</tr>
<tr>
<td>Total</td>
<td>3.12</td>
</tr>
</tbody>
</table>

**Alternative 1 – Preferred Alternative**

Occupied olive-sided flycatcher habitats were buffered by 300 feet in order to calculate potential impacts from construction of the Preferred Alternative. Suitable nesting habitat is abundant from just west of Bena to the Mississippi River. Surveys along this segment of the Preferred Alternative documented 8 territorial males within 300 feet of the existing Enbridge right-of-way. The Preferred Alternative will impact 3.12 acres of occupied olive-sided flycatcher habitat. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1\textsuperscript{st}, or before August 1\textsuperscript{st}, without prior approval from the FWS.

**Alternative 2 – Great Lakes Gas Alternative**

Suitable olive-sided flycatcher habitats occur west of Bena and continue eastward to the Mississippi River. Where this alternative meets the Preferred Alternative north of Six-mile Lake the 2007 songbird surveys documented 7 territorial males. Territorial males have also been documented within 300 feet of the Great Lakes Gas Alternative south and west of Bena. This alternative will also impact the same 3.12 acres of occupied olive-sided flycatcher habitat as Alternative 1, and an additional territory south of Bena.

**Indirect Effects**

Clearing of additional forest to accommodate pipeline construction within suitable forest types may affect long-term habitat opportunities for olive-sided flycatcher within the analysis area. The greatest impacts would occur within areas that currently contain the most acreage of suitable habitat such as those between Bena and the Mississippi River along both Alternative 1 and 2. The additional width of pipeline right-of-way will further fragment forested habitats regardless of which alternative is chosen. However, the existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors greatly reduces the project’s impact.
Cumulative Effects

Cumulative effects for the olive-sided flycatcher were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that fragment suitable habitat are activities that may have negative effects on breeding success of individual olive-sided flycatchers.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors.

The project area in question would result in additional loss of lowland conifer habitat under Alternative 1 and 2. However, Alternative 2 will require higher amounts additional clearing of forested areas due to the narrower corridor, further fragmenting mature contiguous hardwood forest habitat than the preferred alternative.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon olive-sided flycatcher or foraging habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon olive-sided flycatcher or their habitat. Alternative 1 or 2 may have short-term negative effects on habitat for this species, but would not have an effect on population viabilities of olive-sided flycatcher within the forest. Given the current management direction of the CNF for this species, it is unlikely that enough suitable olive-sided flycatcher habitat will be removed to negatively effect this species survival in the forest.

Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

2.4.2.5 Bay-breasted Warbler (*Dendroica castanea*)

CNF, Minnesota, Leech Lake Reservation Status: The bay-breasted warbler has no state status and the Leech Lake Reservation Sensitive Species List (March 2008) lists it as a “Sensitive” species.

The National Forest designates the bay-breasted warbler as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for bay-breasted warblers as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17. There are no Forest Plan directives specific to the bay-breasted warbler.

General Habitat Requirements: The bay-breasted warbler is a regular breeding resident only in the northern portions of Cook, Lake, and Saint Louis Counties in Minnesota (Janssen, 1987). It breeds in mid-age to mature spruce fir forests where cool, dense coniferous growth is interrupted by small openings such as bogs or clearings (Morse, 1989). Preferred nesting trees include balsam fir and spruces, mixed with tamaracks, white pines, birches, or aspens. Nests are usually saddled on a horizontal limb at medium heights (averaging about 20 feet off the ground) and usually in conifers (DeGraaf et al., 1991). The species breeds throughout the spruce-fir forest of Canada and the northernmost parts of the U.S. following the range of spruce budworm (Janssen, 1987). The forests surrounding the project corridor are
predominantly spruce-fir types, so abundant potential habitat for this species exists in the vicinity of the project area, though the project corridor may be south of this species' range.

**Distribution within the CNF/LLR:** This species is a conifer dependent species that is closely associated with spruce budworm outbreaks (Morse, 1989). Conifer dominated forest habitats were replaced with aspen forest in the CNF/LLR over the past 100 years and this has reduced the available habitat for the bay-breasted warbler (USDA FS, 2004). This species seems to respond more to prey abundance than habitat availability. Suitable conifer habitats are present but isolated on the CNF/LLR and therefore do not support spruce budworm epidemics like other parts of the state. Cable (2000) found that when spruce budworm outbreaks occur, they tend to be scattered in white spruce plantations, either in 30-year-old over-crowded trees, or 60 year old dead or dying trees. There are 23 historic and current records of bay-breasted warblers and 2 known territories within the cumulative effects boundaries on the CNF.

**Occurrence within Project Area:** This species was not detected during the songbird surveys conducted for this project in 2007 and 2008 along the Alternative 1 corridor. See Appendices E and F for field survey reports on habitat occupancy.

**Risk Factors:** Risk factors include short tree harvest rotation cycles, decreasing forest age, and conversion of spruce/fir to species less susceptible to spruce budworm attacks such as black spruce and jack pine. Insect control programs would affect the bay-breasted warbler. Management of spruce/fir on a landscape level over time will define this species’ potential habitat within the proclamation boundaries of the CNF.

**Direct Effects**

Table 2.4.2-5 presents the effects of the proposed alternatives on the bay-breasted warbler habitat.

![Table 2.4.2-5](image)

**Alternative 1 – Preferred Alternative**

Suitable bay-breasted warbler habitats were screened according to *Survey Screening Criteria: Regional Forester’s Sensitive Species of Chippewa National Forest March 2007* and acreage of impacts was calculated for potential impacts from construction using GIS protocols. Suitable nesting habitat occurs along the Preferred Alternative. However, surveys along the Preferred Alternative did not detect any bay-breasted warblers within 300 feet of the existing Enbridge right-of-way (Appendices E and F). The Preferred alternative would impact 33.1 acres of suitable habitat. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1st, or before August 1st, without prior approval from the FWS.
Alternative 2 – Great Lakes Gas Alternative

Suitable nesting habitat occurs along the Great Lakes Gas Alternative. However, no records of bay-breasted warblers occur within 300 feet of the existing Enbridge ROW. The Great Lakes Gas Alternative would impact 42.3 acres of suitable habitat.

Indirect Effects

Clearing of additional forest to accommodate pipeline construction within suitable forest types may affect long-term habitat opportunities for bay-breasted warbler within the analysis area. The additional width of pipeline right-of-way will further alter forested habitats regardless of which alternative is chosen. However, the existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission line corridors along the length of the CNF/LLR crossing. The co-location of these corridors has much more human activity than corridors that reach into the less fragmented portions of the CNF.

Cumulative Effects

Cumulative effects for the bay-breasted warbler were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, activities, or treatment of insects that would eliminate spruce budworm outbreaks may have negative effects on breeding success of individual bay-breasted warblers. The CNF/LLR provides some suitable habitat but may be at the southern limit of this species range.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors.

The project area in question would result in additional loss of suitable bay-breasted warbler habitat under Alternative 1 and 2. However, Alternative 2 will require higher amounts additional clearing of forested areas due to the narrower corridor, further altering mature contiguous hardwood forest habitat than the preferred alternative.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon bay-breasted warbler. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon bay-breasted warbler. Alternative 1 or 2 may have short-term negative effects on habitat for this species, but would not have an effect on population viabilities of bay-breasted warbler within the forest. Given the current management direction of the CNF for this species, it is unlikely that enough suitable bay-breasted warbler habitat will be removed to negatively effect this species survival in the forest.

Determination of Effects

Bay-breasted warbler population levels respond to abundance of prey such as spruce budworms outbreaks. The CNF also lies at the southern limit of the bay-breasted warblers’ range and the cover types present tend to not support budworm epidemics (Cable, 2000). The Alberta Clipper and Southern Lights Diluent Projects would affect an insignificant amount of spruce-fir forest.

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.
CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

### 2.4.2.6 Connecticut Warbler (Oporornis agilis)

**CNF, Minnesota, Leech Lake Reservation Status:** The Connecticut warbler has no state status and the Leech Lake Reservation Sensitive Species List (March 2008) lists it as a “Sensitive” species.

The National Forest designates the Connecticut warbler as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for Connecticut warblers as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17. There are no Forest Plan directives specific to the Connecticut warbler.

**General Habitat Requirements:** The Connecticut warbler is an uncommon, elusive neotropical migrant. The species forages for invertebrates and builds nests on the ground under low, dense shrubs (Jaakko Poyry Consulting, 1992). Their habit of remaining concealed within dense foliage makes them difficult to detect (McPeek and Adams, 1994). The species breeds in a variety of habitats ranging from wet coniferous bogs to well-drained deciduous woodlands (Curson et al., 1994). However, this warbler is most abundant in mature, lowland coniferous habitats and is uncommon to rare in other types of coniferous vegetation (NRRI, 1992). The variety of habitat types utilized by this species makes it difficult to determine any strong habitat affinities. This habitat plasticity also suggests that the species is not limited by habitat availability in natural conditions on the Forest, but human alteration of the landscape is probably an important factor. In general, preferred habitats appear to be relatively open, with only moderate understory and ground cover. This describes much of the forested areas surrounding the project area. Thus, there is suitable habitat in the immediate vicinity of the project area.

**Distribution within the CNF/LLR:** This species is known to occur within portions of the CNF/LLR within black spruce and tamarack bogs. CNF records indicate five historic and current records of Connecticut warblers and probable territories within the cumulative effects boundaries on the CNF.

**Occurrence within Project Area:** Six occurrences of this species were detected during the 2007 and 2008 songbird surveys conducted for this project. See Appendices E and F for field survey reports on habitat occupancy.

**Risk Factors:** Risk factors include logging of lowland conifer stands, changes in water table resulting from beaver activity, alteration of bog hydrology, and other natural events.

**Direct Effects**

Table 2.4.2-6 presents the effects of the proposed alternatives on the Connecticut warbler habitat.

<table>
<thead>
<tr>
<th>Table 2.4.2-6</th>
<th>Acres of Connecticut Warbler Habitat a Intersected By Proposed Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Forest Types and Age within Cumulative Effects Boundary</strong></td>
<td><strong>Alternative 1 - (acres of impacted Connecticut Warbler stands)</strong></td>
</tr>
<tr>
<td>15,839 acres</td>
<td>0.52</td>
</tr>
<tr>
<td>Total</td>
<td>0.52</td>
</tr>
</tbody>
</table>
**Alternative 1 – Preferred Alternative**

Suitable Connecticut warbler habitats were screened according to *Survey Screening Criteria: Regional Forester’s Sensitive Species of Chippewa National Forest, March 2007* and acreage of impacts was calculated for potential impacts from construction using GIS protocols. Occupied Connecticut warbler habitats were buffered by 400 feet in order to calculate potential impacts from construction of the preferred alternative. Suitable nesting habitat is abundant from just west of Bena to the Mississippi River. Surveys along this segment of the Preferred Alternative documented 5 territorial males within 400 feet of the existing Enbridge right-of-way. The Preferred Alternative will impact 0.52 acre of occupied Connecticut warbler habitat. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1st, or before August 1st, without prior approval from the FWS.

**Alternative 2 – Great Lakes Gas Alternative**

Suitable nesting habitat occurs along the Great Lakes Gas Alternative at the same locations as the Preferred Alternatives. The same 5 territorial males occurred at the east end of the Great Lakes Gas Alternative. Impacts to Connecticut warbler habitat are identical to the Preferred Alternative and would impact 0.52 acre.

**Indirect Effects**

Long-term habitat opportunities for Connecticut warbler within the analysis area can be affected by clearing of additional forest to accommodate pipeline construction. Impacts could occur within areas that currently contain the most acreage of suitable habitat such as those between Bena and the Mississippi River along both Alternative 1 and 2. The additional width of pipeline right-of-way will further alter forested habitats regardless of which alternative is chosen. However, the existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors has much more human activity than corridors that reach into the less fragmented portions of the CNF/LLR.

**Cumulative Effects**

Cumulative effects for the Connecticut warbler were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands, or hydrologic alteration may have negative effects on breeding success of individual Connecticut warblers. The CNF/LLR provides suitable habitat east of Bena within the analysis area.

**All Alternatives**

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. The project area in question would result in additional loss of lowland conifer habitat under Alternative 1 and 2.
Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon Connecticut warbler or its breeding habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon Connecticut warbler or their habitat due to the small amount of habitat being affected in relation to those habitats that are available on the CNF. Alternative 1 or 2 may have short-term negative effects on habitat for this species, but would not have an effect on population viabilities of Connecticut warbler within the forest. Given the current management direction of the CNF for this species, it is unlikely that enough suitable Connecticut warbler habitat will be removed to negatively effect this species survival in the forest.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

**CNF:** The project will not likely cause a trend to federal listing or loss of viability for the species.

**LLBO:** The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

**2.4.2.7 Black-throated Blue Warbler (*Dendroica caerulescens*)**

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR is proposing to change the status of the black-throated blue warbler to special concern, it currently has no status. The Leech Lake Reservation Sensitive Species List (March 2008) lists the black-throated blue warbler as a “Sensitive” species.

The National Forest designates the black-throated blue warbler as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for black-throated blue warblers as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17. There are no Forest Plan directives specific to the black-throated blue warbler.

**General Habitat Requirements:** The black-throated blue warbler is a bird of the forest interior that generally inhabits large tracts of northern hardwood, maple-basswood, and mixed deciduous-coniferous forests (Holmes, 1994). Breeding habitat characteristics include continuous tracts of deciduous and mixed forest, with a dense shrub understory, remote from openings of edges (Curson et al., 1994). Black-throated blue warblers have been identified as sensitive to forest area size (NRRI, 1992). Finch (1991) classified this species as area sensitive and suggested minimum area of suitable habitat for breeding at 100 ha. However, his study was for populations in the eastern United States in a urbanized and agricultural dominated landscape. The sensitivity of the species to patch size in a forest dominated landscape is unknown (NRRI, 1992). These forests are generally dominated by maples, birch, aspen, and other northern hardwoods, with varying amounts of coniferous species. A study in northeastern Minnesota found that in northern hardwood areas with few shrubs, black-throated blue warblers are primarily associated with small gaps (0.05-0.10 ha) in the canopy that have resulted from blowdowns (Hanowski, 1998). Several studies indicate that forest interior species such as the black-throated blue warbler have likely experienced historic population declines due to extensive deforestation during settlement of forested areas. However, recently some forest species have experienced modest population increases due to cleared areas reverting to forest (Holmes, 1994).

**Distribution within the CNF/LLR:** Black-throated blue warblers are at the western periphery of their range in the CNF/LLR. The CNF database indicates that there are 16 records of black-throated blue warblers within the CNF and breeding is inferred from many of the sightings.
**Occurrence within Project Area:** This species was not detected during the songbird surveys conducted in 2007 and 2008 for this project along the Alternative 1 corridor. See Appendices E and F for field survey reports on habitat occupancy.

**Risk Factors:** Risk factors include short rotation cycles, decreasing forest age, and forest fragmentation.

**Direct Effects**

Table 2.4.2-7 presents the effects of the proposed alternatives on the black-throated blue warbler habitat.

<table>
<thead>
<tr>
<th>TABLE 2.4.2-7</th>
<th>Acres of Black-Throated Blue Warbler (BTBW) Habitat a Intersected By Proposed Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Forest Types and Age within Cumulative Effects Boundary</td>
</tr>
<tr>
<td>28,950 acres a</td>
<td>(35) - represents 0.1 percent of BTBW habitat in Cumulative Effects Boundary</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
</tr>
</tbody>
</table>

a White pine, Balsam fir-aspen-paper birch, Northern white cedar, bur oak, Northern red oak, black ash-American elm-red maple, sugar maple-basswood, sugar maple, mixed hardwoods, paper birch, balsam poplar, aspen-white spruce-balsam fir over 60 years old; Red pine, Northern white cedar, mixed swamp conifer if stands area greater than 80 years old; or Black ash-American elm-red maple if stands are greater than 60 years old if they have dense shrub understories well distributed in the stand over at least 5 contiguous acres.

**Alternative 1 – Preferred Alternative**

Suitable black-throated blue warbler habitats were screened according to *Survey Screening Criteria: Regional Forester’s Sensitive Species of Chippewa National Forest March 2007* and acreage of potential impacts were calculated using GIS protocols. Potential black-throated blue warbler habitats were overlain on the 140-foot construction footprints using Arcmap™ in order to calculate potential impacts from construction of the preferred alternative. The songbird surveys conducted in 2007 did not detect any occurrences of black-throated blue warbler along the Preferred Alternative. However, 35 acres of potential habitat would be altered along this alternative. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1 st, or before August 1 st, without prior approval from the FWS.

**Alternative 2 – Great Lakes Gas Alternative**

Suitable nesting habitat occurs along the Great Lakes Gas Alternative in greater amounts than the Preferred Alternative. Approximately 97.5 acres of suitable black-throated blue warbler habitat would be impacted if this alternative were to be constructed.

**Indirect Effects**

Clearing of additional forest to accommodate pipeline construction within suitable forest types may affect long-term habitat opportunities for black-throated blue warbler within the analysis area. The greatest impacts would occur within areas that currently contain the most acreage of suitable habitat such as those between Pike Bay and Portage Lake along both Alternative 1 and 2. The additional width of pipeline right-of-way will further fragment forested habitats regardless of which alternative is chosen. However, the existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington
Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors greatly reduces the project’s impact.

**Cumulative Effects**

Cumulative effects for the black-throated blue warbler were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands, or hydrologic alteration may have negative effects on breeding success of individual black-throated blue warblers. The CNF/LLR provides suitable habitat especially on the eastern half of the analysis area.

**All Alternatives**

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors.

The additional clearing for construction of a transmission line will reduce the amount of suitable black-throated blue warbler habitat. Alternative 1 would temporarily alter 18 acres of suitable mature forest habitat and alter 17 acres permanently. Impacts due to Alternative 2 would result in the loss of 97.5 acres of suitable habitat. The project area in question would result in additional loss of suitable black-throated blue warbler habitat under Alternative 1 and 2. However, Alternative 2 will require higher amounts additional clearing of forested areas due to the narrower corridor, further altering mature contiguous hardwood forest habitat than the Preferred Alternative.

Timber harvest by the CNF and on state, county, and private lands within suitable habitat may affect habitat opportunities for the black-throated blue warbler particularly along the Great Lakes Gas Alternative. The potential loss of habitat and further forest alteration by these activities would reduce contiguous forest patches and reduce available habitat.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon black-throated blue warbler. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon black-throated blue warbler. Alternative 1 or 2 may have short-term negative effects on habitat for this species, but would not have an effect on population viabilities of black-throated blue warbler within the forest. Given the current management direction of the CNF for this species, it is unlikely that enough suitable black-throated blue warbler habitat will be removed to negatively effect this species survival in the forest.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

**CNF:** The project will not likely cause a trend to federal listing or loss of viability for the species.

**LLBO:** The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.
2.4.2.8 **Black-backed Woodpecker (*Picoides arcticus*)**

**CNF, Minnesota, Leech Lake Reservation Status:** The black-backed woodpecker has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the black-backed woodpecker as “Threatened” and notes that “loss of high-quality jack pine and tamarack habitat has probably caused population decline.”

The National Forest designates the black-backed woodpecker as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for black-backed woodpecker as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17.

Specific to the black-backed woodpecker the following Forest Plan Objectives apply:

O-WL-25: Maintain or improve quality nesting and foraging habitat by managing toward the Landscape Ecosystem Vegetation Objectives for mature and older conifer forest. Important characteristics within these older forests include trees large enough for nest cavities and current or future habitat to provide dead and dying flaky-barked trees for forage.

In addition to tracts of mature and older conifer forest, retain large concentrations of flaky-barked conifer trees (especially jack pine, white spruce, black spruce, and tamarack) that have been damaged or killed by fire, insects, disease, flooding or other disturbances. Prioritize maintenance of woodpecker habitat in areas and concentrations where management objective conflicts can be minimized.

O-WL-26: The amount and distribution of dead and dying trees should provide adequate representation of patterns and amounts that would result from natural disturbances (such as fire and flooding) and other ecological processes (such as insect and disease infestation and vegetation succession). If natural disturbances do not provide adequate habitat, it may be necessary to emulate natural disturbances through management ignited fire or other treatments.

G-WL-19: Protect known nest sites with a 200-foot radius surrounding nest sites until young have fledged.

G-WL-20: Where ecologically appropriate, retain 6-10 jack pine per acre in even-aged regeneration harvests in mixed conifer stands.

Specific to the black-backed woodpecker’s habitat, the following Forest Plan Objectives apply:

S-WL-10: Maintain at least 5,300 acres in mature or older jack pine forest types during the first 10-years of plan implementation.

**General Habitat Requirements:** Black-backed woodpeckers are year-round residents in Minnesota (Janssen, 1987). This species is a wide-ranging species, which prefers early post-fire habitats, provided these areas contain high numbers of dead and dying trees. They are known to inhabit boreal and montane coniferous forests, though conifer composition varies depending upon the geographic location (Dixon and Saab, 2000). In Minnesota, black spruce and tamarack swamps, white cedar swamps, eastern hemlock, and jack pine forests all provide habitat. The species gleans bark-dwelling invertebrates by removing flakes of bark from dead or dying conifer trees which reveal the wood-boring insect larvae (Roberts, 1932). Early post-fire forests can provide good food sources. This species rapidly moves into areas where fire, insect outbreaks, wind events, or flooding have affected stands of flaky-barked conifers (Bergeron et al. 2002). If the area is large enough to provide sufficient bark beetle infestation, the species
will rapidly reproduce for a few years until the food sources are gone. At this point they will disperse across the landscape in low numbers awaiting another disturbance event that will result in a bark beetle infestation. Although there appears to be abundant habitat for this species in the project area, much of it is not in the right stage of decline or death to provide high quality habitat.

**Distribution within the CNF/LLR:** This species is known to occur within portions of the CNF/LLR where black spruce, fire-damaged red pine, jack-pine or tamarack bogs occur. CNF records indicate 49 historic and current records of black-backed woodpeckers occur within the CNF proclamation boundaries. However, no information on population trends is available.

**Occurrence within Project Area:** This species was observed in a black spruce bog near the eastern end of the project during the songbird surveys conducted for this project in 2007 along the alternative 1 corridor; no observations were made of this species in 2008 along alternative 1. See Appendices E and F for field survey reports on habitat occupancy. This species was observed on the edge of the preferred alternative right-of-way near Nushka Lake during the Minnesota County Biological Survey conducted by the MDNR.

**Risk Factors:** Risk factors include incompatible forestry practices; deforestation may detrimentally affect periodic fires that benefit this species (Spahr et al., 1991). Salvaging harvests of stands that have wind, flood, or fire damage before the birds have had the opportunity to exploit the bark beetle infestation greatly reduces habitat for the species. It is believed that this species is declining on the LLR due to loss of jack pine, an important habitat for this species (LLBO, personal communication).

**Direct Effects**

Table 2.4.2-8 presents the effects of the proposed alternatives on the black-backed woodpecker habitat.

<table>
<thead>
<tr>
<th>TABLE 2.4.2-8</th>
<th>Acres of Black-Backed Woodpecker (BBWP) Habitat a Intersected By Proposed Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Forest Types and Age within Cumulative Effects Boundary</strong></td>
<td><strong>Alternative 1 - (acres of impacted BBWP stands)</strong></td>
</tr>
<tr>
<td>13,652 acres*</td>
<td>21.8</td>
</tr>
<tr>
<td>Total</td>
<td>21.8</td>
</tr>
</tbody>
</table>

*Jack Pine, balsam fir-aspen-paper-birch, white spruce, upland black spruce over 40 years old or black spruce, Northern white cedar, Tamarack, mixed swamp conifer, Northern white cedar-aspen over 120 years or, red pine, white pine over 150 years old.

**Alternative 1 – Preferred Alternative**

Suitable black-backed woodpecker habitats were screened according to *Survey Screening Criteria: Regional Forester’s Sensitive Species of Chippewa National Forest March 2007* and acreage of potential impacts was calculated from construction using GIS protocols. Occupied black-backed woodpecker habitats were buffered by 400 feet in order to calculate potential impacts from construction of the preferred alternative. Suitable habitat occurs from just west of Bena to the Mississippi River. Surveys along this segment of the Preferred Alternative documented 1 black-backed woodpecker within 400 feet of the existing Enbridge right-of-way (Appendices E and F). The Preferred Alternative will impact 21.8 acres of potential black-backed woodpecker habitat.

To minimize impacts on nesting black backed woodpeckers before and during construction of the project, Enbridge has agreed to implement the following measures:
• Conduct surveys for active nests in suitable habitat and based on 2007 call survey locations, within 200 feet of the proposed route prior to construction, if construction activities would occur during nesting season (approximately May through July).

• Minimize construction activities within 200 feet of active nests (nesting period is approximately May through July).

**Alternative 2 – Great Lakes Gas Alternative**

Suitable nesting habitat occurs along the Great Lakes Gas Alternative at the same locations as the Preferred Alternative. The same black-backed woodpecker occurred at the east end of the Great Lakes Gas Alternative. Impacts to suitable black-backed woodpecker habitat along the Great Lakes Gas Alternative would impact 27.3 acres.

**Indirect Effects**

Clearing of additional forest to accommodate pipeline construction within suitable forest types may affect long-term habitat opportunities for black-backed woodpecker within the analysis area. The greatest impacts would occur within areas that currently contain the most acreage of suitable habitat such as those between Bena and the Mississippi River along both Alternative 1 and 2. The additional width of pipeline right-of-way will further fragment forested habitats regardless of which alternative is chosen. However, the existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission line corridors along the length of the CNF/LLR crossing. The co-location of these corridors greatly reduces the project’s impact.

**Cumulative Effects**

Cumulative effects for the black-backed woodpecker were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands may have negative effects on breeding success of individual black-backed woodpeckers.

Timber harvest by the CNF and on state, county, tribal, and private lands within suitable habitat may affect long-term habitat opportunities for the black-backed woodpecker. The removal of current or future foraging and nesting trees, and a reduction on the amount of conifers present, or proportion of mature conifers would be detrimental to the amount of available habitat. This species is particularly dependent upon lowland conifer habitats where dying conifers occur as carrying habitat. These lowland conifer habitats sustain small populations of black-backed woodpeckers between forest fires or insect outbreaks (Cable, 2005).

**All Alternatives**

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. The project area in question would result in additional loss of lowland conifer habitat under Alternative 1 and 2.

Impacts due to Alternative 1 and 2 would result in approximately 21.8 and 27.3 acres of suitable habitat loss, respectively. Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon black-backed woodpecker or its breeding habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon
black-backed woodpecker or their habitat due to the small amount of habitat being affected in relation to those habitats that are available on the CNF. Alternative 1 or 2 may have short-term negative effects on habitat for this species, but would not have an effect on population viabilities of black-backed woodpecker within the forest. Given the current management direction of the CNF for this species, it is unlikely that enough suitable black-backed woodpecker habitat will be removed to negatively effect this species survival in the forest.

Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.2.9 LeConte’s Sparrow (*Ammodramus leconteii*)

**CNF, Minnesota, Leech Lake Reservation Status:** The LeConte’s sparrow has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the LeConte’s sparrow as “Sensitive” and notes that a “population decline may be due to habitat changes.”

The National Forest designates the LeConte’s sparrow as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for LeConte’s sparrow as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17.

Specific to the LeConte’s sparrow the following Forest Plan Objectives apply:

G-WL-21: Management activities, especially prescribed fire, that may negatively impact nesting habitat in the short term in order to promote future suitable habitat, should maintain adequate undisturbed nesting habitat.

**General Habitat Requirements:** LeConte’s sparrows are a secretive species that utilize wet grasslands, sometimes mixed with cattails, *Phragmites*, and sedge marshes often interspersed with small alders, birches, and shrubs (Rising, 1996). However, they normally avoid areas with permanent standing water. In addition to wetlands, this species also regularly inhabits timothy hayfields and other types of damp meadows, tall grass prairies, and dry short-grass hayfields (Robbins, 1991; Stewart, 1975; Cooper, 1984). This sparrow is a locally common breeding resident of central and northern Minnesota (Janssen, 1987). Due to their weak insect-like songs, territorial LeConte’s sparrows are often overlooked. This sparrow also tends to be most vocal at night (Murray, 1969). Territorial males will utilize grass clumps, persistent herbaceous vegetation, and small shrubs as singing perches and will also sing from the ground. Given their secretive behavior, historic changes in the status and distribution of LeConte's Sparrows are poorly understood. Wetland drainage may have caused declines in some populations, but since this species also breeds in upland grasslands, their overall populations may not have been reduced to the same extent as species restricted to wetlands. Additionally, populations are known to experience considerable annual fluctuations in abundance in portions of their range, becoming most numerous during wet years (Stewart, 1975). These fluctuations tend to obscure long-term population trends. Abundant habitat for this species exists around the project area.
Distribution within the CNF/LLR: This species is known to occur within portions of the CNF/LLR where sedge meadows, wetlands, and sedge dominated bogs occur. CNF records indicate 23 historic and current records of LeConte’s sparrow occur within the CNF proclamation boundaries.

Occurrence within Project Area: This species has been observed in sedge meadows and mowed fields near the eastern end of the project during past songbird surveys conducted along the Enbridge corridor but not during the 2007 songbird survey for this project (Krych, 2000). Three observations of this species were made during 2008 songbird surveys. See Appendices E and F for field survey reports on habitat occupancy.

Risk Factors: Risk factors include fire suppression, successional changes to fields, and alteration of hydrology to wetlands habitats.

Direct Effects

Table 2.4.2-9 presents the effects of the proposed alternatives on the LeConte’s sparrow habitat.

<table>
<thead>
<tr>
<th>TABLE 2.4.2-9</th>
<th>Acres of LeConte’s Sparrow Habitat a Intersected By Proposed Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Forest Types and Age within Cumulative Effects Boundary</td>
</tr>
<tr>
<td></td>
<td>Alternative 1 - (acres of impacted LeConte’s Sparrow stands)</td>
</tr>
<tr>
<td>7,067 acres a</td>
<td>(68) - represents 0.9 percent of LeConte’s sparrow habitat in Cumulative Effects Boundary</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>Alternative 2 - (acres of impacted LeConte’s Sparrow stands)</td>
</tr>
<tr>
<td></td>
<td>(62.9) - represents 0.9 percent of LeConte’s sparrow habitat in Cumulative Effects Boundary</td>
</tr>
<tr>
<td></td>
<td>62.9</td>
</tr>
</tbody>
</table>

a Stands designated as permanent openings, sedge meadow, shallow marsh, or bog that are equal or greater than 10 acres in size and are not dominated by cattails or shrubs.

Alternative 1 – Preferred Alternative

LeConte’s sparrow habitat occurs along the existing right-of-way but most of the area is not open enough to provide adequate breeding habitat. Several large sedge meadows are crossed by the existing Enbridge right-of-way. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Preferred Alternative. The older pipelines placed above-ground have allowed cattails and shrubs to encroach into the wetlands reducing available habitat. In areas where pipelines were constructed with recent construction techniques, sedge meadow habitat has increased. Clearing of forest would create additional temporary grassland or sporadic brushy habitat that this species prefers. Clearing forest or brushy habitat for additional right-of-way would add 68 acres of grassland habitat. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1st, or before August 1st, without prior approval from the FWS.

Alternative 2 – Great Lakes Gas Alternative

Habitat for this species occurs along the Great Lakes Gas Alternative but most of the area is not open enough to provide adequate breeding habitat. This corridor is characterized as a shrub and grassy habitat that is surrounded by forest. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Great Lakes Gas Alternative.
Clearing of forest would add grassland or sporadic brushy habitat that this species prefers. Clearing additional ROW would create 62.9 acres of additional grassy habitat.

**Indirect Effects**

Clearing of additional forest to accommodate pipeline construction may temporarily increase habitat opportunities for LeConte’s sparrow within the analysis area. The greatest effects would occur within areas that currently contain open grassy habitat. These grassy areas would be augmented by the construction of additional pipeline right-of-way. The additional width of pipeline right-of-way will augment grassy or shrubby habitat regardless of which alternative is chosen. Effects to habitat would be temporary and grassy habitats would recover quickly.

**Cumulative Effects**

Cumulative effects for the LeConte’s sparrow were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands, or hydrologic alteration would have temporary effects on the prevalence of open grassy habitats preferred by this species.

**All Alternatives**

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. The project area in question would result in additional grassland or low shrubby habitat under Alternative 1 and 2.

Clearing of forested areas could create additional grassland habitats that could be utilized by LeConte’s sparrows. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along Alternatives 1 and 2. Impacts due to Alternative 1 and 2 would result in temporary impacts to approximately 68 and 62.9 acres, respectively of suitable habitat.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon LeConte’s sparrow or its breeding habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon LeConte’s sparrow or their habitat due to the small amount of habitat being affected in relation to those habitats that are available on the CNF. Given the current management direction of the CNF for this species, it is unlikely that enough suitable LeConte’s sparrow habitat will be altered to negatively effect this species survival in the forest.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

**CNF**: The project will not likely cause a trend to federal listing or loss of viability for the species.

**LLBO**: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.
2.4.2.10 Nelson’s Sharp-tailed Sparrow (*Ammodramus nelsoni*)

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR lists the Nelson’s sharp-tailed sparrow as species of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) does not list the Nelson’s sharp-tailed sparrow.

The National Forest designates the Nelson’s sharp-tailed sparrow as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for Nelson’s sharp-tailed sparrow as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17.

Specific to the Nelson’s sharp-tailed sparrow the following Forest Plan Objectives apply:

O-WL-28: In at least 8 known breeding locations protect, maintain, or restore high quality nesting habitat: sedge-dominated wet meadows, marshes, and open peatlands with minimal open water.

G-WL-22: Management activities, especially prescribed fire, that may negatively impact nesting habitat in the short term in order to restore future suitable habitat, should maintain adequate undisturbed nesting habitat.

**General Habitat Requirements:** Nelson’s sharp-tailed sparrows are also a secretive species that utilizes prairie habitats where cordgrass, squirreltail, whitetop, and *Phragmites* are common (Rising, 1996). They have also been observed in wet meadows, peatbogs, lakesides with emergent vegetation, native prairie, abandoned fields, and planted cover, although use of these habitats may vary depending upon moisture conditions. In the CNF/LLR, they occur in areas where expansive shallow sedge meadows with little open water predominate. This sparrow is a rare breeding resident of central and northwestern Minnesota (Janssen, 1987). Like many members of the *Ammodramus* genus, this species has a weak insect-like song that is easily overlooked. This sparrow also vocalizes at night (Rising, 1996). Territorial males sing persistently upon arrival on breeding grounds where they sing from the ground and grassy clumps.

**Distribution within the CNF/LLR:** This species is known to occur within portions of the CNF/LLR where sedge meadows, wetlands, and sedge-dominated bogs occur. CNF database records indicate that there are a total 24 historic and current records of Nelson’s sharp-tailed sparrow within the analysis area and one record within the cumulative effects boundaries near the Mississippi River. This record is 32,955 feet from the preferred and Great Lakes Gas Alternatives.

**Occurrence within Project Area:** This species was not detected during the songbird surveys conducted in 2007 and 2008 along the alternative 1 corridor. See Appendices E and F for field survey reports on habitat occupancy.

**Risk Factors:** Risk factors include fire suppression, successional changes to fields and alteration of hydrology to wetlands habitats.

**Direct Effects**

Table 2.4.2-10 presents the effects of the proposed alternatives on the Nelson’s sharp-tailed sparrow habitat.

<table>
<thead>
<tr>
<th>TABLE 2.4.2-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acres of Nelson’s Sharp-Tailed Sparrow Habitat a Intersected By Proposed Alternatives</td>
</tr>
</tbody>
</table>
Alternative 1 – Preferred Alternative

Nelson’s sharp-tailed sparrow habitat occurs along the existing right-of-way but most of the wetland areas are not large enough to provide adequate breeding habitat. Several large sedge meadows are crossed by the existing right-of-way and many of these wetlands have a large percentage of shrub habitat. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Preferred Alternative. The older pipelines placed above-ground have allowed cattails and shrubs to encroach into the wetlands reducing available habitat. In areas where pipelines were constructed using recent construction techniques sedge meadow habitat has increased in forested wetlands. Clearing for additional right-of-way could create additional sedge meadow habitats but not in areas that are wet. Clearing additional right-of-way would affect 22.8 acres of additional open wetland habitat. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1st, or before August 1st, without prior approval from the FWS.

Alternative 2 – Great Lakes Gas Alternative

Habitat for this species occurs along the Great Lakes Gas Alternative but most of the area is not large enough or open enough to provide adequate breeding habitat. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Great Lakes Gas Alternative. This corridor is characterized as a shrub and grassy habitat that is surrounded by forest. Clearing of forest could create additional open wetland habitat that this species prefers. Clearing additional ROW would affect 8.2 acres of additional open wetland habitat.

Indirect Effects

Indirect effects on this species could include alteration of wetland hydrology or the introduction of invasive species into wetland habitats that these birds could utilize. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. The introduction of invasive species could disrupt the function of existing wetland ecosystems by displacing native species or species that provide food, cover, or shelter to existing prey species or the Nelson’s sharp-tailed sparrow. Enbridge has developed a Noxious Weeds and Invasive Species Control Plan to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

Clearing of additional forest to accommodate pipeline construction may temporarily increase habitat opportunities for Nelson’s sharp-tailed sparrow within the analysis area. The greatest effects would occur within areas that currently contain open sedge meadow habitat. These sedge meadow areas would be
augmented by the construction of additional pipeline right-of-way. The additional width of pipeline right-of-way will augment grassy or shrubby habitat regardless of which alternative is chosen. However, the existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors greatly reduces the project’s impact.

Cumulative Effects

Cumulative effects for the Nelson’s sharp-tailed sparrow were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands could have positive effects to the prevalence of open grassy habitats preferred by this species.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. The project area in question would result in additional grassland or low shrubby habitat under Alternative 1 and 2.

Clearing of forested areas could create additional sedge meadow habitats that could be utilized by Nelson’s sharp-tailed sparrows. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along Alternatives 1 and 2. Impacts due to Alternative 1 and 2 would result in temporary alteration of 22.8 and 8.2 acres, respectively of suitable habitat.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon Nelson’s sharp-tailed sparrow or its breeding habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon Nelson’s sharp-tailed sparrow or their habitat due to the small amount of habitat being affected in relation to those habitats that are available on the CNF. Alternative 1 or 2 may have temporary negative effects on habitat for this species, but would not have an effect on population viabilities of Nelson’s sharp-tailed sparrow within the forest. Given the current management direction of the CNF for this species, it is unlikely that enough suitable Nelson’s sharp-tailed sparrow habitat will be removed to negatively effect this species survival in the forest.

Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determination of effects for Alternatives 1 and 2.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

2.4.2.11 Great Blue Heron (Ardea herodias)

CNF, Minnesota, Leech Lake Reservation Status: The great blue heron has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the great blue heron as “Sensitive” and notes that this species is “subject to disturbance and habitat loss.”
The National Forest designates the great blue heron as a Species of Interest and provides special management provisions for rookeries. Forest Plan directives specific to the great blue heron apply:

G-WL-28: Prohibit management activities within 330 feet of active heron colonies. Prohibit management activities from 330 to 660 feet from the heron colony from March 1 through August 31.

**General Habitat Requirements:** Great blue herons are a large solitary species that spend most of their days hunting for prey along lakes, streams, ponds or other waterbodies. Most great blue herons breed in localized colonies that may number in the hundreds of nesting pairs. Colonies can be located in forested lowlands, uplands, or on the ground (Butler, 1992).

**Distribution within the CNF/LLR:** This species is present where lakes, rivers, streams, wetlands, and open water occur throughout the CNF/LLR. MDNR Natural Heritage Inventory review (2008) shows records of 3 historic heron rookeries within one mile of the proposed route through the CNF/LLR. There are 38 historic heron nesting sites within the CNF/LLR. One colony was discovered along the Alberta Clipper and Southern Lights Diluent Projects during 2007 Songbird Surveys and Raptor Stick Nest Surveys (see Appendices C and F).

**Occurrence within Project Area:** One blue heron nest colony was documented along the project route during the raptor surveys and songbird surveys conducted for this project near Portage Creek. See Appendices C and F for field survey reports on habitat occupancy and nests.

**Risk Factors:** Risk factors include removal of nest trees, fire, changes to fields, and alteration of hydrology to wetlands habitats.

**Direct Effects**

**Alternative 1 – Preferred Alternative**

Great blue heron habitat occurs along the existing right-of-way at most of the wetland areas and one known nesting colony was discovered near Portage Creek. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Preferred Alternative. The older pipelines placed above-ground were constructed in a manner that increased foraging habitat for this species by creating open water wetland habitat where amphibians and other prey species for this species can be found. Clearing for additional right-of-way could create additional shallow marsh habitats. Clearing additional right-of-way could impact nest trees or further isolate the one known nesting colony.

To minimize impacts on roosting great blue herons during construction of the project, Enbridge has agreed to implement the following measures:

- Restrict construction activities within 660 feet on CNF lands and 1320 feet on LLR of active rookeries (roosting period is approximately March 1 through August 31).

- Modify construction right-of-way and pipeline route to avoid clearing roost trees during construction (see figure 2.4.2-5). Fencing would be placed around the roost trees prior to construction; in addition, seasonal activity restrictions will be complied with if the roost is active at the time of construction.
Alternative 2 – Great Lakes Gas Alternative

Habitat for this species occurs along the Great Lakes Gas Alternative at most of the wetland areas crossed by this alternative. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Great Lakes Gas Alternative.

Indirect Effects

The additional width of pipeline right-of-way would remove forested areas that could potentially be used as nesting sites for a colony. However, given the relative abundance of upland forested habitat available within the CNF/LLR it is unlikely that the removal of upland forest in this area would have a negative impact on this species. The existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors creates an area that has much more human activity than corridors that reach into the less fragmented portions of the CNF.

Cumulative Effects

Cumulative effects for the great blue heron were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands could have positive effects to the prevalence of marshy and open water habitats preferred by this species.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. The project area in question would result in additional grassland or treeless wetland habitat under Alternative 1 and 2.

Clearing of forested areas could create additional shallow marsh habitats that could be utilized by great blue herons. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along Alternatives 1 and 2.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon great blue heron or its breeding habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon great blue heron or their habitat due to the small amount of habitat being affected in relation to those habitats that are available on the CNF. Alternative 1 or 2 may have temporary negative temporary effects on habitat for this species, but would not have an effect on population viabilities of great blue heron within the forest. Given the abundance of suitable foraging and breeding habitat available within the CNF/LLR for this species, it is unlikely that enough suitable great blue heron habitat will be removed to negatively effect this species survival in the forest.

Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determination of effects for Alternatives 1 and 2.
CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.2.12 Short-eared Owl (*Asio flammeus*)

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR lists the short-eared owl as a species of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) ranks the short-eared owl as “Sensitive” and notes that this is an “owl of open country” possibly at edge of its range.

The National Forest has no designation for the short-eared owl and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** The short-eared owl is a species that utilizes open habitats that include old fields, crop stubble, meadows, pastures, prairie, grasslands, and shrubby habitats (Johnsgard, 1988). During the breeding season these owls utilize prairies, grassy plains, and Mikkola (1983) describes breeding habitats as moorlands, marshlands, bogs, dunes, and cleared forest. A combination of substantial areas of resting and nesting cover with nearby hunting areas with an abundance of small mammals is probably a dominant factor in selecting breeding habitats (Cramp, 1985). The short-eared owl is best represented in the north-western and portions of the north-central region of the state during the breeding season (Janssen, 1987).

**Distribution within the CNF/LLR:** This species is not tracked by the CNF and no documentation is available for the short-eared owl on forest lands.

**Occurrence within Project Area:** This species was not detected during raptor or songbird surveys conducted for this project in 2008 along the alternative 1 corridor. See Appendices C and F for field survey reports on habitat occupancy and nests. However, suitable habitat for this species does occur within the project area.

**Risk Factors:** Risk factors include fire suppression, successional changes to fields and alteration of hydrology to wetlands habitats.

**Direct Effects**

**Alternative 1 – Preferred Alternative**

Short-eared owl habitat occurs along the existing right-of-way but most of the area is not open enough to provide adequate breeding habitat. Several large sedge meadows are crossed by the existing right-of-way. Pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Preferred Alternative. Clearing of additional forest would create additional grassland or sporadic brushy habitat that this species prefers. Clearing additional right-of-way is likely to alter forested habitat and augment brush and grassy habitat preferred by this species for nesting. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1st, or before August 1st, without prior approval from the FWS.
Alternative 2 – Great Lakes Gas Alternative

Habitat for this species occurs along the Great Lakes Gas Alternative but most of the area is not open enough to provide adequate breeding habitat. Fewer open sedge meadows or brushy areas occur along the Great Lakes Gas Alternative due to the narrower dimensions of this corridor. This corridor is characterized as a shrub and grassy habitat that is surrounded by forest. Clearing additional ROW is likely to alter forested habitat and augment brush and grassy habitat preferred by this species for nesting.

Indirect Effects

Clearing of additional forest to accommodate pipeline construction may increase habitat opportunities for short-eared owl within the analysis area. The greatest effects would occur within areas that currently contain open grassy habitat. These grassy areas would be augmented by the construction of additional pipeline right-of-way. The additional width of pipeline right-of-way will augment grassy or shrubby habitat regardless of which alternative is chosen. However, the existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors creates an area that has much more human activity than corridors that reach into the less fragmented portions of the CNF.

Cumulative Effects

Cumulative effects for the short-eared owl were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands, or hydrologic alteration would have positive effects to the prevalence of open grassy habitats preferred by this species.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. The project area in question would result in additional grassland or treeless wetland habitat under Alternative 1 and 2.

The direct effect of other projects on short-eared owl habitat is minimal. The additional clearing for construction of a transmission line will increase the amount of grassland habitat. These additional grassland habitats could be utilized by short-eared owl. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along Alternatives 1 and 2.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon short-eared owl or its breeding habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon short-eared owl or their habitat due to the small amount of habitat being affected in relation to those habitats that are available on the CNF. Alternative 1 or 2 may have temporary negative effects on habitat for this species, but would not have an effect on population viabilities of short-eared owl within the forest. Given the abundance of suitable foraging and breeding habitat available within the CNF/LLR for this species, it is unlikely that enough suitable short-eared owl habitat will be removed to negatively effect this species survival in the forest.
Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.2.13 American Bittern (*Botaurus lentiginosus*)

**CNF, Minnesota, Leech Lake Reservation Status:** The American bittern has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the American bittern as “Sensitive” and notes that this is a species “of sedge/cattail wetlands.”

The National Forest has no designation for the American bittern and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** The American bittern is a medium sized heron that utilizes large cattail, bulrush, or sedge marshes for breeding and feeding. Other habitats utilized for foraging or breeding also include bogs, wet meadows, and hayfields ([www.nj.gov/dep/fgw/ensp/pdf/end-thrttened/ambittern.pdf](http://www.nj.gov/dep/fgw/ensp/pdf/end-thrttened/ambittern.pdf)). The American bittern is best represented in the central, northeast, northwestern regions of Minnesota but may breed sparingly throughout the state wherever suitable marsh habitat exists (Janssen, 1987).

**Distribution within the CNF/LLR:** The American bittern ranges throughout all but the desert region of the contiguous United States and has been recorded throughout all of Minnesota. This species is not tracked by the CNF and no documentation is available for the American bittern on forest lands.

**Occurrence within Project Area:** This species was observed during 2007 songbird surveys conducted for this project along the alternative 1 corridor. However, locations were not documented because this was not a target species for these surveys. Surveys conducted in 2008 (which targeted this species, along with others) did not observe this bird along the alternative 1 corridor. See Appendix F for field survey report on habitat occupancy.

**Risk Factors:** Risk factors include diminished frog populations, human disturbance, and alteration of hydrology to wetlands habitats.

**Direct Effects**

**Alternative 1 – Preferred Alternative**

American bittern habitat occurs along the existing right-of-way but most of the area is not open enough to provide adequate breeding habitat. Several large sedge meadows are crossed by the existing right-of-way. The older pipelines placed above-ground have allowed cattails and shrubs to encroach into the wetlands increasing available foraging habitat. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Preferred Alternative. Clearing of additional forest would create additional sedge meadow, shallow marsh, and open habitat that this species prefers. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1st, or before August 1st, without prior approval from the FWS.
Alternative 2 – Great Lakes Gas Alternative

Habitat for this species occurs along the Great Lakes Gas Alternative but most of the area is not open enough to provide adequate breeding habitat. This corridor is characterized as a shrub and grassy habitat that is surrounded by forest. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Great Lakes Gas Alternative. However, less suitable habitat for this species occurs along the Great Lakes Gas Alternative than along the Preferred Alternative.

Indirect Effects

Indirect effects on this species could include alteration of wetland hydrology or riverine habitats and the introduction of invasive species into wetland habitats that these birds could utilize. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. The introduction of invasive species could disrupt the function of existing wetland ecosystems by displacing native species or species that provide food, cover, or shelter to existing prey species. Enbridge will develop a *Noxious Weeds and Invasive Species Control Plan* to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

The additional width of pipeline right-of-way would remove forested wetlands areas that could potentially be used as additional foraging habitat. However, the existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors creates an area that has much more human activity than corridors that reach into the less fragmented portions of the CNF.

Cumulative Effects

Cumulative effects for the American bittern were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands, or hydrologic alteration could have positive effects to the prevalence of sedge meadows and shallow marsh habitats preferred by this species.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. The direct effect of other projects on American bittern habitat is minimal. The project area in question would result in additional grassland or treeless wetland habitat under Alternative 1 and 2.

The additional clearing for construction of a transmission line will increase the amount of open wetland habitat. These additional wetland habitats could be utilized by American bittern. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along Alternatives 1 and 2.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon American bittern or its breeding habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon American bittern or their
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habitat due to the small amount of habitat being affected in relation to those habitats that are available on the CNF. Alternative 1 or 2 may have temporary negative effects on habitat for this species, but would not have an effect on population viabilities of American bittern within the forest. Given the abundance of suitable foraging and breeding habitat available within the CNF/LLR for this species, it is unlikely that enough suitable American bittern habitat will be removed to negatively effect this species survival in the forest.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determination of effects for Alternatives 1 and 2.

**LLBO:** The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

**2.4.2.14 Black Tern (*Chlidonis niger*)**

**CNF, Minnesota, Leech Lake Reservation Status:** The black tern has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the black tern as “Sensitive” and notes that this species is “uncommon on reservation.”

The National Forest designates the black tern as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for black tern as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17.

Specific to the black tern the following Forest Plan Objectives apply:

O-WL-22: In all known breeding locations maintain or restore high quality nesting habitat: marshes or shallow rivers or lakes with suitable balance of open water and emergent vegetation.

G-WL-17: Management activities, especially prescribed fire, that may negatively impact nesting habitat in the short term in order to restore future suitable habitat, should maintain adequate undisturbed nesting habitat.

**General Habitat Requirements:** Black terns are a neotropical migratory species that are semi-colonial breeders. Black terns reach their breeding territories in Minnesota in late-April through the beginning of May (Janssen, 1987). Breeding occurs in shallow freshwater marshes with emergent vegetation found along lake margins and occasionally in rivers (Dunn and Argo, 1995). Vegetation utilized for nest platforms can vary, but cattails or bulrushes are characteristically dominant in black tern colonies (Dunn 1979, Cuthbert 1954). Vegetation cover can also vary between dense and sparse but nests are usually protected from direct open water to avoid dangers such as wind and wave action (Currier, 2000). Nesting locations of 5 ha. or more are thought to be necessary for establishment of nesting colonies. The black tern is found throughout most of the state during the breeding season and Minnesota is thought to harbor the largest population in the north central United States (Baker and Hines, 1996). Population declines have been noted by U.S. Geological Survey’s Breeding Bird Survey and this decline has resulted in the species being protected in neighboring states such as Ohio, Indiana, Illinois, Iowa, and Wisconsin.

**Distribution within the CNF/LLR:** The black tern has a core range found in Alberta, Saskatchewan, Manitoba, North and South Dakota, and Minnesota. Historic and recent records show seven records of colonies on CNF lands, four of which occur within the cumulative effects boundary.
**Occurrence within Project Area:** A nesting colony for this species was observed during a songbird survey conducted along this project corridor during 2000 (Krych, 2000). However, no colonies or black terns were observed during surveys conducted in 2007. Surveys conducted in 2008 identified one individual flying over the alternative 1 corridor; the historic black tern colony was not occupied during survey. See Appendices E and F for field survey reports on habitat occupancy.

**Risk Factors:** Risk factors include human disturbance, and alteration of hydrology to wetlands habitats.

**Direct Effects**

**Alternative 1 – Preferred Alternative**

Black tern habitat occurs along the existing right-of-way but most of the wetlands crossed do not have enough emergent or floating vegetation to provide nesting platforms. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Preferred Alternative. The few open water wetlands crossed by the proposed pipelines where black terns have been seen in the past are beyond the clearing limits of the Preferred Alternative. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1st, or before August 1st, without prior approval from the FWS.

**Alternative 2 – Great Lakes Gas Alternative**

Habitat for this species is not known to occur along the Great Lakes Gas Alternative and most of the wetlands are not open enough to provide adequate breeding habitat. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Great Lakes Gas Alternative.

**Indirect Effects**

The existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors greatly reduces the project’s impact.

**Cumulative Effects**

Cumulative effects for the black tern were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands may be beneficial. However, hydrologic alteration could have negative effects to the shallow marsh and open water habitats if it reduces the amount of water available and could create additional habitat if water levels rise.

**All Alternatives**

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. The direct effect of other projects on black tern habitat is minimal.
The additional clearing for construction of a transmission line will increase the amount of open wetland habitat but is unlikely to augment habitats that currently exhibit suitable characteristics for the black tern. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along Alternatives 1 and 2.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon black tern or its breeding habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon black tern or their habitat due to the small amount of crossed by the project. Alternative 1 or 2 may have temporary negative effects on habitat for this species, but would not have an effect on population viabilities of black tern within the forest. Given the abundance of suitable foraging and breeding habitat available within the CNF/LLR for this species, it is unlikely that enough suitable black tern habitat will be removed to negatively effect this species survival in the forest.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

**CNF:** The project will not likely cause a trend to federal listing or loss of viability for the species.

**LLBO:** The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

### 2.4.2.15 **Trumpeter Swan (Cygnus buccinator)**

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR lists the trumpeter swan as Threatened and is currently proposing to change the status to Special Concern. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the trumpeter swan as “Endangered” and notes that this species was “once extirpated due to hunting” but the population is now recovering and “one pair nests on the reservation.”

The National Forest designates the trumpeter swan as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for trumpeter swan as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17.

Specific to the trumpeter swan the following Forest Plan Objectives apply:

**O-WL-21:** In all known breeding locations, maintain or restore high quality nesting habitat: marshes with >300 feet of open water and emergent vegetation that covers between 50-85 percent of marsh.

**General Habitat Requirements:** During the breeding season, trumpeter swans select small ponds, lakes, or bays within larger lakes with extensive beds of cattails, bulrush, sedges, and/or horsetail (Coffin and Pfannmuller, 1987). Coffin and Pfannmuller also state that “Muskrat houses and beaver lodges are frequently used for nesting platforms.” They are known to protect large territories during the nesting period and are intolerant of crowding by other species. They have been known to kill perceived competitors such as pelicans while protecting breeding territories. Trumpeter swan nesting territories range from 6 to 150 acres in size. They utilize large, shallow wetlands 1-3 feet deep with a diverse mix of emergent vegetation and open water offer ideal habitat. Such locations support a rich variety of
submerging (underwater) plants used for food, such as sago pondweed and water milfoil (Wisconsin DNR website).

**Distribution within the CNF/LLR:** Since 1987, the trumpeter swan has been reintroduced to Minnesota, South Dakota, Iowa, Wisconsin, Michigan, Ohio and Ontario; these efforts have brought North America's interior population to 4500 in 2004. Minnesota’s flock now consists of 2000 birds. CNF historic and recent records show 17 records on Forest Service lands and one within the cumulative affects boundary.

**Occurrence within Project Area:** No trumpeter swans were observed during surveys conducted in 2007 or 2008 along the alternative 1 corridor. See Appendices E and F for field survey reports on habitat occupancy.

**Risk Factors:** Risk factors include human disturbance, accidental shooting, and alteration of hydrology to wetlands habitats.

**Direct Effects**

**Alternative 1 – Preferred Alternative**

Trumpeter swan habitat occurs along the existing right-of-way but most of the wetlands crossed do not have enough emergent or floating vegetation to provide nesting platforms. Pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Preferred Alternative. The few open water wetlands crossed by the proposed pipelines are beyond the clearing limits of the Preferred Alternative. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1st, or before August 1st, without prior approval from the FWS.

**Alternative 2 – Great Lakes Gas Alternative**

Habitat for this species is not known to occur along the Great Lakes Gas Alternative and most of the wetlands are not open enough to provide adequate breeding habitat. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Great Lakes Gas Alternative.

**Indirect Effects**

Indirect effects on this species could include alteration of wetland hydrology or riverine habitats and the introduction of invasive species into wetland habitats that these birds could utilize. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. The introduction of invasive species could disrupt the function of existing wetland ecosystems by displacing native species or species that provide food, cover, or shelter to existing prey species. Enbridge will develop a *Noxious Weeds and Invasive Species Control Plan* to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

The existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors greatly reduces the project’s impact.
Cumulative Effects

Cumulative effects for the trumpeter swan were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands may be beneficial. However, hydrologic alteration could have negative effects to the shallow marsh and open water habitats if it reduces the amount of water available and could create additional habitat if water levels rise.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. The direct effect of other projects on trumpeter swan habitat is minimal.

The additional clearing for construction of a transmission line may increase the amount of open wetland habitat but current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along Alternatives 1 and 2.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon trumpeter swan or its breeding habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon trumpeter swan or their habitat due to the small amounts crossed by the project. Alternative 1 or 2 may have temporary negative effects on habitat for this species, but would not have an effect on population viabilities of trumpeter swan within the forest. Given the abundance of suitable foraging and breeding habitat available within the CNF/LLR for this species, it is unlikely that enough suitable trumpeter swan habitat will be removed to negatively affect this species survival in the forest.

Determination of Effects

There are no records of trumpeter swans within the project area. Given this and the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

MDNR: The project will have a negligible or improbable negative effect on individuals of the species.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.2.16 Spruce Grouse (*Falcipennis canadensis*)

**CNF, Minnesota, Leech Lake Reservation Status:** The spruce grouse has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) does not list the spruce grouse.

The National Forest designates the spruce grouse as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for spruce grouse as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17. There are no Forest Plan directives specific to the spruce grouse.
**General Habitat Requirements:** Spruce grouse are a species found in coniferous forests including spruce, pine, and fir. Nesting and foraging habitat consists of conifer dominated habitats. The adult spruce grouse prefer to eat the needles of black spruce and white spruce trees. They also feed on jack pine and tamarack. During summer they eat blueberries, snowberries, and invertebrates such as caterpillars and grasshoppers during the nesting season (Tekiela, 1998). Young of the year feed primarily on insects during the summer. In Minnesota, spruce grouse live in the birch and evergreen (coniferous) forests of extreme northern Minnesota, generally the northern portions of Beltrami, Cook, Lake, St. Louis, Hubbard, Itasca, Koochiching, and Lake of the Woods Counties (Janssen, 1987).

**Distribution within the CNF/LLR:** The spruce grouse has a breeding range from Alaska, northern Manitoba, Quebec, and Nova Scotia south to Washington, Wyoming, central Manitoba, Minnesota, Michigan, and northern New England. CNF historic and recent records show one record on Forest Service lands and none occur within the cumulative affects boundary.

**Occurrence within Project Area:** 2007 and 2008 surveys did not identify any birds along Alternative 1. See Appendices D and E for field survey reports on habitat occupancy.

**Risk Factors:** Risk factors include incompatible forestry practices, deforestation, alteration of forest type, and fragmentation.

**Direct Effects**

Table 2.4.2-11 presents the effects of the proposed alternatives on the spruce grouse habitat.

<table>
<thead>
<tr>
<th>TABLE 2.4.2-11</th>
<th>Acres of Spruce Grouse Habitat a Intersected By Proposed Alternatives</th>
</tr>
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<tbody>
<tr>
<td>Forest Types and Age within Cumulative Effects Boundary</td>
<td>Alternative 1 - (acres of impacted Spruce Grouse stands)</td>
</tr>
<tr>
<td>8,369 acres *</td>
<td>(12.9) - represents 0.2 percent of Spruce grouse habitat in Cumulative Effects Boundary</td>
</tr>
<tr>
<td>Total</td>
<td>12.9</td>
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</tbody>
</table>

* Jack pine, balsam fir-aspen-paper birch less than 40 years old; White spruce, upland black spruce, aspen-white spruce-balsam fir older than 60 years; Black spruce, Northern white cedar, Tamarack, mixed swamp conifer, Northern white cedar-aspen older than 120 years.

**Alternative 1 – Preferred Alternative**

Suitable spruce grouse habitats were screened according to *Survey Screening Criteria: Regional Forester’s Sensitive Species of Chippewa National Forest March 2007* and acreage of potential impacts from construction were calculated using GIS protocols. Some suitable habitat occurs along the Preferred Alternative. The Preferred Alternative would impact 12.9 acres of suitable spruce grouse habitat. However, no documented occurrences are known along this alternative. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1st, or before August 1st, without prior approval from the FWS.
Alternative 2 – Great Lakes Gas Alternative

Some suitable habitat occurs along the Great Lakes Gas Alternative. The Great Lakes Gas Alternative would impact 22.9 acres of suitable spruce grouse habitat. However, no documented occurrences are known along this alternative.

Indirect Effects

Clearing of additional forest to accommodate pipeline construction within suitable forest types may affect long-term habitat opportunities for spruce grouse within the analysis area. However, large areas of suitable habitat do not exist along either alternative. The greatest impacts to potential habitat would occur within areas that currently contain the most acreage of suitable habitat such as those between Bena and Ball Club along Alternative 2. The additional width of pipeline right-of-way will further fragment forested habitats regardless of which alternative is chosen. However, the existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors greatly reduces the project’s impact.

Timber harvest by the CNF and on state, county, tribal, and private lands within suitable habitat may affect habitat opportunities for the spruce grouse particularly along the Great Lakes Gas Alternative. The potential loss of habitat and further fragmentation by these activities would reduce contiguous forest patches and reduce available habitat.

Cumulative Effects

Cumulative effects for the spruce grouse were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert suitable habitat to aspen may have negative effects on breeding success of individual spruce grouse.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. The direct effect of other projects on spruce grouse habitat is minimal.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon spruce grouse or its breeding habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon spruce grouse or their habitat due to the small amounts crossed by the project. Alternative 1 or 2 may have temporary negative effects on habitat for this species, but would not have an effect on population viabilities of spruce grouse within the forest. Given the abundance of suitable foraging and breeding habitat available within the CNF/LLR for this species, it is unlikely that enough suitable spruce grouse habitat will be removed to negatively effect this species survival in the forest. The additional clearing for construction of a transmission line will reduce the amount of suitable spruce grouse. The project area in question would result in 12.9 acres of additional loss of suitable habitat under Alternative 1 and should another corridor be constructed additional losses would be expected. Impacts due to Alternative 2 would result in 22.9 acres of suitable habitat loss. Both of these impacts are to habitats that are interspersed by wetlands, lakes, deciduous habitats and upland pine habitats.
Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

2.4.2.17 Sandhill Crane (Grus canadensis)

CNF, Minnesota, Leech Lake Reservation Status: The sandhill crane has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the sandhill crane as “Sensitive” and notes that this species “is suspected to nest on reservation; needs large open fields and shallow wetlands.”

The National Forest has no designation for the sandhill crane and there are no Forest Plan objectives or management guidelines for this species.

General Habitat Requirements: Sandhill Cranes are primarily birds of open fresh water wetlands, but the different subspecies utilize habitats that range from bogs, sedge meadows, and fens to open grasslands, pine savannas, and cultivated lands. Sandhill cranes occur at their highest breeding density in habitats that contain open sedge meadows in wetlands that are adjacent to short vegetation in uplands (International Crane Foundation). The sandhill crane is omnivorous and feeds on a variety of grains, seeds, some insects, other invertebrates, and small vertebrates found in marsh and meadow habitats listed above. Breeding takes place in marshes where a nest platform is built by mounding up vegetation (Johnsgard, 1983). The sandhill crane is best represented in the north-western and north-central regions of the state during the breeding season (Janssen, 1987).

Distribution within the CNF/LLR: The sandhill crane ranges throughout North America, extending into Cuba and far northeastern Siberia. This species is not tracked by the CNF and no documentation is available for the sandhill cranes on forest lands. The LLBO has unconfirmed reports of sandhill cranes, including breeding cranes, near Swamp Lake. Sandhill cranes have also been reported using the wetland sedge meadow near the outlet of Leech Lake (LLBO, personal communication).

Occurrence within Project Area: This species was not observed during 2008 songbird surveys along alternative 1. See Appendix F for field survey report on habitat occupancy. However, suitable habitat occurs at several locations along the project route.

Risk Factors: Risk factors include human disturbance, and alteration of hydrology to wetlands habitats.

Direct Effects

Alternative 1 – Preferred Alternative

Sandhill crane habitat occurs along the existing right-of-way but most of the area is not open enough to provide adequate breeding habitat. Several large sedge meadows are crossed by the existing right-of-way. Current pipeline construction techniques would restore existing contours and allow vegetation to return. Clearing of additional forest would create additional grassland habitat that this species prefers. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1st, or before August 1st, without prior approval from the FWS.
Alternative 2 – Great Lakes Gas Alternative

Habitat for this species occurs along the Great Lakes Gas Alternative but most of the area is not open enough to provide adequate breeding habitat. This corridor is characterized as a shrub and grassy habitat that is surrounded by forest. Clearing of forest would create additional grassland or sporadic brushy habitat that this species prefers.

Indirect Effects

Indirect effects on this species could include alteration of wetland hydrology or riverine habitats and the introduction of invasive species into wetland habitats that these birds could utilize. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. The introduction of invasive species could disrupt the function of existing wetland ecosystems by displacing native species or species that provide food, cover, or shelter to existing prey species. Enbridge will develop a Noxious Weeds and Invasive Species Control Plan to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

Clearing of additional forest to accommodate pipeline construction may increase habitat opportunities for sandhill crane within the analysis area. The greatest effects would occur within areas that currently contain forested wetland habitat adjacent to open sedge meadow or shallow marsh habitat. Under this scenario, sedge meadows and shallow marsh could be augmented by the construction of additional pipeline right-of-way. The additional width of pipeline right-of-way may augment sedge meadow or shallow marsh habitat regardless of which alternative is chosen. However, the existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The colocation of these corridors creates an area that has much more human activity than corridors that reach into the less fragmented portions of the CNF.

Cumulative Effects

Cumulative effects for the sandhill crane were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands, or hydrologic alteration would have positive effects to the prevalence of sedge meadows and shallow marsh habitats preferred by this species.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. The direct effect of other projects on sandhill crane habitat is minimal.

The additional clearing for construction of a transmission line will increase the amount of sedge meadow and shallow marsh wetland habitat that would benefit the sandhill cranes. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along Alternatives 1 and 2.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon sandhill crane or its breeding habitats due to the lack of permanent habitat alteration. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect
upon sandhill crane or their habitat due to the small amounts crossed by the project. Alternative 1 or 2 would not have an effect on population viabilities of sandhill crane within the forest. Given the abundance of suitable foraging and breeding habitat available within the CNF/LLR for this species, it is unlikely that enough suitable sandhill crane habitat will be altered to negatively affect this species survival in the forest. The additional clearing for construction of a transmission line will increase the amount of sedge meadow, shallow marsh, and open wetland habitat. These additional wetland habitats could be utilized by sandhill crane. State, county and private timber harvests also occur within the analysis area and will likely impact suitable habitat for this species.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determination of effects for Alternatives 1 and 2.

**LLBO:** The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

### 2.4.2.18 Bald Eagle (*Haliaeetus leucocephalus*)

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR currently lists the bald eagle as “Special Concern” but is proposing to upgrade the species to “no status.” The Leech Lake Reservation Sensitive Species List (March 2008) ranks the bald eagle as “Threatened” and notes that this species’ “population is recovering, but is subject to habitat loss and disturbance.”

The CNF designates the bald eagle as a Management Indicator Species and provides the following information for management of this species on their lands. Specific to the bald eagle the following Forest Plan Objectives apply:

- **O-WL-15:** Promote the conservation and recovery of the bald eagle. Population goal minimum: 150 occupied breeding territories.

- **S-WL-3:** Management activities for the bald eagle will be governed by Northern Lakes States Bald Eagle Recovery Plan (1983).

**General Habitat Requirements:** Bald eagles characteristic breeding habitat includes super-canopy trees such as red and white pine near lakes and rivers that support an abundant supply of fish (Mathisen, 1983). Most nest sites are located in areas with minimal human activity, some eagles have adapted to human presence and nest in close proximity to human dwellings and other features such as railroads, highways and boat landings.

**Distribution within the CNF/LLR:** The bald eagle breeds across much of North America and are known to have a presence in every U.S. state except Hawaii. Bald Eagles that reside in the northern U.S. and Canada migrate to the warmer southern climates of the U.S. during the winter. The CNF has records for 793 nest locations within the proclamation boundaries and 297 occurrences within the cumulative effects boundaries (CNF provided, February 2008).

**Occurrence within Project Area:** Eight bald eagle nests were observed during raptor surveys along alternative 1 within the CNF/LLR (see Appendix C).

**Risk Factors:** Risk factors include pesticide use, development of shoreline, human disturbance at nest sites, and illegal shooting.
Direct Effects

Table 2.4.2-12 presents the number of bald eagle nest territories intersected by the proposed alternatives.

<table>
<thead>
<tr>
<th>TABLE 2.4.2-12</th>
<th>Number of Bald Eagle Nest Territories Intersected By Proposed Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of nest territories within 330 feet of proposed clearing</td>
<td>Alternative 1 - (number of impacted Bald Eagle stands)</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
</tr>
</tbody>
</table>

Alternative 1 – Preferred Alternative

Documented eagle nest territories occur along the Preferred Alternative at two locations. One of these territories was active in 2007 and lies within 330 feet of the proposed construction area. No activity was noted at the second documented nest site. However bald eagle activity was noted at four other locations along the Preferred Alternative route.

To minimize impacts on nesting bald eagles during construction of the project, Enbridge has agreed to implement the following measures:

- Raptor stick nest surveys were conducted in 2008 (see Appendix C). Approximately 2 weeks ahead of construction, ground surveys would be conducted to determine activity of identified nests from the stick nest surveys. If a nest is identified as active, appropriate restrictions would be placed on construction activities. The CNF and LLBO biologist would be notified at that time.

- Restrict construction activities within 330 feet of active nests, and only allow limited activity within 330-660 feet of active nests (nesting period is approximately February 15 through August 15).

- Trees containing bald eagle nests, regardless of bird activity, will not be removed by construction clearing activities, per the Bald and Golden Eagle Protection Act.
  - A bald eagle nest was identified within the area that would be cleared by construction activities; however, Enbridge has modified the construction right-of-way to avoid clearing of the nest tree, regardless of bird activity. In addition, the seasonal activity restrictions will be complied with if the nest is active at the time of construction (see figure 2.4.2-6).
Alternative 2 – Great Lakes Gas Alternative

Documented eagle nest territories occur along the Great Lakes Gas Alternative at three locations. This area was not surveyed during 2007 so it is not known how many of these historic nest sites are active.

Indirect Effects

Clearing of super-canopy species such as red and white pine to accommodate pipeline construction within suitable forest types may affect long-term habitat opportunities for bald eagle within the analysis area. The greatest impacts to potential habitat would occur within areas that currently contain the most acreage of suitable habitat such as those between Pike Bay and Portage Lake along Alternative 1. However, suitable nest trees occur regularly along both alternatives. The additional width of pipeline right-of-way will alter forested habitats regardless of which alternative is chosen.

Timber harvest by the CNF and on state, county, tribal, and private lands within suitable habitat may also affect habitat opportunities for the bald eagle. The potential loss of habitat and further fragmentation by these activities would reduce the amount of super-canopy trees and reduce available nesting habitat.

Cumulative Effects

Cumulative effects for the bald eagle were evaluated on public lands that lie within the analysis area.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors.

The additional clearing for construction of a transmission line will alter the amount of mature red and white pine adjacent to Alternative 1 and 2. However, foraging habitats crossed by either alternative would remain unaffected and thus would not impact the bald eagle.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon bald eagle or its breeding habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon bald eagle or their habitat due to the small amounts crossed by the project. Alternative 1 or 2 would not have an effect on population viabilities of bald eagle within the forest. Given the abundance of suitable foraging and breeding habitat available within the CNF/LLR for this species, it is unlikely that enough suitable bald eagle habitat will be altered to negatively affect this species survival in the forest. The additional clearing for construction of a transmission line is likely to have similar impacts as those described for Alternatives 1 and 2. However, the location of these impacts is unknown so it is not possible to quantify impacts. State, county and private timber harvests also occur within the analysis area and will likely impact suitable habitat for this species.

Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determination of effects for Alternatives 1 and 2.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.
LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.2.19 Osprey (*Pandion haliaetus*)

**CNF, Minnesota, Leech Lake Reservation Status:** The osprey has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the osprey as “Sensitive” and notes that this species’ population is recovering.

The National Forest designates the osprey as a Species of Interest and provides the following information for management of this species on their lands. Forest Plan objectives specific to the osprey are as follows:

G-WL-26: Minimize activities that may disturb nesting pairs of osprey within 330 feet of the nest during nesting season (April 1- August 15).

G-WL-27: From 330 to 660 feet from nest trees, allow only those management activities that maintain, protect, or enhance nesting area habitat.

**General Habitat Requirements:** Characteristic osprey needs include nesting habitat near oceans, lakes, rivers, ponds, and other sources of water that provide an adequate source of fish. Nest sites are generally dead or open-topped trees, cliffs, rock outcrops, utility poles, channel markers, and other man-made platforms that provide elevated nest sites near to food supplies (Johnsgard, 1990). Most nest sites are located in areas with minimal human activity. However, like eagles, some ospreys have adapted to human presence and nest in close proximity to human dwellings and other features such as railroads, highways and boat landings (Johnsgard, 1990).

**Distribution within the CNF/LLR:** This species is not tracked by the CNF and no documentation is available for the osprey on forest lands.

**Occurrence within Project Area:** Three osprey nests were observed during raptor surveys along alternative 1 within the CNF/LLR (see Appendix C). Suitable habitat occurs along most of the project route.

**Risk Factors:** Risk factors include pesticide use, development of shoreline, human disturbance at nest sites, and illegal shooting.

**Direct Effects**

**Alternative 1 – Preferred Alternative**

Documented osprey nest territories occur along the Preferred Alternative. Several nest structures were noted along this alternative. One of these territories was active in 2007 and lies north of U.S. Highway 2 and the proposed construction area. No activity was noted at other nest sites.

To minimize impacts on nesting ospreys during construction of the project, Enbridge has agreed to implement the following measures:

- Raptor stick nest surveys were conducted in 2008 (see Appendix C). Approximately 2 weeks ahead of construction, ground surveys would be conducted to determine activity of identified
nests from the stick nest surveys. If a nest is identified as active, appropriate restrictions would be placed on construction activities. The CNF and LLBO biologist would be notified at that time.

- Restrict construction activities within 660 feet of active nests, (nesting period is approximately April 1 through August 15).

**Alternative 2 – Great Lakes Gas Alternative**

Documented osprey nest territories occur near the Great Lakes Gas Alternative. This area was not surveyed during 2007 so it is not known how many of these historic nest sites are active.

**Indirect Effects**

Clearing of super-canopy species such as red and white pine to accommodate pipeline construction within suitable forest types may affect long-term habitat opportunities for osprey within the analysis area. This species also nests on transmission line posts and other man-made structures. Suitable nest trees also occur regularly along both alternatives. The additional width of pipeline right-of-way will alter additional forested habitats regardless of which alternative is chosen.

**Cumulative Effects**

Cumulative effects for the osprey were evaluated on public lands that lie within the analysis area.

**All Alternatives**

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors.

The additional clearing for construction of a transmission line will alter the amount of mature red and white pine adjacent to Alternative 1 and 2. However, foraging habitats crossed by either alternative would remain unaffected and thus would not impact the osprey.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon osprey or its breeding habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon osprey or their habitat due to the small amounts crossed by the project. Alternative 1 or 2 would not have an effect on population viabilities of osprey within the forest. Given the abundance of suitable foraging and breeding habitat available within the CNF/LLR for this species, it is unlikely that enough suitable osprey habitat will be altered to negatively effect this species survival in the forest. The additional clearing for construction of a transmission line is likely to have similar impacts as those described for Alternatives 1 and 2. However, the location of these impacts is unknown so it is not possible to quantify impacts. State, county and private timber harvests also occur within the analysis area and will likely impact suitable habitat for this species.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determination of effects for Alternatives 1 and 2.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.
The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.2.20 Wilson’s Phalarope (*Phalaropus tricolor*)

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR lists the Wilson’s phalarope as “Threatened.” The Leech Lake Reservation Sensitive Species List (March 2008) ranks the Wilson’s phalarope as “Sensitive” and notes that this species is an “occasional migrant; may breed here; requires quiet, shallow pools in wetland meadows.”

The CNF designates the Wilson’s phalarope as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands.

General Forest Plan directives are the same for Wilson’s phalarope as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17. There are no Forest Plan directives specific to the phalarope.

**General Habitat Requirements:** Wilson’s phalaropes prefer shallow freshwater marshes in prairie and other open country. It has been known to nest on the ground in wet meadows, sedge meadows, river floodplains, near pasture and croplands, grassy marshes, and along edges of shallow inland waters. Nest site selection does vary seasonally where it nests in upland vegetation early in the breeding season and wet-meadows later in the season (Colwell and Oring, 1990). The Wilson’s phalarope is a very local summer resident mainly in the northwestern and central regions of the U.S. during the breeding season (Janssen, 1987).

**Distribution within the CNF/LLR:** Wilson's phalarope is a unique shorebird that breeds across much of central and western North America, and winters in southern South America. This species is documented from five locations on the CNF/LLR.

**Occurrence within Project Area:** There are no records of Wilson’s phalarope within the analysis area. This species was not observed during 2007 or 2008 surveys conducted along alternative 1. See Appendices E and F for field survey reports on habitat occupancy. However, suitable habitat occurs at several locations along the project route.

**Risk Factors:** Risk factors include draining and alteration of hydrology to wetland habitats.

**Direct Effects**

**Alternative 1 – Preferred Alternative**

Wilson's phalarope habitat occurs along the existing right-of-way but most of the wetland areas do not provide adequate open water for foraging in close proximity breeding habitat. Several large sedge meadows are crossed by the existing right-of-way and many of these wetlands have a large percentage of shrub habitat. The older pipelines placed above-ground have allowed cattails and shrubs to encroach into the wetlands reducing available habitat. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Preferred Alternative. Clearing for additional right-of-way could create additional sedge meadow habitats and are not likely to be detrimental to available Wilson’s phalarope habitat. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1st, or before August 1st, without prior approval from the FWS.
Alternative 2 – Great Lakes Gas Alternative

Wilson's phalarope habitat occurs along the Great Lakes Gas Alternative but most of the wetland areas do not provide adequate open water for foraging in close proximity breeding habitat. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Great Lakes Gas Alternative. This corridor is characterized as shrub and grassy habitat that is surrounded by forest. Clearing of forest could create additional open wetland habitat that this species prefers.

Indirect Effects

Indirect effects on this species could include alteration of wetland hydrology and the introduction of invasive species into wetland habitats that these birds could utilize. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. The introduction of invasive species could disrupt the function of existing wetland ecosystems by displacing native species or species that provide food, cover, or shelter to existing prey species. Enbridge will develop a Noxious Weeds and Invasive Species Control Plan to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

Clearing of additional forest to accommodate pipeline construction may increase habitat opportunities for Wilson's phalarope within the analysis area. The greatest effects would occur within areas that currently contain open sedge meadow habitat. These sedge meadow areas would be augmented by the construction of additional pipeline right-of-way. The additional width of pipeline right-of-way will augment grassy or shrubby habitat regardless of which alternative is chosen. However, the existing Enbridge right-of-way lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors greatly reduces the project’s impact.

Cumulative Effects

Cumulative effects for the Wilson's phalarope were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands could have positive effects to the prevalence of sedge meadow habitats preferred by this species.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the either of the Alternatives. The expansion of open habitats and reduction of forested wetland habitat will create a wider corridor adjacent to Alternative 1 or 2. Should the CapX 2020 corridor be constructed adjacent to existing corridors the same types of impacts would be expected.

The additional clearing for construction of a transmission line will not affect the amount or character of wetlands adjacent to Alternative 1 and 2. Foraging habitats crossed by the either alternative would remain unaffected and thus would not impact the Wilson's phalarope. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along Alternatives 1 and 2.
Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon Wilson's phalarope or its breeding habitats due to the lack of permanent habitat alteration. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon Wilson's phalarope or their habitat due to the lack of alteration to wetland habitats. Alternative 1 or 2 would not have an effect on population viabilities of Wilson's phalarope within the forest. Given the abundance of suitable foraging and breeding habitat available within the CNF/LLR for this species, it is unlikely that enough suitable Wilson's phalarope habitat will be altered to negatively affect this species survival in the forest. The additional clearing for construction of a transmission line is likely to have similar impacts as those described for Alternatives 1 and 2. However, the location of these impacts is unknown so it is not possible to quantify impacts. State, county and private timber harvests also occur within the analysis area and will likely impact suitable habitat for this species. However, these projects are unlikely to have a cumulative effect on this species.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

**CNF:** The project will not likely cause a trend to federal listing or loss of viability for the species.

**MDNR:** The project will have a negligible or improbable negative effect on individuals of the species.

**LLBO:** The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

### 2.4.2.21 Horned Grebe (*Podiceps auritus*)

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR lists the horned grebe as “Threatened.” The Leech Lake Reservation Sensitive Species List (March 2008) ranks the horned grebe as “Threatened” and notes that this species is at the “edge of range; may breed here, but seen mainly during migration.”

The National Forest has no designation for the horned grebe and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** Horned grebes occupy inhabit lakes with a mix of open water and wetland vegetation during the breeding season. Nests are built over water on large water bodies (over 10 hectares) where bays and inlets provide protection from wind action (Coffin and Pfannmuller, 1988). Nests are constructed in shallow water, usually within emergent vegetation. Coffin and Pfannmuller state that “On larger wetlands and water bodies, they tend to lose out in competition with other grebes and probably also with loons. As a result, they are usually found on small water bodies that often have little emergent vegetation.” The horned grebe is a summer resident that is now primarily restricted to Roseau, Marshall, and Pennington Counties in northwestern Minnesota (Janssen, 1987).

**Distribution within the CNF/LLR:** The horned grebe has a wide breeding distribution across eastern North America from the Great Plains, east to the Atlantic Ocean, and from southern Ontario south to the Gulf of Mexico. This species is not tracked by the CNF and no documentation is available for the horned grebe on forest lands.

**Occurrence within Project Area:** This species was not observed during songbird surveys conducted along alternative 1 in 2008. See Appendix F for field survey report on habitat occupancy. Stopover habitat occurs along the project route, but breeding habitat does not exist within the project area.
**Risk Factors:** Risk factors include human disturbance, and alteration of hydrology to wetlands habitats.

**Direct Effects**

**Alternative 1 – Preferred Alternative**

Horned grebe habitat occurs along the existing right-of-way but most of the wetlands and lakes crossed do not have enough emergent or floating vegetation to provide nesting platforms for this species. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Preferred Alternative. The few open water wetlands crossed by the proposed pipelines are beyond the clearing limits of the Preferred Alternative. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1st, or before August 1st, without prior approval from the FWS.

**Alternative 2 – Great Lakes Gas Alternative**

Habitat for this species is not known to occur along the Great Lakes Gas Alternative and most of the wetlands are not open enough to provide adequate breeding habitat. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Great Lakes Gas Alternative. None of the wetlands crossed are known to be utilized by this species.

**Indirect Effects**

Indirect effects on this species could include alteration of wetland hydrology and the introduction of invasive species into wetland habitats that these birds could utilize. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. The introduction of invasive species could disrupt the function of existing wetland ecosystems by displacing native species or species that provide food, cover, or shelter to existing prey species. Enbridge will develop a *Noxious Weeds and Invasive Species Control Plan* to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

**Cumulative Effects**

Cumulative effects for the horned grebe were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands may be beneficial to this species. However, hydrologic alteration could have negative effects to the shallow marsh and open water habitats if it reduces the amount of water available and could create additional habitat if water levels rise.

**All Alternatives**

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands or hydrology along either of the Alternatives. The expansion of open habitats and reduction of forested wetland habitat will create a wider corridor adjacent to Alternative 1 or 2. Should the CapX 2020 corridor be constructed adjacent to existing corridors the same types of impacts would be expected.
The additional clearing for construction of a transmission line will not affect the amount or character of wetlands adjacent to Alternative 1 and 2. Foraging habitats crossed by the either alternative would remain unaffected and thus would not impact the horned grebe. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along Alternatives 1 and 2.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon horned grebe or its breeding habitats due to the lack of permanent habitat alteration. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon horned grebe or their habitat due to the lack of alteration to wetland habitats. Alternative 1 or 2 would not have an effect on population viabilities of horned grebe within the forest. Given the availability of suitable foraging and breeding habitat available within the CNF/LLR for this species, it is unlikely that enough suitable horned grebe habitat will be altered to negatively effect this species survival in the forest. The additional clearing for construction of a transmission line is likely to have similar impacts as those described for Alternatives 1 and 2. However, the location of these impacts is unknown so it is not possible to quantify impacts. State, county and private timber harvests also occur within the analysis area and these projects are unlikely to have a cumulative effect on this species.

Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

MDNR: The project will have a negligible or improbable negative effect on individuals of the species.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.2.22 King Rail (*Rallus elegans*)

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR lists the king rail as Endangered. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the king rail as “Endangered” and notes that this species is “not known to be present on the reservation, though suitable shallow marsh habitat exists.”

The National Forest has no designation for the king rail and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** King rails utilize marshes, wetlands, and river floodplains where abundant emergent vegetation provide nesting and foraging habitat. They breed in marshes in eastern North America. The presence of tussocks or clumps of vegetation in a rail territory is a key determinant of nest site selection (Evers, 1984; Rabe, 1986). Nest sites are usually in shallow water with depths of less than 10 inches (Meanley, 1969). The nest is a raised platform built with marsh vegetation and covered by a canopy. The king rail is considered a casual species and its population status is generally unknown (Janssen, 1987).

**Distribution within the CNF/LLR:** The king rail has a wide breeding distribution across eastern North America from the Great Plains, east to the Atlantic Ocean, and from southern Ontario south to the Gulf of Mexico. This species is not tracked by the CNF and no documentation is available for the king rails on forest lands.
Occurrence within Project Area: This species was not observed during songbird surveys along alternative 1 in 2008. See Appendix F for field survey report on habitat occupancy. However, suitable habitat occurs at several locations along the project route.

Risk Factors: Risk factors include human disturbance, and alteration of hydrology to wetlands habitats.

Direct Effects

Alternative 1 – Preferred Alternative

King rail habitat occurs along the existing right-of-way but most of the area is not open enough to provide adequate breeding habitat. Several large sedge meadows and shallow marshes are crossed by the existing right-of-way. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Preferred Alternative. In order to avoid causing direct take to active nesting birds, vegetation will not be cleared after May 1st, or before August 1st, without prior approval from the FWS.

Alternative 2 – Great Lakes Gas Alternative

Habitat for this species occurs along the Great Lakes Gas Alternative but most of the area is not open enough to provide adequate breeding habitat. This corridor is characterized as a shrub and grassy habitat that is surrounded by forest. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Great Lakes Gas Alternative. Clearing of forested wetlands would create additional emergent marsh habitat that this species prefers.

Indirect Effects

Indirect effects on this species could include alteration of wetland hydrology or riverine habitats and the introduction of invasive species into wetland habitats that these birds could utilize. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. The introduction of invasive species could disrupt the function of existing wetland ecosystems by displacing native species or species that provide food, cover, or shelter to existing prey species. Enbridge will develop a Noxious Weeds and Invasive Species Control Plan to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

The existing Enbridge ROW lies adjacent to the U.S. Highway 2 corridor, the existing Burlington Northern Sante Fe Railroad corridor and various transmission lines corridors along the length of the CNF/LLR crossing. The co-location of these corridors creates an area that has much more human activity than corridors that reach into the less fragmented portions of the CNF.

Cumulative Effects

Cumulative effects for the king rail were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands could benefit this species. Hydrologic alteration could have beneficial or detrimental effects on habitat for this species depending upon whether the water level is raised or lowered.
All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along either of the Alternatives. The expansion of open habitats and reduction of forested wetland habitat will create a wider corridor adjacent to Alternative 1 or 2. Should the CapX 2020 corridor be constructed adjacent to existing corridors the same types of impacts would be expected.

The additional clearing for construction of a transmission line will not affect the amount or character of wetlands adjacent to Alternative 1 and 2. Foraging habitats crossed by either alternative would remain unaffected and thus would not impact the king rail. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along Alternatives 1 and 2.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon king rail or its breeding habitats due to the lack of permanent habitat alteration. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon king rail or their habitat due to the lack of alteration to wetland habitats. Alternative 1 or 2 would not have an effect on population viabilities of king rail within the forest. Given the availability of suitable foraging and breeding habitat available within the CNF/LLR for this species, it is unlikely that enough suitable king rail habitat will be altered to negatively effect this species survival in the forest. The additional clearing for construction of a transmission line is likely to have similar impacts as those described for Alternatives 1 and 2. However, the location of these impacts is unknown so it is not possible to quantify impacts. State, county and private timber harvests also occur within the analysis area and these projects are unlikely to have a cumulative effect on this species.

Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

MDNR: The project will have a negligible or improbable negative effect on individuals of the species.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.3 Reptiles

2.4.3.1 Snapping Turtle (Chelydra serpentine)

CNF, Minnesota, Leech Lake Reservation Status: The MDNR currently lists the snapping turtle as “Special Concern” but is proposing to upgrade the species to “no status.” The Leech Lake Reservation Sensitive Species List (March 2008) ranks the snapping turtle as “Sensitive” and notes that this species is “long-lived species; may be subject to over-harvest and poor reproduction due to egg predation.”

The National Forest has no designation for the snapping turtle and there are no Forest Plan objectives or management guidelines for this species.
General Habitat Requirements: The snapping turtle is associated with a wide-variety of lakes, rivers, ponds, wetlands, swamps, bogs, ditches, and other waterbodies (Oldfield and Moriarty, 1994). Oldfield and Moriarty (1994) notes that; “larger populations of snapping turtles are found in water bodies with mud bottoms and abundant aquatic vegetation.” They also utilize open, sandy, gravel roads, or other upland areas near these waterbodies for nesting.

Distribution within the CNF/LLR: This species is not tracked by the CNF and no documentation is available for the snapping turtle on forest lands.

Occurrence within Project Area: The snapping turtle is known to occur within the project area. Pike Bay Channel and the Mississippi River are known to contain this species, as well as other waterways within the LLR (LLBO, personal communication).

Risk Factors: Risk factors include habitat destruction, and over harvest.

Direct Effects

Alternative 1 – Preferred Alternative

Snapping turtle habitat occurs along the right-of-way at most of the emergent wetlands crossed by this alternative. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Preferred Alternative. The open water wetlands crossed by the proposed pipelines would be maintained and thus would not limit the amount of habitat available to the snapping turtle.

Alternative 2 – Great Lakes Gas Alternative

Habitat for this species is known to occur along the Great Lakes Gas Alternative and most of the wetlands provide adequate foraging and overwintering habitat. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Great Lakes Gas Alternative. Nesting habitat is also present in abundance throughout this alternative.

Indirect Effects

Indirect effects on this species could include alteration of wetland hydrology or riverine habitats and the introduction of invasive species into wetland habitats that these reptiles could utilize. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. The introduction of invasive species could disrupt the function of existing wetland ecosystems by displacing native species or species that provide food, cover, or shelter to existing prey species. Enbridge will develop a Noxious Weeds and Invasive Species Control Plan to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

Cumulative Effects

Cumulative effects for the snapping turtle were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands may be beneficial. However, hydrologic alteration could have negative effects to the shallow marsh, emergent
marsh and open water habitats if it reduces the amount of water available and could create additional habitat if water levels rise.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along either of the Alternatives. The expansion of open habitats and reduction of forested wetland habitat will create a wider corridor adjacent to Alternative 1 or 2. Should the CapX 2020 corridor be constructed adjacent to existing corridors the same types of impacts would be expected.

The additional clearing for construction of a transmission line will not affect the amount or character of wetlands adjacent to Alternative 1 and 2. Foraging and nesting habitats crossed by either alternative would remain unaffected and thus would not impact the snapping turtle. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along Alternatives 1 and 2. Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon snapping turtle or its breeding habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon snapping turtle or their habitat due to the lack of permanent alteration to wetland habitats. Alternative 1 or 2 would not have an effect on population viabilities of snapping turtle within the forest. Given the availability of suitable foraging and breeding habitat within the CNF/LLR for this species, it is unlikely that enough suitable snapping turtle habitat will be altered to negatively affect this species survival in the forest. The additional clearing for construction of a transmission line is likely to have similar impacts as those described for Alternatives 1 and 2. However, the location of these impacts is unknown so it is not possible to quantify impacts. State, county and private timber harvests also occur within the analysis area and these projects are unlikely to have a cumulative effect on this species.

Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.3.2 Blanding’s Turtle (Emydoidea blandingii)

CNF, Minnesota, Leech Lake Reservation Status: The MDNR currently lists the Blanding’s turtle as “Threatened.” The Leech Lake Reservation Sensitive Species List (March 2008) lists the Blanding’s turtle as “Threatened”.

The National Forest designates the Blanding’s turtle as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for Blanding’s turtle as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17.

General Habitat Requirements: The Blanding’s turtle is associated with shallow lakes, ponds, wetlands, shrub swamps, bogs, ditches, and other calm shallow waterbodies that are characterized by mud
bottoms and abundant aquatic vegetation such as sedges, cattails, and water lilies. They also utilize open, sandy upland areas or hilly uplands near these waterbodies for nesting (Oldfield and Moriarty, 1994).

**Distribution within the CNF/LLR:** This species is not tracked by the CNF and no documentation is available for the Blanding’s turtle on forest lands. There is one known occurrence on the northern boundary of the LLR (LLBO, personal communication).

**Occurrence within Project Area:** The Blanding’s turtle is not known to occur within the project area.

**Risk Factors:** Risk factors include elimination or alteration of wetland habitats.

**Direct Effects**

**Alternative 1 – Preferred Alternative**

Blanding’s turtle habitat occurs along the existing ROW at most of the emergent wetlands crossed by this alternative. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect to emergent wetlands along the Preferred Alternative. The open water wetlands crossed by the proposed pipelines would be maintained and thus would not limit the amount of habitat available to the Blanding’s turtle.

**Alternative 2 – Great Lakes Gas Alternative**

Habitat for this species is known to occur along the Great Lakes Gas Alternative and most of the wetlands provide adequate foraging and overwintering habitat. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Great Lakes Gas Alternative. Nesting habitat is also present in abundance throughout this alternative. Clearing of forest at the edge of large wetlands could create additional open water habitat and upland nesting habitat.

**Indirect Effects**

Indirect effects on this species could include alteration of wetland hydrology or riverine habitats and the introduction of invasive species into wetland habitats that these reptiles could utilize. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. The introduction of invasive species could disrupt the function of existing wetland ecosystems by displacing native species or species that provide food, cover, or shelter to existing prey species. Enbridge will develop a *Noxious Weeds and Invasive Species Control Plan* to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

**Cumulative Effects**

Cumulative effects for the Blanding’s turtle were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands may be beneficial. Hydrologic alteration is a possible risk that could have negative effects to the shallow marsh, emergent marsh and open water habitats if it reduces the amount of water available in these
habitats. However, given current wetland crossing techniques it is unlikely that hydrologic alteration would occur due to pipeline construction techniques.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along either of the Alternatives. The expansion of open habitats and reduction of forested wetland habitat will create a wider corridor adjacent to Alternative 1 or 2. Should the CapX 2020 corridor be constructed adjacent to existing corridors the same types of impacts would be expected.

The additional clearing for construction of a transmission line will not affect the amount or character of wetlands adjacent to Alternative 1 and 2. Foraging and nesting habitats crossed by the either alternative would remain unaffected and thus would not impact the Blanding’s turtle. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along Alternatives 1 and 2.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon Blanding’s turtle or its breeding habitats. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon Blanding’s turtle or their habitat due to the lack of permanent alteration to wetland habitats. Alternative 1 or 2 would not have an effect on population viabilities of Blanding’s turtle within the forest. Given the availability of suitable foraging and breeding habitat within the CNF/LLR for this species, it is unlikely that enough suitable Blanding’s turtle habitat will be altered to negatively effect this species survival in the forest. The additional clearing for construction of a transmission line is likely to have similar impacts as those described for Alternatives 1 and 2. However, the location of these impacts is unknown so it is not possible to quantify impacts. State, county and private timber harvests also occur within the analysis area and these projects are unlikely to have a cumulative effect on this species.

Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

MDNR: The project will have a negligible or improbable negative effect on individuals of the species.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.3.3 Eastern and Western hognose snakes (Heterodon platirhinos, and H. nasicus)

CNF, Minnesota, Leech Lake Reservation Status: The eastern hognose snake has no state status; the western hognose snake is listed as “special concern”. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the eastern hognose snake as “Sensitive” and notes “present distribution on reservation unknown”; it does not include the western hognose snake.
The National Forest has no designation for the eastern hognose snake, and designates the western hognose snake as “Forest Sensitive” and there are no Forest Plan objectives or management guidelines for either of these species.

**General Habitat Requirements:** Eastern hognose snakes are not as choosy about their habitats as their western cousins. Heavily wooded areas, prairies, and grasslands are commonly used and they are even found on bluff prairies, river floodplains, open woodlands, grasslands, and old fields on occasion (Oldfield and Moriarty, 1994). Like western hognose snakes, however, these snakes prefer sandy or loamy soil in which to burrow. Oldfield and Moriarty (1994) also note that an important component of eastern hognose snake habitat is loose sandy or loamy soil in which they burrow.

**Distribution within the CNF/LLR:** These species are not tracked by the CNF and no documentation is available for the eastern or western hognose snake on forest lands.

**Occurrence within Project Area:** The eastern or western hognose snake is not known to occur within the project area. However, suitable habitat does exist along the project.

**Risk Factors:** Risk factors include road kill, loss of suitable habitat to agriculture, development and other land management activities.

**Direct Effects**

**All Alternatives**

The direct effect of Alternatives 1 and on eastern and western hognose snake habitat is minimal. Loose sandy or loamy soils occur at several locations along each alternative. These habitats would not be eliminated by pipeline construction.

**Indirect Effects**

Clearing of additional forest to accommodate pipeline construction may increase access to loose sandy or loamy soils and upland nesting habitat for each of these snakes within the analysis area.

**Cumulative Effects**

Cumulative effects for the eastern and western hognose snakes were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested areas to open habitats may be beneficial.

**All Alternatives**

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested wetland habitat will create a wider corridor adjacent to Alternative 1 or 2. Should the CapX 2020 corridor be constructed adjacent to existing corridors the same types of impacts would be expected.

The additional clearing for construction of a transmission line will not diminish the amount or character suitable upland habitats adjacent to Alternative 1 and 2. Foraging and nesting habitats crossed by either alternative would remain unaffected and thus would not impact the eastern and western hognose snakes.
Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon eastern and western hognose snakes or their breeding habitats due to the lack of permanent alteration to sandy upland habitats utilized by these species. Activities proposed in Alternative 2 are not likely to contribute to an adverse cumulative effect upon Eastern and Western hognose snakes or their habitat due to the lack of permanent alteration to sandy upland habitats. Alternative 1 or 2 would not have an effect on population viabilities of eastern and western hognose snakes within the forest. Given the availability of suitable habitat within the CNF/LLR for this species, it is unlikely that enough suitable habitat will be altered to negatively effect this species survival in the forest. The additional clearing for construction of a transmission line is likely to have similar impacts as those described for Alternatives 1 and 2. However, the location of these impacts is unknown so it is not possible to quantify impacts. State, county and private timber harvests also occur within the analysis area and these projects are unlikely to have a cumulative effect on this species.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determination of effects for Alternatives 1 and 2.

**CNF:** The project will not likely cause a trend to federal listing or loss of viability for the species.

**LLBO:** The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

### 2.4.4 Amphibians

#### 2.4.4.1 Four-toed Salamander (*Hemidactylium scutatum*)

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR lists the four-toed salamander as “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) ranks the four-toed salamanders as “Sensitive” and notes that this “species documented at one location just outside reservation; likely present on reservation.”

The National Forest designates the four-toed salamander as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for four-toed salamander as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17.

Specific to the four-toed salamander the following Forest Plan Objectives apply:

**O-WL-19:** In all know breeding locations maintain or restore high quality breeding habitat: Adults prefer moist closed-canopy northern hardwoods with abundant coarse woody debris and vegetation litter/moss for security cover adjacent to breeding wetland: swamps, boggy streams, and wet, wooded or open areas near fish-free ponds (the larval habitat).

**General Habitat Requirements:** Four-toed salamanders utilize deciduous forests adjacent to spring, creeks, and small bogs (Oldfield and Moriarty, 1994). They are often found in small isolated colonies that are vulnerable to catastrophic events or drastic habitat alterations. Adults typically inhabit mature northern hardwood forests with a closed canopy with abundant woody debris, vegetative litter, logs, rocks or sphagnum moss. Females lay eggs in sphagnum moss hummocks or sedge hummocks in shallow wetlands or streamside pools where hatchlings move into the water after emerging from the egg (Gates, 2002).
Distribution within the CNF/LLR: CNF historic and recent records show 12 records on Forest Service lands none of which occur within the cumulative affects boundary.

Occurrence within Project Area: No four-toed salamanders are recorded within the project area. However, suitable habitat occurs at limited locations along the project route.

Risk Factors: Risk factors include human disturbance, habitat alteration, and alteration of hydrology to its wetlands habitats.

Direct Effects

Table 2.4.4-1 presents the four-toed salamander habitat with CNF and impacted by the alternatives.

<table>
<thead>
<tr>
<th>TABLE 2.4.4-1</th>
<th>Four-toed Salamander Habitat a Within CNF and Impacted by Proposed Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Potential Habitat Available in the CNF/LLR</td>
<td>Alternative 1 - (acres of impacted Four-toed Salamander stands)</td>
</tr>
<tr>
<td>178,721 acres</td>
<td>31 acres</td>
</tr>
</tbody>
</table>

* Balsam fir-aspen-paper birch, cedar/aspen/paper birch, white oak, northern red oak, sugar maple/basswood, sugar maple, mixed hardwoods, quaking aspen, paper birch, bigtooth aspen, balsam poplar, or aspen-white spruce-balsam fir that are at least 50 years old and are wetlands. Acreages reflect all stands that meet forest type parameter but are not checked for wetland parameter.

All Alternatives

The direct effect of Alternatives 1 and 2 on four-toed salamander habitat is minimal. Although suitable habitat exists along portions of each alternative no known occurrences have been documented within the analysis area. Some northern hardwood habitat would be altered but closed canopy forests would not be eliminated by pipeline construction.

Indirect Effects

Clearing of additional forest to accommodate pipeline construction may decrease the amount of closed canopy forest available to this species. Wetland habitats would not be eliminated but forested or shrub wetlands would temporarily change types until trees and shrubs could regenerate.

Cumulative Effects

Cumulative effects for four-toed salamanders were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested areas to open habitats would alter available habitat over the long-term.
All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested wetland habitat will create a wider corridor adjacent to Alternative 1 or 2. Should the CapX 2020 corridor be constructed adjacent to existing corridors the same types of impacts would be expected.

The additional clearing for construction of a transmission line will alter the amount of suitable mature forest habitats adjacent to Alternative 1 and 2. Portions of this forest habitat would be allowed to recover while a portion will be maintained as shrub or grassland habitats. The affect would be the greatest along Alternative 2 where mature forest habitats occur as large patches between Pike Bay and Portage Lake.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon four-toed salamander or its breeding habitats due to the limited amount of permanent alteration to mature forest habitats utilized by these species. Activities proposed in Alternative 2 would alter more mature forest habitat due to the abundance of large patches of this habitat crossed by this alternative. Alternative 1 or 2 would not have an effect on population viabilities of four-toed salamander within the forest. Given the availability of suitable habitat within the CNF/LLR for this species, it is unlikely that enough suitable four-toed salamander habitat will be altered to negatively affect this species survival in the forest. The additional clearing for construction of a transmission line is likely to have similar impacts as those described for Alternatives 1 and 2. However, the location of these impacts is unknown so it is not possible to quantify impacts. State, county and private timber harvests also occur within the analysis area and these projects are unlikely to have a cumulative effect on this species.

Determination of Effects

There are no records of four-toed salamander within the analysis area. Given this and the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.4.2 Red-backed Salamander (*Plethodon cinereus*)

**CNF, Minnesota, Leech Lake Reservation Status:** The red-backed salamander has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the red-backed salamander as “Sensitive” and notes “present distribution on reservation unknown.”

The National Forest has no designation for the red-backed salamander and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** Red-backed salamanders are terrestrial, and prefer deciduous forests habitats. They are found in the leaf litter on the ground as well as under rocks, logs, or in small burrows. They must live in a moist environment and are rarely found when the humidity is below 85 percent (Heatwole, 1962). One habitat factor affecting red-backed salamanders is soil pH. Red-backed salamanders, like many other amphibians, are negatively affected by high levels of acidity. Red-backed salamanders have been shown to exhibit the same primary response to acidic substrate as do amphibian
larvae exposed to acidic water, disruption of their sodium balance. The red-backed salamander is rarely found on soils with a pH of 3.7 or lower (Horne, 1988; Frisbie and Wyman, 1991; Harding and Holman, 1992).

**Distribution within the CNF/LLR:** This species is not tracked by the CNF and no documentation is available for the red-backed salamander on forest lands.

**Occurrence within Project Area:** The red-backed salamander is not known to occur within the project area. However, suitable habitat does exist along the project corridor.

**Risk Factors:** Risk factors include loss of suitable habitat to road construction, forest fragmentation, and forestry practices.

**Direct Effects**

**All Alternatives**

The direct effect of Alternatives 1 and 2 on red-backed salamander habitat is minimal. Although suitable habitat exists along portions of each alternative no known occurrences have been documented within the analysis area. Some northern hardwood habitat would be altered but closed canopy forests would not be eliminated by pipeline construction.

**Indirect Effects**

Clearing of additional forest to accommodate pipeline construction may decrease the amount of closed canopy forest available to this species. Wetland habitats would not be eliminated but forested or shrub wetlands would change types until trees and shrubs could regenerate.

**Cumulative Effects**

Cumulative effects for the red-backed salamander were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested areas to open habitats would alter available habitat over the long-term.

**All Alternatives**

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2. Should the CapX 2020 corridor be constructed adjacent to existing corridors the same types of impacts would be expected.

The additional clearing for construction of a transmission line will alter the amount of suitable upland habitats adjacent to Alternative 1 and 2. Mature forest habitats would be altered by clearing for additional right-of-way. Portions of this forest habitat would be allowed to recover while a portion will be maintained as shrub or grassland habitats. The affect would be the greatest along Alternative 2 where mature forest habitats occur as large patches between Pike Bay and Portage Lake.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon red-backed salamander or its breeding habitats due to the limited amount of permanent alteration to mature forest habitats utilized by these species. Activities proposed in Alternative 2 would alter more mature forest habitat due to the abundance of large patches of this habitat.
crossed by this alternative. Alternative 1 or 2 would not have an effect on population viabilities of red-backed salamander within the forest. Given the availability of suitable habitat within the CNF/LLR for this species, it is unlikely that enough suitable red-backed salamander habitat will be altered to negatively effect this species survival in the forest. The additional clearing for construction of a transmission line is likely to have similar impacts as those described for Alternatives 1 and 2. However, the location of these impacts is unknown so it is not possible to quantify impacts. State, county and private timber harvests also occur within the analysis area and these projects are unlikely to have a cumulative effect on this species.

Determination of Effects

There are no records of red-backed salamander within the analysis area. Given this and the above discussion on direct, indirect, and cumulative effects, we have made the following determination of effect for Alternatives 1 and 2.

LLBO: The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

2.4.4.3 Green Frog (Rana clamitans)

CNF, Minnesota, Leech Lake Reservation Status: The green frog has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) ranks the green frog as “Sensitive” and notes “distribution on reservation unknown; thought to need open water in winter.”

The National Forest has no designation for the green frog and there are no Forest Plan objectives or management guidelines for this species.

General Habitat Requirements: Green frogs utilize wetlands with permanent hydrology regimes i.e., open water and emergent vegetation including river, streams, and their associated backwaters (Fleming 1976). Oldfield and Moriarty (1994) state that “They are known to utilize lakes and ponds with shallow margins and springs and seeps with permanent water are also used. Green frogs require oxygen for aquatic sites that do not freeze solid and that maintain enough oxygen for overwintering tadpoles and adults.”

Distribution within the CNF/LLR: This species is not tracked by the CNF and no documentation is available for the green frog on forest lands. The LLBO 2007 Frog Survey identified this species in the Leech Lake; it is likely to occur in other large lakes on the Reservation and CNF (LLBO, personal communication).

Occurrence within Project Area: The green frog is not known to occur within the project area. However, suitable habitat exists along the project corridor.

Risk Factors: Risk factors include loss of suitable habitat to alteration of wetland hydrology.

Direct Effects

Alternative 1 – Preferred Alternative

Green frog habitat occurs along the existing right-of-way at most of the emergent wetlands crossed by this alternative. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in
little to no effect on emergent wetlands along the Preferred Alternative. The open water wetlands crossed by the proposed pipelines would be maintained and thus would not limit the amount of habitat available to the green frog.

Alternative 2 – Great Lakes Gas Alternative

Habitat for this species is known to occur along the Great Lakes Gas Alternative and many of the wetlands provide adequate foraging and overwintering habitat. Overwintering habitat is also present throughout this alternative. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along the Great Lakes Gas Alternative.

Indirect Effects

Indirect effects on this species could include alteration of wetland hydrology or riverine habitats and the introduction of invasive species into wetland habitats that these amphibians could utilize. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. The introduction of invasive species could disrupt the function of existing wetland ecosystems by displacing native species or species that provide food, cover, or shelter to existing prey species. Enbridge will develop a Noxious Weeds and Invasive Species Control Plan to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

Cumulative Effects

Cumulative effects for the green frog were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands may be beneficial. However, hydrologic alteration could have negative effects to the shallow marsh, emergent marsh and open water habitats if it reduces the amount of water available and could create additional habitat if water levels rise.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands or rivers along either of the Alternatives. The expansion of open habitats and reduction of forested wetland habitat will create a wider corridor adjacent to Alternative 1 or 2. Should the CapX 2020 corridor be constructed adjacent to existing corridors the same types of impacts would be expected.

The additional clearing for construction of a transmission line will not affect the amount or character of wetlands adjacent to Alternative 1 and 2. Foraging and overwintering habitats crossed by the either alternative would remain unaffected and thus would not affect the green frog. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on emergent wetlands along Alternatives 1 and 2.

Based upon known past, present, and foreseeable effects, Alternative 1 is not expected to contribute to an adverse cumulative effect upon green frog or its breeding or overwintering habitats. Activities proposed
in Alternative 2 are not likely to contribute to an adverse cumulative effect upon green frog or their habitat due to the lack of permanent alteration to wetland habitats. Alternative 1 or 2 would not have an effect on population viabilities of green frog within the forest. Given the availability of suitable foraging and breeding habitat within the CNF/LLR for this species, it is unlikely that enough suitable green frog habitat will be altered to negatively effect this species survival in the forest. The additional clearing for construction of a transmission line is likely to have similar impacts as those described for Alternatives 1 and 2. However, the location of these impacts is unknown so it is not possible to quantify impacts. State, county and private timber harvests also occur within the analysis area and these projects are unlikely to have a cumulative effect on this species.

**Determination of Effects**

There are no records of green frog within the analysis area. Given this and the above discussion on direct, indirect, and cumulative effects, we have made the following determination of effects for Alternatives 1 and 2.

**LLBO:** The project will have a negligible or improbable negative effect on individuals of the species. The population of the species on LLR will not be affected.

### 2.4.5 Aquatic Species

The following species are evaluated as a guild due to similarities in habitat requirements: Pugnose shiner, creek heelsplitter, fluted-shell mussel, black sandshell, Vertree’s caddisfly. All of these species are associated with aquatic environments. Direct, indirect, and cumulative effects for each species in the aquatic guild are provided in table 2.4.5-1.

#### 2.4.5.1 Pugnose shiner (*Notropis anogenus*)

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR has designated the pugnose shiner as a species of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) ranks the pugnose shiner as “Sensitive” and notes “present distribution on reservation unknown.”

The National Forest designates the pugnose shiner as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for pugnose shiner as for all Sensitive Fish, Mollusks, Aquatic Insects and follow general direction objectives O-WL-29 and O-WL-30.

**General Direction**

O-WL-29: In all known sites and breeding locations, enhance, or restore high quality habitat for these species primarily by implementing management direction that promotes desired conditions for healthy and functional watersheds, riparian areas, and vegetation.

O-WL-30: Additionally, during evaluation and restoration of one or two 5th level watersheds per year, known locations of the following sensitive aquatic species will provide priority areas for proactive management to improve habitats:

- Least darter
- Greater redhorse
- Pugnose shiner
- Creek heelsplitter
- Fluted-shell mussel
• Black sandshell
• Vertree’s caddisfly

**General Habitat Requirements:** The pugnose shiner inhabits clear vegetated lakes and vegetated pools and runs of low gradient streams and rivers over sand, mud, gravel or marl (Page and Gurr, 1991). Characteristic vegetation includes pondweed, water milfoil, *Elodea*, eelgrass, coontail, bulrush and filamentous algae. They appear to be extremely intolerant to turbidity (Trautman, 1981).

**Distribution within the CNF/LLR:** This species is not tracked by the CNF and no documentation is available for the pugnose shiner on forest lands.

**Occurrence within Project Area:** The pugnose shiner is not known to occur within the project area.

**Risk Factors:** Risk factors include water pollution and siltation, and the removal of littoral vegetation, which provides important feeding and breeding habitat. The introduction of Eurasian water milfoil (*Myriophyllum spicatum*) also has a negative affect on this species.

### 2.4.5.2 Mussels

**Creek heelsplitter (Lasmigona compressa)**

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR has designated the creek heelsplitter as a species of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) designates the creek heelsplitter as a “Sensitive Species” and notes that this species is “found in several streams on the reservation.”

The National Forest designates the creek heelsplitter as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for creek heelsplitter as for all Sensitive Fish, Mollusks, Aquatic Insects and follow general direction objectives O-WL-29 and O-WL-30.

**General Habitat Requirements:** Creek heelsplitter is a widespread but uncommon lotic mussel found in creeks and the headwaters of small to medium rivers (Cummings and Mayer, 1992). Preferred substrates are sand or fine gravel, generally adjacent to but not directly in the current. The species is rarely found in large rivers. Key factors determining habitat suitability for the creek heelsplitter are substrate characteristics, maintenance of wetted substrates, and availability of suitable larval hosts.

Previous studies indicate that at least five fish species probably serve as hosts for heelsplitter larva: spotfin shiner, crappie, yellow perch, slimy sculpin, and rock bass (Hove et al. 1999, Anderson, 2001). While this is a fairly small number of potential hosts, Hove et al., 1999 suggested that the relationship between mussels and hosts is broader than currently documented and that the persistence of certain fish community components such as feeding guilds may be more important long-term management considerations.

**Distribution within the CNF/LLR:** This species is known to occupy mid-sized rivers on the CNF/LLR.

**Occurrence within Project Area:** There are 17 records of creek heelsplitter or fluted-shell mussels within the CNF and two within the Cumulative Affects boundaries. Review of MDNR NHI data did not identify any waterbodies within the CNF/LLR that would harbor this species.

**Risk Factors:** Major risk factors include threats to water quality and pollution.
Fluted-shell Mussel (*Lasmigona costata*)

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR has designated the fluted-shell mussel as a species of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) does not include the fluted-shell mussel.

The National Forest designates the fluted-shell mussel as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for fluted-shell mussel as for all Sensitive Fish, Mollusks, Aquatic Insects and follow general direction objectives O-WL-29 and O-WL-30.

**General Habitat Requirements:** The fluted-shell mussel is an obligate riverine species preferring clear water riffles with moderate current. They are found in sand, mud, or fine gravel in medium to large rivers where the flow of water is slow to moderate (USFWS website).

**Distribution within the CNF/LLR:** The fluted-shell mussel does occur within the proclamation boundaries of the CNF. There are 17 records of fluted-shell mussel within the CNF and two within the cumulative affects boundaries.

**Occurrence within Project Area:** Review of MDNR NHI data did not identify any waterbodies within the CNF/LLR that would harbor this species.

**Risk Factors:** Risk factors include water pollution, excessive siltation, and nutrient enrichment. Channelization, construction of dams, agriculture, and mining also contribute to siltation and water quality degradation.

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Black sandshell (*Ligumia recta*)

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR has designated the black sandshell as a species of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) lists the black sandshell as “Sensitive” and notes that this species is “found in several streams on the reservation.”

The National Forest designates the black sandshell as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for black sandshell as for all Sensitive Fish, Mollusks, Aquatic Insects and follow general direction objectives O-WL-29 and O-WL-30.

**General Habitat Requirements:** This mussel is found in medium to large rivers in riffles or raceways with gravel or firm sand substrate (Cummings, 1992).

**Distribution within the CNF/LLR:** This species is known to occupy mid-sized rivers on the CNF/LLR. There are 19 records of fluted-shell mussel within the CNF and two within the cumulative affects boundaries.

**Occurrence within Project Area:** Review of MDNR NHI data did not identify any waterbodies within the CNF/LLR that would harbor this species.

**Risk Factors:** Major risk factors include threats to water quality and pollution.
2.4.5.3 Vertree’s Caddisfly (*Ceraclea vertreesi*)

**CNF, Minnesota, Leech Lake Reservation Status:** The MDNR has designated the Vertree’s caddisfly as a species of “Special Concern” but has proposed to change its status to no status because (‘recent studies conclude that the three specimens collected in 1989 at the only known Minnesota location, were misidentified; designation must be withdrawn until identification is confirmed’). The Leech Lake Reservation Sensitive Species List (March 2008) does not include the Vertree’s caddisfly.

The National Forest designates the Vertree’s caddisfly as a Regional Foresters Sensitive Species and provides the following information for management of this species on their lands. General Forest Plan directives are the same for Vertree’s caddisfly as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, and O-WL-17.

**General Habitat Requirements:** This invertebrate’s larvae are found in substrates of lakes, ponds, and medium to large rivers (Mathisen, 2000).

**Distribution within the CNF/LLR:** There are no records for this species within the CNF/LLR. However, suitable habitats do occur along the project right-of-way.

**Occurrence within Project Area:** This species is not known to occur within the project area.

**Risk Factors:** Major risk factors include threats to water quality and pollution.

2.4.5.4 Greater redhorse (*Moxostoma valenciennesi*)

**CNF, Minnesota, Leech Lake Reservation Status:** The greater redhorse has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates this species as “Sensitive”.

The National Forest designates the greater redhorse as “Forest Sensitive” and provides the following information for management of this species on their lands. General Forest Plan directives are the same for pugnose shiner as for all Sensitive Fish, Mollusks, Aquatic Insects and follow general direction objectives O-WL-29 and O-WL-30.

**General Habitat Requirements:** The greater redhorse inhabits moderate to fast flowing clear streams, with substrates of sand, gravel, or boulders. It is not very tolerant of siltation. The redhorse generally feeds on invertebrates such as aquatic insects and mollusks (NatureServe, 2008). The Draft Conservation Assessment for the Greater Redhorse (*Moxostoma valenciennesi*) in the Great Lakes States National Forests, 2002 state that in the CNF “Recently, greater redhorse have been documented in 141 locations in six of ten major Minnesota drainages including the Upper and Lower Mississippi, Red River, St Croix, Minnesota River, and St. Louis (Lake Superior) drainages. In addition, there is one questionable record from the Rainy River drainage (Lake of the Woods, Phillips et al. 1982). Less emphasis has been focused on documenting the distribution of this species in Minnesota, probably because of its unlisted status by the Minnesota Natural Heritage program. Because historical distributional records are incomplete for greater redhorse in Minnesota, it is difficult to establish a clear population trend for this species.

**Distribution within the CNF/LLR:** The greater redhorse has been documented in several watersheds within the CNF and LLBO boundaries, including the Boy River, Willow River, Cass Lake, and Turtle River watersheds. However, in 2000, a juvenile greater redhorse was collected from Cass Lake, providing evidence of natural reproduction within the Mississippi River drainage on the CNF.
**Occurrence within Project Area:** In 2000 a greater redhorse was collected from Cass Lake, providing evidence of occurrence within the Mississippi River drainage within the project area.

**Risk Factors:** This species is particularly vulnerable to habitat alterations such as reduction in benthic invertebrates due to sedimentation. Structures such as dams and impoundments reduce available habitat.

**Determination of Effects**

Table 2.4.5-1 presents a summary of effects for aquatic species guild.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Direct Effects</th>
<th>Indirect Effects</th>
<th>Cumulative Effects</th>
<th>Determination of Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pugnose shiner Notropis anogenus</td>
<td>Pike Bay channel is a potential habitat for this species. No impacts are expected as these waterbodies are proposed to be crossed by HDD which have no in-stream impacts. A tributary to Portage Lake is also potential habitat for this species; this waterbody is proposed to be crossed by open-cut method, and impacts are expected to be minimal and short term as most open-cut crossings take less than 48 hours to complete.</td>
<td>While vegetation is re-establishing increased turbidity could result.</td>
<td>No long term changes to habitats are likely. Populations are unlikely to be effected by pipeline construction.</td>
<td>CNF: Not likely to cause a trend to federal listing or loss of viability. LLBO: Negligible or improbable negative effect on individuals of the species. Population on LLR will not be affected.</td>
</tr>
<tr>
<td>Greater redhorse</td>
<td>Pike Bay channel and Mississippi River crossings which have suitable habitat for this species are proposed to be crossed by HDD which have no in-stream impacts.</td>
<td>While vegetation is re-establishing increased turbidity could result.</td>
<td>No long term changes to habitats are likely. Populations are unlikely to be effected by pipeline construction.</td>
<td>CNF: Not likely to cause a trend to federal listing or loss of viability. LLBO: Negligible or improbable negative effect on individuals of the species. Population on LLR will not be affected.</td>
</tr>
<tr>
<td>Creek heelsplitter Lasmigona compressa</td>
<td>Pike Bay channel and Mississippi River crossings have suitable habitat for mussels, but not in the project area. No impacts are expected as these waterbodies are proposed to be crossed by HDD which have no in-stream impacts.</td>
<td>While vegetation is re-establishing increased turbidity could result.</td>
<td>No long term changes to habitats are likely. Populations are unlikely to be effected by pipeline construction.</td>
<td>CNF: Not likely to cause a trend to federal listing or loss of viability. LLBO: Negligible or improbable negative effect on individuals of the species. Population on LLR will not be affected.</td>
</tr>
<tr>
<td>Fluted-shell mussel Lasmigona costata</td>
<td>Pike Bay channel and Mississippi River crossings have suitable habitat for mussels, but not in the project area. No impacts are expected as these waterbodies are proposed to be crossed by HDD which have no in-stream impacts.</td>
<td>While vegetation is re-establishing increased turbidity could result.</td>
<td>No long term changes to habitats are likely. Populations are unlikely to be effected by pipeline construction.</td>
<td>CNF: Not likely to cause a trend to federal listing or loss of viability. LLBO: Negligible or improbable negative effect on individuals of the species. Population on LLR will not be affected.</td>
</tr>
<tr>
<td>Black sandshell Ligumia recta</td>
<td>Pike Bay channel and Mississippi River crossings have suitable habitat for mussels, but not in the project area. No impacts are expected as these waterbodies are proposed to be crossed by HDD which have no in-stream impacts.</td>
<td>While vegetation is re-establishing increased turbidity could result.</td>
<td>No long term changes to habitats are likely. Populations are unlikely to be effected by pipeline construction.</td>
<td>CNF: Not likely to cause a trend to federal listing or loss of viability. LLBO: Negligible or improbable negative effect on individuals of the species. Population on LLR will not be affected.</td>
</tr>
<tr>
<td>Common Name</td>
<td>Scientific Name</td>
<td>Direct Effects</td>
<td>Indirect Effects</td>
<td>Cumulative Effects</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vertree's caddisfly</td>
<td>Ceraclea vertreesi</td>
<td>Elk River channel and Mississippi River are potential habitat for this species. No impacts are expected as these waterbodies are proposed to be crossed by HDD which have no in-stream impacts.</td>
<td>While vegetation is re-establishing increased turbidity could result.</td>
<td>No long term changes to habitats are likely. Populations are unlikely to be effected by pipeline construction.</td>
</tr>
</tbody>
</table>

**TABLE 2.4.5-1**

Summary of Effects For Aquatic Species Guild

2.4.6 Terrestrial Insects

2.4.6.1 Dakota Skipper (*Hesperia dacotae*)

**ESA, CNF, Minnesota, Leech Lake Reservation Status:** The FWS lists the Dakota skipper as a candidate species for listing. The MDNR lists the Dakota skipper as “Threatened”. The Leech Lake Reservation Sensitive Species List (March 2008) does not list the Dakota skipper.

The CNF has no designation for the Dakota skipper and there are no Forest Plan objectives or management guidelines for this species.

**Species Biology and General Habitat Requirements:** The Dakota skipper is found in native high-quality prairie such as wet-mesic tallgrass prairie to dry-mesic mixed grass prairie. They are often found in association with particular plant species which they are dependent on for food and reproduction, such as *Lilium philadelphicum*, *Campanula rotundifolia*, *Zigadenus elegans*, *Solidago canadensis*, *Echinacea spp.*, and *Astragalus spp*. (see Cochran and Delphey, 2002 for a more complete list).

**Rangewide Distribution/Status**

Within the project area, the Dakota skipper is only found in portions of North Dakota and Minnesota. It is not known from Wisconsin.

**Distribution in Minnesota and North Dakota:** Dakota skippers’ historic range included tallgrass and mixed prairies in Illinois, Iowa, Minnesota, South Dakota, North Dakota, Manitoba, and Saskatchewan. Currently, populations are known from western Minnesota, northeastern South Dakota and the eastern half of North Dakota (Cochran and Delphey, 2002).

**Distribution within the CNF/LLR:** The CNF/LLR does not include habitat for this species. There are no records of this species on the CNF/LLR.

**Occurrence within Project Area:** Potential habitat occurs in native prairie segments in Pembina County, North Dakota; Kittson, Marshall, Pennington, Red Lake, and Polk Counties, Minnesota. There are no FWS records of this species in the project area (Cochran and Delphey, 2002). The MDNR Natural Heritage database identifies mesic prairie remnants in Kittson, Red Lake, and Polk Counties adjacent to railroad rights-of-way.

**Risk factors:** Risk factors for the Dakota skipper include conversion of native prairie for agriculture and other uses, fragmentation of high quality prairie habitat, and artificial and natural disturbances.
Direct Effects

Alternative 1 and 2—Preferred Alternative and Great Lakes Gas Alternative

It is unlikely that the proposed action would have a significant impact on habitat or survival of this species due to the limited amount of prairie habitat in the project area. These prairie remnants are in agricultural areas, with disturbance from an adjacent railroad, which make them lower quality habitats for use by the Dakota skipper. In addition, these prairie remnants are adjacent to railroad rights-of-way and would be crossed using a bore technique, therefore, not disturbing the potential habitat for this species.

Indirect Effects

Alternative 1 and 2—Preferred Alternative and Great Lakes Gas Alternative

Further disturbance of the remnant prairie habitats may decrease availability for use by the Dakota skipper. Some of these areas will not be disturbed directly by construction activities, but construction activities in the area may temporarily decrease availability of habitats for the Dakota skipper.

Cumulative Effects

All Alternatives

Historic effects to prairie habitats include land conversion for agricultural practices and other uses, and railroad construction.

Foreseeable effects are likely to include vegetation management, and construction of utility corridors throughout the project area. However, the exact location and scope of these projects is unknown. Additional disturbance of remnant prairie habitats will likely be the greatest impact to habitats present along the project corridor.

Based upon known past, present, and foreseeable effects on private, state, and federal lands, the proposed action is not expected to contribute to an adverse cumulative effect upon Dakota skippers or their habitat.

Determination of Effects

ESA/USFWS: This project is not likely to adversely affect the Dakota skipper.

MDNR: The project will have a negligible or improbable negative effect on individuals of the species.

2.4.6.2 Jutta arctic (Oeneis jutta ascerta)

CNF, Minnesota, Leech Lake Reservation Status: The jutta arctic has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) also does not have a designation for this species.

This species meets the criteria for Regional Forester’s Sensitive Species, however, it is not currently listed, because it was unknown on the CNF. During project surveys by S. Krych in 2007, this species was observed on the CNF. Because the jutta arctic is listed in the nearby Superior National Forest as “Sensitive”, it will be treated as a “Sensitive” species on the CNF.
**General Habitat Requirements:** The range of the Jutta arctic is Holarctic and in North America occurs from Alaska, through most of Canada, and in the Rocky Mountains, the northern portions of the Great Lakes states, and Maine. Its life history is poorly known, although sedges (*Carex, Eriophorum*) have been reported as larval hosts and complete development from egg to adult may require two years (Coffin and Pfannmuller, 1988). One generation of adults emerge biennially from late June to Late July, although it is known to emerge annually from a few locations (Layberry et al., 1998). This species occurs only in moderately forested black spruce bogs (Coffin and Pfannmuller, 1988). In eastern bogs, it prefers the forested edges to the more open spaces; it is often seen perching on tree trunks and occasionally utilizing Labrador tea (*Ledum groenlandicum*) for nectar (Layberry et al., 1998).

**Distribution within the CNF/LLR:** The Jutta arctic is not documented within the CNF/LLR or Cass County. However, several were observed during songbird surveys in appropriate habitat and were reported to CNF staff.

**Occurrence within Project Area:** This species was observed at several locations within black spruce bogs on the east half of the project between Bena and the Mississippi River.

**Risk Factors:** Risk factors include peat mining, logging of lowland conifer stands and changes in water table resulting from beaver activity and other natural events.

**Direct Effects**

Table 2.4.6-1 presents the effects of the proposed alternatives on the Jutta arctic habitat.

<table>
<thead>
<tr>
<th>TABLE 2.4.6-1</th>
<th>Acres of Jutta Arctic Habitat a Intersected By Proposed Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Types and Age</td>
<td>Alternative 1 - (acres of impacted Jutta Arctic stands)</td>
</tr>
<tr>
<td>Total a</td>
<td>19</td>
</tr>
</tbody>
</table>

*a* Black spruce Tamarack swamp with sphagnum/ericaceous understory.

**Alternative 1 – Preferred Alternative**

Suitable Jutta arctic habitats were screened using polygons of black spruce tamarack swamps and potential impacts from construction were calculated using GIS protocols. Occupied Jutta arctic habitats were buffered by 140 feet in order to calculate potential impacts from construction of the Preferred Alternative. Suitable habitat is abundant from just east of Nushka Lake to the Mississippi River. Surveys along this segment of the Preferred Alternative documented 6 occurrences within 150 feet of the existing Enbridge right-of-way. The Preferred Alternative will impact 19 acres of occupied Jutta arctic habitat.
Alternative 2 – Great Lakes Gas Alternative

Suitable Jutta arctic habitats were screened using polygons of black spruce tamarack swamps and potential impacts from construction were calculated using GIS protocols. Occupied Jutta arctic habitats were buffered by 140 feet in order to calculate potential impacts from construction of the Great Lakes Gas Alternative. Suitable habitat is abundant from just east of Nushka Lake to the Mississippi River. Surveys along this segment of the Great Lakes Gas Alternative documented 6 occurrences within 150 feet of the existing Enbridge ROW. The Great Lakes Gas Alternative will impact 19 acres of occupied Jutta arctic habitat.

Indirect Effects

Indirect effects on this species could include alteration of wetland hydrology and the introduction of invasive species into wetland habitats that these butterflies could utilize. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. The introduction of invasive species could disrupt the function of existing wetland ecosystems by displacing native species or species that provide food, cover, or shelter to existing prey species. Enbridge will develop a *Noxious Weeds and Invasive Species Control Plan* to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

Clearing of additional forest to accommodate pipeline construction within suitable forest types may affect long-term habitat opportunities for Jutta arctic within the analysis area. The greatest impacts would occur within areas that currently contain the most acreage of suitable habitat such as those between Nushka Lake and the Mississippi River along both Alternative 1 and 2. The additional width of pipeline right-of-way will further reduce forested habitats regardless of which alternative is chosen.

Cumulative Effects

Cumulative effects for the Jutta arctic were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands, or hydrologic alteration would have negative effects on habitats utilized by the Jutta arctic. The CNF/LLR provides suitable habitat especially on the east half of the analysis area.

All Alternatives

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to Alternative 1 or 2 should the CapX 2020 corridor be constructed adjacent to existing corridors. The project area in question would result in additional loss of lowland conifer habitat under Alternative 1 and 2.

Based upon known past, present, and foreseeable effects, Alternatives 1 and 2 is not expected to contribute to an adverse cumulative effect upon the Jutta arctic or its breeding habitat due to the small amount of habitat being affected in relation to those habitats that are available on the CNF/LLR. Alternative 1 or 2 may have short-term negative effects on habitat for this species, but would not have an effect on population viabilities of Jutta arctic within the forest.

Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determination of effects for Alternatives 1 and 2.
CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

2.4.6.3 Red-disked Alpine (*Erebia discoidalis discoidalis*)

**CNF, Minnesota, Leech Lake Reservation Status:** The red-disked alpine has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) also does not have a designation for this species.

This species meets the criteria for Regional Forester’s Sensitive Species, however, it is not currently listed, because it was unknown on the CNF. During project surveys by S. Krych in 2007, this species was observed on the CNF. The red-disked alpine is listed in the nearby Superior National Forest as “Sensitive”; therefore, it will be treated as a “Sensitive” species on the CNF.

**General Habitat Requirements:** The red-disked alpine occurs throughout a large part of subarctic North America, ranging farther south in the Great Lakes region than other subspecies within this genus (Layberry et al,1998). It is known from only a small number of sites in Minnesota, but probably occurs throughout the northern 1/3 of the state. The larvae are known to utilize several species of grasses in the genus *Poa* and have also been reared on cotton grass (*Eríophorum sp.*) and other sedges (*Carex spp.*) in captivity. One generation of adult butterflies emerge in May or June every year (Opler, 1992). The red-disked alpine has been reported from moist prairie habitats, grassy areas on bog margins, occasionally in dry meadows and on sandy ridges in open Jack pine forests. In Minnesota, it is a bog-associated species, although it seems to prefer open, grassy bogs and moist meadows on bog margins to conifer-heath-sphagnum bogs (Coffin and Pfannmuller, 1988).

**Distribution within the CNF/LLR:** The red-disked alpine is not documented within the CNF or Cass County. However, one adult was observed in appropriate habitat during raptor call-back surveys being conducted on May 22, 2008 and were reported to CNF staff.

**Occurrence within Project Area:** This species occurs within an open bog at MP 976.6. Additional suitable habitat is present along the project route but no additional sightings were documented.

**Risk Factors:** Risk factors include peat mining, logging of lowland conifer stands and changes in water table resulting from beaver activity and other natural events.

**Direct Effects**

Table 2.4.6-1 presents the effects of the proposed alternatives on the red-disked alpine habitat.

<table>
<thead>
<tr>
<th>TABLE 2.4.6-1</th>
<th>Acres of red-disked alpine Habitat a Intersected By Proposed Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Forest Types and Age</strong></td>
<td><strong>Alternative 1 – Preferred</strong></td>
</tr>
<tr>
<td>Alternative (acres of impacted red-disked alpine stands)</td>
<td>Alternative (acres of impacted red-disked alpine stands)</td>
</tr>
<tr>
<td>Total a</td>
<td>68</td>
</tr>
</tbody>
</table>

a Stands designated as permanent openings, sedge meadow, shallow marsh, or bog that are equal or greater than 10 acres in size and are not dominated by cattails or shrubs.

**Alternative 1 – Preferred Alternative**

Suitable red-disked alpine habitats were screened using polygons of permanent openings, sedge meadow, shallow marsh or bog and potential impacts from construction were calculated using GIS protocols.
Occupied red-disked alpine habitats were buffered by 140 feet in order to calculate potential impacts from construction of the Preferred Alternative. Suitable habitat is abundant from just west of Bena to the Mississippi River. Surveys along this segment of the Preferred Alternative documented 1 occurrence within 150 feet of the existing Enbridge ROW. The Preferred Alternative will impact 3 acres of occupied red-disked alpine habitat.

**Alternative 2 – Great Lakes Gas Alternative**

Suitable red-disked alpine habitats were screened using polygons of permanent openings, sedge meadow, shallow marsh or bog and potential impacts from construction were calculated using GIS protocols. Occupied red-disked alpine habitats were buffered by 140 feet in order to calculate potential impacts from construction of the Great Lakes Gas Alternative. Suitable habitat is abundant from just east of Nushka Lake to the Mississippi River. Surveys along this segment of the Great Lakes Gas Alternative documented one occurrence within 150 feet of the existing Enbridge ROW. The Great Lakes Gas Alternative will impact no occupied red-disked alpine habitat.

**Indirect Effects**

Indirect effects on this species could include alteration of wetland hydrology and the introduction of invasive species into wetland habitats that these butterflies could utilize. The introduction of invasive species could disrupt the function of existing wetland ecosystems by displacing native species or species that provide food, cover, or shelter to existing prey species. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. Implementing BMP’s should serve to minimize any hydrologic alteration to the project area and surrounding habitat. Enbridge will develop a *Noxious Weeds and Invasive Species Control Plan* to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

Clearing of additional forest to accommodate pipeline construction within suitable forest types may affect long-term habitat opportunities for red-disked alpine within the analysis area. The greatest impacts would occur within areas that currently contain the most acreage of suitable habitat such as those between Bena and the Mississippi River along the proposed route. The additional width of pipeline ROW will further reduce forested habitats.

**Cumulative Effects**

Cumulative effects for the red-disked alpine were evaluated on public lands that lie within the analysis area. Timber harvest, road construction, or activities that convert forested wetland to open wetlands, or hydrologic alteration would have negative effects on habitats utilized by the red-disked alpine. The CNF provides suitable habitat especially on the east half of the analysis area.

Historic and foreseeable effects are noted in the northern goshawk and red-shouldered hawk sections. The expansion of open habitats and reduction of forested habitat will create a wider corridor adjacent to the proposed route should the CapX 2020 corridor be constructed adjacent to existing corridors. The project area in question would result in open peatland or sedge meadow habitat.

Based upon known past, present, and foreseeable effects, the proposed action is not expected to contribute to an adverse cumulative effect upon red-disked alpine or its breeding habitat due to the small amount of habitat being affected in relation to those habitats that are available on the CNF. The proposed action may have short-term negative effects on habitat for this species, but would not have an effect on population viabilities of red-disked alpine within the forest.
Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determination of effects for Alternatives 1 and 2.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

2.4.7 Plants

TES plants determined to have potential habitat that could be affected by the alternatives were grouped for effects analysis. Groups were determined according to habitat similarities. Species with varied habitat requirements were included in more than one group.

*Carpinus caroliniana, Taxus canadensis, and Pinus strobus* are considered Traditional Cultural Properties (TCP) by the Great Lakes Ojibwe people. *Carpinus caroliniana* has been used traditionally as a building material. *Taxus canadensis* is an essential ingredient in an important medicine. *Pinus strobus* has many traditional uses both specified and unspecified. Impacts to TCPs are addressed under Protection of Historic Properties--36 CFR Part 800. Their cultural importance is taken into consideration within the determination of effects for these species.

The Forest Plan Standards and Guidelines section provide direction for the management of TES species at two levels. The first level provides a General Direction for the management of all TES plant species on CNF lands, the second level includes management direction specific to each species listed as RFSS or that is included in the Forest Plan as a sensitive species.

Landscape level (or coarse filter) management strategies include: Addressing species’ needs through integrated resource management at large landscape scales including, but not limited to: Landscape Ecosystem scales for vegetation and Management Indicator Habitat (MIH) objectives; watersheds for aquatic and riparian condition objectives; and acceptable levels of human uses.

Site-level (or fine filter) management strategies include: Addressing species’ needs by managing specifically for high quality potential habitat or known locations of sensitive species.

Forest Plan General Direction for All Sensitive Plants

O-WL-31 Enhance or restore high-quality habitat on a minimum of 20 (average of 2 sites per year) known sites of sensitive plants. Priority for habitat improvement will generally be for those species and habitats for which:

a. Proactive management (versus protection based on avoidance of any management activities) is needed to maintain species and;

b. Coarse filter management does not provide adequate maintenance or restoration.

S-WL-6 Prohibit the harvesting of sensitive and state listed threatened and endangered plants. Exceptions may be made for scientific research purposes or in fulfillment of treaty rights.

Plant species have been classified according to guilds (used by the CNF) due to similarities in habitat requirements. Some species, which utilize more than one habitat or guild type, are analyzed under more than one guild. Rare plant field survey reports can be found in Appendices G and H.
2.4.7.1 Mesic Northern Hardwoods Sensitive Plants Guild

The following species area evaluated as a guild due to similarities in habitat requirements:

- *Botrychium dissectum* – Dissected grape fern
- *Botrychium lanceolatum* var. *angustisegmentum* – lance-leaved grape fern
- *Botrychium minganense* – Mingan moonwort
- *Botrychium mormo* – goblin fern
- *Botrychium oneidense* – blunt-lobed grape fern
- *Botrychium simplex* – least grape fern
- *Carya cordiformis* – bitternut hickory
- *Carpinus caroliniana* – blue beech
- *Dryopteris goldiana* – Goldie’s wood fern
- *Juglans cinerea* – butternut
- *Mitchella repens* – partridge-berry
- *Orobanche uniflora* – One-flowered broomrape
- *Pinus strobus* – white pine
- *Waldsteinia fragarioides* – barren strawberry

All of these species are associated with mesic northern hardwood forests.

**Dissected grape-fern (*Botrychium dissectum*) Sprengel**

**CNF, Minnesota, and LLBO Conservation Status:** The dissected grape-fern has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates this species as “Threatened” and notes that this species is “Very rare on the reservation.”

The National Forest has no designation for the dissected grape-fern and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** Wagner and Wagner (1993) indicate that *B. dissectum* inhabits a variety of habitats, open grassy areas to deep forest. Lellinger (1985) describes the habitat as including moist to rather dry woods, swamps, and pastures or old fields, commonly under somewhat disturbed conditions.

**Distribution within the CNF/LLR:** As of 2001, there were two known locations of this species in the CNF (U.S. Forest Service, 2001a).

**Occurrence within Project Area:** This species was not discovered during 2007 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1; but was found during 2008 surveys on alternative 1. This species was found during 2008 surveys for CapX, (along Alternative 2).

**Risk Factors:** Johnson-Groh (1999 cf. Chadde and Kudray, 2000a) concluded that mycorrhizae are the most limiting factor for *Botrychium* establishment, distribution, and abundance. *Botrychium* are quite often a part of the flora of utility corridors, which suggests this genera of fern responds positively to the disturbance associated corridor development. The suitability of these newly developed habitats is, however, likely associated with presence of mycorrhizae populations, as well as moisture availability. The invasion of exotic earthworms appears to be a significant threat to the genus as a whole. In an ongoing *B. mormo* monitoring effort on the Chippewa National Forest plots impacted by worms exhibited significant negative effects on *B. mormo* populations (Johnson-Groh, 1999 cf. Chadde and Kudray, 2000a).
Although the Alberta Clipper and Southern Lights Diluent Projects will impact habitat deemed suitable for this species, this species is often found in previously disturbed sites. The Alberta Clipper and Southern Lights Diluent Projects will represent a low risk to the overall viability of this species in the CNF/LLR along the highway 2 corridor. However, the viability of *Botrychium* species located within the alternative route corridor would stand a much greater risk of earthworm invasion from these projects due to differences in soil-type (LLBO, personal communication).

**Lanceleaf grape-fern** (*Botrychium lanceolatum* (S.G. Gmelin) Angström var. angustisegmentum Pease & A.H. Moore))

**CNF, Minnesota, and LLBO Conservation Status:** The lanceleaf grape-fern has a state status of “Threatened.” The Leech Lake Reservation Sensitive Species List (March 2008) designates this species as “Threatened” and notes that this species is “Very rare; several locations within reservation.”

The lanceleaf grape-fern is designated as RFSS on the CNF. General Forest Plan directives are the same for triangle grape-fern as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no Forest Plan objectives or management guidelines specific to this species.

**General Habitat Requirements:** Wagner and Wagner (1993) indicated that this species occurs mainly in shaded woods. Lellinger (1985) cites this species as occurring in woods and on hummocks in swamps, in cool to warm, mostly rich, subacid soil.

**Distribution within the CNF/LLR:** There are 48 records of lanceleaf grape-fern within the CNF/LLR.

**Occurrence within Project Area:** This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. However, it was observed within 100 feet of the Alternative 1 corridor during a survey conducted in 2001. This species was found during 2008 surveys for CapX, (along Alternative 2).

**Risk Factors:** The principal risk to this species is the loss of suitable habitat through activities that remove overstory canopy. The invasion of exotic earthworms poses a potential significant long term risk to this species, while herbivory and drought, are likely short term risks.

The Alberta Clipper and Southern Lights Diluent Projects will reduce some available suitable habitat for this species; however, this is minimal, relative to the total amount of suitable habitat present in the Forest. The Alberta Clipper and Southern Lights Diluent Projects will represent a low risk to the viability of the species in the CNF/LLR.

**Mingan Moonwort** (*Botrychium minganense*) **Victorin**

**CNF, Minnesota, and LLBO Conservation Status:** The mingan moonwort has a state status of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) designates this species as “Threatened” and notes that this species is “Uncommon in this area; sometimes found with *B. mormo* or other *Botrychium* species.”

The mingan moonwort is not designated as RFSS on the CNF. There are no Forest Plan objectives or management guidelines specific to this species.

**General Habitat Requirements:** This species grows in a broad variety of usually moist or mesic habitats such as meadows, prairies, woods, riverbanks (Chadde and Kudray, 2000b; Lellinger, 1985). Wagner and
Wagner (1990) characterize the habitat for mingan moonwort as second-growth low, shrubby fields and woods.

**Distribution within the CNF/LLR:** As of 2001, there were 18 known locations of mingan moonwort in the CNF; the principal habitat cited being deciduous forests with sugar maple as a principal component (U.S. Forest Service, 2001b).

**Occurrence within Project Area:** This species was observed during 2007 and 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was also found during 2008 surveys for CapX, (along Alternative 2).

**Risk Factors:** In the CNF/LLR the principal risk to this species is the loss of suitable habitat through activities that remove overstory canopy, particularly in those systems that support a predominance of sugar maple in the overstory. The invasion of exotic earthworms pose a potential significant long term risk to this species, while herbivory and drought likely pose a short term risk to this species.

The Alberta Clipper and Southern Lights Diluent Projects will result in a reduction of potentially suitable habitat; however, this will be minimal, relative to the total amount available on the Forest. The disturbance to land associated with this project may provide additional suitable habitat for this species as this species is often found in previously disturbed areas. The project will pose a low risk to the viability of the mingan moonwort in the CNF/LLR.

**Goblin fern (Botrychium mormo) W.H. Wagner**

**CNF, Minnesota, and LLBO Conservation Status:** The goblin fern has a state status of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) designates this species as “Endangered” and notes that this species is “Found only in MN, WI, and MI; largest population on reservation; threatened by timber harvest and exotic earthworm infestation.”

The goblin fern is designated as RFSS on the CNF. General Forest Plan directives are the same for goblin fern as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6.

Specific to the Goblin fern the following Forest Plan Objectives apply.

S-WL-7

a) Activities that could disturb goblin ferns, their habitat, or microhabitat should not occur within 250 feet of known goblin fern populations. The exception to this standard is for administrative studies or research that contributes to the conservation of the species.

b) In suitable habitat that is immediately adjacent and contiguous to existing populations beyond the 250-foot no-activity zone, site disturbing activities should occur only during frozen ground conditions (as evidenced by and absence of rutting, compaction, or breaking through the frost layer), and a minimum canopy closure of 70 percent should be maintained. (Single tree selection would generally meet desired conditions in this standard, but group selection harvest does not meet conditions desired in this standard because of the gaps created in proximity to occupied habitat.)

c) Minimize the likelihood of worm invasion in existing or potential habitat areas identified as having low potential for worm invasion. Such conditions exist where areas are void of
roads and trails (or where densities can be minimized), developments, lakes and streams that support game fish, or are isolated due to wetlands or some other condition not conducive to worm colonization. Examples of actions to minimize worm invasion include limiting vehicle or OHV access, road building, or summer activities that move soil into geologically isolated habitat.

d) In unoccupied habitat, not contiguous to occupied habitat, of moderate or high quality, generally defined as mature or older northern hardwoods, mixed hardwoods on Mesic Northern Hardwood or Rich Hardwood Native Plant Communities; on sites currently free of exotic worm populations):

In order to avoid light level changes that result in soil temperature increases, humidity, and soil moisture decreases, management activities will maintain a minimum of 70 percent crown closure on average at the stand level. (Single trees of group selection harvests could be used as long as at least minimal conditions desired in the standard are met). On low quality unoccupied habitat or former habitat that has been impacted by exotic earthworms (determined at the project level by a biologist, ecologist, or botanist), management emphasis may be towards meeting other multiple use objectives and may deviate from the conditions above.

**General Habitat Requirements:** The primary habitat for *B. mormo* is rich, mature northern hardwood forest with a well-develop layer of duff in various stages of decay lying over mineral soil (Berlin et al., 1998). Most occurrences of the goblin fern are on flat terrain, but occasionally they will be found on a moderate slope (Berlin et al., 1998). Except for patchy sun spots, all of the occurrences are in deep shade (Berlin et al., 1998).

**Distribution within the CNF/LLR:** In 2000 there were 133 element occurrences of *B. mormo* in the CNF, representing over 80 percent of the known occurrences in Minnesota (Chadde and Kudray, 2000c).

**Occurrence within Project Area:** This species was not discovered during the 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species shows great variability in its annual presence at known sites, largely dependent upon annual precipitation levels. In any given year, plants push their way through the leaf litter or lie dormant, depending upon seasonal moisture availability (Wagner and Wagner, 1981 cf.; Chadde and Kudray, 2000c). This species was found during 2008 surveys for CapX, (along Alternative 2).

**Risk Factors:** Risks to this species include, loss of habitat through land conversion, timber harvesting techniques that remove a large amount of forest canopy or convert sites to monocultures, soil compaction, alteration in moisture regime, sustained drought, and invasion of exotic earthworms.

The Alberta Clipper and Southern Lights Diluent Projects will result in the removal of some potentially suitable habitat for the goblin fern; however, the amount is minimal, relative to the total amount available in the Forest. There are no known populations within the project area, so impacts to this species and management activities under S-WL-7 will not be affected.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Blunt-lobed grape-fern (*Botrychium oneidense*) (Gilbert) House**

**CNF, Minnesota, and LLBO Conservation Status:** The blunt-lobed grape-fern has a state status of “Endangered.” The Leech Lake Reservation Sensitive Species List (March 2008) designates this species
as “Endangered” and notes that this species is “Very rare; one location south of reservation, one location within reservation.”

The blunt-lobed grape-fern is designated as RFSS on the CNF. General Forest Plan directives are the same for blunt-lobed grape-fern as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the blunt-lobed grape-fern.

**General Habitat Requirements:** “Range wide this species occurs in second growth forests in shallow depressions and ephemeral pools, rich coves and secondary growth with some areas with light-gaps from fallen trees, low wet woods with peat or silt, stream terraces, northern and eastern aspects in oak/pine and birch woods and basswood and maple woods with moist depressions or boggy edges” (NatureServe, 2007).

**Distribution within the CNF/LLR:** As of 2001, this species was known from one site in the CNF, occurring in a moist ephemeral pond in a deciduous forest, with sugar maple and basswood (U.S. Forest Service, 2001b).

**Occurrence within Project Area:** This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1 or during 2008 surveys for CapX on Alternative 2.

**Risk Factors:** Threats to *B. oneidense* include drought, fire, timber harvest, collecting, herbicides, herbivory, exotic earthworms, succession, and grazing (USDA Forest Service, 2000 cf. Chadde and Kudray, 2000d).

The Alberta Clipper and Southern Lights Diluent Projects will affect some potentially suitable habitat for this species, however, this will minimal relative to the amount available in the Forest. The Alberta Clipper and Southern Lights Diluent Projects will represent a low risk to the blunt-lobed grape fern.

**Least Moonwort (Botrychium simplex) E. Hitchcock**

**CNF, Minnesota, and LLBO Conservation Status:** The least moonwort has a state status of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) designates this species as “Threatened” and notes that this species is “Rare in north-central Minnesota; found at several locations; large population on tribal land.”

The least moonwort is designated as RFSS on the CNF. General Forest Plan directives are the same for least moonwort as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the least moonwort.

**General Habitat Requirements:** The habitat of the least moonwort includes meadows, barrens, woods, dry fields, marshes, bogs, swamps, and roadside ditches (Lellinger, 1985; Wagner and Wagner, 1993). Lellinger (1985) indicates that the substrate supporting this moonwort is typically subacid. According to Wagner and Wagner (1993) the many environmental forms and juvenile stages of *Botrychium simplex* have resulted in the naming of numerous, mostly taxonomically worthless, intraspecific taxa. In Minnesota, *B. simplex* has been found in northern hardwood forest of sugar maple and basswood, rich black ash and cedar swamps, jack pine woods, prairies, and disturbed areas such as borrow pits, tailings ponds and road shoulders (Chadde and Kudray, 2000e). Rock (2001 cf. Chadde and Kudray, 2000e) cited habitat in Minnesota as including dry or more often damp, partially shaded areas in coniferous forest, or rich deciduous woods on slopes.
Distribution within the CNF/LLR: There are 35 records of least moonwort within the CNF. The habitats supporting *B. simplex* in the CNF include open fields, cedar plantation, and upland and lowland forests systems.

Occurrence within Project Area: This species was not observed during 2007 plant surveys within the Alternative 1 route, however, it has been observed on the adjacent Enbridge pipeline corridor within the CNF/LLR during surveys conducted prior to 2007, and was identified during 2008 rare plant surveys on alternative 1. This species was found during 2008 surveys for CapX, (along Alternative 2).

Population studies on other species of moonworts have shown that there can be considerable annual variation in the number of aboveground plants at a given site (Johnson-Groh, 1999 cf.; Chadde and Kudray, 2000e). These variations reflected micro site differences such as soil moisture, herbivory, or mycorrhizae although populations of moonworts often fluctuate wildly from year-to-year without any apparent cause, and individual plants may not emerge every year (Johnson-Groh, 1999 cf.; Chadde and Kudray, 2000e; Muller, 1993; Johnson-Groh and Farrar 1996a; Johnson-Groh, 1998, 1999 cf.; Chadde and Kudray, 2000e).

Risk Factors: The occurrence of this species in a wide spectrum of habitats, ranging from open to closed canopy plant communities, suggests that micro site conditions (i.e., available moisture, mycorrhizae population) may dictate the presence of this species. The invasion of exotic earthworms and their impact on the forest duff condition likely results in a loss of habitat for this species.

The Alberta Clipper and Southern Lights Diluent Projects will impact historic habitat of this species, however, utility corridor development should result in creation of additional suitable habitat for this species, as evidenced by the occurrence of this species on and near pipeline corridors in the Forest.

The Alberta Clipper and Southern Lights Diluent Projects should pose low risk to the viability of this species in the CNF/LLR.

Bittern nut Hickory (*Carya cordiformis*) (Wang.) K. Koch

CNF, Minnesota, and LLBO Conservation Status: The bitternut hickory has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates this species as “Sensitive” and notes that this species is “Rare; not known for certain if occurrences were originally planted by Native Americans.”

The bitternut hickory has no forest designation and there are no management guidelines specific to the least moonwort.

General Habitat Requirements: This species inhabits beech-maple and mixed hardwood stands (Voss, 1985), river flood plains, well-drained hillsides, and limestone glades (Stone, 1997 cf. U.S. Forest Service, 2001a).

Distribution within the CNF/LLR: As of 2001, this species was known from two sites, in the CNF (U.S. Forest Service, 2001a). These sites represent the northern-most location for this species in Minnesota.

Occurrence within Project Area: This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area and typical suitable habitat was not observed along Alternative 1. This species was not found during 2008 surveys for CapX on Alternative 2.
**Risk Factors:** Risk to this species where it occurs is land conversion and timber management that use clear-cut silviculture.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Goldie’s wood-fern (Dryopteris goldiana) (Hooker ex Goldie) A. Gray**

**CNF, Minnesota, and LLBO Conservation Status:** The Goldie’s wood-fern has a state status of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) designates this species as “Threatened” and notes that this species is “found in old deciduous forest; only locations known in northern Minnesota are within reservation.”

The Goldie’s wood-fern is designated as RFSS on the CNF. General Forest Plan directives are the same for Goldie’s wood-fern as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the Goldie’s wood-fern.

**General Habitat Requirements:** Range wide, Goldie’s fern inhabits dense, moist woods, especially ravines, limey seeps, or at the edge of swamps (Montgomery and Wagner, 1993). Minnesota represents the northwestern extent of the species range; inhabiting moist soil on north- or east-facing, wooded slopes.

**Distribution within the CNF/LLR:** As of 2001, this species was known from nine locations in the CNF (U.S. Forest Service, 2001b).

**Occurrence within Project Area:** This species was not discovered during the 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area and no suitable habitat was observed. This species was not discovered during 2008 surveys for CapX, on alternative 2.

**Risk Factors:** The principal risk to this species where it occurs is the loss of suitable habitat through the removal of forest canopy through timber operations, or conversion of land to another land use.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Blue Beech (Carpinus caroliniana) Walter**

**CNF, Minnesota, and LLBO Conservation Status:** The blue beech has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates this species as “Sensitive” and notes that this species is “One known location on reservation.”

Blue beech is not listed in the CNF. There are no management guidelines specific to the blue beech.

**General Habitat Requirements:** Blue beech occurs in swamp forests, stream banks, and in upland woods including aspen, oak-hickory, and rich beech-maple stands (Voss, 1985).

**Distribution within the CNF/LLR:** This species is not tracked in the CNF.
Occurrence within Project Area: The 2007 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area discovered one population of this species along Alternative 1. This species was also found during 2008 surveys for CapX, (along Alternative 2).

Risk Factors: Risk to this species where it occurs is loss of habitat through conversion and timber management that uses clear-cut silviculture. This species is tolerant of selective timber harvesting.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Butternut (Juglans cinerea) Linnaeus**

CNF, Minnesota, and LLBO Conservation Status: The butternut has a state status of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) designates this species as “Sensitive” and notes that there are “About a dozen trees found in oak forest in Cass County; northwesternmost population in North America.”

The CNF has no designation for the butternut and there are no Forest Plan objectives or management guidelines for this species.

General Habitat Requirements: Voss (1985) characterizes the habitat for this species as consisting of stream banks and swamp forests, as well as upland beech-maple, oak-hickory, and mixed hardwood stands.

Distribution within the CNF/LLR: There are no known occurrences of this species in the CNF; the nearest site is nine miles south of the Forest boundary (U.S. Forest Service, 2001b). The Cass County specimens represent the northwestern most location for this species in North America (U.S. Forest Service, 2001b).

Occurrence within Project Area: This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

Risk Factors: Risk to this species where it occurs is land conversion, timber management that employs clearcutting as a silvicultural method, and the butternut canker fungus.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Partridge-berry (Mitchella repens) Linnaeus**

CNF, Minnesota, and LLBO Conservation Status: The partridge-berry has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates this species as “Sensitive” and notes that this species has “Few occurrences in area; single occurrence on reservation on Forest Service land, probably extirpated due to timber harvest.”

The CNF has no designation for the partridge-berry and there are no Forest Plan objectives or management guidelines for this species.
General Habitat Requirements: This species inhabits deciduous woods with beech, maple, birch, aspen, and/or oak; often with cedar and hemlock or with pine, including hummocks in cedar swamps (Voss, 1996).

Distribution within the CNF/LLR: This species is not tracked in the CNF.

Occurrence within Project Area: This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

Risk Factors: Loss of habitat is the principal risk to this species where it occurs. The amount of available habitat impacted is minimal relative to the total amount available in the Forest.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

One-flowered broomrape (Orobanche uniflora) Linnaeus

CNF, Minnesota, and LLBO Conservation Status: The one-flowered broomrape has a state status of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) designates this species as “Threatened” and notes that this species is “Very rare; single location on reservation is only record from MN in the past 30 years.”

One-flowered broomrape is listed as a RFSS in the CNF. General Forest Plan directives are the same for one-flowered broomrape as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the one-flowered broomrape.

General Habitat Requirements: Voss (1996) characterizes the habitat of this species in Michigan as at edges of conifer thickets along dunes and in both dry sandy open areas and rich woods. Coffin and Pfannmuller (1988) indicate that in Minnesota the plant inhabits a variety of woodland types with a preference, if any, for mesic sites with north-facing exposures.

Distribution within the CNF/LLR: The one known site of this species in the CNF is from a transition zone between a white cedar swamp and a northern hardwood forest approximately 3 miles south of Alternative 1, along the GLGT route (Alternative 2) (U.S. Forest Service, 2001b; LLBO Personal Communication).

Occurrence within Project Area: This species was not discovered during 2007 or 2008 plant surveys of the Alberta Clipper and Southern Lights Diluent Projects area. The LLBO biologist is aware of one population of this species along the GLGT alternative, found in 1998; this population was not found during 2008 surveys for CapX (on alternative 2).

Risk Factors: The conversion of known habitat to a different land use is likely the principal risk to this species where it occurs. The presence of this species is likely linked to the presence of its host species.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR along alternative 1. The one known population in the CNF/LLR would be at risk for extirpation by construction activities along alternative 2.
**White Pine (Pinus strobus)**

**CNF, Minnesota, and LLBO Conservation Status:** The white pine has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates the white pine as “Sensitive” and states “Population greatly reduced due to over-harvest, blister rust, deer browsing, and insect pests. Regeneration efforts underway.”

The white pine has no designation within the CNF, but it is considered a Management Indicator Species. The following management guidelines include the white pine:

- **O-WS-3:** Within “near-bank” riparian management zones, as part of all actions involving vegetation management, favor management for long-lived tree species (such as white pine, red pine, black spruce, tamarack, etc.) suitable for the site, at stand densities suitable for the site.

- **O-VG-7:** Restore the diversity of tree species within stands to conditions more representative of native vegetation communities by increasing the component of white pine, red pine, paper birch, white cedar, upland tamarack, and in some areas, white spruce and black spruce.

- **O-VG-17:** In mature or older red and white pine forest types maintain characteristics of mature or older vegetation communities and promote the maintenance or development of interior forest habitat conditions.

The following management guidelines are specific to the white pine:

- **O-WL-33:** Increase amount of white pine to amounts more representative of native plant communities by planting or naturally regenerating white pine trees in white pine forest types and in other upland deciduous, mixed, and conifer forest types.

- **O-WL-34:** Manage to improve white pine survival on planted sites and as many naturally regenerating sites as possible.

**General Habitat Requirements:** This species occurs in mixed woods, sandy plains and dunes, bogs with tamarack, in swampy woods, on rock ridges, and cedar swamps (Voss, 1972).

**Distribution within the CNF/LLR:** This species is not tracked in the CNF. However, it is widely distributed across the project and analysis areas.

**Occurrence within Project Area:** This species was noted as being widespread during the 2007 plant surveys within Alternative 1’s proposed route. This species was also found in abundance during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** The Alberta Clipper and Southern Lights Diluent Projects will directly impact this species; however, the extent of impact relative to the amount of sites supporting this species on the Forest is minimal. The construction right-of-way will be necked down to 100 feet across waterbodies and extra workspaces not placed within 50 feet of waterbodies, when possible.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.
Barren strawberry (*Waldsteinia fragarioides*) (Michx.) Tratt.

**CNF, Minnesota, and LLBO Conservation Status:** The barren strawberry has a state status of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) designates the barren strawberry as “Sensitive” and states that this species is at the “Edge of range, usually found on sandy soils especially in conifer or oak forest.”

The CNF has no designation for the barren strawberry and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** The Conservation Assessment for barren strawberry indicates that in Wisconsin this species has been collected in a wide range of habitats including old fields, open dry places, secondary forests, bottomlands, stream banks, burned over forests, sand hills, and virgin forest (Hill, 2003). Coffin and Pfannmuller (1988) describe Minnesota occurrences coming mostly from upland pine forests, particularly jack pine (*Pinus banksiana*). Minnesota is the westernmost occurrence of this species in North America.

**Distribution within the CNF/LLR:** In 2001 (U.S. Forest Service, 2001b) there were five known occurrences of this species in the CNF; as recently as 2008, another occurrence of this species was found on tribal lands (LLBO, personal communication). In 2000, this species was considered but not selected for addition to the RFSS list. The Risk Evaluation stated that the species was “frequent enough on the Chippewa NF to not warrant listing” (U.S. Forest Service, 2001b).

**Occurrence within Project Area:** This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** Risk to this species where it occurs in loss of habitat from conversion of land to different land use and forestry practices that remove a significant portion of the overstory trees allowing a significant increase in solar radiation to the ground layer.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Environmental Baseline**

Suitable habitat occurs for plants within the Mesic Northern Hardwood (MNH) guild along portions of both alternatives. Surveys were conducted along each alternative for the presence of these species. Sensitive plants are generally habitat specialists and the MNH guild contains species that are currently and historically associated with northern hardwoods or micro-sites within these forest communities. The distribution and abundance of suitable habitat has declined due to timber harvest practices that result in younger even-aged forest types. Consequently, the MNH community type has become more fragmented and isolated patches of this habitat type occupy a smaller portion of the landscape. The isolated nature of the habitat type, limit the opportunities for plants within this guild to interact which increases the potential for extirpation to occur.

Effects of Action: Table 2.4.7-1 provides estimated amounts of MNH habitat within each alternative. Table 2.4.7-2 provides TES, RFSS, and LLBO species occurrences within the impact areas of each alternative.
### TABLE 2.4.7-1

<table>
<thead>
<tr>
<th>Species</th>
<th>Acres of MNH Crossed By Each Alternative</th>
</tr>
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<tbody>
<tr>
<td>Alternative 1 (acres)</td>
<td>Alternative 2 (acres)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>34.8</td>
</tr>
</tbody>
</table>

### TABLE 2.4.7-2

<table>
<thead>
<tr>
<th>Species</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Botrychium dissectum</em> – Dissected grape fern</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><em>Botrychium lanceolatum var.</em> angustisegmentum* – lance-leaved grape fern</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td><em>Botrychium minganense</em> Mingan moonwort</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td><em>Botrychium momo</em> – goblin fern</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td><em>Botrychium oneidense</em> – blunt-lobed grape fern</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>Botrychium simplex</em> – least grape fern</td>
<td>16</td>
<td>40</td>
</tr>
<tr>
<td><em>Carya cordiformis</em>  – bitternut hickory</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>Carpinus caroliniana</em> – blue beech</td>
<td>Yes (abundance not tallied)</td>
<td>17</td>
</tr>
<tr>
<td><em>Dryopteris goldiana</em> – Goldie’s wood fern</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>Juglans cinerea</em> – butternut</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>Mitchella repens</em> – partridge-berry</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>Orobanche uniflora</em> – One-flowered broomrape</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>Pinus strobus</em> – white pine</td>
<td>Yes (abundance not tallied)</td>
<td>Yes (abundance not tallied)</td>
</tr>
<tr>
<td><em>Waldsteinia fragarioides</em> – Barren strawberry</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

* Species occurrences based on 2007 and 2008 field surveys.

**Direct Effects**

**Alternative 1 – Preferred Alternative**

No habitat designated as MNH will be crossed by this alternative. However, known occurrences of 5 species from this guild are documented within the clearing limits of the Preferred Alternative. *Botrychium dissectum* (2), *B. minganense* (6), *B. simplex* (16), *Carpinus caroliniana*, and *Pinus strobus* all occur within the clearing limits of this alternative. Pipeline construction techniques in forested areas will clear the tree canopy and all the understory species within the project footprint. Areas within the temporary work areas will be seeded to diminish erosion of topsoils and allowed to revegetate. These techniques will result in the permanent removal of mature forest and a temporary removal of a canopy in temporary work spaces. These activities will directly affect some of the known occurrences for these species. However, the occurrence of these species along an existing pipeline corridor indicates that some of these species have acclimated to past disturbance of these habitats or have benefited from these disturbances and will not impact species within this guild. Implementing BMPs will also serve to minimize any significant alteration to the project area and surrounding habitat. Where required by law, species will be avoided or impacts minimized in accordance with the CNF/LLR specific Revegetation Plan.

Enbridge 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 has been submitted for agency approval and will be finalized prior to the start of construction.

Alternative 2– Great Lakes Gas Alternative

The Great Lakes Gas Alternative crosses 34.8 acres of habitat designated MNH. Known occurrences of 21 species listed by the CNF, LLBO, or MDNR are documented within the two MNH habitat blocks crossed by the Preferred Alternative. None of these occurrences fall within a 200 foot distance of the proposed corridor. However, known occurrences of 7 species from this guild are documented within the clearing limits of this Alternative. *Botrychium dissectum* (4), *B. lanceolatum* (20), *B. mingenense* (9), *B. mormo* (9), *B. simplex* (40), *Carpinus caroliniana* (17), and *Pinus strobus* all occur within the clearing limits of this alternative. Pipeline construction techniques in forested areas will clear the tree canopy and all the understory species within the project footprint. Areas within the temporary work areas will be seeded to diminish erosion of topsoils and allowed to revegetate. These techniques will result in the permanent removal of mature forest and a temporary removal of a canopy in temporary work spaces. These activities will directly affect some of the known occurrences for these species. However, the occurrence of these species along an existing pipeline corridor indicates that some of these species have acclimated to past disturbance of these habitats or have benefited from these disturbances and will not impact species within this guild. Other forest dwelling species will be eliminated permanently. Implementing BMPs will also serve to minimize any significant alteration to the project area and surrounding habitat.

**Indirect Effects**

Changes to forests due to clearing and succession would reduce available habitat opportunities to MNH species over the short term. The clearing of additional right-of-way could also create opportunities for earthworms or invasive species to colonize areas that would otherwise regenerate to native habitat types. However, current pipeline construction techniques will restore existing contours and allow the revegetation of native species along the construction right-of-ways. Enbridge will develop a *Noxious Weeds and Invasive Species Control Plan* to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

**Cumulative Effects**

Timber harvest range-wide and on the CNF, has resulted in young even-aged fragmented MNH forests that are isolated on the landscape. It is also known that the CapX 2020 transmission line is likely to cross the CNF/LLR near the Alberta Clipper and Southern Lights Diluent Projects or the Great Lakes Gas Alternative. The additional clearing for construction of a transmission line will increase the widths of existing corridors and further reduce the acreage of MNH habitats on the CNF/LLR. Based upon known past, present, and foreseeable effects, Alternative 2 is not expected to contribute to an adverse cumulative effect upon the species within this group or their habitat.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects.

**Alternative 1**

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.
LLBO: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected on LLR. The project will have a negligible or improbable effect on the remainder of the species in this guild.

Alternative 2

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

LLBO: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected on LLBO lands. The project will have a negligible or improbable effect on the remainder of the species in this guild.

2.4.7.2 Lowland Hardwoods/Lowland Conifer Sensitive Plants Guild

(Includes: Tamarack Swamp, White Cedar Swamp, Boreal Northern Hardwoods and some MNH LES types). The list below includes some species which have been described in previous sections; reference to those sections are included in parentheses after the species name below.

- *Botrychium dissectum* – dissected grape fern (2.4.7.1)
- *Botrychium lanceolatum* var. *angustisegmentum* – lance-leaf or triangle grape fern (2.4.7.1)
- *Botrychium simplex* – least grape fern (2.4.7.1)
- *Calypso bulbosa* – fairy slipper
- *Carpinus caroliniana* – blue beech (2.4.7.1)
- *Carya cordiformis* – bitternut hickory (2.4.7.1)
- *Cypripedium arietinum* – ram's-head ladyslipper
- *Gymnocarpum robertianum* – limestone oak fern
- *Juglans cinerea* – butternut (2.4.7.1)
- *Malaxis monophyllos* var. *brachypoda* – white adder’s mouth orchid
- *Malaxis paludosa* – bog adder’s mouth orchid
- *Mitchella repens* – partridge-berry (2.4.7.1)
- *Polemonium occidentale* var. *lacustre* – Western Jacob’s ladder
- *Pinus strobus* – white pine (2.4.7.1)
- *Taxus canadensis* – Canada yew
- *Ulmus americana* - American elm
- *Viola novae-angliae* – New England violet
- *Waldsteinia fragarioides* – barren strawberry (2.4.7.1)

Fairy Slipper (*Calypso bulbosa*) (L.) Oakes

**CNF, Minnesota, and LLBO Conservation Status:** The fairy slipper has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates the fairy slipper as “Threatened” and states “Very rare on reservation; may experience habitat loss due to beaver flooding and timber harvest.”

The fairy slipper is listed as a RFSS in the CNF. General Forest Plan directives are the same for fairy slipper as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the fairy slipper.
General Habitat Requirements: Case (1987) indicates that in the Great Lakes region the fairy slipper inhabits cool soils only, growing in old, undisturbed, heavily wooded spruce-balsam-cedar swamps, or in evergreen woods along shorelines of the Great Lakes. In Minnesota, Smith (1993) cites the typical habitat for this orchid is lowland coniferous forests, particularly under cedar (Thuja), spruce (Picea), and fir (Abies). It typically chooses substrate of coarse woody humus rather than saturated peat or deep Sphagnum. It occurs to a lesser extent in upland coniferous forests, especially in needle duff under pines.

Distribution within the CNF/LLR: According to CNF records there are 36 known occurrences on the CNF and 5 within the analysis area.

Occurrence within Project Area: This species was not discovered during the 2007 or 2008 plant surveys within the alternative 1 corridor and no optimal habitat was discovered on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

Risk Factors: The principal risk to this species is changes in the hydrology (i.e., beaver flooding, drainage) in occupied habitats. Although suitable habitat likely occurs within the vicinity of the project area, the Alberta Clipper and Southern Lights Diluent Projects will not directly affect this habitat. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

Ram’s-head ladyslipper (Cypripedium arietinum) R. Brown

CNF, Minnesota, and LLBO Conservation Status: The ram’s-head ladyslipper has a state status of “Threatened.” The Leech Lake Reservation Sensitive Species List (March 2008) designates the ram’s head ladyslipper as “Threatened” and states “Usually found at edges of lowland conifer bogs; threatened by timber harvest and beaver flooding.”

The ram’s-head ladyslipper is listed as a RFSS in the CNF. General Forest Plan directives are the same for ram’s-head ladyslipper as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the ram’s-head ladyslipper.

General Habitat Requirements: The USDA Conservation Assessment (Brzeskiewicz, 2000) indicates that this species occurs in cool, sub-acid or neutral soil in three situations (1) Cool dense white cedar/balsam/spruce swamps; (2) Nearly pure sand over limestone beach cobble or bedrock, mulched with juniper, jack and red pine or white cedar needles; (3) Mesic soil of sandy loam, or clay under the partial shade of mixed forest. Smith (1993) describes habitats occupied by Cypripedium arietinum in Minnesota, as wide ranging forest types including dry sandy jack pine forest, coniferous/sphagnum swamp, spruce-fir forest, and mixed conifer-hardwood upland.

Distribution within the CNF/LLR: As of 2001, there were 19 known locations of this species in the CNF (U.S. Forest Service, 2001b).

Occurrence within Project Area: This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.
**Risk Factors:** A principal risk to this species is removal of a significant portion of the canopy trees, allowing an increase in radiant sun to reach the ground layer. Timber practices such as clear cutting or heavy thinning can be harmful to this species. In wetland habitat, the alteration of the existing hydrology could negatively impact this species. The invasion of exotic species can potentially stress this orchid as it competes for available nutrients and moisture.

The Alberta Clipper and Southern Lights Diluent Projects will affect some potentially suitable habitat of this species but this will be minimal, relative to the total amount of available habitat in the Forest. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. Enbridge will develop a *Noxious Weeds and Invasive Species Control Plan* to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Limestone oak fern (Gymnocarpium robertianum) (Hoffman) Newman**

**CNF, Minnesota, and LLBO Conservation Status:** The limestone oak fern has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates the limestone oak fern as “Sensitive” and states this species is known from “3 locations; white cedar swamps.”

The limestone oak fern is listed as a RFSS in the CNF. General Forest Plan directives are the same for limestone oak fern as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31 and S-WL-6. There are no management guidelines specific to the limestone oak fern.

**General Habitat Requirements:** This species inhabits calcareous substrates such as limestone pavement, outcrops, and cliffs and also in Thuja swamps (Pryer, 1993). Material from northern Minnesota has mostly come from cedar swamp or spruce-fir habitat (U.S. Forest Service, 2001b).

**Distribution within the CNF/LLR:** As of 2001, this species was known from three sites in the CNF (U.S. Forest Service, 2001b).

**Occurrence within Project Area:** This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** The principal risk to this species where it occurs is the removal of the forest canopy. The amount of potentially suitable habitat affected by this project is minor, relative to the total amount within the Forest. As this plant is considered an indicator of moist sites, changes in hydrology (i.e. road-building, drainage) may negatively impact the availability of suitable habitat.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**White Adder’s Mouth (Malaxis monophyllos (Linnaeus) Swartz var. brachypoda) (A. Gray) F. Morris & E.A. Eames**

**CNF, Minnesota, and LLBO Conservation Status:** The white adder’s mouth has a state status of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) designates the
white adder’s mouth as “Threatened” and states that it is an “Uncommon orchid sometimes found in lowland conifer swamps.”

The white adder’s mouth is listed as a RFSS in the CNF. General Forest Plan directives are the same for white adder’s mouth as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the white adder’s mouth.

**General Habitat Requirements:** In North America, this species is recognized as being comprised of two varieties; variety *monophyllos*, occurring along the northwestern North American coast, and variety *brachypoda*, which is widely distributed (Catling and Magrath, 2002). This species inhabits cold, wet soils, mainly neutral in reaction and usually shaded (Case, 1987). It is most often found in cedar-balsam-spruce swamps over marly soils, where it grows in moss or among sedges (Case, 1987). Smith (1993) indicates that in Minnesota this species is typically found on *Sphagnum* hummocks in coniferous swamps, under white cedar (*Thuja occidentalis*), black spruce (*Picea mariana*), or tamarack (*Larix laricina*). It is also found growing in peat soil in some hardwood swamps.

**Distribution within the CNF/LLR:** As of 2001, there were 23 known locations for this species in the CNF (U.S. Forest Service, 2001b).

**Occurrence within Project Area:** This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** USFS (1999 cf. Schultz, 2003) suggests, “The major threat to *Malaxis brachypoda* appears to be changes to the wetland hydrology of sites supporting this species, either from human-caused drainage, or from fluctuating water levels due to beaver or climatic changes.” Case (pers. comm. cf. Schultz, 2003) observed that *Malaxis brachypoda* occurrence is much more localized due to “destruction and drainage of the land, lack of suitable cover, and in open habitats with overly warm soil temperatures.” According to the USFS (2000 cf. Schultz, 2003), in Region 9, 50 percent or more canopy cover is best for *Malaxis brachypoda*. A major threat to *Malaxis brachypoda* is logging which removes or reduces canopy cover through clear-cuts and heavy thinning (USFS 1999 cf. Schultz, 2003). Other risks include peat mining and conversion of peat lands to other land uses.

Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. The extent of potentially suitable habitat occurring in the Alberta Clipper and Southern Lights Diluent Projects area is minimal relative to the total extent in the Forest.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Bog Adder’s Mouth (*Malaxis paludosa*) Linnaeus**

**CNF, Minnesota, and LLBO Conservation Status:** The bog adder’s mouth has a state status of “Endangered.” The Leech Lake Reservation Sensitive Species List (March 2008) designates the bog adder’s mouth as “Endangered” and states that it is “Extremely rare in cont. US; currently found at two sites in MN, one just outside reservation, also one older, unconfirmed report from reservation.”

The CNF has no designation for the bog adder’s mouth and there are no Forest Plan objectives or management guidelines for this species.
General Habitat Requirements: Smith (1993) indicates that all known occurrences of this species in Minnesota are from black spruce (Picea mariana) swamps, where the plants grow perched on hummocks of Sphagnum or rarely Mnium moss. He also indicates that other swamps and bogs may provide suitable habitat. Coffin and Pfanmuller’s (1988) characterization of habitat for this species in Minnesota is somewhat different than that of Smith’s (1993) in that they indicate that Thuja occidentalis (northern white cedar), and Larix laricina (tamarack) are characteristic tree species at known sites as well as Picea mariana (black spruce). They go on to say that, these swamps are nearly neutral in pH with moderate levels of dissolved minerals.

Distribution within the CNF/LLR: There is a historic record of this species from state land on the west side of Pike Bay and a recent, 2008, record found within the LLR/CNF boundaries in the Boy River area (LLBO, personal communication).

Occurrence within Project Area: This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

Risk Factors: Risk to this species where it occurs includes timber harvesting that removes the forest canopy and major changes to the hydrologic regime that would result in drier or flooded conditions within the site. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

Western Jacob’s ladder (Polemonium occidentale (L.) var. lacustre Wherry)

CNF, Minnesota, and LLBO Conservation Status: The western Jacob’s ladder has a state status of “Endangered.” The Leech Lake Reservation Sensitive Species List (March 2008) has no designation for this species.

The western Jacob’s ladder is not listed as a RFSS in the CNF. There are no management guidelines specific to the western Jacob’s ladder.

General Habitat Requirements: Polemonium occidentale var. lacustre is a Midwestern subspecies of the western montane taxon (Davidson, 1950; Wherry, 1945 cf. Sather, 1991). In 1991 Sather (1991) reported that this species was known from only two locations, one in Wisconsin and another Minnesota. The habitat at these sites consists of cedar bogs with spruce and fir co-dominant in the canopy. Minnesota Natural Heritage Rare Features Database (2000 cf. U.S. Forest Service, 2001b), shows three sites in Minnesota all within 55 miles east of the Forest.

Distribution within the CNF/LLR: This species is not known from the CNF; the nearest site being 25 miles east of the Marcell Ranger District.

Occurrence within Project Area: This species was not discovered during the 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. Although potentially suitable habitat occurs in the project area and cumulative affects area it is doubtful this species is present on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

Risk Factors: Risks to this species, where it occurs, are alteration of the existing hydrology, invasion of exotic species, timber harvesting operations that would remove the entire canopy, and land conversion to
a different land use. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. Enbridge will develop a Noxious Weeds and Invasive Species Control Plan to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way. As this plant is considered an indicator of moist sites, changes in hydrology (i.e. road-building, drainage) may negatively impact the availability of suitable habitat. The species is apparently tolerant of timber management, as sites examined by Sather (1991) had been selectively logged approximately 30-years previous to the visit, and supported thousands of flowering western Jacob’s ladder.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Canada yew (Taxus canadensis) Marsh**

**CNF, Minnesota, and LLBO Conservation Status:** The Canada yew has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates the Canada yew as “Sensitive” and states that it is “Uncommon on reservation; probably declining due to habitat changes and deer browsing, but past abundance unknown.” The Canada yew is a traditionally utilized species by the Ojibwe people of Leech Lake.

The Canada yew is listed as a RFSS in the CNF. General Forest Plan directives are the same for Canada yew as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31,and S-WL-6. There are no management guidelines specific to the Canada yew.

**General Habitat Requirements:** This species inhabits swampy thickets, coniferous or mixed woods, ravine slopes, rocky banks (Soper and Heimburger, 1982). Schmoller (1999) indicates that the highest percent of yew cover occurs when the tree canopies support less than 30 percent evergreen trees.

**Distribution within the CNF/LLR:** As of 2001, Canada yew is known from 21 locations on the CNF (U.S. Forest Service, 2001b) and from a range of characteristic habitats.

**Occurrence within Project Area:** Taxus canadensis was documented along the Enbridge corridor during the 2007 and 2008 plant surveys on Alternative 1. This species was also found during 2008 surveys for CapX, (along Alternative 2).

**Risk Factors:** Risk factors for this species include over-browsing by deer, logging, or other land type alterations that remove portions of the canopy. It is poorly adapted to browsing or fire. Over-browsing by deer appears to be the primary reason for population decline. An increase in corridor width for alternative 1 will provide increased, temporary access and travel for deer, but will be short-term in nature until the corridor reestablishes with vegetation. Canada yew is common north of the highway 2 corridor, so the Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**American elm (Ulmus americana) Linnaeus**

**CNF, Minnesota, and LLBO Conservation Status:** The American elm has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates the American elm as “Sensitive” and states that this species was “Once common canopy tree in reservation hardwood forests; most, if not all, mature trees dead due to exotic Dutch elm disease.”
The CNF has no designation for the American elm and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** Voss (1985) characterizes typical habitat in Michigan as swamp forests, such as river floodplains, wet bogs, even cedar swamps, often with silver maple, and also in rich hardwoods.

**Distribution within the CNF/LLR:** This species is not tracked in the CNF.

**Occurrence within Project Area:** This species was discovered during 2007 and 2008 plant surveys on Alternative 1. This species was also found during 2008 surveys for CapX, (along Alternative 2).

**Risk Factors:** Risk to this species where present is clear-cut timber management, conversion of land to another land use, and hydrologic alterations which reduce available moisture. It is not known how this species, if present in the vicinity, would respond to development of permanent and temporary utility corridor construction. Although seedlings of this species will grow in full sunlight, they make their best growth with about one-third of full sunlight (USDA, 1965). It does, however, regenerate profusely via vegetative means, following cutting or disturbances (USDA, 1965).

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**New England violet (Viola novae-angliae) House**

**CNF, Minnesota, and LLBO Conservation Status:** The New England violet has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates the New England violet as “Sensitive” and states this species is considered at the “edge of range, uncommon on reservation; found in dry-mesic forest.”

The CNF has no designation for the New England violet and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** This species inhabits open, xeric-mesic rock or sand sites. In Minnesota it occurs most often in rock crevices, along the North Shore of Lake Superior and beside cold, rapidly flowing streams. It also occurs in meadows, grassy lake terraces, and rock outcrops (Coffin and Pfannmuller, 1988). NatureServe (2007) cites this species as being found on undisturbed acidic, xeric or xeric-mesic rock or sand substrates, under partially or totally closed-canopy dry northern forest of mixed hardwoods and conifers.

**Distribution within the CNF/LLR:** The New England violet appears as a RFSS species in Amendment 29 of the Chippewa National Forest Land and Resource Management Plan (1994), although the species was dropped from the list in 2000 (U.S. Forest Service, 2001a). The Risk Evaluation states, “Common on the Chippewa and Superior; habitat and population viability unthreatened.” This species was dropped from the state list in 1996 and is no longer tracked by the DNR. As of 2001, (U.S. Forest Service, 2001a) there were four records of this species in the CNF.

**Occurrence within Project Area:** This species was discovered during 2007 plant surveys of the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. Two populations of this species were found. One population of this species was found along Alternative 2.
**Risk Factors:** The New England violet is a species of open, xeric-mesic sites, yet there appear to be few threats to its occurrence at a site containing suitable habitat. In fact, destructive activities that would tend to eliminate other rare plant species (disturbed fields, road building, etc.) tend to enhance the species survival. Ballard (1989a cf. NatureServe, 2007) indicated that the species is able to invade such areas at numbers significantly higher than found in natural settings. Such evidence suggests that the habitat is highly recoverable with respect to this species, and that the New England violet is a species that may be dependent on moderate levels of disturbance. Maintenance of moderately open woodlands via selective logging is probably the most beneficial method for long-term survival of the species at a given site (Ballard pers. comm. cf. NatureServe, 2007). Ballard, (1988 cf. NatureServe, 2007) suggested that certain human disturbances, if they do not disturb the soil chemistry of the substrate or strongly shade sites, may enhance the vigor and viability of a given violet population. The largest populations that have been found have been associated with areas of past, low-level disturbance: old meadows, disturbed roadsides and power-line rights-of-way.

The Alberta Clipper and Southern Lights Diluent Projects will impact habitat supporting this species, however, this species appears well suited to disturbance and the impacted population would be able to recover to preconstruction conditions.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Environmental Baseline**

Suitable habitat occurs for plants within the Lowland Hardwood/Lowland Conifer (LHLC) guild along portions of both alternatives. Surveys were conducted along the Preferred Alternative for the presence of these species. Sensitive plants are generally habitat specialists and the LHLC guild contains species that are currently and historically associated with lowland hardwoods and lowland conifers or micro-sites within these forest communities. Many of these areas are not managed with the intensity of upland hardwood and therefore retain much of their original characteristics. However, many of these habitat communities are naturally limited in extent by proper soil types, or water sources. The isolated nature of the habitat type, limit the opportunities for plants within this guild to interact, which increases the potential for extirpation to occur. For purposes of this analysis we have based calculations on the following Landscape Ecosystem types: Tamarack Swamp, White Cedar Swamp, Boreal Northern Hardwoods and some MNH types.

This guild consists largely of species that require moist-to-wet soils. Lowland forest generally includes areas that are classified as wetlands, but also includes forest types typical of moist soils, including shrub thickets such as the wet alder thickets near the project site.

Effects of Action: Table 2.4.7-3 provides estimated amounts of LHLC habitat within each alternative. Table 2.4.7-4 provides the TES, RFSS, and LLBO species occurrences within the impact areas of each alternative.
TABLE 2.4.7-4
Lowland Hardwood/Lowland Conifer Guild TES, RFSS, LLBO Species Occurrences Within Impact Areas of Each Alternative a

<table>
<thead>
<tr>
<th>Species</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botrychium dissectum – Dissected grape fern</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Botrychium lanceolatum var. angustisegmentum – lance-leaved grape fern</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Botrychium simplex – least grape fern</td>
<td>16</td>
<td>40</td>
</tr>
<tr>
<td>Calypso bulbosa</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fairy slipper</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Carya cordiformis – bitternut hickory</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Carpinus caroliniana – blue beech</td>
<td>Yes (abundance not tallied)</td>
<td>17</td>
</tr>
<tr>
<td>Cypripedium arietinum – ram's-head ladyslipper</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Juglans cinerea – butternut</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Malaxis brachypoda var. brachypoda</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>White adder’s mouth orchid</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Malaxis paludosa</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>bog adder’s mouth orchid</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mitchella repens – partridge-berry</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pinus strobus – white pine</td>
<td>Yes (abundance not tallied)</td>
<td>Yes (abundance not tallied)</td>
</tr>
<tr>
<td>Polemonium occidentale var. lacustre</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Western Jacob’s ladder</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Taxus canadensis – Canada yew</td>
<td>300+</td>
<td>300+</td>
</tr>
<tr>
<td>Ulmus americana - American elm</td>
<td>Yes (abundance not tallied)</td>
<td>Yes (abundance not tallied)</td>
</tr>
<tr>
<td>Viola novae-angliae – New England violet</td>
<td>2 populations</td>
<td>1 population</td>
</tr>
<tr>
<td>Waldsteinia fragarioides – Barren strawberry</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

* Species occurrences based on 2007 and 2008 field surveys.

Direct Effects

Alternative 1 – Preferred Alternative

Approximately 170 acres of habitat designated as LHLC will be crossed by this alternative. Known occurrences of 7 species from this guild are documented within the clearing limits of the Preferred Alternative. *Botrychium dissectum* (2), *B. simplex* (16), *Carpinus caroliniana*, *Pinus strobus*, *Taxus canadensis* (300+), and *Viola novae-angliae* (2 populations) all occur within the clearing limits of this alternative. Pipeline construction techniques in forested areas will clear the tree canopy and all the understory species within the project footprint. Areas within the temporary work areas will be seeded to diminish erosion of topsoils and allowed to revegetate. These techniques will result in the permanent removal of mature forest and a temporary removal of a canopy in temporary work spaces. These activities will directly affect some of the known occurrences for these species. However, the occurrence of these species along an existing pipeline corridor indicates that some of these species have acclimated to past disturbance of these habitats or have benefited from these disturbances and will not impact species within this guild. Implementing BMPs will also serve to minimize any significant alteration to the project area and surrounding habitat. Where required by law, species will be avoided or impacts minimized in accordance with the CNF/LLR specific Revegetation Plan.

Enbridge 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 has been submitted for agency approval and will be finalized prior to the start of construction.

Enbridge will develop a Rare Plant Mitigation Plan for protection of the Canada yew. This plan will be finalized per agency approvals prior to construction.

Alternative 2– Great Lakes Gas Alternative

The Great Lakes Gas Alternative crosses 296.5 acres of habitat designated LHLC. Known occurrences of 8 species from this guild are documented within the clearing limits of the Great Lakes Gas Alternative. *Botrychium dissectum* (4), *B. lanceolatum* (20), *B. simplex* (40), *Carpinus caroliniana* (17), *Pinus strobus*, *Taxus canadensis* (300+), *Ulmus americana*, and *Viola novae-angliae* (1 population) all occur within the clearing limits of this alternative. Pipeline construction techniques in forested areas will clear the tree canopy and all the understory species within the project footprint. Areas within the temporary work areas will be seeded to diminish erosion of topsoils and allowed to revegetate. These techniques will result in the permanent removal of mature forest and a temporary removal of a canopy in temporary work spaces. These activities will directly affect some of the known occurrences for these species. However, the occurrence of these species along an existing pipeline corridor indicates that some of these species have acclimated to past disturbance of these habitats or have benefited from these disturbances and will not impact species within this guild. Other forest dwelling species will be eliminated permanently. Implementing BMPs will also serve to minimize any significant alteration to the project area and surrounding habitat.

Indirect Effects

Changes to forests due to clearing and succession would reduce available habitat opportunities to LHLC species over the short term. This risk would be the same between alternatives.

Cumulative Effects

Timber harvest range-wide and on the CNF, has had less impact on this habitat type than on MNH types. It is also known that the CapX 2020 transmission line is likely to cross the CNF/LLR near the Alberta Clipper and Southern Lights Diluent Projects or the Great Lakes Gas Alternative. The additional clearing for construction of a transmission line will increase the widths of existing corridors and further reduce the acreage of LHLC habitats on the CNF/LLR. In addition clearing would increase habitat for white-tailed deer browsing. Co-location of the project along existing Enbridge right-of-way will minimize the increase to white-tailed deer browsing habitat on some plant species.

Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects.

Alternative 1

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

MDNR: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected. The project will have a negligible or improbable effect on the remainder of the species in this guild.
Alternative 2

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

MDNR: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected. The project will have a negligible or improbable effect on the remainder of the species in this guild.

LLBO: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected on LLBO lands. The project will have a negligible or improbable effect on the remainder of the species in this guild.

2.4.7.3 Stream or Riparian Habitats

The list below includes some species which have been described in previous sections; reference to those sections are included in parentheses after the species name below.

- *Botrychium pallidum* – pale moonwort
- *Carpinus caroliniana* – blue beech (2.4.7.1)
- *Carya cordiformis* – bitternut hickory (2.4.7.1)
- *Celtis occidentalis* - hackberry
- *Eleocharis olivacea* – olivaceous spike-rush
- *Listera auriculata* – auricled twayblade
- *Subularia aquatica* – awlwort
- *Torreyochloa pallida* – Torrey’s manna-grass
- *Ulmus americana* – American elm (2.4.7.2)
- *Ulmus rubra* – slippery elm

Pale moonwort (*Botrychium pallidum*)

**CNF, Minnesota, and LLBO Conservation Status:** The pale moonwort has a state status of “Endangered.” The Leech Lake Reservation Sensitive Species List (March 2008) designates the pale moonwort as “Threatened” and states; “Very rare, 6 of 8 locations in MN are from tribal lands.”

The pale moonwort is listed as a RFSS in the CNF. General Forest Plan directives are the same for pale moonwort as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the pale moonwort.

**General Habitat Requirements:** Wagner and Wagner (1990) indicate that this species’ habitat includes sandy dunes, open meadows and fields, sandy road banks and grassy ditches, shrubby second-growth fields, and mixed hardwoods. In Minnesota, *B. pallidum* is known from tailing ponds, sandy ridges, along lakeshores, in wetlands and ephemeral ponds, in open fields, log landings, developments, and small stream-side benches; in areas which are generally free of shrub layers (PVA, 2000).

**Distribution within the CNF/LLR:** CNF database records indicate that there are 35 records of pale moonwort within the CNF.
**Occurrence within Project Area:** This species was discovered during the 2007 and 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was also found during 2008 surveys for CapX, (along Alternative 2).

**Risk Factors:** Risk to this species includes successional changes from an open to a closed vegetative community that is dominated by woody material. Other factors may include: changes to available moisture, fluctuations in necessary mycorrhizae, soil compaction, and invasion of exotic earthworms.

The Alberta Clipper and Southern Lights Diluent Projects may represent a risk to plants in the existing utility corridor that could have gone undetected in 2007. Utility corridor development should result in creation of additional suitable habitat for this species, as evidenced by the occurrence of this species on and near pipeline corridors in the Forest.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Hackberry (Celtis occidentalis) Linnaeus**

**CNF, Minnesota, and LLBO Conservation Status:** The hackberry has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates the hackberry as “Sensitive” and states “Rare on reservation, occurring near lakes in floodplain-type habitat.”

The CNF has no designation for the hackberry and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** This species inhabits river banks, stream valleys and ravines, rich moist woods, and rarely drier sites (Voss, 1985). Within its range this species also occurs on limestone outcrops or limestone soils (USDA, 1965).

**Distribution within the CNF/LLR:** This species is not tracked in the CNF. LLBO records show occurrences of this species on Ottertail Point, Bear Island, and the shores of Leech Lake (LLBO, personal communication).

**Occurrence within Project Area:** This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** Risk to this species where it occurs is land conversion and timber management using clear-cut silviculture. Seedlings of this species become established primarily in hardwood stands, rarely occurring in openings.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Olivaceous spike-rush (Eleocharis olivacea) Poriet (Torrey) Gleason** = (*Eleocharis olivacea*) Torrey

**CNF, Minnesota, and LLBO Conservation Status:** The olivaceous spike-rush has a state status of “Threatened.” The Leech Lake Reservation Sensitive Species List (March 2008) designates the olivaceous spike-rush as “Threatened” and states; “Found at mucky edges of bog lakes; distribution on reservation unknown.”
The olivaceous spike-rush is listed as a RFSS in the CNF. General Forest Plan directives are the same for olivaceous spike-rush as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the olivaceous spike-rush.

**General Habitat Requirements:** Menapace (2002) cites the range wide habitat for this species to include bogs, cold springs, dry stream banks, lake and pond margins, maritime mudflats, marshes, moist meadows, and swamps. In Minnesota, (Coffin and Pfannmuller, 1988) indicate that the habitats listed for three collections included mucky lakeshore in a mixed forest and muddy shore of a peatland pond.

**Distribution within the CNF/LLR:** As of 2001, there was only one site for olivaceous spike-rush in the CNF that was collected in 1994 on free-floating at the edge of small bog lake (U.S. Forest Service, 2001b). There are two other sites within seven miles of the Forest (U.S. Forest Service, 2001b).

**Occurrence within Project Area:** This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** Alteration to exiting hydrologic conditions is the principal risk to this species. Plant succession, leading towards a dense woody canopy, could also pose a risk to this species. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Auricled Twayblade (Listera auriculata) Wiegand**

**CNF, Minnesota, and LLBO Conservation Status:** The auricled twayblade has a state status of “Endangered.” The Leech Lake Reservation Sensitive Species List (March 2008) has no designation for this species.

The auricled twayblade is listed as a Forest Sensitive species in the CNF. General Forest Plan directives are the same for auricled twayblade as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the auricled twayblade.

**General Habitat Requirements:** Case (1987) characterizes the habitat of the auricled twayblade as being very distinctive—raw, alluvial sand along river. Plants develop at about the high flood water line in sandy wash under alders. It grows among scattered sedges and grasses. Smith (1993) indicates that in Minnesota this species occurs along streams in low, moist hardwood forest, mixed hardwood-coniferous forest, and shrub swamps. These are typically shady, mossy, acidic habitats on alluvial deposits or shallow organic soil. Coffin and Pfannmuller (1988) surmise that this species may be extirpated from Minnesota; the most recent record being a 1945 record from Duluth area.

**Distribution within the CNF/LLR:** This species is not known to occur in the CNF.

**Occurrence within Project Area:** This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area and no suitable habitat was observed on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.
**Risk Factors:** Because auricled twayblade is most often found in frequently disturbed natural communities, changes in disturbance frequency or severity can alter or destroy its habitat. In northern New England, the most frequent disturbers of auricled twayblade–related hydrology are logging and dams for flood control and electricity (Hoy, 2001). Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Awlwort (*Subularia aquatica*) Linnaeus**

**CNF, Minnesota, and LLBO Conservation Status:** The awlwort has a state status of “Threatened.” The Leech Lake Reservation Sensitive Species List (March 2008) has no designation for this species.

The awlwort is listed as a Forest Sensitive species in the CNF. General Forest Plan directives are the same for awlwort as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL-31, and S-WL-6. There are no management guidelines specific to the awlwort.

**General Habitat Requirements:** Fernald (1950) characterizes the habitat of this species as sandy or gravelly margins or immersed in lakes and slow streams. Coffin and Pfannmuller (1988) indicate that in Minnesota *S. aquatica* is an aquatic species that inhabits shallow water (typically 15 to 45 centimeters deep) in the littoral zone of sandy oligotrophic lakes.

**Distribution within the CNF/LLR:** As of 2001, there was one known location of this species in the CNF found along the shore of Caribou Lake in 1994 (U.S. Forest Service, 2001b).

**Occurrence within Project Area:** This species was not discovered during the 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** This project does not impact typical suitable habitat for this species. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Torrey's manna-grass (*Torreyochloa pallida* (Torr.) G.L. Church var. *fernaldii* (Hitchc.) Dore**

**CNF, Minnesota, and LLBO Conservation Status:** Torrey’s manna-grass has a state status of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) designates Torrey’s manna-grass as “Sensitive” and states, “One known occurrence north of reservation; shallow water in swampy forest.”

The CNF has no designation for Torrey’s manna-grass and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** Torrey’s manna-grass grows in swamps, marshes, bogs, and margin of lakes and streams (Davis, 2007).

**Distribution within the CNF/LLR:** As of 2001, there was only one record of this species in the CNF (U.S. Forest Service, 2001b).
Occurrence within Project Area: This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was found during 2008 surveys for CapX, (along Alternative 2).

Risk Factors: Where this species occurs the principal risk is loss of habitat by alteration of existing hydrology. Other factors that could affect this species include conversion of land to a different land use, construction and/or timber harvesting practices that result in increased sedimentation of habitat. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat. The extent of potential habitat disturbed by the project is minimal relative to the total amount available in the Forest.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

Slippery elm (*Ulmus rubra*) Muhl

CNF, Minnesota, and LLBO Conservation Status: Slippery elm has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates slippery elm as “Threatened” and states; “Once common canopy tree in reservation hardwood forests; most, if not all, mature trees dead due to exotic Dutch elm disease.”

The CNF has no designation for the slippery elm and there are no Forest Plan objectives or management guidelines for this species.

General Habitat Requirements: Throughout its range slippery elm typically occurs on the moist, rich, soils of lower slopes, streambanks, river terraces, and bottom lands. However, it is often found on much drier sites, particularly those of limestone origin (U.S.D.A., 1965). On the LLR, this species is usually associated with habitat near large lakes (LLBO, personal communication).

Distribution within the CNF/LLR: As of 2001 (U.S. Forest Service, 2001a) there were five collections from the CNF, made between 1992 and 1994, all from deciduous forest habitat dominated by sugar maple and basswood.

Occurrence within Project Area: This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

Risk Factors: Risk to this species includes loss of habitat through land conversion and timber harvesting activities such as clearcutting. Studies in southeastern Minnesota showed that slippery elm seedlings grow well in the open or under light shade (USDA, 1965). Thus, selective harvesting of surrounding trees may not significantly alter the habitat for this species. It is uncertain how this species would respond to the development of temporary and permanent utility corridor.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

Environmental Baseline

This group consists of aquatic and saturated-soil species. These species require various habitats that may occur in the nearby creeks and rivers, including slow-moving water, fast rocky reaches, and streambanks. Potential habitat for these species may occur at the Cass Lake/Pike Bay channel, Portage Creek, Upper
Sucker Lake, and numerous wetland complexes along the right-of-way. Suitable habitat occurs for plants within the Stream and Riparian guild along portions of both alternatives. Surveys were conducted along the Preferred Alternative for the presence of these species. Stream and Riparian sites along the alternatives included Pike Bay channel, tributary to Portage Lake, and the Mississippi River. Table 2.4.7-5 provides the Stream and Riparian guild TES, RFSS, and LLBO species occurrences within the impact areas of each alternative.

<table>
<thead>
<tr>
<th>Species</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botrychium pallidum</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td>Pale moonwort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpinus caroliniana</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue beech</td>
<td>Yes (abundance not tallied)</td>
<td>17</td>
</tr>
<tr>
<td>Carya cordiformis</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bitternut hickory</td>
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<td></td>
</tr>
<tr>
<td>Celtis occidentalis</td>
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<td>0</td>
</tr>
<tr>
<td>Hackberry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eleocharis olivacea</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Olivaceous spike-rush</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listera auriculata</td>
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<td>0</td>
</tr>
<tr>
<td>Auricled twayblade</td>
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<tr>
<td>Subularia aquatica</td>
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<td>0</td>
</tr>
<tr>
<td>Awlwort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torreyochloa pallida</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Torrey's manna-grass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ulmus americana</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American elm</td>
<td>Yes (abundance not tallied)</td>
<td>Yes (abundance not tallied)</td>
</tr>
<tr>
<td>Ulmus rubra</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Slippery elm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Species occurrences based on 2007 and 2008 field surveys.

**Direct Effects**

**Alternative 1 – Preferred Alternative**

The Pike Bay channel, a tributary to Portage Lake and the Mississippi River are three Stream and Riparian habitats that will be crossed by this alternative. Pike Bay channel and the Mississippi River will both be crossed by horizontal directional drill; construction activities will cause no in-stream impacts. The tributary to Portage Lake will be crossed using the open cut method; impacts are expected to be minimal and short term as most open-cut crossings take less than 48 hours to complete. Known occurrences of 3 species from this guild are documented within the clearing limits of the Preferred Alternative. *Botrychium pallidum* (4), *Carpinus caroliniana*, and *Ulmus Americana* all occur within the clearing limits of this alternative. Current pipeline construction techniques in wetlands will restore existing topographic contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on stream and tributary habitats along the proposed route. Woody and herbaceous species would be cleared within the work space of the project during construction. These activities will directly affect some of the known occurrences for these species.
However, the occurrence of these species along an existing pipeline corridor indicates that these species have acclimated to past disturbance of these habitats or may have benefited from these disturbances and proposed activities may not impact species within this guild. Implementing BMPs will also serve to minimize any significant alteration to the project area and surrounding habitat.

Enbridge 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 has been submitted for agency approval and will be finalized prior to the start of construction.

**Alternative 2– Great Lakes Gas Alternative**

The Great Lakes Gas Alternative crosses stream and riparian habitats at Sucker Creek, Portage Creek and the Mississippi River. Known occurrences of 4 species from this guild are documented within the clearing limits of the Great Lakes Gas Alternative. *Botrychium pallidum* (17), *Carpinus caroliniana* (17), *Torreyochloa pallid* (1), and *Ulmus americana* all occur within the clearing limits of this alternative. Current pipeline construction techniques in wetlands will restore existing topographic contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on stream and tributary habitats along the Great Lakes Gas Alternative. Woody and herbaceous species would be cleared within the work space of the project during construction. These activities will directly affect some of the known occurrences for these species. However, the occurrence of these species along an existing pipeline corridor indicates that these species have acclimated to past disturbance of these habitats or have benefited from these disturbances and will not impact species within this guild. Implementing BMPs will also serve to minimize any significant alteration to the project area and surrounding habitat.

**Indirect Effects**

Changes in herbaceous habitat due to clearing may temporarily create conditions that are suitable for many of these species if open substrate is maintained, but may temporarily negatively affect late successional species. Implementing BMPs will also serve to minimize any significant alteration to the project area and surrounding habitat.

**Cumulative Effects**

Temporary clearing of project corridors could temporarily create suitable habitat for some members of this guild. Forestry practices have had little effect on these crossings due to the lack of harvestable timber. The additional clearing for construction of a transmission line will increase the widths of existing corridors that this guild could utilize on the CNF/LLR.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects.

**Alternative 1 – Preferred Alternative**

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.
MDNR: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected. The project will have a negligible or improbable effect on the remainder of the species in this guild.

LLBO: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected on LLR. The project will have a negligible or improbable effect on the remainder of the species in this guild.

Alternative 2– Great Lakes Gas Alternative

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

MDNR: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected. The project will have a negligible or improbable effect on the remainder of the species in this guild.

LLBO: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected on LLBO lands. The project will have a negligible or improbable effect on the remainder of the species in this guild.

2.4.7.4 Wet Meadows, Bogs, Marshes, or Sedge Meadows

The list below includes some species which have been described in previous sections; reference to those sections are included in parentheses after the species name below.

- *Arethusa bulbosa* – Dragon’s mouth orchid
- *Botrychium simplex* – least moonwort (2.4.7.1)
- *Drosera intermedia* – spatulate-leaved sundew
- *Eleocharis olivacea* – olivaceous spike-rush (2.4.7.3)
- *Eleocharis quinqueflora* – few-flowered spike-rush
- *Hierochloe odorata* – sweet grass
- *Platanthera clavellata* – club spur orchid
- *Platanthera flava var. herbiola* – tubercled rein-orchid
- *Ranunculus lapponicus* – Lapland buttercup
- *Sparaganium glomeratum* – northern bur-reed
- *Torreyochloa pallida* – Torrey’s manna-grass (2.4.7.3)
- *Utricularia gibba* – humped bladderwort
- *Utricularia purpurea* – purple bladderwort

**Dragon’s Mouth Orchid (*Arethusa bulbosa*) L.**

**CNF, Minnesota, and LLBO Conservation Status:** Dragon’s mouth orchid has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates Dragon’s mouth orchid as “Sensitive” and states; “Rare, may experience habitat loss due to beaver flooding and development.”

The CNF has no designation for the dragon’s mouth orchid and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** Case (1987) cites deep, open, sunny sphagnum bogs, especially in black spruce-tamarack bogs surrounding lakes as the principal habitat in the Great Lakes region. In
Minnesota, Smith (1993) indicates that this species occurs in coniferous swamps of all types, but typically on a substrate of deep Sphagnum moss under partial canopy gaps. It also occurs on floating mats around “bog” lakes and in peaty, acid sedge meadows (Smith, 1993).

**Distribution within the CNF/LLR:** As of 2001, this species was known from 18 sites in the CNF (U.S. Forest Service, 2001a). It appears as a Forest Sensitive species in Amendment 29 of the Chippewa National Forest Land and Resource Management Plant (1994); however, the species was delisted by Minnesota DNR in 1996, and therefore no longer meets the definition of a Forest Sensitive species (U.S. Forest Service, 2001a). The species was considered for addition to the RFSS list in 2000 but was not added. The Risk Evaluation stated, “The habitat of *Arethusa bulbosa* is generally unthreatened on the Chippewa NF and Superior NF. No evidence of threats to the species’ viability on the Forests.”

**Occurrence within Project Area:** This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** A principal risk to this species where it occurs is alteration to existing hydrology. Implementing BMPs should serve to minimize any significant alteration to the project area and surrounding habitat.

This project represents a low risk to the viability of this species in the CNF/LLR.

**Spatulate-leaved Sundew (*Drosera intermedia*) Hayne**

**CNF, Minnesota, and LLBO Conservation Status:** The spatulate-leaved sundew has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates spatulate-leaved sundew as “Sensitive” and states there are “Few recent records from reservation area.”

The CNF has no designation for the spatulate-leaved sundew and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** This species usually occurs in the wettest parts of bogs and on sandy shores subject to periodic inundation (Voss, 1985). Lakela (1965) cites the species as occurring in floating bogs, on edges of mucky hummocks in northeastern Minnesota.

**Distribution within the CNF/LLR:** This species is not tracked in the CNF.

**Occurrence within Project Area:** This species was discovered within a sedge meadow bog complex during 2007 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area along Alternative 1. Over 300 individual plants were counted within this stretch of wetland. This species was not found during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** Risks to this species in habitat supporting it is the alteration of hydrology and the succession of a site to dense woody plants. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.
Few-flowered Spike-rush (*Eleocharis quinqueflora*) (Hartmann) O. Schwarz = (*Eleocharis pauciflora*) (Lightf.) Lank

**CNF, Minnesota, and LLBO Conservation Status:** The few-flowered spike-rush has a state status of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) designates the few-flowered spike-rush as “Sensitive” and states this species is “Rare, one known location on reservation.”

The few-flowered spike-rush is listed as a RFSS in the CNF. General Forest Plan directives are the same for few-flowered spike-rush as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the few-flowered spike-rush.

**General Habitat Requirements:** Range wide this species inhabits fens, wet meadows, seeps, springs, and hot springs (Menapace, 2002). Minnesota collections are from an assortment of wetlands including a quaking sedge mat, a lake beach, and a river margin (Coffin and Pfannmuller, 1988).

**Distribution within the CNF/LLR:** As of 2001, there were three records for this species in the CNF, but only one is recent (U.S. Forest Service, 2001b). Unlike records from the northwestern counties in Minnesota, where few-flowered spike-rush is associated with calcareous seepage fens, the records from Cass County are from shallow, sandy lakeshores (U.S. Forest Service, 2001b).

**Occurrence within Project Area:** This species was not discovered during the 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** Alterations to hydrology resulting in increased water levels in lakes supporting this species could pose a risk to the maintenance of this species at known sites. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

Sweet grass (*Hierochloe odorata*) (L.) Beauv.

**CNF, Minnesota, and LLBO Conservation Status:** The sweet grass has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates the sweet grass as “Sensitive” and states this species is “Traditionally used, fairly uncommon, unrecognized, or underreported on reservation.”

The CNF has no designation for sweet grass and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** Range wide sweet grass grows in meadows, pastures, grassy beaches, old hay fields, waste places, and openings in coniferous forests, occasionally in dense shade or as a weed in lawns (Allred and Barkworth, 2007). In Canada, Dore (1980) indicates that this species occurs in open grassy places and is especially characteristic of wet, sandy soil on or near riverbanks and lakeshores. Voss (1972) cites habitat in Michigan as including, edges of woods, shores, meadows, boggy places; usually in moist ground.

**Distribution within the CNF/LLR:** Sweet grass was considered for addition to the RFSS list in 2000 but was not added. The Risk Evaluation states “Not uncommon on the Chippewa National Forest. Habitat
generally not threatened by National Forest management” (U.S. Forest Service, 2001a). As of 2001 (U.S.
Forest Service, 2001a) there were two known locations from the CNF.

**Occurrence within Project Area:** This species was discovered during 2007 plant surveys within the
Alberta Clipper and Southern Lights Diluent Projects’ Alternative 1; over 200 plants were documented
within the search area east of the Mississippi River within Forest Service Lands, but not within the
boundaries of the Leech Lake Reservation. This species also occurs along Alternative 2.

**Risk Factors:** The principal risk to this species is the loss of habitat through land use conversion and
alterations to hydrology that result drying or long-term flooding of a site. Implementing BMPs should
serve to minimize any hydrologic alteration to the project area and surrounding habitat. Sweetgrass
remains a highly revered plant of traditional use still gathered for all types of basketry, braided
ornamental pieces, medicinal uses, as well as cut and burned for ceremonial purposes by the Ojibwe
people of Leech Lake.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this
species in the CNF/LLR.

**Club-spur orchid (Platanthera clavellata) (Michx.) Luer**

**CNF, Minnesota, and LLBO Conservation Status:** The club-spur orchid has a state status of “Special
Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) designates the club-spur
orchid as “Threatened” and states this species is “Rare, one known location on reservation.”

The club-spur orchid is listed as a RFSS in the CNF. General Forest Plan directives are the same for
club-spur orchid as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-
WL-17, O-WL 31,and S-WL-6. There are no management guidelines specific to the club-spur orchid.

**General Habitat Requirements:** Case (1987) indicates this species is widespread and tolerant of many
situations; most common in tamarack-spruce bogs, where it grows in Sphagnum, in shade or sun. It also
grows in loose moss in balsam-cedar-spruce swamps or a less acid nature, sometimes in alder thickets or
damp woods. In Minnesota, Smith (1993) indicates that this orchid occurs mostly in boreal-type
Sphagnum swamps and floating mats; usually associated with scattered, often stunted black spruce or
tamarack.

**Distribution within the CNF/LLR:** This species is known from one location in the CNF (U.S. Forest
service, 2001b).

**Occurrence within Project Area:** This species was not discovered during 2007 or 2008 plant surveys
within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. Habitat that
appears suitable for this species was observed adjacent to the Alternative 1 corridor. This species was not
found during CapX surveys in 2008 along Alternative 2

**Risk Factors:** The principal risk to this species is alteration to the hydrologic regime which either results
in a drawdown or flooding of the site. Although this species occurs in sunny areas, the removal of a
major portion of the overstory trees in sites that harbor it may serve as a stressor to plants. Implementing
BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this
species in the CNF/LLR.
Tubercled rein-orchid (*Platanthera flava*) (Linnaeus) Lindley var. *herbiola* (R. Brown) Luer

**CNF, Minnesota, and LLBO Conservation Status:** The tubercled rein-orchid has a state status of “Endangered.” The Leech Lake Reservation Sensitive Species List (March 2008) has no designation for this species.

The tubercled rein-orchid is listed as Forest Service “Sensitive” in the CNF. General Forest Plan directives are the same for tubercled-rein orchid as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31,and S-WL-6. There are no management guidelines specific to the tubercled rein-orchid.

**General Habitat Requirements:** Range wide the species occurs in alluvial forests, riparian thickets, wet meadows, wet prairies, seeps, and salt marshes (Sheviak, 2002). In Minnesota, Smith (1993) indicates the habitat includes moist grassy or sedge-dominated meadows on calcareous or circumneutral substrate. The known habitats tend to be somewhat brushy, with scattered willow (*Salix*) and dogwood (*Cornus*).

**Distribution within the CNF/LLR:** This species is not known to occur in the CNF (U.S. Forest Service, 2001b). The nearest locations are three sites between 12 and 18 miles east of the Forest, all collected from a taconite tailings area (U.S. Forest Service, 2001b).

**Occurrence within Project Area:** This species was not discovered during the 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area along Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2. Although habitat for this species occurs in the cumulative affects area, it is unlikely that this species is present along either of the Alternatives.

**Risk Factors:** The principal risk to this species where it occurs is the loss of habitat through land use conversion. The alteration of hydrology could result in a drawdown of water table that may negatively impact this species. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

Lapland buttercup (*Ranunculus lapponicus*) Linnaeus

**CNF, Minnesota, and LLBO Conservation Status:** The Lapland buttercup has a state status of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008) designates the Lapland buttercup as “Threatened” and states this species is “Rare, found at one location on reservation.”

The Lapland buttercup is listed as a Forest Sensitive species in the CNF. General Forest Plan directives are the same for Lapland buttercup as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31,and S-WL-6. There are no management guidelines specific to the Lapland buttercup.

**General Habitat Requirements:** Range wide this species occurs in boggy places and lakesides in tundra, muskeg, and boreal forest (Whittemore, 1997). In Minnesota, Lapland buttercup seems to prefer *Sphagnum* hummocks in cool, conifer swamps.

**Distribution within the CNF/LLR:** As of 2001 there were three known locations of this species in the CNF (U.S. Forest Service, 2001b). In 2000 this species was considered but not selected for addition to
the RFSS list. The Risk Evaluation recommended not listing the species based on abundance further north and reduced disturbance in conifer swamps (U.S. Forest Service, 2001b).

**Occurrence within Project Area:** Plant surveys conducted in 2007 within the Alternative 1 survey corridor discovered this species in a boggy area just east of Bena; the plant was outside of the construction right-of-way so will not be impacted by construction activities. Over 75 plants were documented at this location. This species was not found during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** Risks to this species include direct disturbance to habitat supporting this species, alteration to existing hydrology, removal of major portion of the tree cover.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Northern bur-reed (Sparganium glomeratum) (Beurling ex Laestadius) L.M. Newman**

**CNF, Minnesota, and LLBO Conservation Status:** The northern bur-reed is listed as a state “Special Concern” species. The Leech Lake Reservation Sensitive Species List (March 2008) designates the northern bur-reed as “Threatened” and states this species is “Uncommon plant of shallow wetlands; sometimes found in moats around wetlands.”

The northern bur-reed is listed as a RFSS in the CNF. General Forest Plan directives are the same for northern bur-reed as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the northern bur-reed.

**General Habitat Requirements:** This species occurs in shallow, quiet, neutral, mesotrophic waters (Kaul, 2000). In general, northern bur-reed inhabits areas characterized by gradually fluctuating water levels. These habitats include ditches, wetlands influenced by beaver activity, detached floating mats of marsh vegetation, and areas of open water that encircle wetlands (Cass County Biological Survey information sheet cf. U.S. Forest Service, 2001b).

**Distribution within the CNF/LLR:** As of 2001, there were 17 known locations of northern bur-reed on the CNF; nine from small flooded areas in upland sites (often in a ditch or near a road), two from a wet site in black ash habitat, five from wet sites in black spruce or bog habitat, and one from the south shore of Leech Lake (U.S. Forest Service, 2001b).

**Occurrence within Project Area:** Sparganium glomeratum was documented along the Alternative 1 corridor during the 2007 and 2008 plant surveys. This species is also found along Alternative 2.

**Risk Factors:** The principal risk to this species where it occurs is the alteration to existing hydrology; one which drains or significantly lowers the water level of the site. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.
**Humped bladderwort** (*Utricularia gibba*) Linnaeus

**CNF, Minnesota, and LLBO Conservation Status:** The Humped bladderwort has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates Humped bladderwort as “Sensitive” and states this species is “found in relatively pristine, sandy-bottom lakes.”

*Utricularia gibba* appears as a Forest Sensitive species in Amendment 29 of the Chippewa National Forestland and Resource Management plant (April 1994), however, the species was de-listed by Minnesota DNR in 1996, and therefore no longer meets the definition of a Forest Sensitive species. The species was considered for addition to the RFSS list in 2000 but was not added. The Risk Evaluation states “Habitat generally unthreatened by National Forest management” (U.S. Forest Service, 2001a).

**General Habitat Requirements:** Voss (1996) characterizes habitat for humped bladderwort as including lakes, ponds, pools, marshes, fens, and other wet places. Coffin and Pfannmuller (1988) indicate that in Minnesota, *U. gibba* seems to prefer shallow water at the margins of small lakes and protected bays, but also occurs in shallow peatland pools and the submerged margin of sedge mats.

**Distribution within the CNF/LLR:** As of 2001, there were 26 known sites on the CNF (Minnesota DNR, 2000 cf. U.S. Forest Service, 2001a).

**Occurrence within Project Area:** This species was discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was found during 2008 surveys for CapX, (along Alternative 2).

**Risk Factors:** The principal risk to this species appears to be loss of habitat through conversion of land to a different land use. This species is somewhat tolerant of drawdown of water in its habitat but would be negatively impacted if hydrologic alterations resulted in a total drying of habitat. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Purple bladderwort** (*Utricularia purpurea*) Walter

**CNF, Minnesota, and LLBO Conservation Status:** The purple bladderwort has a state status of “Special Concern.” The Leech Lake Reservation Sensitive Species List (March 2008 designates the purple bladderwort as “Sensitive” and states this species has “One known location on reservation; possibility of other locations, shallow lakes.”

The purple bladderwort is listed as a Forest Sensitive species in the CNF. General Forest Plan directives are the same for purple bladderwort as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the purple bladderwort.

**General Habitat Requirements:** Voss (1996) indicates that characteristic habitat for this species is shallow to often deep (3 feet) water of softwater lakes; sometimes, however, in fens; river margins; and marshes.

**Distribution within the CNF/LLR:** As of 2001, there were no known occurrences of purple bladderwort in the CNF (U.S. Forest Service, 2001b). There are two sites approximately five miles south of the Walker Ranger District (U.S. Forest Service, 2001b).
Occurrence within Project Area: This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

Risk Factors: The principal risk to this species is loss of habitat by hydrologic alterations that would result in a total drawdown of water levels. Implementing BMPs during construction will reduce potential for alteration to local hydrologic regimes. The Cass County Biological Survey status sheet for this species states that “Although its rarity indicates that protection is needed, Special Concern status is reasonable for this species because its habitat appears to be at little risk.” (1998 cf. U.S. Forest Service, 2001b)

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

Environmental Baseline

Suitable habitat occurs for plants within the Wet Meadows, Bogs, Marshes, and Sedge Meadows guild along portions of either of the alternatives. Surveys were conducted along the Preferred Alternative for the presence of these species. Table 2.4.7-6 provides the acres of wet meadows, bogs, marshes, and sedge meadows crossed by each alternative. Table 2.4.7-7 provides the Wet Meadows, Bogs, Marshes, and Sedge Meadows Guild TES, RFSS, and LLBO species occurrences within the impact areas of each alternative.

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<thead>
<tr>
<th>Species</th>
<th>Alternative 1 (number of individuals)</th>
<th>Alternative 2 (number of individuals)</th>
</tr>
</thead>
<tbody>
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<td>0</td>
</tr>
<tr>
<td>Dragon’s mouth orchid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Botrychium simplex</td>
<td>16</td>
<td>40</td>
</tr>
<tr>
<td>Least moonwort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caladium mariscoides</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Twig rush</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drosera intermedia</td>
<td>One location over 300 individual plants</td>
<td>0</td>
</tr>
<tr>
<td>Spatulate-leaved sundew</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eleocharis olivacea</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Olivaceous spike-rush</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eleocharis quinqueflora</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Few-flowered spike-rush</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hierochloe odorata</td>
<td>One location over 200 individual plants</td>
<td>One location over 200 individual plants</td>
</tr>
<tr>
<td>Sweet vernal grass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platanthera flava var. herbiola</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tubercled rein-orchid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platanthera clavellata</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Club spur orchid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ranunculus lapponicus</td>
<td>One location over 75 plants</td>
<td>0</td>
</tr>
<tr>
<td>Lapland buttercup</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Acres of Wet Meadows, Bogs, Marshes, and Sedge Meadows Crossed By Each Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 1 (acres)</td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>Total 341</td>
</tr>
</tbody>
</table>

176
TABLE 2.4.7-7
Wet Meadows, Bogs, Marshes, and Sedge Meadows Guild TES, RFSS, LLBO Species Occurrences Within Impact Areas of Each Alternative a

<table>
<thead>
<tr>
<th>Species</th>
<th>Alternative 1 (number of individuals)</th>
<th>Alternative 2 (number of individuals)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Sparganium glomeratum</em></td>
<td>1100+</td>
<td>680+</td>
</tr>
<tr>
<td><em>Northern bur-reed</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Torreyochloa pallid</em></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><em>Torrey's Manna-grass</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Utricularia gibba</em></td>
<td>20+</td>
<td>20+</td>
</tr>
<tr>
<td><em>Humped bladderwort</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Utricularia purpurea</em></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>Purple bladderwort</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Species occurrences based on 2007 and 2008 field surveys.

**Direct Effects**

**Alternative 1 – Preferred Alternative**

Numerous Wet Meadows, Bogs, Marshes, and Sedge Meadows will be crossed by this alternative. Known occurrences of 6 species from this guild are documented within the clearing limits of the Preferred Alternative. *Botrychium simplex* (16), *Drosera intermedia* (300+), *Hierochloe odorata* (200+), *Ranunculus lapponicus* (75+), and *Sparganium glomeratum* (1100+) all occur within the clearing limits of this alternative. Current pipeline construction techniques in wetlands will restore existing topographic contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on open water and emergent wetlands along the Preferred Alternative. Where required by law, species will be avoided or impacts minimized in accordance with the CNF/LLR specific Revegetation Plan.

Enbridge 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 has been submitted for agency approval and will be finalized prior to the start of construction.

Enbridge will develop a *Rare Plant Mitigation Plan* for protection of the northern bur-reed. This plan will be finalized per agency approvals prior to construction.

**Alternative 2– Great Lakes Gas Alternative**

Numerous Wet Meadows, Bogs, Marshes, and Sedge Meadows will be crossed by this alternative. Known occurrences of 5 species from this guild are documented within the clearing limits of the Great Lakes Gas Alternative. *Botrychium simplex* (4), *Hierochloe odorata* (200+), *Sparganium glomeratum* (680+), and *Utricularia gibba* (20+); all occur within the clearing limits of this alternative. Current pipeline construction techniques in wetlands will restore existing topographic contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on open water and emergent wetlands along the Great Lakes Gas Alternative.

**Indirect Effects**

Removal of existing vegetation could create conditions that may allow invasive species to establish within the right-of-way. Construction through these areas could also remove woody vegetation that can crowd out several species in this guild. Past pipeline construction has also created conditions that have allowed...
species such as *Sparganium glomeratum* to become established in large numbers. Earlier pipeline construction placed the pipe on the ground surface and soils adjacent the line was then used to cover the pipe. This construction technique created numerous linear open water features within wetlands that have allowed *Sparganium glomeratum* to become abundant in some areas of the right-of-way. Current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. Implementing BMP’s should serve to minimize any hydrologic alteration to the project area and surrounding habitat. Enbridge will develop a *Noxious Weeds and Invasive Species Control Plan* to minimize the introduction and spread of noxious weeds and invasive species along the pipeline right-of-way.

**Cumulative Effects**

Forestry practices have had little effect on these habitat types due to the lack of harvestable timber. The additional clearing for construction of a transmission line will increase the widths of existing corridors on the CNF/LLR.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects.

**Alternative 1 – Preferred Alternative**

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

MDNR: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected. The project will have a negligible or improbable effect on the remainder of the species in this guild.

LLBO: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected on LLR. The project will have a negligible or improbable effect on the remainder of the species in this guild.

**Alternative 2– Great Lakes Gas Alternative**

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

MDNR: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected. The project will have a negligible or improbable effect on the remainder of the species in this guild.

LLBO: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected on LLBO lands. The project will have a negligible or improbable effect on the remainder of the species in this guild.

**2.4.7.5 Exposed Wet and/or Dry Soils Sensitive Plants Guild**

The list below includes some species which have been described in previous sections; reference to those sections are included in parentheses after the species name below.

- *Botrychium dissectum* – dissected grape fern (2.4.7.1)
Biological Assessment / Biological Evaluation
Enbridge Energy Southern Lights Project

- *Botrychium pallidum* – pallid moonwort (2.4.7.3)
- *Botrychium rugulosum* – ternate grape fern
- *Botrychium simplex* – least moonwort (2.4.7.1)
- *Comptonia peregrine* – sweet fern
- *Drosera intermedia* – spatulate-leaved sundew (2.4.7.4)
- *Eleocharis olivacea* – olivaceous spike-rush (2.4.7.3)
- *Eleocharis quinqueflora* – few-flowered spike-rush (2.4.7.4)
- *Hierochloe odorata* – sweet grass (2.4.7.4)
- *Orobanche uniflora* – one-flowered broomrape (2.4.7.1)
- *Waldsteinia fragaroides* – barren strawberry (2.4.7.1)

**Ternate grape-fern (*Botrychium rugulosum*) W.H. Wagner**

**CNF, Minnesota, and LLBO Conservation Status:** The ternate grape-fern has a state status of “Threatened.” The Leech Lake Reservation Sensitive Species List (March 2008) designates the ternate grape-fern as “Threatened” and states this species has “One known location on reservation; possibility of other locations, shallow lakes.”

The ternate grape-fern is listed as a RFSS in the CNF. General Forest Plan directives are the same for ternate grape-fern as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the ternate grape-fern.

**General Habitat Requirements:** Wagner and Wagner (1982) indicate that habitat for the ternate grape-fern includes low swamp areas, especially in old second-growth grassy places and along paths, and areas that support low shrubs such as *Gaultheria procumbens* and *Rubus hispidus* and the moss *Polytricum*. *B. rugulosum* can also occur in brushy fields, thickets, or margins and stream banks, as well as sandy pine-barrens and old open dunes (Ostlie, 1990a).

**Distribution within the CNF/LLR:** As of 2001, there were 10 known locations of this species in the CNF; four from moist mossy spots along or near a pipeline, five from odd moist spots in red pine forest, and one from an upland hardwood stand near a lake (U.S. Forest Service, 2001).

**Occurrence within Project Area:** This species was discovered during the 2007 and 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** A principal risk to this species is plant succession leading towards dense canopy of trees and shrubs. Other factors include extended periods of drought, changes in necessary mycorrhizae populations, soil compaction, and invasion of exotic earthworms.

The utility corridor development should result in creation of additional suitable habitat for this species, as evidenced by the occurrence of this species on and near pipeline corridors in the Forest. The Alberta Clipper and Southern Lights Diluent Projects will represent a low risk to the viability of this species in the CNF/LLR.

**Sweet Fern (*Comptonia peregrina*) (L.) Coult**

**CNF, Minnesota, and LLBO Conservation Status:** The sweet fern has no state status. The Leech Lake Reservation Sensitive Species List (March 2008) designates the sweet fern as “Sensitive” and states this species is “Traditionally used; uncommon, perhaps due to decrease in mature jack pine forest.”
The CNF has no designation for the sweet fern and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** Soper and Heimburger (1982) characterize the habitat of this species in the north as dry, sandy, gravelly, or rocky soil, often in association with jack pine. Voss (1985) indicates that in Michigan this species is found on sandy plains and hills, usually in open woodland or oak, aspen, and/or jack pine; especially prevalent in cutover lands to the north.

**Distribution within the CNF/LLR:** This species is not tracked in the CNF.

**Occurrence within Project Area:** This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** Risk to this species where it occurs is the loss of habitat through land conversion or development of a dense woody plant overstory. The Alberta Clipper and Southern Lights Diluent Projects may create additional potential habitat for this species, particularly on dry soils.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Environmental Baseline**

Suitable habitat occurs for plants within the Exposed Wet and/or Dry Soils guild along portions of all the alternatives. Surveys were conducted along the Preferred Alternative for the presence of these species (see table 2.4.7-8).

### TABLE 2.4.7-8

<table>
<thead>
<tr>
<th>Exposed Wet and/or Dry Guild TES, RFSS, LLBO Species Occurrences Within Impact Area of Each Alternative ⁴</th>
<th>Alternative 1 (number of individuals)</th>
<th>Alternative 2 (number of individuals)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Botrychium dissectum</em> dissected grape fern</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><em>Botrychium palidum</em> palid moonwort</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td><em>Botrychium rugulosum</em> ternate grape fern</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td><em>Botrychium simplex</em> least moonwort</td>
<td>16</td>
<td>40</td>
</tr>
<tr>
<td><em>Comptonia peregrine</em> sweet fern</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>Drosera intermedia</em> spatulate-leaved sundew</td>
<td>One location over 300 individual plants</td>
<td>0</td>
</tr>
<tr>
<td><em>Eleocharis olivacea</em> olivaceous spike-rush</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>Eleocharis quinqueflora</em> few-flowered spike-rush</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>Hierochloe odorata</em> sweet grass</td>
<td>One location over 200 individual plants</td>
<td>One location over 200 individual plants</td>
</tr>
</tbody>
</table>
TABLE 2.4.7-8
Exposed Wet and/or Dry Guild TES, RFSS, LLBO Species Occurrences Within Impact Area of Each Alternative

<table>
<thead>
<tr>
<th>Species</th>
<th>Alternative 1 (number of individuals)</th>
<th>Alternative 2 (number of individuals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orobanche uniflora</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>one-flowered broomrape</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waldsteinia fragaroides</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>barren strawberry</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Species occurrences based on 2007 and 2008 field surveys.

Direct Effects

Alternative 1 – Preferred Alternative

Numerous Exposed Wet and/or Dry Soils habitats will be crossed by this alternative. Known occurrences of 6 species from this guild are documented within the clearing limits of the Preferred Alternative *Botrychium dissectum* (2), *B. pallidum* (4), *B. rugulosum* (4), *B. simplex* (16), *Drosera intermedia* (300+), and *Hierochloe odorata* (200+) all occur within the clearing limits of this alternative. Construction of this alternative will require removal of woody and herbaceous vegetation and disturbance of subsoils. These activities will directly affect some of the known occurrences. However, the occurrence of these species along an existing pipeline corridor indicates that these species have acclimated to past disturbance of these habitats or have benefited from these disturbances and proposed activities will not permanently impact species within this guild.

Enbridge 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 has been submitted for agency approval and will be finalized prior to the start of construction.

Alternative 2– Great Lakes Gas Alternative

Numerous Exposed Wet and/or Dry Soils habitats will be crossed by this alternative. Known occurrences of 4 species from this guild are documented within the clearing limits of the Great Lakes Gas Alternative. *Botrychium dissectum* (4), *B. pallidum* (17), *B. simplex* (40), and *Hierochloe odorata* (200+) occur within the clearing limits of this alternative. Construction of this alternative will require removal of woody and herbaceous vegetation and disturbance of subsoils. These activities will directly affect some of the known occurrences. However, the occurrence of these species along an existing pipeline corridor indicates that these species have acclimated to past disturbance of these habitats or have benefited from these disturbances and will not impact species within this guild.

Indirect Effects

Changes in herbaceous habitat due to clearing would temporarily create conditions that are suitable for many of these species if open substrate is maintained. These open substrate areas would be restored and allowed to revegetate to pre-construction conditions.

Cumulative Effects

Temporary clearing of project corridors could temporarily create suitable habitat for some members of this guild. Forestry practices have had little effect on these crossings due to the lack of harvestable
timber. The additional clearing for construction of a transmission line will increase the widths of existing corridors and could temporarily increase Exposed Wet and/or Dry soil habitats that this guild could utilize on the CNF/LLR.

**Determination of Effects**

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects.

**Alternative 1 – Preferred Alternative**

**CNF:** The project will not likely cause a trend to federal listing or loss of viability for the species.

**MDNR:** The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected. The project will have a negligible or improbable effect on the remainder of the species in this guild.

**LLBO:** The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected on LLR. The project will have a negligible or improbable effect on the remainder of the species in this guild.

**Alternative 2 – Great Lakes Gas Alternative**

**CNF:** The project will not likely cause a trend to federal listing or loss of viability for the species.

**MDNR:** The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected. The project will have a negligible or improbable effect on the remainder of the species in this guild.

**LLBO:** The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected on LLBO lands. The project will have a negligible or improbable effect on the remainder of the species in this guild.

**2.4.7.6 Open Water Sensitive Plants Guild**

The list below includes some species which have been described in previous sections; reference to those sections are included in parentheses after the species name below.

- *Nymphaea leibergii* – dwarf water-lily
- *Sparganium glomeratum* – northern bur-reed (2.4.7.4)
- *Utricularia geminiscapa* – hiddenfruit bladderwort

**Dwarf Water-lily (*Nymphaea leibergii*) Morong**

**CNF, Minnesota, and LLBO Conservation Status:** The dwarf water-lily has a state status of “Threatened.” The Leech Lake Reservation Sensitive Species List (March 2008) has no designation for this species.

The dwarf water-lily is listed as Forest Sensitive in the CNF. General Forest Plan directives are the same for dwarf water-lily as for all sensitive species and follow general direction objectives O-WL-1, O-WL-2, O-WL-17, O-WL 31, and S-WL-6. There are no management guidelines specific to the dwarf water-lily.
**General Habitat Requirements:** This species is found in slow moving streams, beaver impoundments, shallow lakes, and protected bays, preferring the outer margin of emergent vegetation such as wild rice (*Zizania aquatica*), arrowhead (*Sagittaria spp.*), bulrush (*Scirpus spp.*), and cattails (*Typha spp.*) (Chippewa Rare Plants Field Guide, 1996 cf. U.S. Forest Service, 2001b).

**Distribution within the CNF/LLR:** This species is not known to occur in the CNF.

**Occurrence within Project Area:** This species was not discovered during 2007 or 2008 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1. This species was not found during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** Permanent drawdown of waters at known sites is probably a principal risk to this species. Implementing BMPs should serve to minimize any hydrologic alteration to the project area and surrounding habitat.

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Hiddenfruit Bladderwort (Utricularia geminiscapa) Nutt. ex Gray**

**CNF, Minnesota, and LLBO Conservation Status:** The hiddenfruit bladderwort has no state status, but has been proposed for listing. The Leech Lake Reservation Sensitive Species List (March 2008) lists the bladderwort as “Threatened”; and states; “Found in small pools in moss/sedge acid bogs, recently found on Reservation. Extent of population unknown.”

The CNF has no designation for the hiddenfruit bladderwort and there are no Forest Plan objectives or management guidelines for this species.

**General Habitat Requirements:** This species is generally found in shallow pools in Sphagnum or northern spruce bogs.

**Distribution within the CNF/LLR:** This species was unknown until recently in the CNF/LLR.

**Occurrence within Project Area:** This species was discovered during 2007 plant surveys within the Alberta Clipper and Southern Lights Diluent Projects area on Alternative 1; however, the plant is approximately 1-mile south of the currently proposed route and will not be impacted by construction activities. This species was not found during CapX surveys in 2008 along Alternative 2.

**Risk Factors:** “Destruction of bog habitat by flooding, dredging, or filling. Overgrowth of the open Sphagnum mat by woody species as a result of succession.” (Ohio Department of Natural Resources, 1994).

The Alberta Clipper and Southern Lights Diluent Projects represent a low risk to the viability of this species in the CNF/LLR.

**Environmental Baseline**

Suitable Open Water habitat occurs for plants within this guild along portions of each of the alternatives. Surveys were conducted along the Preferred Alternative for the presence of these species (see table 2.4.7-9).
## TABLE 2.4.7-9

<table>
<thead>
<tr>
<th>Species</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Nymphaea leibergii</em></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dwarf water-lily</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Sparganium glomeratum</em></td>
<td>1100+</td>
<td>680+</td>
</tr>
<tr>
<td>Northern bur-reed</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Utricularia guminiscapa</em></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Hiddenfruit bladderwort</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a* Species occurrences based on 2007 and 2008 field surveys.

### Direct Effects

**Alternative 1 – Preferred Alternative**

Numerous Open Water habitats will be crossed by this alternative. Known occurrences of 1 species from this guild are documented during field surveys within the clearing limits of the Preferred Alternative. *Sparganium glomeratum* (1100+) occur within the clearing limits of this alternative. Current pipeline construction techniques in wetlands will restore existing topographic contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on open water and emergent wetlands along the Preferred Alternative.

Enbridge will develop a [Rare Plant Mitigation Plan](#) for protection of the northern bur-reed. This plan will be finalized per agency approvals prior to construction.

**Alternative 2 – Great Lakes Gas Alternative**

Numerous Open Water habitats will be crossed by this alternative. Known occurrences of 1 species from this guild are documented within the clearing limits of the Great Lakes Gas Alternative. *Sparganium glomeratum* (680+) occurs within the clearing limits of this alternative. Current pipeline construction techniques in wetlands will restore existing topographic contours and allow the revegetation of native species along the construction right-of-ways. These techniques will result in little to no effect on open water and emergent wetlands along the Great Lakes Gas Alternative.

### Indirect Effects

Changes in herbaceous habitat due to clearing would temporarily create conditions that are suitable for many of these species if open water is maintained. Colonization by these and other emergent species is also possible after construction is completed on the pipeline.

### Cumulative Effects

Temporary clearing of wetland areas could create suitable habitat for some members of this guild, however, current pipeline construction techniques in wetlands will restore existing contours and allow the revegetation of native species along the construction right-of-ways. Forestry practices have had little effect on these crossings due to the lack of harvestable timber in water.
Determination of Effects

Given the above discussion on direct, indirect, and cumulative effects, we have made the following determinations of effects for Alternatives 1 and 2.

CNF: The project will not likely cause a trend to federal listing or loss of viability for the species.

MDNR: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected. The project will have a negligible or improbable effect on the remainder of the species in this guild.

LLBO: The project may have a negative effect on individuals of some species in this guild; however, the status of these species’ populations will not be affected on the LLR. The project will have a negligible or improbable effect on the remainder of the species in this guild.

3.0 SUMMARY OF DETERMINATIONS

The summary of determinations in table 3-1, below, is based upon the proposed management action as described in this BA/BE. If project facilities are not constructed within 1 year from the date of issuance of authorizations, Enbridge should consult with the appropriate offices of the FWS, CNF, and LLBO to update the species list and to determine if additional surveys are required.
<table>
<thead>
<tr>
<th>Species</th>
<th>Species Present in Analysis Area?</th>
<th>Suitable Habitat Present in Analysis Area?</th>
<th>Habitat Affected by Project?</th>
<th>FWS Determination</th>
<th>CNF Determination</th>
<th>LLBO Determination</th>
<th>MDNR Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Federally Listed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada Lynx</td>
<td><strong>No:</strong> Sightings documented near analysis area</td>
<td><strong>Yes:</strong> suitable feeding habitat</td>
<td><strong>No</strong></td>
<td>Not likely to adversely affect.</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
</tr>
<tr>
<td>Lynx canadensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gray Wolf</td>
<td><strong>Yes:</strong> Known occurrences; Wolf packs are known to occur along the project corridor</td>
<td><strong>Yes:</strong> suitable habitat</td>
<td><strong>No</strong></td>
<td>Not likely to adversely affect.</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
</tr>
<tr>
<td>Canis lupus</td>
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<td>Dakota Skipper</td>
<td><strong>No:</strong> Sightings outside of project area</td>
<td><strong>Yes:</strong> suitable habitat</td>
<td><strong>No</strong></td>
<td>Not likely to adversely affect.</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
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<td>Hesperia dacotae</td>
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<td><strong>Birds</strong></td>
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<tr>
<td>Northern Goshawk</td>
<td><strong>Yes:</strong> known occurrences</td>
<td><strong>Yes:</strong> suitable nesting habitat</td>
<td><strong>Yes</strong></td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Accipiter gentilis</td>
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<tr>
<td>LeConte’s Sparrow</td>
<td><strong>Yes:</strong> Known occurrences</td>
<td><strong>Yes:</strong> suitable nesting habitat</td>
<td><strong>Yes</strong></td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Ammodramus leconteii</td>
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<td>Nelson’s sharp-tailed sparrow</td>
<td><strong>Yes:</strong> Known occurrences</td>
<td><strong>Yes:</strong> suitable nesting habitat</td>
<td><strong>No</strong></td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>NA</td>
<td>NA</td>
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<td>Ammodramus nelsoni</td>
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<tr>
<td>Great Blue Heron Ardea herodias</td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<td>Short-eared owl Asio flammeus</td>
<td>No; No known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<td>American bittern Botaurus lentiginosus</td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<td>Red-shouldered Hawk Buteo lineatus</td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<td>Black tern Chlidonias niger</td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<td>Olive-sided Flycatcher Contopus cooperi</td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>NA</td>
<td>NA</td>
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<td>Trumpeter Swan Cygnus buccinator</td>
<td>No; No known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>No</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
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<tr>
<td>Black-throated blue warbler <em>Dendroica caerulescens</em></td>
<td><strong>No</strong>; No known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
</tr>
<tr>
<td>Bay-breasted Warbler <em>Dendroica castanea</em></td>
<td><strong>No</strong>; No known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
</tr>
<tr>
<td>Spruce Grouse <em>Falcipennis canadensis</em></td>
<td><strong>No</strong>; No known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Sandhill Crane <em>Grus canadensis</em></td>
<td><strong>No</strong>; No known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Bald Eagle <em>Haliaeetus leucocephalus</em></td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Connecticut Warbler <em>Oporornis agilis</em></td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Osprey <em>Pandion haliaetus</em></td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Wilson’s Phalarope Phalaropus tricolor</td>
<td>No; No known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
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<tr>
<td>Black-backed woodpecker Picoides arcticus</td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Horned grebe Podiceps auritus</td>
<td>No; No known occurrences</td>
<td>Yes; suitable stopover habitat</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
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<tr>
<td>King Rail Rallus elegans</td>
<td>No; No known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
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<tr>
<td>Great Gray Owl Strix nebulosa</td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable nesting habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<td>Amphibians</td>
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<tr>
<td>Four-toed Salamander Hemidactylium scutatum</td>
<td>No; No known occurrences</td>
<td>Yes; suitable habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Red-backed Salamander Plethodon cinereus</td>
<td>No; No known occurrences</td>
<td>Yes; suitable habitat</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td><strong>Green Frog</strong>&lt;br&gt;Rana clamitans</td>
<td>No; No known occurrences</td>
<td>Yes; suitable habitat</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<td><strong>Mammals</strong></td>
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<tr>
<td>Mountain Lion&lt;br&gt;Felis concolor</td>
<td>No: No known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
</tr>
<tr>
<td>Pine martin&lt;br&gt;Martes americana</td>
<td>No: No known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Northern Myotis&lt;br&gt;Myotis septentrionalis</td>
<td>No: No known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Heather Vole&lt;br&gt;Phenocomys intermedius</td>
<td>No; No known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Franklin's Ground Squirrel&lt;br&gt;Spermophilus franklinii</td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<td><strong>Reptiles</strong></td>
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<tr>
<td>Snapping Turtle</td>
<td>Yes; known occurrences</td>
<td>Yes; suitable habitat</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Blanding’s Turtle</td>
<td>No; no known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Eastern Hognose Snake</td>
<td>No; no known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Western Hognose Snake</td>
<td>No; no known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>NA</td>
<td>NA</td>
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<td>Greater redhorse</td>
<td>Yes; known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<td>Pugnose Shiner</td>
<td>No; no known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<td>Mollusks</td>
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<td>Creek Heelsplitter</td>
<td>Possible; however species not documented from within analysis area</td>
<td>Yes; suitable habitat</td>
<td>Not likely; potential effects from pipeline unlikely.</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<tr>
<td>Species</td>
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<td>Species Present in Analysis Area?</td>
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<tr>
<td>Fluted-shell mussel Lasmigona costata</td>
<td>Possible; however species not documented from within analysis area</td>
<td>Yes; suitable habitat</td>
<td>Not likely; potential effects from pipeline unlikely.</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Black Sandshell Ligumia recta</td>
<td>Possible; however species not documented from within analysis area</td>
<td>Yes; suitable habitat</td>
<td>Not likely; potential effects from pipeline unlikely.</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
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<td>Vertree’s Caddisfly Ceraclea vertreesi</td>
<td>No; No known occurrences</td>
<td>Yes; suitable habitat</td>
<td>Not likely; potential effects from pipeline unlikely.</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Red-disked alpine Erebia discoidalis discoidalis</td>
<td>Yes; Known occurrence</td>
<td>Yes; suitable habitat</td>
<td>Not likely; potential effects from pipeline unlikely.</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Jutta arctic Oeneis Jutta ascerta</td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>NA</td>
<td>NA</td>
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<td>Dragon’s Mouth Orchid Arethusa bulbosa</td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
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<tr>
<td>Dissected grape-fern Botrychium dissectum</td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>May have a negative effect on individuals. Populations will not be affected.</td>
</tr>
<tr>
<td>Species</td>
<td>Species Present in Analysis Area?</td>
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</tr>
<tr>
<td>Lanceleaf Grape-fern</td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>May have a negative effect on individuals. Populations will not be affected.</td>
<td>May have a negative effect on individuals. Populations will not be affected.</td>
</tr>
<tr>
<td>Botrychium lanceolatum var. angustisegmentum</td>
<td>Mingan Moonwort</td>
<td>Botrychium minganense</td>
<td>Yes; known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Goblin Fern</td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
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<td>Botrychium oneidense</td>
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<td>May have a negative effect on individuals. Populations will not be affected.</td>
<td>May have a negative effect on individuals. Populations will not be affected.</td>
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<td>Suitable Habitat Present in Analysis Area?</td>
<td>Habitat Affected by Project?</td>
<td>FWS Determination</td>
<td>CNF Determination</td>
<td>LLBO Determination</td>
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<td>CNF Determination</td>
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<td>Negligible or improbable negative effect on individuals of the species.</td>
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<td>Yes; suitable habitat</td>
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<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
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<td>Yes - Known occurrences</td>
<td>Yes; suitable habitat</td>
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<td>Negligible or improbable negative effect on individuals of the species.</td>
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<td>Yes; suitable habitat</td>
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<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
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<td>Yes; suitable habitat</td>
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<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
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<tr>
<td>Species</td>
<td>Species Present in Analysis Area?</td>
<td>Suitable Habitat Present in Analysis Area?</td>
<td>Habitat Affected by Project?</td>
<td>FWS Determination</td>
<td>CNF Determination</td>
<td>LLBO Determination</td>
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<td>Dwarf Water-lily Nymphaea leibergii</td>
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<td>Yes; suitable habitat</td>
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<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
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<td>One-flowered Broomrape Orobanche uniflora</td>
<td><strong>Yes</strong>: Known occurrence</td>
<td>Yes; suitable habitat</td>
<td>Yes; alternative 2 only</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Alt 1: Negligible or improbable negative effect on individuals of the species. Alt 2: May have a negative effect on individuals, may extirpate only known population on CNF/LLR.</td>
<td>NA</td>
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<td>White Pine Pinus strobus</td>
<td><strong>Yes</strong>: Known occurrences</td>
<td>Yes; suitable habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>May have a negative effect on individuals. Populations will not be affected.</td>
<td>NA</td>
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<td>Club-spur Orchid Platanthera clavellata</td>
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<td>Yes; suitable habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
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<td>Tubercled Rein-orchid Platanthera flava var. herbiola</td>
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<td>Yes; suitable habitat</td>
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<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
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## TABLE 3-1
Summary of Effects Determinations for Alternative 1 and Alternative 2

<table>
<thead>
<tr>
<th>Species</th>
<th>Species Present in Analysis Area?</th>
<th>Suitable Habitat Present in Analysis Area?</th>
<th>Habitat Affected by Project?</th>
<th>FWS Determination</th>
<th>CNF Determination</th>
<th>LLBO Determination</th>
<th>MDNR Determination</th>
<th>Summary of Determinations</th>
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<tr>
<td>Western Jacob’s Ladder</td>
<td>No; No known occurrences</td>
<td>Yes; suitable habitat</td>
<td>Yes</td>
<td>NA</td>
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<td>Negligible or improbable negative effect on individuals of the species.</td>
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<td>Polemonium occidentale</td>
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<td>Lapland Buttercup</td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable habitat</td>
<td>Yes</td>
<td>NA</td>
<td>Not likely to cause a trend to federal listing or loss of viability.</td>
<td>Alt 1: May have a negative effect on individuals. Populations will not be affected.</td>
<td>Alt 2: No effect.</td>
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<td>Northern bur-reed</td>
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<td>Yes; suitable habitat</td>
<td>Yes</td>
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<td>May have a negative effect on individuals. Populations will not be affected.</td>
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<td>No; typical suitable habitat does not exist</td>
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<td>Yes; suitable habitat</td>
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<tr>
<td>Barren strawberry <em>Waldsteinia fragarioides</em></td>
<td>Yes; Known occurrences</td>
<td>Yes; suitable habitat</td>
<td>No</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Negligible or improbable negative effect on individuals of the species.</td>
<td>NA</td>
</tr>
</tbody>
</table>
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