

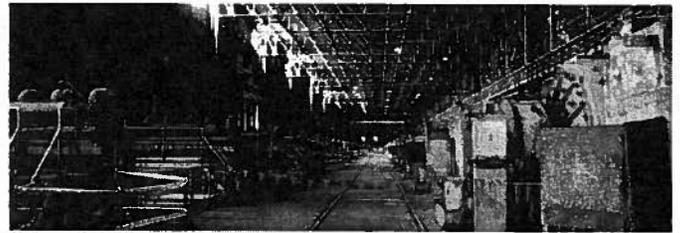
Attachment 2

Polymet Draft Environmental Impact Statement, Section 4.4: Wildlife

NORTHMET PROJECT

ENVIRONMENTAL IMPACT STATEMENT OCTOBER 2009

DRAFT



VOLUME II: FIGURES



**US Army Corps
of Engineers**
St. Paul District

4.4 WILDLIFE

This section describes the existing wildlife conditions in the Project area and evaluates the direct, indirect, and cumulative effects of the Project on wildlife, wildlife habitat and potentially significant wildlife travel corridors traversing the Mesabi Iron Range. Project effects on three, somewhat overlapping, categories of critical wildlife are evaluated: federally and state listed endangered, threatened, and species of special concern (ETSC – seven species); the Minnesota Species of Greatest Conservation Need (SGCN - 58 species); and the USFS's Regional Foresters Sensitive Species (RFSS – 23 species).

Several other species have been identified as being of significant tribal concern including moose, deer, grouse, and furbearing species. Most of these species are relatively common in Northern Minnesota and would likely relocate to other, nearby habitat; therefore, loss of tribal access to Project lands would not affect use of these species. Moose populations are generally declining state-wide, and are relatively uncommon at the Mine Site. There is no documented tribal use of the Plant and Mine Sites for hunting/trapping of these species.¹

4.4.1 Existing Conditions

4.4.1.1 Endangered, Threatened, and Special Concern Wildlife Species

Seven federally- and state-listed ETSC wildlife species, which were identified in scoping as potentially present in the Project area are briefly described below. Federally-listed species records are maintained by the USFWS and the state-listed species records are maintained in the Minnesota Natural Heritage Information System (NHIS).

The NHIS is the most complete source of data on Minnesota's rare or otherwise significant wildlife species, but is not a comprehensive statewide inventory. It is based on historical museum records, published information, and field work and is continually updated as new information becomes available. Therefore the lack of a species occurrence in the NHIS database does not necessarily confirm the absence of a particular species in that area (MnDNR 2009,

Position statements submitted by tribal cooperating agencies are footnoted as part of the process of documenting their differences of opinion with specific content and conclusions of the DEIS. See Section 1.6.1.

¹ The tribal cooperating agencies note that the Area of Potential Effect for the Project was not determined until August 11, 2009, and consultation under Section 106 of the National Historic Preservation Act is still ongoing between the USACE and Tribes. Therefore, historic and current tribal harvest has not been determined for either the Plant or Mine Sites yet. The tribal cooperators position is that while there is no current documented tribal use of said resources, most band members don't formally report their harvest sites at the scale that would allow identification of proximity to the Mine Site. If species of tribal concern 'relocated' to other lands and these other lands were private lands, there would be a loss of opportunity to harvest.

Recent studies from the MnDNR, the Natural Resources Research Institute at the University of Minnesota-Duluth and tribal natural resource management staff indicate that preservation of wetlands may be one of the most important factors in maintaining the moose population in NE MN.

Natural heritage Information System [NHIS]). A county-by-county survey (Minnesota County Biological Survey [MCBS]) of rare natural features is underway. The MCBS is not complete for St. Louis County (including the Plant Site); however, surveys in the vicinity of the Mine Site have been completed (MnDNR 2009, *Minnesota County Biological Survey [MCBS]*). The discussions below include the results of the MCBS at the Mine Site.

Canada Lynx

Canada lynx (*Lynx canadensis*) populations in the United States are protected under the Endangered Species Act (ESA) as a federally-listed threatened species, although it is not state-listed as an ETSC species in Minnesota and is considered globally secure by NatureServe (NatureServe 2009). Lynx population cycles are related to snowshoe hare populations, and therefore lynx are predominantly found in boreal (specifically spruce and fir) forests (USFWS 2009). Mortality due to starvation and declining reproduction rates have been documented during periods of hare scarcity (Poole 1994; Slough and Mowat 1996). Hunger-related stress, which induces dispersal, may increase exposure of lynx to other forms of mortality such as trapping and vehicle collisions (Brand and Keith 1979; Carbyn and Patriquin 1983; Ward and Krebs 1985; Bailey et al. 1986). Since 2000, the USFWS and USFS documented five road-killed lynx in Minnesota (DelGuidice et al. 2007). Lynx may also be subject to competition (Buskirk et al. 2000) and predation.

Staples (Staples 1995) described lynx as generally tolerant of humans. Other anecdotal reports suggest that lynx are not displaced by human activity, including moderate levels of snowmobile traffic (Mowat et al. 2000) and ski resort activities (Roe et al. 1999; RS62, ENSR 2006). In an area with sparse roads in north-central Washington State, logging roads did not appear to affect habitat use by lynx (McKelvey et al. 2000; RS62, ENSR 2006). By contrast, lynx in the more heavily roaded southern Canadian Rocky Mountains crossed highways within their home ranges less than would be expected (Apps 2000).

Current conditions for this species in the Project area were determined through review of existing data sources, including various lynx sighting databases (NRRI 2006; MnDNR 2009, *Canada lynx sightings in Minnesota*) and general reports (Foth and Van Dyke 1999) as well as project-specific studies during the summer season (ENSR 2000; ENSR 2005) and a winter tracking survey (RS62, ENSR 2006). The winter tracking survey also included interviews with experts, private conservation groups, and the public, who are familiar with lynx use of the survey area.

Over three-quarters of lynx records in Minnesota are from the northeastern portion of the state (McKelvey et al. 2000; RS62, ENSR 2006). Recent research in Minnesota confirmed a resident breeding population of lynx. Of the 426 sightings reported to the Minnesota DNR Division of Ecological Resources between 2000 and 2006, 76 percent were in St. Louis, Lake, and Cook counties. Approximately 113 lynx were sighted in St. Louis County between 2000 and 2006 and 8 percent of these lynx showed evidence of reproductive activity (MnDNR 2009, *Canada lynx sightings in Minnesota*).

On February 25, 2009, the USFWS published the Final Rule for Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada lynx (50

CFR 17). Portions of the Mine Site lie within the revised boundaries of federally designated lynx critical habitat. A recovery plan has not yet been issued for the Canada lynx.

The USFS designates Lynx Analysis Units (LAUs) within the Superior National Forest that comprise landscape-scale analysis areas for lynx management. These LAUs were developed in consultation with the U.S. Fish and Wildlife Service. The Mine Site is located within LAU 12; a 70,979-acre area in the southwest portion of the Superior National Forest. According to the USFS (USFS 2009, *MidLevel Tracks Analysis, Wildlife T&E*), approximately 66,414 acres, or 94 percent, of LAU 12 currently provides suitable lynx habitat. The Plant Site is not on USFS land, and therefore is not located within a LAU.

At least 20 different individual lynx sightings have occurred within 18 miles of the Project area (NRRI 2006), including several radio-collared and reproductive individuals. The nearest reported sighting was approximately six miles from the Mine Site. The majority of sightings are clustered along roads and other places frequented by people.

The lynx winter tracking survey (RS62, ENSR 2006) covered a 250-square-mile area centered on the Project. The survey did not find any signs of lynx at the Mine or Plant Sites, but DNA analysis of scat indicated four unrelated females within the 250-square-mile survey area. Track surveys suggest that two individuals made most of the trails found. Although preferred cover types for the snowshoe hare exist on the Mine Site (e.g., Jack pine, fir-aspen-birch, aspen-birch), the forest may be too old for high hare densities as snowshoe hare generally favor sapling or young pole stands (RS62, ENSR 2006). Lynx density may increase as snowshoe hare populations cycle from a low point.

Gray Wolf

On July 1, 2009, a U.S. District Judge signed a settlement agreement that remanded an April 2009 USFWS decision to delist the western Great Lakes population of gray wolves. As a result, the gray wolf (*Canis lupus*) is again a federally-listed threatened species. The gray wolf is listed as a Minnesota Species of Special Concern. The Project is located within Zone 2 of the designated critical habitat for the gray wolf (43 FR 9607, March 9, 1978). Minnesota is divided into five “zones” with Zones 1, 2, and 3 comprising the critical habitat.

Populations of gray wolves have become re-established in several western states from their low point in the mid-1970s when only northeast Minnesota, among the lower 48 states, had a reproducing population. Gray wolf populations in the western Great Lakes Region (i.e., Minnesota, Wisconsin, and Michigan) are expanding and have exceeded recovery goals for several years (Erb and Benson 2004). A 2007 to 2008 winter survey by the MnDNR (Erb 2008) estimated that 2,921 gray wolves live in Minnesota, which is second only to Alaska in wolf populations among the U.S. states. The MnDNR considers the gray wolf population fully recovered as it has surpassed the federal delisting goal of 1,251 to 1,400 wolves (MnDNR 2008, News Release).

In northern Minnesota, the principal prey of the gray wolf includes white-tailed deer, moose, beaver, hare, and muskrat, with occasional small mammals, birds, and large invertebrates. Most wolves live in 2 to 12 member family packs and defend territories of 20 to 214 square miles. In

Minnesota, the average pack size is 5.5 individuals (Erb and Benson 2004). The forest and brush habitats at the Mine Site are typical wolf habitat.

Radio-collared wolves were documented to the north and northeast of the Mine Site (International Wolf Center 2008); wolf tracks were observed on the Mine Site in 2000, 2005, and 2008; and calling surveys located wolves south of the Mine Site in 2004 (ENSR 2000; ENSR 2005; and AECOM 2009). Because of typical wolf territory size, these reports likely represent a single pack.

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) was removed from the federal threatened species list on June 28, 2007. After a period of decline due to hunting and widespread use of Dichloro-Diphenyl-Trichloroethane (DDT), bald eagle populations in the lower 48 states rose dramatically beginning in 1972. It continues to be listed by the State of Minnesota as a Species of Special Concern, as a RFSS by the USFS, and is globally secure according to NatureServe (NatureServe 2009). In addition, the bald eagle is federally protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

The Minnesota NHIS (MnDNR 2007, NHIS) contains records of 35 nests within 12 miles of the Mine and Plant Sites. These nests occurred in five groups, with each group representing nests in close proximity and assumed to be used by a single pair (Guinn 2004). No nests were recorded at the Mine and Plant Sites and field surveys found no evidence of any nests (ENSR 2005). The five nearest bald eagle nesting territories ranged from 2.4 to 7.3 miles from the Mine or Plant Sites (averaging 5.7 miles apart). Bald eagles are typically associated with large lakes surrounded by mature forest where large trees provide suitable nest sites and eagles perch while searching for fish and other prey. No large lakes or large nesting trees are located at the Mine or Plant Sites and it is unlikely that bald eagles would use these areas.

The Project area was also reviewed to evaluate whether it may provide wintering habitat for bald eagles. Eagles generally winter where there is available food at or near open water and where carrion is available. There are no large water bodies within the Project area that are likely to remain open in the winter. Animal-vehicle collisions on Dunka Road and/or natural deer mortality are not likely to produce sufficient carrion to sustain bald eagles at the Mine or Plant Sites (ENSR 2005).

Wood Turtle

The wood turtle (*Clemmys insculpta*) is listed as a threatened animal species in Minnesota and as a RFSS by the USFS. The wood turtle is not federally listed and is considered apparently secure by NatureServe (NatureServe 2009). The species range extends from Virginia to Nova Scotia and westward to Minnesota and northeast Iowa. The Project area is located at the western edge of its range in Minnesota; populations are restricted to the eastern third of the state. Significant wood turtle populations, however, are unlikely to be found at the Mine or Plant Sites because its preferred habitat of sandy-gravelly streams and bars, which are used for hibernating, mating, and nesting (Bradley et al. 2002), are not present. The Minnesota NHIS records indicate the northernmost population in the state was observed immediately south of the Mine Site and, given

its proximity, it is possible that wood turtles may potentially occur along the southern fringes of the Mine Site.

Heather Vole

The heather vole (*Phenacomys intermedius*) is listed as a species of special concern by Minnesota and as a RFSS by the USFS, but is not federally listed or globally sensitive according to NatureServe (NatureServe 2009). The heather vole is a habitat generalist, but typically inhabits the coniferous zones in upland forests, brushlands and meadows with low shrub species, and usually near water. Habitats of this type may occur at the Mine or Plant Sites; however, the Minnesota NHIS does not contain any heather vole records within 10 miles of the Project. It was also not found in nearby surveys of small mammals on the Chippewa National Forest (Christian 1999) and in Cook County (Jannett 1998). The Project area is at the southern edge of the heather vole's home range in far northern Minnesota and only a few collections of the species occur within Minnesota.

Yellow Rail

The yellow rail (*Coturnicops noveboracensis*) is a state listed species of special concern and as a RFSS by the USFS. It is not federally listed and its global rank is considered apparently secure (NatureServe 2009). Habitat for yellow rail includes lowland sedge meadows. Several small patches (totaling 49 acres) of wet meadow/sedge meadow occur at the Mine Site. The Minnesota NHIS, however, has no records of the yellow rail occurring within 10 miles of the Project and field surveys did not identify any yellow rail (ENSR 2005).

Tiger Beetle

A species of tiger beetle (*Cicindela denikei*) is listed as a threatened species by Minnesota and as a RFSS by the USFS. Although it was not searched for during field surveys, the NHIS has no records of tiger beetle occurring within 10 miles of the Project. This species inhabits openings in northern coniferous forests, specifically abandoned gravel and sand pits, undisturbed corners of active gravel and sand pits, sand and gravel roads, and sparsely vegetated rock outcrops (MnDNR 2009, *Cicindela denikei*). Conifer forests occur on the Mine Site, but field surveys did not detect sandy or rocky openings in the forest (ENSR 2005). Rock exposures are evident in areas disturbed by past mining, but conifer forests do not surround these areas.

4.4.1.2 Species of Greatest Conservation Need

The Minnesota Comprehensive Wildlife Conservation Strategy (MCWCS), an ecoregion-based wildlife management strategy (MnDNR 2006, *Tomorrow's Habitat for the Wild and Rare*) identifies SGCN by ecoregion subsections based on a statewide approach. The MCWCS was created with input from multiple stakeholders and expert panels to cover issues of regional as well as statewide concern. The Mine and Plant Sites are located within the Nashwauk and Laurentian Upland subsections and includes six key habitat types. The SGCN species associated with these habitat types are identified in Table 4.4-1.

Table 4.4-1 Key Habitat Types and Species of Greatest Conservation Need in the Nashwauk and Laurentian Uplands Subsections which Occur or May Occur in the Project Area

Key Habitat Type	Cover Types at the Mine and Plant Sites in the Key Habitat Types	Associated Species of Greatest Conservation Need ¹	Plant Site (Acres)	Mine Site (Acres)
1. Mature Upland Forest, Continuous Upland/Lowland Forest	Aspen forest/Aspen-birch forest, Jack pine forest, Mixed pine-hardwood forest	Veery, Whip-poor-will, Eastern Wood-pewee, Yellow-bellied Sapsucker, Ovenbird, Canada Warbler, <i>Northern Goshawk</i> , Cape May Warbler, <i>Spruce Grouse</i> , Winter Wren, Boreal Chickadee, Wood thrush, <i>Black-backed Woodpecker</i> , <i>Bald Eagle</i> ² , <i>Boreal Owl</i> , <i>Bay-breasted Warbler</i> , <i>Black-throated Blue Warbler</i>	653	1,351
2. Open Ground, Bare Soils	Disturbed/Developed	None	2,768	66
3. Grassland/Brushland, Early Successional Forest	Brush/Grassland	Eastern Meadowlark, Franklin's Ground Squirrel, Brown Thrasher, White-throated Sparrow, Sharp-tailed Grouse, Golden-winged Warbler, <i>American Woodcock</i> , Northern Harrier, Sedge Wren, LeConte's Sparrow, Common Nighthawk, Black-billed Cuckoo, Red-headed Woodpecker, Tawny Crescent, <i>Least Weasel</i>	263	293
4. Open Water	Tailings Basin, Partridge River, Embarrass River, former LTVSMC mine pits	Common Loon, Red-necked Grebe, Common Snapping Turtle, Northern Rough-winged Swallow, American White Pelican, Common Tern, Wilson's Phalarope, Black Tern, Trumpeter Swan	552	3
5. Wetland	Mixed hardwood swamp (Hardwood swamp, Eggers and Reed 1997), Black spruce swamp/bog (Coniferous swamp and Open bog, Eggers and Reed 1997)	Black Duck, American Bittern, Swamp Sparrow, Eastern Red-backed Salamander, Bog Copper, Disa Alpine, <i>Marbled Godwit</i>	189	1,303
6. Multiple Habitats	Combinations of Habitat Types	<i>Gray Wolf</i> ³ (1-3, 5 ^(b)), <i>Canada Lynx</i> ² (1-3, 5), Rose-breasted Grosbeak (1, 3), Macoun's Arctic (1, 3), <i>Least Flycatcher</i> (1, 3), <i>Connecticut Warbler</i> (1, 3), <i>Olive-sided Flycatcher</i> (1, 4), Grizzled Skipper (2, 3), Nabokov's Blue (2, 5), Wood Turtle (1, 3, 4) ²		
Total			4,425	3,016

Source: MnDNR 2006, *Tomorrow's Habitat for the Wild and Rare*

¹ Bold italicized text indicates SGCN species observed at Mine and Plant Sites (ENSR 2005); italicized text indicates SGCN species targeted by ENSR (2005) that were not found; plain text indicates SGCN species identified as likely to be present at the Mine or Plant Sites but not targeted in surveys.

² Canada lynx, gray wolf, bald eagle, and wood turtle are or have recently been listed as ETSC species as discussed in detail in the ETSC species section.

³ Numbers refer to the Key Habitat Types (1-5) where those species may occur or are known to occur.

Mature upland and lowland forest is the most common habitat type at the Project (primarily at the Mine Site), with the majority of the forest currently in the 5 to 12 inch diameter at breast height (dbh) class. Northern goshawk, spruce grouse, black-backed woodpecker, and boreal owl were observed in these forests (ENSR 2005). These species represent a group of species that generally requires large forested blocks and/or minimal human intrusion.

Areas of open ground/bare soils are rare at the Mine Site, but abundant at the Plant Site in areas disturbed by the LTVSMC operations or deposition in the Tailings Basin, both non-natural habitats. No SGCN are associated with this habitat type.

Brush/grassland and very early successional forest (trees less than five inches dbh) are uncommon at the Mine and Plant Sites (ENSR 2005) and where present are typically small

patches resulting from recent logging. The USFS has indicated that American woodcock has been observed at the Mine Site and the least weasel may occur as well. Most of the other SGCN species in Table 4.4-1 are generally associated with large patches of grassland and savanna habitats that are not present at the Plant and Mine Sites.

Open water and aquatic communities are confined to the LTVSMC Tailings Basin at the Plant Site. The Tailings Basin attracts Canada geese and other waterfowl during migration and may at other times as well; however, the Project does not appear to provide good waterfowl or waterbird habitat. Common loon, American white pelican, common tern, Wilson's phalarope, black tern, and trumpeter swan were surveyed for, but not found (ENSR 2000 and 2005). The common loon is common in the nearby area (e.g., Partridge and Embarrass rivers), but was not observed at the Tailings Basin.

The Project area, especially the Mine Site, contains a large expanse of wetland habitat consisting primarily of coniferous and open bogs. No wetland SGCN species, however, were observed. marbled godwit, which was surveyed for, was not found likely because its preferred habitat is graminoid wetlands and shallow marshes near extensive upland grassland, which are not present at the Mine or Plant Sites.

Multiple habitats are not mapped as such, but are made up of combinations of other key habitat types. This category is used for SGCN species that are known to use multiple habitats during a season. The gray wolf, Canada lynx, least flycatcher, and wood turtle were observed in the general vicinity of the Mine or Plant Sites and are known to utilize multiple key habitat types, including mature and early-successional upland forest and wetlands. The Connecticut warbler, which also uses mature and early-successional upland forest and wetlands, was searched for, but not found. Similarly, the olive-sided flycatcher was surveyed for in both lowland forest and wetlands, but was not found, probably because it prefers more open and mature conifer and mixed conifer-deciduous stands. The butterfly species grizzled skipper and Nabakov's blue are not found within 12 miles of the Mine or Plant Sites and are unlikely to occur on the Mine and Plant Sites as suitable habitat is not present.

4.4.1.3 Regional Foresters Sensitive Species

The Mine Site is located within the current boundaries of the Superior National Forest; however, the USFS and PolyMet are currently exploring the feasibility of a land exchange whereby the Project lands would no longer be National Forest lands. The USFS manages 23 RFSS of terrestrial wildlife on this forest. Six of these species are state ETSC species (i.e., gray wolf, bald eagle, wood turtle, heather vole, yellow rail, and tiger beetle) and are discussed above. Eleven other species are on the SGCN list and are discussed by habitat type in Table 4.4-1. These species include the boreal owl (*Aegolias funereus*), olive-sided flycatcher (*Contopus borealis*), black-throated blue warbler (*Dendroica caerulescens*), bay-breasted warbler (*Dendroica castanea*), Connecticut warbler (*Oporornis agilis*), LeConte's sparrow (*Ammodramus leconteii*), peregrine falcon (*Falco peregrinus*), disa alpine (*Erebia disa mancinus*), sharp-tailed grouse (*Tympanuchus phasianellus*), Freija's grizzled skipper (*Pyrgus centaureae freija*), and the Nabokov's blue (*Lycaeides idas nabokovi*). The remaining six species are discussed briefly below.

The northern goshawk (*Accipiter gentilis*) is not federally or state-listed nor is it tracked in the Minnesota NHIS. It is considered globally secure by NatureServe (NatureServe 2009). Its preferred habitat includes older forests, particularly aspen. This habitat is found in the Project area. Recent calling surveys did not identify northern goshawk at the Mine Site (ENSR 2005); however, previous surveys (ENSR 2000) did identify northern goshawk at the Mine Site and the USFS (unpublished data 2009) previously identified a nest site at the Mine Site in 2000. The nest site has not been active since 2000; however, a new stick nest was identified approximately 0.75 mile west of the Mine Site (unpublished data 2009).

The great gray owl (*Strix nebulosa*) is not federally or state-listed nor is it tracked in the Minnesota NHIS. It is considered globally secure by NatureServe (NatureServe 2009). Its preferred habitat includes coniferous and mixed forests and boreal bogs. These habitats are found in the Project area. Calling surveys did not identify great gray owls at the Mine or Plant Sites (ENSR 2000; ENSR 2005); however, the USFS has records of a great gray owl nesting unsuccessfully in the Project area in 2006.

The three-toed woodpecker (*Picoides tridactylus*) is not federally or state-listed and is globally secure according to NatureServe (NatureServe 2009). This species was identified during winter field surveys (ENSR 2000); however, it was not identified during summer field surveys (ENSR 2005) nor is it tracked in the Minnesota NHIS. A limiting factor for this species is foraging habitat where sufficient insects can be found to feed its young during the breeding season. Three-toed woodpeckers prefer and are most abundant in large tracts of old growth coniferous forest near recent burns where they forage on dead and dying trees for bark beetles (Burdett and Niemi 2002). No old growth coniferous habitat or recent burns exist at the Mine Site. A three-toed woodpecker was observed at the Mine Site by USFS personnel in 2007; however, the birds are unlikely to be common due to a lack of suitable habitat.

The red-disked alpine (*Erebia discoidalis discoidalis*), a butterfly, is not federally or state-listed and is globally secure according to NatureServe (NatureServe 2009). Field surveys for this species were not completed nor is it tracked in the Minnesota NHIS. It was found in 1979 and 1982 at Greenwood Lake, about 12 miles from the Project area. Its preferred habitat is acidic open bogs, of which there are 189 acres present at the Mine Site (Table 4.2-3), so this species may occur at the Mine Site.

The jutta arctic (*Oeneis jutta ascerta*), a butterfly, is not federally or state-listed and is globally secure according to NatureServe (NatureServe 2009). Field surveys for this species were not completed nor is it tracked in the Minnesota NHIS. However, 749 acres of its preferred habitat (spruce bog) is present at the Mine Site (Table 4.2-3), so this species may occur at the Mine Site.

The Quebec emerald (*Somatochlora brevicincta*), a dragonfly, is not federally or state-listed, however, it is considered globally vulnerable by NatureServe (NatureServe 2009). Field surveys for this species were not completed nor is it tracked in the Minnesota NHIS. However, the Minnesota Odonata Survey Project (Minnesota Odonata Survey Project 2009) found an individual in northern Lake County approximately 30 miles north of the Project area in 2006. This species' habitat requirements are not well understood in Minnesota, although reports suggest it that it inhabits poor fens. This habitat type is not found in the Project area, but it is similar to the wet meadow/sedge meadow habitat at the Mine Site. There has only been one

documented occurrence of this species in Minnesota (Lake County in 2006), although it is not tracked in the Minnesota NHIS. The likelihood of observing Quebec emerald individuals or populations in the vicinity of the Mine Site are low.

4.4.2 Impact Criteria

The following criteria are considered in evaluating Project effects on wildlife:

- Direct effects to federally or state-listed species including the taking (removal or loss) of an individual or population due to traffic collisions or habitat destruction, a change in an individual or population's habitat use due to noise, or visual disturbance from lights, mining, and transportation activity;
- Indirect effects to federally or state-listed species such as increased competition for resources or habitat due to displacement of individuals from the affected area into the territory of other animals, or other indirect effects which cause mortality or reduced breeding and recruitment in the future population; and
- Direct or indirect effects on habitat types that affect population size and long-term viability for federally and state-listed species and other species potentially at risk (SGCN or RFSS species). Direct effects include vegetation removal by clearing, burial, or other destructive activity. Indirect effects include changes within larger ecological units (e.g., the Laurentian Uplands or Partridge River Watershed), but not necessarily at the Plant or Mine Sites, that could occur at a later point in time such as a change in long-term vegetation composition or dominance, habitat conversion due to hydrologic changes; invasion by non-native species, or disruption of natural disturbance regimes (e.g., the annual natural hydrological cycle).²

4.4.3 Environmental Consequences

4.4.3.1 Proposed Action

Endangered, Threatened, and Special Concern Wildlife Species

Consultation between the USACE and the USFWS regarding the potential effects on federally-listed species is currently ongoing. The USFWS was provided a copy of the PDEIS and no comments have been received. Consultation will continue throughout the EIS process and the results of the consultation process will be included in the FEIS.

Position statements submitted by tribal cooperating agencies are footnoted as part of the process of documenting their differences of opinion with specific content and conclusions of the DEIS. See Section 1.6.1.

² The tribal cooperating agencies note that this list of impact criteria is incomplete. This section should also analyze the effects of the project on species harvested and gathered by tribal members on public lands. Consultation with the USACE is currently ongoing.

Canada Lynx

The Project area is currently within designated critical habitat for the Canada lynx (USFWS 2009). Surveys did not find any evidence of lynx use at the Mine or Plant Sites, but at least 20 different individual lynx were identified within 18 miles of the Mine or Plant Sites.

Site clearing and mining activities associated with the Project would potentially adversely affect lynx by reducing available habitat and increasing habitat fragmentation. The total impact from increased activity is not known, as lynx may habituate to increased activity. The Project would, however, result in the destruction of approximately two square miles (1,454 acres) of suitable lynx habitat, a mix of upland forest and lowland forest and bog. Assuming that the territory size of a resident lynx pair is 28 and 58 mi² (female and male territory size, respectively), this corresponds to a loss of three to seven percent of the territory for a single pair of lynx (RS62, ENSR 2006). Any lynx currently using the Mine Site could expand their territory into surrounding areas since lynx density in the vicinity is considered low relative to the rest of the Minnesota lynx range (RS62, ENSR 2006). Although the Proposed Action would result in a loss and fragmentation of lynx habitat at the Mine Site, the effect on statewide lynx populations would be insignificant since no individual lynx or pair of lynx would be significantly affected by the habitat loss. Habitat loss at the Mine Site, however, would result in fragmentation of lynx habitat in a portion of its current range.³

The USFS determined that approximately 4,104 acres, or 6 percent, of LAU 12 is currently unsuitable for lynx use (USFS 2009, *MidLevel Tracks Analysis, Wildlife T&E*). As described above, the Project would result in the loss of an additional 1,454 acres of lynx habitat. The USFS also indicated that current timber harvesting proposals would affect 2,538 acres within LAU 12, although it should be noted that this includes thinning activities, which would not affect lynx habitat, leading to a total of 8,096 acres, or 12 percent of the LAU consists of unsuitable lynx habitat. Based on this analysis, the USFS indicated that no USFS management standards or guidelines would be violated (USFS 2009, *MidLevel Tracks Analysis, Wildlife T&E*).

The increased vehicle traffic associated with the Project, including train and small vehicle traffic between the Mine and Plant Sites, could potentially result in vehicle collisions with lynx (Table 4.4-2). The Project would generate approximately 970 (948 vehicle and 22 rail) trips per day, totaling about 3,989 miles, between the Mine and Plant Sites. This traffic would consist primarily of light trucks and maintenance vehicles traveling between 30 to 45 mph, and a few large fuel trucks, waste/supply trucks, and trains traveling between 15 to 40 mph. An additional 3,930 miles per day of vehicular traffic are expected within the Mine Site itself, primarily to haul ore to the rail siding and waste rock to the stockpiles (Table 4.4-3).

Position statements submitted by tribal cooperating agencies are footnoted as part of the process of documenting their differences of opinion with specific content and conclusions of the DEIS. See Section 1.6.1.

³ The tribal cooperating agencies disagree with the conclusion that the effect on statewide lynx populations would be insignificant; this analysis does not consider the possibility that the Mine Site might include critical components of lynx habitat present, such as den sites.

Table 4.4-2 Vehicular and Train Traffic Volume Between the Mine and Plant Sites

Vehicle Type	Vehicle Weight (tons)	Speed (min – max mph)	Road Segment	Trips per Day	Roundtrip Miles per Trip	Total Miles (per day)
Light Cars and Trucks	2	30-45	A, B, C	90	16.8	1,512
Light Cars and Trucks	2	30-45	H	390	4.4	1,716
Light Cars and Trucks	2	30-45	D	456	0.4	182
Light Vans	2	30-45	E-F	6	3.2	19
Fuel Trucks	40	25-40	A, B, C, H	3	21.2	64
Supply & Waste Trucks	40	25-40	B, C, D, F	2.4	25.2	60
Haul Trucks	81.5-425	15-25	A, B, J	1	17.6	18
Trains	3,000	15-25	Train track from Mine Site to Plant Site	22	19.0	418
Total/Average				970	4.11	3,989

Source: Barr 2007, Requested Traffic Information, AQ01

Table 4.4-3 Vehicle Traffic Within the Mine Site Only

Vehicle type	Vehicle Weight (Tons)	Speed (average mph)	Road Segment	Total Road Miles in Mine Site	Total Miles (per day)
Haul Trucks and Construction Vehicles	81.5-425	12-14	Mine area only	4.44	3,930

Source: Barr 2007, Requested Traffic Information, AQ01

Although there is the potential for incidental take as a result of vehicle collisions with lynx, haul traffic at the Mine Site would likely have little direct impact on lynx, since lynx use of the Mine Site appears to be very low and the area would be heavily affected by mining operations and not likely to be used by lynx during the active mining phase. State and federal forest lands near the Mine or Plant Sites would continue to provide refuge for lynx, and it is likely lynx would favor these areas over those affected by mining for the duration of mine operations.

Restoration of disturbed areas as part of Mine Closure would eventually create a complex of upland forest, wetlands, and open water at the Mine Site, which would likely serve as lynx habitat, but this successional process would likely take decades. Potential lynx habitat would be lost for the duration of mine operations (over 20 years) and an additional 20 years or more after Closure before suitable lynx habitat would again occur at the Mine Site (RS62, ENSR 2006).⁴

Position statements submitted by tribal cooperating agencies are footnoted as part of the process of documenting their differences of opinion with specific content and conclusions of the DEIS. See Section 1.6.1.

⁴ It is the tribal cooperating agencies' note that this restoration of "lynx habitat" initially creates good bobcat habitat. Bobcats are superior competitors to lynx and thus may prevent lynx from returning to the site.

The impacts to the Canada lynx describe above would result in the localized direct loss and fragmentation of designated critical habitat and the increased potential (albeit low) for incidental takes resulting from vehicular collisions; however, these impacts are not anticipated to threaten the overall species population level and abundance in Minnesota.

Gray Wolf

The Project is located within the designated critical habitat for the gray wolf. Observations indicate the likelihood of a single wolf pack whose territory includes the Mine and Plant Sites. The overall footprint of the Mine Site would remove approximately two square miles (1,454 acres) of habitat, or 1 percent to a maximum of 10 percent of a single wolf pack territory. This reduction in available habitat is relatively small and is not expected to significantly affect the wolf population in the region, which is considered healthy by the MnDNR. After Closure, this area would again be available and suitable as wolf habitat, but this would not occur for over 40 years as described above for lynx.

Vehicle collisions are a major cause of wolf mortality (Fuller 1989; Kohn et al. 2000; Mech 1977). The increased vehicular and rail traffic associated with the Project, including haul truck traffic within the Mine Site and truck and rail traffic between the Mine and Plant Sites (Table 4.4-2) could potentially result in vehicle collisions with wolves. Although there is the potential for incidental take from collisions, haul traffic at the Mine Site would likely have little direct impact on wolves because the area would be heavily affected by mining operations (e.g., high levels of noise, traffic, disturbance), which would discourage wolf use during the active mining phase. State and federal forest lands near the Mine or Plant Sites would continue to provide refuge for wolves, and it is likely wolves would favor these areas over those affected by mining for the duration of mine operations. Increased Project use of Dunka Road would increase the potential for vehicular collisions with wolves for the duration of mining operations. Road density outside of the Mine Site would not change as a result of the Project. The haul road network would increase the road density at the Mine Site; however, mining operations would disturb the Mine Site such that it would reduce habitat availability for the gray wolf. Therefore, the haul road network itself would not influence the overall effects of the Project on the gray wolf.

The *Recovery Plan for the Eastern Timber Wolf* (USFWS 1992), which is the same species as the gray wolf, identifies five main factors critical to the long-term survival of this species. These critical 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. The Project would impact the availability of wild land (factor 1) and prey availability (factor 3) through a reduction in general habitat availability (approximately 1,454 acres) at the Mine Site, although adjacent federal and state lands would continue to provide suitable habitat.

The gray wolf population in Minnesota (estimated at 2,922 gray wolves) is considered fully recovered by MnDNR as it has surpassed the federal delisting goal of 1,251 to 1,400 wolves. Therefore, while the impacts to the gray wolf described above would result in the direct loss and

fragmentation of suitable habitat, the increased potential for incidental takes from vehicular collisions, and indirect decline in prey species due to habitat loss, these impacts are not anticipated to threaten the overall species population level and abundance in Minnesota.

Bald Eagle

In Minnesota, bald eagles typically nest in large trees within 500 feet of lakes or rivers (Guinn 2004). There are no large lakes or rivers located at the Mine or Plant Sites that would provide optimal nesting/foraging habitat. The USFWS eagle management guidelines suggest that human activity within one-quarter mile to two miles can be seen by eagles and, depending on the level of screening and habituation of individual eagles, may cause them to abandon a nest. Generally, the closer the activity the greater the effect. The nearest recorded bald eagle nest to the Mine or Plant Sites is approximately 2.4 miles from the Mine Site; consequently, there should be no adverse effect on existing nesting eagles due to activities at the Mine and Plant Sites.

Bald eagle nesting territories in Minnesota generally have a 10-mile radius that varies with habitat quality (Guinn 2004). Bald eagle nests near the Project area are on average 5.7 miles apart (3.8 to 9.4 mile range), which is less than the average territory radius and suggests that the area is saturated with bald eagle nesting territories and that no new eagles are likely to move into the area. As eagles become more numerous, any eagles seeking to establish new territories in the Project area would need to select lower quality habitat and/or move into closer proximity to human activity.

Therefore, the Project is not likely to adversely affect bald eagles because the Mine and Plant Sites are more than two miles from any known nesting sites and do not provide optimal habitat for nesting and foraging bald eagles.⁵

Wood Turtle

The only known population of wood turtles in the Project area is downstream from the Mine Site. There is not suitable habitat for wood turtles at the Mine or Plant Sites and no individuals are known to occur, although given the proximity of the wood turtle in the area, individuals could potentially use the southern riparian fringe of the Mine Site. These fringe areas would not be permanently impacted by the Project and no wood turtles are currently known occur in the fringe areas that would be affected by temporary Project impacts; therefore, the Project should not have any direct effects on the wood turtle.

The Project would not result in any exceedances of surface water quality standards in the Upper Partridge River; therefore, there would be no significant Project-related changes to water quality

Position statements submitted by tribal cooperating agencies are footnoted as part of the process of documenting their differences of opinion with specific content and conclusions of the DEIS. See Section 1.6.1.

⁵ The tribal cooperating agencies disagree with this conclusion; impacts to bald eagles could result from eagle feeding sites within or adjacent to the project area. Contaminants from the mine site, specifically mercury and heavy metals, could effect prey species thus having secondary impacts on eagle reproduction.

and no indirect effects on downstream habitat where wood turtles are located (refer to Section 4.1.3 for a detailed discussion of Project effects on water quality). Changes in the Upper Partridge River that may affect the wood turtle include increased sedimentation and modifications in the flow regime. PolyMet would provide sedimentation ponds at the Mine Site outlet locations to manage suspended solids prior to discharge, which should be adequate to limit potential sedimentation effects. The predicted small decrease in Upper Partridge River flow during the active mining period is not likely to negatively affect the wood turtle. The most likely effect of a decrease in water level would be to expose additional nesting areas. Over the long term, the exposed soil on the lower bank would be overtaken by vegetation from the upper bank.

Therefore, the Project is not likely to adversely affect wood turtles because there would be no direct loss of individuals, populations, or suitable habitat and the Project would have no indirect effects on downstream habitat.⁶

Heather Vole

The heather vole has not been observed during field surveys within 10 miles of the Mine or Plant Sites or found in small mammal surveys in the region (Christian 1999; Jannett 1998) and is at the southern edge of its range. Approximately 1,479 acres of potentially suitable habitat (mixed pine-hardwood forest, Jack pine forest, and grassland/brushlands) exists at the Mine Site (Table 4.3-2), so the heather vole could be present, but if so, likely in very small numbers. The Project would impact much of the heather vole's potential habitat at the Mine Site (approximately 53 percent, Table 4.3-7), but given the lack of known occurrences of heather vole in the Project area, the habitat impacts are unlikely to jeopardize the presence of heather vole in Minnesota. Therefore, the Project is not likely to adversely affect heather voles.

Yellow Rail

The yellow rail was not found during surveys at the Mine Site and was not reported in the NHIS database within 10 miles of the Project. Small, scattered areas of its preferred habitat, wet meadow/sedge meadow, are present at the Mine Site, but the minimum nesting patch size used by rails (54 acres) (Goldade et al. 2002) exceeds the total amount of suitable habitat available (approximately 49 acres, refer to Section 4.2). Since the yellow rail was not detected in surveys and patches of its preferred habitat are smaller than the reported minimum patch size for nesting, it is not expected to occur at the Mine or Plant Sites. Therefore, the Project is not likely to adversely affect the yellow rail.

Position statements submitted by tribal cooperating agencies are footnoted as part of the process of documenting their differences of opinion with specific content and conclusions of the DEIS. See Section 1.6.1.

⁶ The tribal cooperating agencies have noted concerns in previous drafts of the EIS that the project may create attractive nesting sites where mining or heavy vehicle activity takes place. This could result in increased adult or nest mortality. The tribal cooperators do not see any new evidence or clear analysis to support the claim that the Project is not likely to adversely affect wood turtles.

Tiger Beetle

The lack of suitable habitat and any recorded observations in the Project area for the tiger beetle (*Cicindela denikei*) suggest that the species does not occur at the Mine or Plant Sites. Therefore, the Project should have no effect on the tiger beetle.

Species of Greatest Conservation Need

The Project would affect SGCN as a result of increased human activity, collisions with vehicular and rail traffic, and loss of habitat.

Increased Human Activity

Direct impacts due to increased human activity and consequent increases in trapping and hunting are unlikely because public access would be restricted. The USFS and PolyMet are currently exploring the feasibility of a land exchange, which would convert Project lands to private ownership and therefore be inaccessible for public use. PolyMet intends to propose private lands within the 1854 Ceded Territory. This analysis assumes completion of the land exchange. The main access road (Dunka Road) is privately owned and would remain gated to prevent non-mining access during mining operations and following Mine Closure.

During operations, increased human activity may frighten some species and discourage their use of otherwise suitable habitat. In general, suitable habitat is available in the Project area and most mobile wildlife species would be displaced. Following migration to new areas, individuals displaced from the Mine and Plant Sites may increase competition for resources in their new habitat; however, this is unlikely unless the new habitat is already at or above its carrying capacity. Displaced species may also suffer increased mortality due to foraging in new areas; however, this is unlikely because the habitat at the Mine Site is common to the region. Less mobile species, such as herptiles, would likely incur relatively high mortality rates since they cannot emigrate from the area as quickly and would be more susceptible to changing habitat conditions. During the winter a combination of plowing and sand, gravel, or salts (magnesium chloride) applications would be used to maintain passable roadways. The potential exists for sand and salts to accumulate in the trenches adjacent to the roadways affecting less mobile species; however, these areas would not be considered high quality habitat and the impacts to wildlife are not considered significant.

Vehicular and Rail Traffic Impacts

Vehicular and train traffic, primarily between the Mine and Plant Sites, is expected to average approximately 3,989 miles per day with travel speeds averaging between 15 and 45 mph, with trains, fuel, and waste/supply trucks traveling somewhat slower (Table 4.4-2). There is additional vehicular traffic totaling approximately 3,930 miles per day within the Mine Site itself (Table 4.4-3).

Traffic impacts from collisions with wildlife depend to a large extent upon micro-site features, traffic volume, traffic speed, and the species involved (Forman et al. 2003). Micro-site features

that increase the potential for road impacts are the presence of wildlife travel corridors across, and attractive habitat along, roads. The high density of wetlands at the Mine Site and the proposed retention of wetland “islands” among the haul roads may result in a relatively high rate of amphibian and reptile impacts. Shrub and trees near roadsides can increase road crossings by deer and birds.

Wildlife mortality generally increases with increasing traffic volumes and speed. In general, highly mobile species and habitat generalists are expected to have higher road mortalities. There is little research on the visual and noise effects of traffic on certain wildlife groups (e.g., invertebrates, reptiles, amphibians). Small passerine birds appear affected by noise at distances up to several hundred meters from a road, while other wildlife groups (e.g., mammals) appear less sensitive (Kaseloo and Tyson 2004). The barrier effect of roads is greater for small mammals, amphibians, and reptiles than for birds and large mammals (Kaseloo and Tyson 2004). Edge effects in the small preserved forest island remnants between haul roads at the Mine Site would be greatest for species that require large blocks of continuous habitat (i.e., “area sensitive” or “core habitat” species). In general, the indirect vehicular and rail traffic effects of the Proposed Action are expected to be locally significant for amphibian and reptile SGCN species at the Mine Site and along the road and railroad, but not significant at the scale of the Nashwauk and Laurentian Uplands or the Partridge River watershed.

Wildlife Habitat Impacts

The direct effect on wildlife habitat (and by inference on SGCN species) was assessed by evaluating the acres of habitat types that would be lost under the Proposed Action. The habitat type of these areas that would be disturbed was derived from the U.S. Geological Service (USGS) Level 3 Gap Analysis Program (GAP) GIS data and the 2006 mine features layers from the MnDNR Division of Lands & Minerals (Table 4.4-4).

Table 4.4-4 Direct Effects of the Proposed Action on Key Habitat Types

Key Habitat Types	Directly Affected at Mine Site (Acres)	Directly Affected at Plant Site (Acres)
Mature Upland Forest, Continuous Upland/Lowland Forest ¹	611	151
Open Ground, Bare Soils	0	946
Brush/Grassland, Early Successional Forest	245	55
Open Water	1	539
Wetland ²	597 ⁽³⁾	63 ⁽³⁾
Multiple Habitats	NA	NA
Total	1,454	1,754

Source: MnDNR 2009, *GAP Land Cover - Vector*

¹ Contains significantly reduced cover types Jack pine forest (84 acres) and Mixed pine-hardwood forest (460 acres). Lowland forest may include small areas of wetlands not reflected in the total wetland impact of the project.

² The Tailings Basin is not considered a jurisdictional wetland. However, this wetland provides low-quality habitat for open water and mud flat species.

³ Wetland acreage provided here is based solely on land cover mapping and therefore varies from the wetland acreage delineated for regulatory purposes as described in Section 4.2.

Mature Upland/Lowland Forest

Most of the Plant Site is developed or disturbed with only approximately 19 percent (842 acres) consisting of forest habitat (Table 4.3-1). Approximately 151 acres of this forest habitat at the Plant Site would be disturbed, most of which is in small or isolated patches of aspen-birch forest that are in poor to fair condition (MnDNR 2009, NHIS) and that do not represent any significantly reduced cover types. Therefore, the Project would have little effect on SGCN in mature upland/lowland forest habitat at the Plant Site.

At the Mine Site, approximately 611 acres (23 percent) of the upland and lowland forest would be lost as a result of the Project, including approximately 84 acres of Jack pine forest (Table 4.3-7), which, as indicated above, is considered a “significantly reduced cover type.” All of the SGCN species found in this mature forest habitat are birds (Table 4.4-1), which would be displaced, but likely not injured or killed, during mine construction and operation assuming construction does not occur during the breeding season when nest sites could be disturbed.

Reclamation of the Mine Site would include revegetating nearly all disturbed ground according to *Minnesota Rules*, part 6132.2700. At the Mine Site, red pine would be planted to reclaim approximately 792 acres of the Category 1, 2, and 3 stockpiles (Table 4.3-8), although woody

growth would be controlled on the tops and benches of the Category 3 stockpiles to prevent deep-rooted trees from penetrating the cap.⁷

Tree plantings would begin to resemble forest habitat types approximately 20 years following Closure. Natural succession may increase the Jack pine composition within the red pine restoration area. Because most of revegetation areas are contiguous with remaining upland/lowland forest, the resulting size of the continuous upland/lowland forest patch at the Mine Site would be restored to near pre-mine levels, which would restore much of the SGCN species habitat. However, it should be noted that a red pine monoculture would not mimic the natural plant community at the Mine Site.

Natural succession would also alter the 149 acres of removed stockpile areas at the Mine Site that would be re-vegetated with grasses and other herbaceous materials (Table 4.3-8). Initial colonization by lighter-seeded aspen, willows, and perhaps paper birch would begin at Year 20 following stockpile removal. Subsequent colonization and establishment by heavier-seeded tree species is likely to begin slowly and accelerate after Year 40 (20 years after Closure) when pole-sized aspen become established. At Year 60 (40 years after Closure), it is expected that the deciduous forest would contain a greater variety of tree species, possibly including Jack pine, paper birch, white spruce, and balsam fir. Natural succession would likely be slower in the Tailings Basin and in areas with compacted soils (such as reclaimed mining roads), perhaps taking 50 to 100 or more years in some locations.

Reclamation and re-vegetation of the Mine Site would improve wildlife habitat relative to conditions during mine operations; however, the quality of habitat for SGCN species is likely to remain degraded for some decades after Closure relative to pre-mining operations due to conversion of high-quality habitat to lower-quality habitat.

Open Ground/Bare Soils

The likelihood of SGCN species using open ground/bare soils at the Mine or Plant Sites is small. These areas were created by past mining activity, are generally of low-quality, and are expected to decrease after Mine Closure as a result of reclamation. Therefore, Project effects on open ground/bare ground habitat should result in little adverse impact on wildlife.

Brush/Grassland

Brush/grassland (including early successional forest) at the Mine and Plant Sites consists of small vegetative patches that are generally not attractive to SGCN species. Young trees (less than four inches dbh) make up most of this habitat type (ENSR 2005). One SGCN species associated with this habitat type was observed by USFS personnel at the Mine Site (American

Position statements submitted by tribal cooperating agencies are footnoted as part of the process of documenting their differences of opinion with specific content and conclusions of the DEIS. See Section 1.6.1.

⁷ The tribal cooperating agencies reiterate previous DEIS review statements that single species conifer plantations have little wildlife value.

Woodcock) and Least Weasel may occur as well. Most of the other SGCN species (Table 4.4-1) are associated with large patches of grassland and savanna habitats, which are not present at the Mine Site. Approximately 245 of the 293 total acres of brush/grassland at the Mine Site would be directly impacted by the Project. Approximately 55 of the 263 acres of brush/grassland at the Plant Site would be directly affected by the Project. Overall, the Project would have minor adverse effects on grassland/brush SGCN species.

Mine reclamation would create approximately 212 acres of seeded grassland. In addition, PolyMet would remove or cover portions of the existing road, railroad, and ditch and dike systems and restore them as well as the Tailings Basin with grass/herbaceous seeding, resulting in approximately 2,803 acres of grassland/shrub and wetland habitat at the Plant Site after Closure. Reclamation of these areas, which currently constitute poor wildlife habitat, would ultimately enhance wildlife habitat in comparison to current conditions. Some SGCN species, including Eastern Meadowlark, Northern Harrier, and Common Nighthawk would likely use the grasslands until they are replaced by early successional forest about 20 to 50 years after Closure, although these species are not common in the Iron Range. Early successional forests are likely to support two SGCN species: White-throated Sparrow and American Woodcock.

Open Water

Open water at the Project primarily occurs in the Tailings Basin. None of the targeted SGCN species were observed on open water during the survey (ENSR 2005); however, common waterfowl and water birds were observed at the Tailings Basin during migration, in particular Canada Geese and ducks. Much of this open water habitat at the Mine or Plant Sites would be impacted during mine operations. The open water of the Tailings Basin, however, is unlikely to provide valuable habitat because of the lack of emergent or submerged vegetation for feeding waterfowl, associated vegetated fringes, or upland nesting areas.

PolyMet would create approximately 278 acres of open water by eventually flooding the West Pit, which is estimated to fill in Year 65. Initially, water quality in the West Pit is predicted to exceed surface water standards for several parameters, but is expected to improve with time. The West Pit would be fenced as a deterrent to wildlife species and it should be noted that this habitat is not likely to provide high quality foraging habitat for waterfowl because of a lack of emergent or submerged vegetation along the pit fringes due to the steep pit walls.

Wetlands

This section focuses on Project effects on wildlife species that use wetland habitats; additional discussion on wetland conditions and impacts is presented in Section 4.2. Of the wetland-related SGCN, the marbled godwit and olive-sided flycatcher were surveyed for, but not found (ENSR 2005); the black duck, American bittern, and swamp sparrow are not likely to be present because they require non-forested wetlands and open water, which are relatively scarce on-site; the red-backed salamander is primarily an upland species, but may be present along the edges of mixed hardwood swamps; the bog copper was not found during surveys and there are no records of any sightings within 12 miles of the Mine Site; and the disa alpine butterfly may inhabit the black

spruce bogs of the Mine Site and is historically known to occur in the Laurentian and Nashwauk Uplands (MnDNR 2006, *Tomorrow's Habitat for the Wild and Rare*).

Based on the site-specific wetland delineation, the Project would impact approximately 1,522.1 acres of wetlands (853.9 acres of direct impacts and 667.9 acres of indirect impacts), primarily coniferous bog (661.7 acres of total impacts) and open bog (189.2 acres of total impacts) (Table 4.2-3). In addition, approximately 349.3 acres of wetlands may be indirectly impacted north of the Tailings Basin, for a total impact of 1,522.1 acres. Although on-site wetland use by the SGCN species described above may be limited, these wetlands are generally considered to be of high quality and provide valuable habitat to a wide range of wildlife species.⁸

Some 36,565 acres of wetland habitat exist in the Partridge River watershed surrounding the Mine Site. The wetland types affected at the Mine Site, primarily black spruce and open bogs, are common in the Partridge River watershed. Consequently the loss of this habitat at the Mine Site is expected to displace wildlife into surrounding similar habitat, which would be sufficiently large to absorb the displaced wildlife.

Wetland mitigation is proposed both on-site and off-site. Approximately 175 acres of shallow and deep marsh wetland creation is proposed for on-site mitigation. This is significantly less than the wetland acreage lost and would not replace in-kind the wetland habitat impacted (primarily coniferous and open bogs). Off-site mitigation would consist of 1,325.5 acres of wetland creation consisting of various habitat types at two sites and an additional 202.3 acres of upland buffer at both sites (Section 4.2.4). The proposed off-site mitigation would result in the creation of substantially different habitat types in a different eco-region and in a different watershed (e.g., outside the St. Louis River watershed) than that of the impacted wetlands at the Mine or Plant Sites.

The SGCN species most likely to be present at, and affected by, the Project (e.g., bog copper and disa alpine) may use the off-site mitigation areas, although these sites provide less coniferous bog and more of other wetland habitat types (e.g., sedge meadow, marsh, shrub-carr, and hardwood and coniferous swamp) than occur at Mine or Plant Sites. SGCN species that utilize shallow and deep marsh and open water habitats created at the Mine Site in the East and West Pits would likely benefit from on-site mitigation. These may include American bittern, swamp sparrow, and black duck, but their presence depends on the vegetation quality established after Closure.

Position statements submitted by tribal cooperating agencies are footnoted as part of the process of documenting their differences of opinion with specific content and conclusions of the DEIS. See Section 1.6.1.

⁸ The tribal cooperating agencies strongly disagree with the conclusions presented in the wetlands section. The methodology used to predict the acres of wetlands indirectly impacted by the project pit dewatering are not adequate to assess indirect wetland impacts.

Multiple Habitats

The species using multiple habitats and known to occur on or near the Mine Site (e.g., gray wolf, Canada lynx, least flycatcher) are discussed above. Most multiple-habitat SGCN species use mature/continuous and early successional forest. Project effects are therefore largely limited to the mature/continuous forest effects described above.

Regional Foresters Sensitive Species

The USFS manages 23 RFSS of wildlife in the Superior National Forest. Six of these species are ETSC species and are discussed above. Eleven of these species are also on the SGCN list and are discussed by habitat type above. The analysis of potential impacts to the remaining six RFSS of wildlife, which are not federally or state listed ETSC or SGCN species, are discussed below:

- The northern goshawk may be occasionally present at the Mine Site, since an active nest site has been identified approximately 0.75 mile west of the Mine Site. However, their preferred habitat (aspen forest) is common throughout the region and the nest site was not located at the Mine Site. Because the Project would not directly affect the known nest site area and alternative nesting and foraging habitat in the region is common, impacts to the northern goshawk population are expected to be minimal;
- The great gray owl may be occasionally present at the Mine Site, as a nest site has been seen in the area. However, since this nest was unsuccessful and subsequent owl calling surveys (ENSR 2005) found no owls, populations in the area are likely small and/or occasional. Owls are sensitive to disturbance, so populations would be unlikely to use the Mine Site during mine operations. Because populations are thought to be low, impacts to the great gray owl populations are expected to be minimal;
- Systematic survey data for three-toed woodpeckers are lacking, however, one bird was observed during field surveys (ENSR 2000) and by USFS personnel in 2007. Generally, the young age of the forest habitat at the Mine Site is not suitable for three-toed woodpeckers and populations or individuals in the area are not likely to occur. Woodpeckers are sensitive to disturbance and would not be expected to use the Mine Site during mining operations. Because populations are expected to be low, impacts to the three-toed woodpecker populations are expected to be minimal;
- Survey data are lacking, but the red-disked alpine butterfly's acidic open bog habitat is present in the Mine Site. Since 189 acres of this habitat present at the Mine Site would be disturbed by the Project, impacts to this species may occur. This species, however, is not an ETSC or SGCN species and is globally secure; therefore, the Project is unlikely to jeopardize the existence of this species;
- Although the *jutta arctica* has not been found at the Mine Site, this butterfly's preferred spruce bog habitat is present on the Mine Site and 661 acres would be impacted. If this species is present at the Mine Site, it would incur impacts. This species, however, is not an ETSC or SGCN species and is globally secure; therefore, the Project is unlikely to jeopardize the existence of this species; and

- The Quebec emerald dragonfly inhabits poor fens, a wetland type not found at the Mine Site but similar to the wet meadow/sedge meadow that is present. Approximately 45.8 of the existing 49 acres of wet meadow/sedge meadow at the Mine Site would be affected by mining activities. The presence of the Quebec emerald in the region and the existence of similar habitat at the Mine Site suggest that this species may be impacted by the Project. However, there has only been one documented occurrence of this species in Minnesota (Lake County 2006); therefore, the likelihood of observing Quebec emerald individuals or populations within the vicinity of the Mine Site are low. This species, however, is not considered an ETSC or SGCN species and, therefore, the Project is unlikely to jeopardize the existence of this species.

4.4.3.2 No Action Alternative

The No Action Alternative would likely have a neutral to slightly positive effect on wildlife. The LTVSMC Plant Site reclamation would proceed as planned under the previous closure agreement including revegetation of open ground and disturbed soil, removal of buildings, and revegetation of the Tailings Basin. The Mine Site, which is primarily young forest, would continue to mature, except where it is logged, which would benefit the majority of the federal and state-listed ETSC and SGCN species and RFSS species found or likely to occur at the Mine and Plant Sites that prefer mature forest habitat.

4.4.3.3 Mine Site Alternative

The impacts of the Mine Site Alternative would be comparable to the Proposed Action, except that the long-term Category 4 waste rock and lean ore stockpiles would be eliminated, thereby reducing the total areal footprint of the stockpiles at Closure by approximately 33 acres. This alternative would reduce the impacts primarily to Jack pine forest and mixed hardwood swamps and retain these areas for resident wildlife species.

4.4.3.4 Tailings Basin Alternative

The Tailings Basin alternative would reduce the indirect wetland impacts north of the Tailings Basin from approximately 349 acres to zero acres through capture of the seepage from the north toe of the Tailings Basin (see Section 4.2.3.4); however, some of the seepage would be redirected to the Partridge River although no adverse habitat effects are anticipated. This alternative would also involve the construction of an 8.4-mile water discharge pipeline from the Tailings Basin to the Partridge River downstream of Colby Lake. Construction of the pipeline would impact approximately 50.6 acres of wildlife habitat through clearing and routine maintenance associated with the expanded berm. While portions of the pipeline ROW are already maintained, clearing and maintenance would convert some upland forests to grassland/shrublands habitats and reduce habitat availability for forest-dwelling species. These impacts would not be expected to be significant as they occur along existing disturbed areas and would not result in additional habitat fragmentation.

There are no ETSC species known to occur within the existing Tailings Basin and the Minnesota NHIS did not identify any ETSC species occurring within, or adjacent to, the proposed discharge

pipeline corridor; therefore, it is unlikely that the Tailings Basin Alternative would impact ETSC species.

4.4.3.5 Other Mitigation Measures

As discussed above, there is the potential for wildlife mortality resulting from vehicle collisions, particularly to amphibians and reptiles at the Mine Site, due to the pocket wetlands between the haul roads. The risk of vehicle collisions with wildlife could be reduced by controlling vehicular speeds, educating drivers using Dunka Road about the potential for collisions, and other similar prevention and avoidance techniques.

PolyMet proposes to reclaim disturbed areas as part of Closure primarily with a combination of red pine and herbaceous planting that includes invasive, non-native species. Although rapid stabilization of these disturbed areas is a priority, there may be opportunities to enhance wildlife habitat using alternative revegetation measures. The recommended mitigation measures include planting a broader mix of native conifers and other native trees, shrubs, forbs, and grasses, which would result in a more diverse and better quality wildlife habitat at an earlier stage of forest succession. In addition to red pine, other appropriate species to plant could include Jack pine, white pine, red fescue, Canada goldenrod, and other native plants that have proven successful in mine land reclamation projects in the Laurentian Mixed Forest Province. Patches of forest with non-forested openings provide ideal habitat for white-tailed deer, a major wolf food in the Arrowhead Region. The Canada lynx would benefit from a focus on conifer species that would provide winter habitat for snowshoe hare, the lynx's preferred food.

At Closure, the surface of haul roads and other infrastructure would be scarified and vegetatively stabilized; however, they would continue to potentially provide access to this area. Limiting off-road vehicles and foot traffic by no trespassing signage, and installing gates, rock barriers, or berms at likely entry points to the Mine Site would reduce human intrusion, enhance habitat restoration, and promote wildlife use.

The following potential mitigation measures may also benefit wildlife:

- Monitoring of Waste Rock Stockpiles and Tailing Basin – would help ensure that water quality would meet state standards and not adversely affect wildlife at the Mine Site; and
- Habitat improvements to the West Pit –the West Pit overflow is currently predicted to exceed water quality standards for several parameters (see Section 4.1.3); however, multiple mitigation measures are available which should improve water quality in the West Pit. This improvement in water quality may indirectly benefit some waterfowl species, but for the reasons described above (i.e., steep wall, lack of nearshore vegetation) it is unlikely that the West Pit would provide significant foraging habitat.

4.4.4 Cumulative Effects

Cumulative effects on wildlife may include the loss or fragmentation of habitat and encroachments into critical wildlife travel corridors. These impacts were assessed by evaluating

the effects of the Project with other past, present, and reasonably foreseeable future federal, state, tribal, and private actions.

4.4.4.1 Loss and Fragmentation of Wildlife Habitat

The study area for loss and fragmentation of habitat is the 12.5 million acre Arrowhead Region consisting of eight ecological subsections. The Project is located in the 810,000 acre Nashwauk Uplands (Plant Site) and the 567,000 acre Laurentian Uplands (Mine Site) subsections. The extent of habitat loss and fragmentation in the Arrowhead Region was analyzed semi-quantitatively using:

- Minnesota's Comprehensive Wildlife Conservation Strategy (MCWCS);
- Marschner's Original Pre-settlement Vegetation Map of Minnesota as interpreted and analyzed by researchers, the Minnesota Forest Resources Council, and at the subsection level in the MCWCS approach by the MnDNR;
- Scientific literature and reports (e.g., Minnesota Generic Environmental Impact Study [MnGEIS] on Timber Harvest, University of Minnesota researchers, Minnesota Forest Resources Council);
- Reports on mining, infrastructure, and forestry impacts (e.g., Emmons and Olivier 2006; Barr 2009, Cumulative Effects Analysis of Wildlife Habitat and Threatened and Endangered Wildlife Species; Superior National Forest Management Plan Revision Final Environmental Impact Statement (USFS 2004b); state and county timber harvest data); and
- GIS land cover and ecological data (e.g., GAP Level 3 landcover data) and summaries of GIS land cover and ecological data in the MnGEIS on Timber Harvest, by the Minnesota Forest Resources Council as part of the MCWCS approach.

The MCWCS is a central component of MnDNR's strategy for managing wildlife populations in the state; use of the MCWCS is therefore appropriate as the basis for assessing cumulative effects on wildlife habitat loss and fragmentation for the Project.

4.4.4.2 Past and Current Habitat and Wildlife Trends

Two periods of changes in forest composition were evaluated – the 1890s to 1990s and 1977 to 1990, as indicative of past and relatively current trends in wildlife habitat, respectively.

Forest changes from the 1890s to the 1990s are indicative of past wildlife habitat trends. The MCWCS approach uses Marschner pre-settlement mapping as a baseline for describing changes taking place in vegetation types/ecosystems since the 1800s, using recent land cover data from the Minnesota GAP Landcover data and reported by ecological subsection (MnDNR 2006, *Tomorrow's Habitat for the Wild and Rare*). The effects on wildlife were evaluated by noting the change in amount of each Marschner habitat type in terms of the effect on wildlife species which use that habitat type. Wildlife habitats that decreased in acreage from pre-settlement to

current conditions present a higher risk of future SGCN population decreases and are in greater need of conservation in Minnesota.

The changes in habitat types in the Nashwauk and Laurentian Upland subsections from the 1890s to 1990s are presented in Table 4.4-6. These data indicate a significant decrease occurred from the 1890s to 1990s in red-white pine forest and mixed pine-hardwood forest in the Nashwauk Uplands, and in Jack pine woodland in the Laurentian Uplands. At the Mine Site, there is little red-white pine forest; about 1,003 acres of mixed pine-hardwood forest (but it is in the Laurentian rather than the Nashwauk uplands); and 183 acres of Jack pine forest (in the Laurentian Uplands). Although much of the Mine Site is classified as “Mature Upland Forest” by MnDNR definition (> five inch dbh), in fact most of this forest is still relatively young.

Table 4.4-6 Change in Habitat Types in the Nashwauk and Laurentian Upland Subsections from the 1890s to 1990s

Habitat Type	Nashwauk Uplands Subsection (Plant Site and Tailings Basin)		Laurentian Uplands Subsection (Mine Site)	
	% of Subsection Land Surface in 1890s	% of Subsection Land Surface in 1990s	% of Subsection Land Surface in 1890s	% of Subsection Land Surface in 1990s
Aspen Forest (Upland Deciduous Forest)	32.5	32.0	34.6	36.1
Lowland Conifer Forest/Shrubland	25.2	21.3	28.2	35.3
Jack Pine Woodland (Upland Shrub/Woodland)	10.5	19.4	19.4	4.7
Red-White Pine Forest (Upland Conifer Forest)	17.9	9.9	13.2	17.4
Mixed Pine-Hardwood Forest (Upland Deciduous Forest)	7.1	1.7	0.0 ⁽¹⁾	0.3
Grassland	N/A ⁽²⁾	5.2	N/A	0.5
Open Water ³	6.3	6.1	N/A	4.3
Lowland Deciduous Forest	0.0	1.7	0.0	0.3
Wetland – Nonforest	0.6	0.9	0.0	0.1
Cropland	N/A	1.2	N/A	0.0
Developed	N/A	0.7	N/A	0.0

Source: MnDNR 2006, *Tomorrow's Habitat for the Wild and Rare*

Note: Not all columns total to 100 percent due to rounding and small variations in data availability as described below.

¹ 0.0 indicates less than 0.05 percent coverage

² N/A indicates that insufficient data was available to determine percent coverage within the subsections, although these habitat types likely occurred at very low levels

³ Open water includes deep and shallow lake habitat. Insufficient data was available to determine the size of river habitats.

Other data for northeastern Minnesota (MFRC 1999) also show that conifer species (e.g., tamarack, white pine, Jack pine, red pine, spruce) and birch abundance declined significantly, while other deciduous (e.g., aspen/cottonwood, sugar maple/maple, ash, balm-of-Gilead) and fir trees increased from the late 1890s to the 1990s. At the time of European settlement, forest patches were typically large and dominated by a few species with white pine common in most forests (Friedman et al. 2005). In the majority of the region, forest communities have shifted from pine and tamarack as consistent co-dominants with other tree species, to aspen as a

consistent co-dominant with other tree species (Jaakko Poyry Consulting Inc. 1994; Friedman et al. 2005). Further, research indicates that current mature forest represents only about 4.4 percent of the old growth acreage that existed in the 1800s (Jaakko Poyry Consulting Inc. 1994).⁹

Current trends in habitat and wildlife are indicated by 1977 to 1990 forest changes. Forest harvesting data circa 1990 indicate overharvesting of some cover types (e.g., aspen and Jack pine) in northeast Minnesota, although overall harvesting was less than the net growth of forests (MFRC 1999; Jaakko Poyry Consulting Inc. 1994). The USFS data (1977-1990) show significant increases in elm-ash-soft maple, tamarack, northern white-cedar, red-white pine, and maple-basswood forest. Spruce-balsam fir, black spruce, Jack pine, and aspen-birch forests declined significantly. Some forest types (e.g., tamarack) that are currently increasing include species that decreased in abundance during the last century.

In general, land use in the Arrowhead Region over the past century has reduced the conifer component, size, age, and diversity of forests. The greatest impact has been to Jack pine, red-white pine, and mixed pine-hardwood forests. Reasons for the change include past timber harvesting, catastrophic wildfire, fire suppression, and current timber harvesting practices.

Although there have been changes in forest composition, the Minnesota Forest Resources Council (MFRC 1999; MFRC 2003) concluded that the extent of current forest cover in northeastern Minnesota is approximately the same size as it was in the late 1800s. The Mesabi Iron Range is the largest developed area in northeast Minnesota, followed by Duluth and other smaller towns (MFRC 1999). Agricultural use is minimal. Developed land (including mined lands), cropland, and pasture total 11 percent of the Nashwauk Uplands and 1 percent of the Laurentian Uplands. The balance is forest (54 percent and 79 percent, respectively), wetlands, and open water. The majority of forest land in northeast Minnesota is public (MFRC 1999), including reserved forests in the BWCAW, Voyageurs National Park, and state parks. Private forest ownership is shifting from farmers and industry to private individuals, especially near lakes.

Wildlife in northeast Minnesota is affected by habitat changes. Lane, Carr, and Perry (Lane et al. 2003) concluded that past management practices produced a landscape pattern that contains less habitat for species needing large habitat patches such as ovenbirds, and poorer quality habitat for species requiring older and more diverse forest vegetation such as northern goshawks. The MFRC (MFRC 1999) evaluated 1977 to 1998 MnDNR data and concluded that some wildlife populations (e.g., otter, fisher, marten) have increased over that period, while some were stable or within normal cyclical patterns (e.g., bobcat, ruffed grouse).

Position statements submitted by tribal cooperating agencies are footnoted as part of the process of documenting their differences of opinion with specific content and conclusions of the DEIS. See Section 1.6.1.

⁹ The tribal cooperating agencies consider the loss of mature forest a significant impact, and note that the activities on the mine site will prevent more forest acreage from reaching this mature community state, representing a nearly permanent loss of habitat.

These studies generally suggest that Minnesota's forests are recovering from poor harvesting practices of a century ago and that wildlife is responding accordingly. The total amount of forest cover has returned to 1890 levels and the conifer component has recently increased, although not all conifer types have recovered (e.g., Jack pine). As a result, wildlife species that depend on forest cover with a conifer component were harmed by past forest changes but are favored by recent forest changes in the Arrowhead Region. Wildlife species that require mature to old forests or large forest patches were harmed by past forest changes, but may benefit from recent forest changes.

4.4.4.3 Future Wildlife Habitat Trends

An assessment of future cumulative impacts through 2014 from forestry, and for an unstated near-term period from mining and non-mining development, was completed for the 12.5 million acre Arrowhead Region (Emmons and Olivier Resources Inc. 2006). This study estimated a loss of approximately 8,727 acres of wildlife habitat in the Arrowhead Region, representing approximately 0.1 percent of regional wildlife habitat. Forestry accounted for approximately 84 percent, mining 10 percent, and non-mining development 6 percent of these wildlife habitat losses (Emmons and Olivier Resources Inc. 2006).

A subsequent study for the Keetac Expansion Project (Barr 2009, *Cumulative Effects Analysis of Wildlife Habitat and Threatened and Endangered Wildlife Species*) expanded on the 2006 Emmons and Olivier Wildlife Corridor and Habitat analysis and quantified the habitat impacts from reasonably foreseeable mining and urban/development projects along the Iron Range. The 2009 Barr study differentiated between "High Impact" and "Moderate Impact" features as related to mining and other urban/development. "High impact" features create physically impenetrable barriers to wildlife including mining pits, in-pit activities, and hardscape such as operations plants and buildings. "Moderate impact" features are areas that experience a change in topography, community structure, diversity, and function but would not be physically impenetrable for many species such as stockpiles, Tailings Basins, borrow areas, settling ponds, and haul roads. Moderate impact areas may naturalize and revegetate over time (Barr 2009, *Cumulative Effects Analysis of Wildlife Habitat and Threatened and Endangered Wildlife Species*). The total loss of wildlife habitats due to these development projects are described in Table 4.4-7.

Table 4.4-7 Losses of Wildlife Habitat in the Iron Range Due to Reasonably Foreseeable Urban Development and Mining

Habitat Type	Future Losses due to Urban/Developed ¹		Future Losses due to Mining		Total Future Losses due to Urban/ Developed & Mining			
	Acres in the Iron Range	Percent of Iron Range	Acres (High/Moderate)	Percent of Habitat Type ² (High/Moderate)	Acres (High/Moderate)	Percent of Habitat Type ² (High/Moderate)	Acres (High/Moderate)	Percent of Habitat Type (High/Moderate)
Open Wetland	6,731	0.7	0.0/50.5	0.0/0.8	7.8/166.8	0.1/2.5	7.8/217.3	0.8/3.2
Lowland Deciduous	17,651	1.7	0.0/0.0	0.0/0.0	73.8/ 485.9	0.4/2.8	73.8/ 485.9	0.4/2.8
Lowland Conifer/Shrubland	187,864	18.7	0.0/278.0	0.0/0.2	381.3/ 3,922.7	0.2/2.1	381.3/ 4,200.7	0.2/2.2
Upland Conifer	67,950	6.8	0.0/48.3	0.0/0.1	257.1/ 2,877.5	0.4/4.2	257.1/ 2,925.8	0.4/4.3
Upland Deciduous (Aspen/Birch)	277,692	27.7	0.0/690.4	0.0/0.3	2,259.2/ 10,923	0.8/3.9	2,259.2/ 11,613.4	0.8/4.2
Upland Deciduous (Hardwoods)	28,680	2.9	0.0/27.4	0.0/0.1	769.8/ 1,099	2.7/3.8	769.8/ 1,126.4	2.7/4.0
Upland Shrub/Woodland	101,459	10.1	0.0/91.1	0.0/0.1	930.3/ 5,326.8	0.9/5.3	930.3/ 5,417.9	0.9/5.3
Water	56,604	5.6	0.0/10.7	0.0/0.0	102.1/ 1,771.2	0.2/3.1	102.1/ 1,718.9	0.2/3.2
Cropland	21,914	2.2	0.0/0.0	0.0/0.0	12.8/ 104.4	0.1/0.5	12.8/104.4	0.1/0.5
Grassland	64,931	6.5	0.0/15.4	0.0/0.0	337.2/ 1,531.7	0.5/2.4	337.2/ 1,546.7	0.5/2.4
Subtotal Vegetated Habitat	831,476	82.9	0.0/ 1,211.4	0.0/0.2	5,131.4/ 28,209	0.6/3.4	5,131.4/ 29,420.4	0.6/3.5
Urban/Developed	55,440	5.5	0.0/230.5	0.0/0.4	986/ 3,074.2	0.8/5.6	986.0/ 3,304.7	1.7/6.0
Mining-High ³	37,157	3.7	N/A	N/A	N/A	N/A	N/A	N/A
Mining-Moderate ³	78,626	7.8	N/A	N/A	N/A	N/A	N/A	N/A
Total	1,002,699	100	0.0/ 1,441.9	0.0/0.1	6,117.4/ 31,283.2	0.6/3.1	6,117.4/ 32,725.1	0.6/3.3

Source: Barr 2009, *Cumulative Effects Analysis of Wildlife Habitat and Threatened and Endangered Wildlife Species*

¹ Urban/Developed Projects are limited to Minnesota Syl Laksin Energy Center, the only reasonably foreseeable non-mining project identified in Barr 2009 (the Hoyt Lakes to Babbitt Connection project has been cancelled).

² For percent of habitat type, 0.0 includes occurrences less than 0.01 percent.

³ The area covered by existing mining features is provided to complete the data set; however, was not included in calculations for future habitat loss in the Barr 2009 study.

The future impact of forestry practices on wildlife habitat in the seven Arrowhead counties (Aitkin, Carlton, Cook, Itasca, Koochiching, Lake, and St. Louis) was estimated over the next 20 years for this DEIS using data from the Superior National Forest Revised Management Plan (USDA Forest Service 2004a; USDA Forest Service 2004b); the MnDNR (2006) timber sale database; St. Louis County timber harvest plans; and MnDNR estimates of private forest harvests (Miles 2007; Pro-West and Associates 2007). From these sources it is estimated that future timber harvest due to government and private actions may annually affect about 42,000 acres (0.9 percent) of the nearly 4.5 million acres of timberland in the 12.5 million acres constituting the Arrowhead counties.

Logging temporarily changes wildlife habitat by reducing the acreage of mature forest. Timber harvesting trends are shifting to more longer-rotation harvests that promote the regeneration of

conifers. If this trend continues, the acreage of late-successional forest would increase, especially in spruce-fir and mixed conifer-deciduous stands (Mehta et al. 2003).

Cumulative impacts from historic, current, and reasonably foreseeable future mining activities in the Mesabi Iron Range are estimated to be 153,184 acres. Existing mine features (already disturbed wildlife habitat) cover 115,783 acres. These features include ore mines that were in operation before permitting requirements were established by the State, as well as past and currently permitted taconite mines. Future losses of existing vegetative cover types due to reasonably foreseeable future mining projects (Barr 2009, *Cumulative Effects Analysis of Wildlife Habitat and Threatened and Endangered Wildlife Species*) on both public and private lands in the Mesabi Iron Range (high and moderate impacts) total approximately 37,401 acres (Table 4.4-7). This estimate differs from the Emmons and Olivier 2006 data because the Barr Engineering data includes additional reasonably foreseeable projects developed since the EOR study was published in 2006. The primary habitat impacts would be to upland conifer, shrub/woodlands, and croplands habitats with grasslands, open wetlands, existing urban/developed land, upland deciduous and conifer-deciduous habitats, and lowland forests/shrublands affected to a lesser extent. The grasslands are unlikely to be native prairie, but rather non-native hay meadows, pastures, and reclaimed mine sites.

4.4.4.4 Conclusions

Assuming a harvest level of approximately 42,000 acres annually in northeast Minnesota, the wildlife habitat affected by forestry over 20 years (the life of the NorthMet Project) would be about 840,000 acres. This level of harvest and the trend towards longer-rotation harvests and larger harvest units would slowly increase the conifer component and the age of forests in northeast Minnesota. Forest diversity and forest patch size may increase depending on ownership. These trends would benefit wildlife that depend on mature forest, forests with conifers, and large forest patches such as bald eagle, Canada lynx, Connecticut Warbler, gray wolf, Least Flycatcher, and Northern Goshawk. As noted above, habitat for this type of wildlife had been reduced by forestry practices since 1890. The proposed mining projects would affect an additional 31,000 acres over approximately the same period.

In total, approximately 871,000 of forest land could be impacted over the projected 20 year term of the Project by forestry (96 percent) and mining (4 percent). It should be noted that forestry impacts are short-term land conversions and the affected areas still provide habitat that can support nearly continuous wildlife use, although for different species, while it recovers through natural forest succession. Mining impacts, on the other hand, represent a total habitat loss (i.e., wildlife use is essentially eliminated in the affected area for the duration of mine operations) that has a longer duration and slower recovery (e.g., the lack of nutrients and organic material in the soils would slow forest succession). It is assumed that all existing and future mining projects would be required to revegetate disturbed areas as part of their closure plans. Over time, the extent of the area affected by mining should decrease as revegetation and forest succession occur.

In terms of effects on wildlife, forestry and mining would primarily impact species requiring large habitat patches. Current trends in forestry practices favoring longer rotation harvest would incrementally benefit species that require older and more diverse (e.g., larger conifer component)

forest, but even with this trend, relatively little forest would reach “maturity.” Mining contributes to habitat loss in some cover types that have declined historically (e.g., upland conifer, upland conifer-deciduous), but these habitat types are gradually increasing with current harvesting levels and practices. Mining may have some positive effects on wildlife by offsetting the loss of non-forested habitats (e.g., abandoned farms converting to forest) with the creation of grasslands as part of Mine Closure. This benefit, however, is only temporary as these areas will eventually become forested as a result of natural succession.

4.4.5 Wildlife Travel Corridors

4.4.5.1 Approach

The minerals present in the Mesabi Iron Range have been and will likely continue to be mined. The potential for relatively continuous mining operations and/or habitat loss along the Iron Range could pose a barrier for wildlife movement. Wildlife populations move less frequently between habitat patches when passage is blocked by mining operations, roads, and urban development. This may lead to increased population and genetic isolation and decreased meta-population dynamics, which in turn can lead to decreases in overall population stability and persistence. Two studies have examined the potential cumulative effects of mining operations on wildlife movement along the Iron Range: Emmons and Olivier (Emmons and Olivier Resources Inc. 2006) and Barr (Barr 2009, *Cumulative Effects Analysis of Wildlife Habitat and Threatened and Endangered Wildlife Species*). The conclusions in the analysis in this DEIS are based on Emmons and Olivier (Emmons and Olivier Resources Inc. 2006) and supplemented with additional findings from Barr Engineering (Barr 2009, *Cumulative Effects Analysis of Wildlife Habitat and Threatened and Endangered Wildlife Species*).

Emmons and Olivier (Emmons and Olivier Resources Inc. 2006) completed a wildlife corridor analysis for moose, deer, bear, and other large mammals in a 15-mile-wide zone along the approximately 115-mile-long Mesabi Iron Range. The study identified 13 major wildlife travel corridors connecting large roadless blocks along the Iron Range and the loss of any were considered significant. These corridors ranged from less than 0.1 mile to over 3.2 miles wide, with a total combined length of 20.2 miles. Barr Engineering (Barr 2009, *Cumulative Effects Analysis of Wildlife Habitat and Threatened and Endangered Wildlife Species*) also analyzed wildlife corridors along the Mesabi Iron Range identifying 5 additional corridors (for a total of 18) along the same extent and differentiating between mine features that precluded wildlife movement (high impact features) and mine features that were still passable and would potentially revegetate over time (moderate impact features) (Figure 4.4-1).

Emmons and Olivier may have underestimated the number of corridors by treating all historic mining features as impediments to travel and not accounting for closed mines, revegetation, and natural succession. Historic mining impacts may range from relatively small, gently-sloped spoil piles and ore mine pits less than 50 feet deep (no to slight impediment), to large, steep-sided taconite pits that may be up to several hundred feet deep (large impediment). The EOR analysis, therefore, represents a conservative estimate of the number and size of remaining wildlife travel corridors in the Iron Range.

Impacts to the wildlife travel corridors were classified as: 1) direct loss of habitat inside the corridor; 2) fragmentation of habitat inside the corridor; 3) isolation of a corridor by the creation of a barrier inside or near its termini; and 4) direct loss or fragmentation of large habitat blocks outside the corridor. These large habitat blocks are the presumed destinations of animals using the corridors; if they disappear, it is assumed that there would be fewer large mammals in the vicinity that would use the corridors.

This analysis included the following projects that could potentially represent barriers to wildlife travel. The corridors are identified as described in Emmons and Olivier (Emmons and Olivier Resources Inc. 2006):

- Essar Steel Minnesota DRI, Steel Plant and Connected Actions (Corridors 2, 3, 4);
- US Steel Keewatin Taconite Mine and Plant (Corridor 4);
- Mittal Minorca East Reserve/Inspat Inland (Corridor 8);
- NorthMet Mine, Tailings Basin, and Railroad Spur (Corridors 11, 12);
- Peter Mitchell Mine Pits Expansion (Corridors 12, 13);
- Mesabi Nuggett Phases I and II (Corridor 10);
- Mesaba Energy Power Generation Station (Corridors 2, 10); and
- Cliffs Erie Railroad Pellet Transfer Facility (Corridor 10).

4.4.5.2 Wildlife Corridor Impacts by the NorthMet Project

Of the 13 wildlife corridors identified by Emmons and Olivier (Emmons and Olivier Resources Inc. 2006), Corridors 11 and 12 are in the vicinity of the Mine or Plant Sites. These corridors are identified as Corridors 16 and 17 by Barr Engineering (Barr 2009, *Cumulative Effects Analysis of Wildlife Habitat and Threatened and Endangered Wildlife Species*).

Corridor 11 (16) is located southeast of the existing Plant Site (Figure 4.4-1). The existing LTVSMC Tailings Basin provides poor habitat, is not likely to be heavily used by wildlife, and currently obstructs animal movement. Because current use is already limited, increased activity at the Tailings Basin would have minimal impact on wildlife movement through the corridor. The proposed vegetative restoration of the Tailings Basin and adjacent processing plant at Closure may increase the value of the corridor by improving habitat to the northwest. The mining features surrounding this corridor are considered to be moderate impact features that would not be complete barriers to wildlife movement (Barr 2009, *Cumulative Effects Analysis of Wildlife Habitat and Threatened and Endangered Wildlife Species*). No high impact features would be constructed such that wildlife movement through the corridor would be prevented.

Corridor 12 (17) is located approximately 0.5 mile northwest of the Mine Site. Operations at the Mine Site would indirectly impact the corridor by reducing the size of, and acting as a source of

noise and activity near, the large habitat block southeast of the corridor. These activities would limit access to the corridor in the vicinity of the Mine Site; however, the corridor would continue to be accessible north of the Mine Site and from south and southwest of the corridor. Vegetative restoration of the stockpiles and disturbed areas, as proposed during Closure, would mitigate some of the effects of habitat loss in this large habitat block in the long term. Not all the Mine Site would be available for habitat restoration due to fencing around the mine pits and the open water in the West Pit.

Rail and vehicular traffic between the Mine and Plant Sites would increase as a result of the Project. This NorthMet transportation corridor is outside of Wildlife Corridors 11 (16) and 12 (17); however, it runs parallel to the corridors and would potentially impact wildlife use, although the impact would be minimal.

In summary, the Project would have negligible effects on Corridor 11 (16), and would eventually enhance this corridor after the completion of Tailings Basin restoration. Although the Project would not physically encroach into Corridor 12 (17), mining operations could generate sufficient activity and noise to discourage wildlife use of this corridor during mine operations. Long term effects Post-Closure are not expected to be significant.¹⁰

4.4.5.3 Wildlife Corridor Impacts by Other Projects

The other reasonably foreseeable projects are anticipated to affect nine of the 13 wildlife travel corridors (Table 4.4-9) identified by Emmons and Olivier (Emmons and Olivier Resources Inc. 2006). These effects may include blocking or encroachment into the mapped wildlife corridors, affecting adjacent habitat that may make the corridor less valuable, and increasing traffic along new or existing roads through the corridor. These impacts range from the possible complete loss of Corridors 3, 5 and 13 (Barr Engineering Corridors 3, 6, and 18) depending upon final extent of mining activities; to minor fragmentation within Corridor 2 (Barr Engineering Corridors 2); and habitat loss near Corridors 4, 6, 8, 10, and 12 (Barr Engineering Corridors 4, 8, 11, 14, and 17). Barr Engineering (Barr 2009, *Cumulative Effects Analysis of Wildlife Habitat and Threatened and Endangered Wildlife Species*) also identified two additional corridors (Corridors 5 and 9) that would be lost, while Corridor 15 would incur minimal impacts. These impacts should be considered significant; however, relative to the impacts from these other reasonably foreseeable projects, the contribution of the NorthMet project to cumulative effects on wildlife corridors would be minor.

Position statements submitted by tribal cooperating agencies are footnoted as part of the process of documenting their differences of opinion with specific content and conclusions of the DEIS. See Section 1.6.1.

¹⁰ The tribal cooperating agencies' position is that Corridor 11 is currently a poor and obstructed corridor pending the long term success of a proposed revegetation corridor, and #12 will likely be degraded as a corridor by the Project; these impacts should be considered significant.

Table 4.4-9 Cumulative Effects to Wildlife Travel Corridors in the Mesabi Iron Range

Wildlife Travel Corridor ¹	Original EOR Identified Impacts to Corridors		Additional Identified Impacts to Corridors		
	Type of Impact	Project	Type of Impact	Project	Impact
1 (1)	Minimal Isolation	Urban Development	None		
2 (2)	Isolation	Highway Traffic	Fragmentation and Isolation	MN Steel Connected Action	Nashwauk-Blackberry Gas Pipeline (underground with grass cover) passes through this forested corridor from north to south; rail spur traffic crosses NE of corridor
3 (3)	Direct Loss	Mining/ Urban Development	Direct Loss	MN Steel mine pits and stockpiles	East half and least fragmented part of corridor largely removed
4 (4)	Isolation	Mining / Highway Traffic	Direct Loss	MN Steel Tailings Basin/ Keewatin	Habitat loss to NE and SE of corridor
NA (5)	NA	NA	Direct Loss	Hibbtac Project	Loss of low quality corridor
5 (6)	Fragmentation	Highway Traffic/ Urban Development	Direct Loss	US Steel/ Hibbing Taconite Co.	Mining operations nearly block northern extent and west third of corridor
NA (7)	NA	NA	None		
6 (8)	Isolation	Highway Traffic	Direct Loss	US Steel Minntac	Mine and Tailings Basin may have small effect on habitat to NE of corridor
NA (9)	NA	NA	Direct Loss	Minntac expansion	Mine pit expansion will eliminate eastern end of corridor
7 (10)	Minimal Impact	Urban Development	None		
8 (11)	Isolation	Mining	Direct Loss	Mittal Steel East Reserve	East Reserve pit prevents access between north and south blocks of the corridor.
NA (12)	NA	NA	None		
9 (13)	Minimal Impact	Urban Development	None		
10 (14)	Minimal Impact	Mining/ Urban Development	Minimal Impact	Cliffs-Erie RR Pellet Transfer Facility/ Erie Mining	RR transfer facility overlaps with prior impacts, no additional habitat or corridor loss. Likely increase in traffic/noise.
NA (15)	NA	NA	Minimal Impact	Mesabi Nugget	Expansion of west mine pit will reduce corridor width, but not eliminate use
11 (16)	Minimal Impact	Urban Development	None		
12 (17)	No Impact		Direct Loss and Fragmentation	NorthMet mine area/ Northshore mine	Mine area reduces habitat to southeast of corridor (<1000 acres). The Project would not physically encroach into the corridor, but mine operations could discourage use during mine operations.
13 (18)	No Impact		Direct Loss	Northshore Peter Mitchell	Possible expansion eastward may block or fragment Corridor 13

Sources: Emmons and Olivier Resources Inc. 2006; Barr 2009, *Cumulative Effects Analysis of Wildlife Habitat and Threatened and Endangered Wildlife Species*.

¹ The primary corridor numbers are based on Emmons and Olivier (Emmons and Olivier Resources Inc. 2006). For comparison purposes, the numbers in parenthesis represent the corresponding corridor numbers in the Barr Engineering study (Barr 2009, *Cumulative Effects Analysis of Wildlife Habitat and Threatened and Endangered Wildlife Species*). NA indicates that this corridor was not identified in the Emmons and Olivier (Emmons and Olivier Resources Inc. 2006).

4.4.5.4 Travel Corridor Mitigation¹¹

No wildlife travel corridor mitigation measures are specifically proposed for the Project; however, the following portions of the Project would offset the long-term impacts to the wildlife travel corridors:

- Reclamation work, especially establishment of diverse forest cover, would partially restore the large habitat blocks northwest and southeast of Corridors 11 (16) and 12 (17), respectively;
- Removal of the rail spurs, buildings and roads, and re-vegetation of disturbed areas during Closure would improve wildlife habitat near the corridors; and
- Closure of operations would reduce human activity and noise levels near the corridors, thereby improving the attractiveness of the area to wildlife.

Position statements submitted by tribal cooperating agencies are footnoted as part of the process of documenting their differences of opinion with specific content and conclusions of the DEIS. See Section 1.6.1.

¹¹ The tribal cooperating agencies' position is that per Emmons & Olivier (2006), any new impacts to the existing wildlife migration corridors is by definition significant, and should require mitigation. For the entire time period (decades) of mine development and operation, Corridor 12 would experience a significant direct loss or fragmentation of wildlife habitat, and impact the ability of many wildlife species to migrate throughout their ranges. Also, until the Section 106 consultation process between the USACOE is complete, it is not possible to determine the potential impacts to treaty-protected wildlife.

Attachment 3

U.S. Fish and Wildlife Service Biological Opinion on Mittal Steel's East Reserve Project, 2/20/07