APPENDIX D5
Wildlife Habitat

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Cumulative Wildlife Effect Assessment

Prepared for Excelsior Energy

Mesaba Energy Project

SEH No. EXENR0502.03

November 2006

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Short Elliott Hendrickson Inc.
3535 Vadnais Center Drive
St. Paul, MN 55110-5196
651.490.2000

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Cumulative Wildlife Effect Assessment

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- **Prepared for Excelsior Energy**
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- **Mesaba Energy Project**

Introduction

This assessment of cumulative impacts to wildlife has been prepared on behalf of Excelsior Energy for the proposed Mesaba Energy Project and to assist the federal and state agencies in the preparation of the environmental impact statement (EIS).

The Department of Energy (DOE) National Energy Technology Laboratory (NETL) is required by the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321, *et seq*.), the Council on Environmental Quality NEPA regulations (40 Code of Federal Regulations [C.F.R.] Parts 1500-1508), and the DOE NEPA regulations (10 C.F.R. Part 1021) to prepare an EIS as part of its participation in the Mesaba Energy Project.

Similarly, under the Power Plant Siting Act (PPSA) (Minnesota Statutes §§ 116C.51-.697) a site permit from the Public Utilities Commission (PUC) is required to build a large electric power generating plant (LEPGP), including preparation of a State EIS. The EIS requirements under NEPA and the PPSA are substantially similar, and DOE will prepare, in cooperation with the Minnesota Department of Commerce and the Minnesota Public Utilities Commission, a joint EIS that will fulfill the requirements of both state and federal law. The information contained in this report will be used in the preparation of that EIS.

The NEPA provides the context and carries the mandate to analyze the cumulative effects of federal actions (in this case, funding provided by the DOE). The Council on Environmental Quality (CEQ) regulations for implementing the NEPA defines cumulative effects as:

> The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions (40 CFR § 1508.7).

The consideration of past, present and reasonable foreseeable future actions provide a context for assessing the cumulative impacts on the wetland resources.

Study Area

The PPSA and Applicable Rules requires definition of at least two potential sites for the proposed project, identification of which a preferred site, and justification for its preference. In compliance with these requirements, Excelsior Energy has identified two potential project sites, the West Range site and the East Range site.

The West Range site includes approximately 1,260 acres of undeveloped land within the city limits of Taconite, Minnesota in Iron Range Township as shown on **Figure 1**. The East Range site includes approximately 810 acres of undeveloped property located within the city limits of Hoyt Lakes, Minnesota as shown on **Figure 2**. The West Range site has been identified as the preferred location on which to construct the Mesaba Energy Project, however, final determination of the project site will be made by the Minnesota Department of Commerce and the Minnesota Public Utilities Commission under the PPSA requirements. The EIS includes a description of additional supporting project elements, including roadways, railroad, natural gas and electric transmission, required for operation of the proposed project at both alternative sites. This assessment includes evaluation of the potential wildlife impacts from the preferred alternative project elements for each alternate site.

Because other cumulative effects studies performed on wetlands are related to the surrounding watershed, the study area for the cumulative effects assessment was defined according to the limits of the affected subwatersheds for each alternative site. This provides a convenient and meaningful study area boundary for assessing wildlife and habitat. Implications on wildlife and habitat at scales extending beyond the study areas are addressed as well. The paragraphs below describe the study area for both the West Range and East Range sites. The characteristics of the study areas are described in the following sections.

West Range Site

The West Range site is located within subwatersheds on the boundary between the Swan River and Prairie River watersheds. The study area associated with the West Range site (See **Figure 3**) is defined as follows.

1) That part of the Swan River watershed upstream of the point where Holman Lake discharges to the Swan River. The Holman Lake discharge point represents the point on the Swan River affected by discharge and drainage from the West Range site.

2) That part of the Prairie River watershed upstream of Prairie Lake.

Swan River Watershed

The portion of the Swan River watershed considered within the study area covers approximately 114,266 acres extending from just northeast of the City of Grand Rapids to just northwest of the City of Hibbing (**Figure 1**) and then

south and east. Seven small communities (Coleraine, Bovey, Taconite, Marble, Calumet, Nashwauk and Keewatin) are located along the Mesabi Iron Range that lies just south of the divide between the Swan River watershed and the adjacent Prairie River watershed to the north. These communities, along with the associated iron and ore mining that support them, represent the primary development in the study area.

Outside of the small urban areas and scattered farmsteads and rural residences, land uses in the watershed primarily consists of ore mine pits and spoil areas. The remainder of this portion of the study area is a mixture of deciduous and mixed forest and wetland. The Minnesota Department of Natural Resources (MnDNR) Census of the Land (1996) identifies the primary land cover in the watershed as gravel pits and open mines, deciduous and mixed wood forest and open water.

Prairie River Watershed

The portion of the Prairie River watershed considered in the study area covers approximately 285,890 acres along the same portion of the Mesabi Iron Range (**Figure 3**) but extending north and west. Because the existing communities lie primarily along the southern edge of the iron formation, there are no established communities within this area of the Prairie River watershed. Outside of widely scattered farmsteads and rural residences, land use in the watershed is primarily mixed wood and deciduous forest and wetland. The MnDNR Census of the Land identifies the primary land cover in the watershed as deciduous and mixed wood forest, regenerating forest, wetlands, and water.

East Range Site

The East Range site is located in a subwatershed of the Partridge River in St. Louis County, Minnesota. The study area of the East Range site (See **Figure 4**) is defined as point on the Partridge River approximately 5 miles downstream of the confluence with First Creek.

Partridge River Watershed

The portion of the Partridge River watershed considered in the study area covers approximately 88,692 acres extending from the City of Aurora northeast toward the City of Babbitt (**Figure 4**). Outside of the small urban areas of Aurora and Hoyt Lakes and widely scattered farmsteads and rural residences, land use in the watershed is primarily mining, mixed wood forest and wetland. The MnDNR Census of the Land identifies the primary land cover in the watershed as deciduous and mixed wood forest, regenerating forest, gravel pits and open mines, wetlands, and water.

Methodology

This analysis includes the evaluation of the incremental impact of the proposed project when added to other past, present, and reasonably foreseeable future actions. The proposed project will be evaluated along with reasonably foreseeable future actions within the study area to determine the potential for cumulative effects on wildlife resources for each alternative site.

Both alternative site study areas for the cumulative effects analyses have been defined to create a scale of reference and a study area boundary that

encompasses all the defined reasonable and foreseeable actions. But the cumulative effects implications defined in this assessment for wildlife resources extend beyond the study area. Biota interchange and movement, habitat continuity and ecological scales recognize no such boundaries. So this assessment on wildlife resources will address cumulative effects that may extend beyond the study areas as well as those within it. For example, effects at the regional scales of wildlife population should be addressed, besides those at smaller scales or microhabitats that are located entirely within the study area boundary. Ignoring the effects that occur out side of the study area, despite the obvious and direct link or correlation with variables and effects that occur within the boundary would result in an incomplete study on the cumulative effects on wildlife resources.

Two distinct wildlife habitat settings will be analyzed; terrestrial, and aerial habitats. Terrestrial wildlife habitat settings will utilize the GIS GAP land cover classification data, the MNDNR Ecological Land Classification program codes, the MNDNR's *Action Plan for Wildlife* (MNDNR, 2006) habitat type classifications, and the wildlife travel corridor data and criteria determined in a previous cumulative effects analysis on wildlife (MNDNR, 2006) conducted in the region. Terrestrial wildlife habitat analysis will utilize larger mammals as species to measure effects on due to their motility and ability to disperse over measurable distances. Smaller vertebrates will be addressed strictly from a habitat loss, fragmentation and population change perspective, verses addressing travel corridors and migration that would be expected for the larger fauna. Terrestrial habitat and species analyses will address the following:

1. Direct cumulative habitat loss and fragmentation resulting from development of the project alternatives and the other reasonable/foreseeable actions to all species of terrestrial vertebrates.

2. Both direct and indirect cumulative effects on faunal populations resulting from development of the project and the other reasonable and foreseeable actions.

3. Potential effects on habitat continuity blocks through habitat loss or conversion and fragmentation within the study area boundaries.

4. Cumulative effects on large mammal populations and motilities at local and regional scales that are anticipated under the project alternatives and the reasonable/foreseeable actions.

The above referenced GAP data, previous MNDNR study, and the MNDNR data and guidance documents will be utilized for the terrestrial habitat analyses.

Aerial wildlife habitat and species analyses will address the following:

1. The potential for bird strikes resulting from construction of the facility and the reasonable and foreseeable actions.

2. Potential effects on seasonal migration patterns and populations of migratory birds.

Terrestrial Wildlife and Habitats

The aerial habitat study will mostly rely on existing parametric data and previous studies. The assessment of terrestrial wildlife species and habitats will be accomplished by the following methods.

Previous Conditions (Pre-settlement, or prior to 1900)

The previous conditions will be based on the MNDNR presettlement vegetative cover mapped through the use of land survey data, known as the Marshner map (Marschner, 1974). The Marschner map vegetative communities represent wildlife habitats that were present prior to European settlement, including those preceding any mining, timber harvesting, or other developments. **Figures 3** and **4** show the Marschner codes for both study areas respectively and reflect a mosaic of terrestrial upland and wetland habitats common to the region. Similarly, the GAP data in **Figures 5** and **6** show the same mosaic of habitats, largely influenced by timber practices and to a lesser degree mining.

Existing Conditions

The Marshner map being used for the previous condition is based on data collected long before satellite and GIS technologies developed. Today's land cover databases are developed from aerial imagery and ground level data, all combined with advances in wildlife habitat and ecological classifications developed in recent years. The most comparable to Marschner and useful land cover data for this study is the GAP land cover system. The GAP provides multiple layers of land cover data and the level or layer that is most similar in scale to the Marschner classifications will be considered and utilized for most of this study. Some of the higher level GAP land uses will also be used, in particular for determining direct habitat losses or when an important habitat element needs to be addressed. GAP data are shown in **Figures 5** and **6** for the West and East Range Site study areas respectively.

The GAP data will reflect and show all of the new developments and effects of land usess that have occurred since the data was collected in the 1870s for the Marschner map. This includes mines, roads, cities and towns, and larger scale land conversions (e.g. agricultural).

The GAP data does not provide extensive details on timber harvest related land use changes are not. To adequately assess the existing condition as it applies to the results of timber harvesting and management, other resources will be reviewed and utilized when applicable. The Generic EIS on the on Timber Harvesting and Forest Management in Minnesota (MNDNR, 1992) will be reviewed to identify the existing condition as it relates to the effects of timber harvesting on wildlife. Given the dynamic nature of timber production tracts, where they are subjected to harvesting on a rotational scale, this EIS study may yield the highest level of details possible for describing the existing conditions. This study may also be useful for the assessment for the foreseeable future conditions described in the next section.

Since the region is vegetated with an intact mosaic of terrestrial upland and wetland habitats and lakes, all natural cover is considered wildlife habitat for the purposes of this study. Habitat is extensive and prevalent among the land

uses in the region, with qualitative variation. The only areas completely devoid of any element of suitable habitat are full built out industrial sites, intense developments, and active mines are considered poor or non-exsitent wildlife habitats. With that in mind, this should even be qualified further with an example. Federally threatened peregrine falcons (*Falco peregrinus*) nest on the emission stacks of power generating plants located in Cohasset and St. Paul, Minnesota. Technically, emission stacks provide nesting habitat for peregrine falcons. At the same time, the facility structure and impact footprint of these facilities may not provide much else for wildlife habitat, but they are important structures for an important single species of wildlife.

Foreseeable Future Conditions

The reasonable and foreseeable actions defined below will be merged into the GAP data and maps assembled for the existing conditions for future conditions scenario. The following table provides a summary of the projects considered reasonably foreseeable in each of the study areas. The potential effects of each project on existing wildlife resources was estimated using the existing conditions mapping described above and an assumed footprint of disturbance for each potential future project.

Table 1
Reasonably Foreseeable Future Actions

West Range Site Study Area	East Range Site Study Area
Minnesota Steel Industries	PolyMet Mining NorthMet Project
Nashwauk Gas Pipeline	Mesabi Nugget
Itasca County Highway 7 Realignment	St. Louis County – new roadway from Hoyt Lakes to Babbitt
Itasca County Railroad	

Results - Cumulative Effects Assessment

Terrestrial Wildlife and Habitats

Ecological Setting, Wildlife Habitats, and Wildlife Ecology Implications

Study considerations include a determination and description of the ecological conditions in the region (both East and West Range Study Areas), the arrangement of wildlife habitats, and wildlife behavioral and ecological factors that all establish the base condition for analyzing and describing the cumulative effects that are anticipated through the analysis. The GAP data, literature, and best professional judgments used in the analysis are also utilized to assemble this baseline condition.

The ***ecological setting*** of Northeast Minnesota including the Mesabi iron range formation is highly influenced by human land uses and practices relating to natural resources, primarily timber related activities and iron ore mining. The region is relatively undeveloped with a low percentage of permanent land use conversions and natural vegetative cover and surface water resources predominate the landscape level ecological community compositions

Although the GAP data is not consistent or compatible with or as detailed as the MNDNR defined vegetative community codes in the Ecological Classification System program (ECS), correlations between the two are fairly obvious and straightforward.

The GAP data layers were the base data used for the analysis and the ECS is utilized when discussing habitats and ecological implications on specific wildlife species or smaller scales.

Wildlife Habitat character is similar both within the study area and throughout the region. Nearly all of the upland forest habitat is second growth and much of it is subjected to timber harvesting. Timber harvesting tracts are influenced by parcel boundaries and harvesting cycles resulting in a mosaic patchwork of tracts ranging from recently clear cut to older growth stands that will be subjected to harvesting again in the near term. Many tracts of timber have been harvested several iterations over the past 120 years or less. Timber harvesting and management heavily influence and define the upland forest habitats in the region. Ecologically, timber harvesting is a source of disturbance, perturbations, and ecological succession of these habitats.

In the ECS, the communities defined as Fire Dependent Forest/Woodland (FP code prefixes) and Mesic Hardwood Forest (MH code) comprise the forested upland habitats in the study area and region. These ECS codes correlate with the Upland codes in the GAP database. Many of these are influenced again by timber harvesting and management, often altering the character of these vegetative communities. Large expanses of upland habitat are characterized with compositions of early successsional tree species, primarily aspen and birch species (*Populus, betula*) that are harvested before the next successional sere develops. With the ECS based on presettlement vegetative communities, the effects of timber harvesting have resulted in an upland forest that often does not fit neatly into any particular ECS code. The pure monotypic stands of quaking aspen (*P. tremula*) so prevalent throughout the region are the main example, there is no comparable ECS code for this community since it was not present prior to settlement. Again, this is why the GAP data is used for most of the analysis, it most consistently represents the habitats present today.

Permanent ***habitat fragmentation*** is also limited in the region compared to areas further south in the state. Agricultural conversions are sparse, rural development is limited, and urbanization is restricted to existing towns and small cities, with relatively slower growth than other regions. Mines, all of which are concentrated on an axis along the Iron Range, represent a permanent conversion except on abandoned mine land where natural cover has reestablished. Linear facilities, including transmission lines, roads, and utility corridors are also a permanent habitat conversion and agent of habitat fragmentation. Timber harvesting is not considered a fragmentation agent since these vegetative communities become reforested after the disturbance.

Compared to other settings where habitat fragmentation has been studied, the region and study area does not have extensive habitat fragmentation or conversion. For example, the Amazon rain forest setting where many

fragmentation studies have occurred is a large region never disturbed anthropogenically that is being fragmented by wide scale land clearing and permanent conversion. Or the studies in Southern Illinois on the effects of fragmentation Neotropical migrants located in a highly agricultural landscape setting. Extensive agriculture has fragmented the once contiguous Eastern deciduous forest community into isolated patches or fragments of forest with bird assemblages that demonstrate the effects of fragmentation (Donovan et. al., 1995). In comparison, northeast Minnesota has extensive forested habitats frequently disturbed by timber harvesting with a relatively low amount of habitat that has been permanently converted. Because of this, fragmentation will focus on the habitats that are permanently converted or lost as a result of the reasonable and foreseeable actions.

Specific wildlife behaviors and ecologies should be recognized prior to making any interpretations on wildlife. The MNDNR 2006 wildlife cumulative effects analysis focuses on "***wildlife travel corridors***" in the main part of their analysis. But this study failed to define the species and justifications for designating such corridors. In particular, defining the species that have behaviors or autecologies requiring the presence of travel corridors as a key habitat element was not established. Compared to other parts of the world, Minnesota does not have any large terrestrial fauna that migrate or are dependent on fixed discrete travel corridors. The exception is the semi-migratory deer herd in the Cascade River watershed along the Lake Superior shore of the state (MNDNR, 2006). Habitats in the region are diffusely distributed and widespread geographically, as are the wildlife species present in the region. Larger mammals are also diffusely distributed and move freely throughout these habitats in a pattern defined by their biology, not geography or for some other extrinsic reason. For the larger, motile mammals with the ability to travel widely, types of habitat and habitat needs define species use and movement in the region, not the presence or absence of barriers, travel corridors, or habitat fragmentation.

The wildlife travel corridors identified in the MNDNR 2006 cumulative effects wildlife analysis were overlaid on the GAP data. These were then redefined and analyzed as ***habitat continuity blocks***. Other areas in the GAP data that were similar as undisturbed polygons of habitat, were also defined as such for discussion in the analysis. This reclassification removes the travel corridor element and replaces with a more ecologically meaningful unit where contiguous and contiguous undisturbed blocks of habitat are defined as the currency. This assumes that these areas provide key linkages for genetic interchange, refugia, and habitat connectivity.

Many smaller species of fauna in the region do have fixed, discrete travel corridors. For example, many reptiles and amphibians make seasonal movements that are habitat based. Aquatic turtles that make annual overland movements to the same upland breeding habitat is a good example. Because these are so numerous and little known, these small travel corridors were not addressed in the analysis. Instead, these small corridors are assumed as habitat losses when they are directly affected by an action. This accounts for all of the effects on the habitat, including the travel corridors when present.

Lastly within this framework, is the subject of ***habitat loss or permanent conversion*** defined as just that; the direct loss or conversion of habitat that will result from the construction of development of infrastructure or permanent fixed facilities. The impact footprint of each reasonable and foreseeable action has been cumulatively analyzed to establish the anticipated amount of total habitat loss and conversion.

West Range Site

Previous Conditions

Terrestrial Wildlife and Habitat

In the previous conditions (presettlement) there are no anthropogenically driven habitat fragmentation vectors or sources of habitat loss/conversion. Timber harvesting disturbances and perturbations were not present, and no mining had occurred.

Existing Conditions

Terrestrial Wildlife and Habitat

In the existing condition, all of the mine land features on the USGS maps shown in the **Figures 1** and **2** are present, as are the cities, towns, rural development, and linear right of ways including highways and utilities. The study area and surrounding region has been subjected to extensive timber harvesting.

Foreseeable Future Conditions

Terrestrial Wildlife and Habitat

The proposed Minnesota Steel Industry (MSI) project, the Mesaba Energy Project, the Nashwauk Gas Pipeline, Itasca County Highway 7 Realignment, and the Itasca County Railroad projects all define the Foreseeable Future Condition for evaluating the cumulative effects on terrestrial wildlife and habitat in the West Range Study Area.

Terrestrial acreages that will be ***habitat losses/conversions*** include ***1,708 acres*** of upland and wetland habitats resulting from the **Mesaba Energy Project**, and ***379 acres*** from the **MSI project**. Acres of impact are not known from the linear project including the Nashwauk Gas Pipeline, Itasca County Highway 7 Realignment Project, and the Itasca County Railroad Project. **Cumulatively** these projects combine to impact ***2,987 acres*** of terrestrial upland and wetland habitat found within the study area. **Existing Condition** wildlife habitat totals within the West Range Site study area is ***400,423 acres***. In the **Foreseeable Future Condition**, there will be an estimated ***397,436 acres*** of wildlife habitat remaining after the cumulative impacts defined in this study. This represents habitat conversions or direct losses resulting from reasonable and foreseeable actions.

These facilities also represent the new wildlife habitat barriers and fragmentation agents. More specifically, the Mesaba Energy Project Site is located directly north of a habitat continuity block delineated in the MNDNR study known as Wildlife Travel Corridor #2 (see **Figure 3**). In comparison, the MSI site is located mostly on the north side of active mine lands and the

edge of Wildlife Travel Corridor #3 eastward of the Mesaba Energy footprint. The West Range Site of the Mesaba Energy Project will create permanent habitat loss, fragment habitat, and disrupt habitat continuity along the north side of Wildlife Travel Corridor #2. The MSI Project site will create permanent habitat loss and fragment habitat, and be a wildlife aversion/avoidance element located along the east side of Wildlife Travel Corridor #3.

Results Summary – West Range Site Study Area

1. The most measurable cumulative effects on terrestrial wildlife and their habitats that result from the reasonable and foreseeable actions in the West Range Site study area are direct habitat loss/conversion (2,987 Acres total) resulting from construction of the defined reasonable and foreseeable projects in the study area. The area of direct habitat loss also represents the extent of habitat fragmentation. Within the West Range Site study area 397,436 acres of wildlife habitat will remain after the cumulative effect.

2. The proposed West Range Site Alternative of the Mesaba Energy facility will be located above the Wildlife Travel Corridor #2 block delineated in the MNDNR study, reclassified as habitat continuity blocks in this study. Since portions of the Mesaba Project site will be permanent habitat losses, this represents a potential barrier to animal movement, habitat connectivity, and at smaller scales, genetic interchange. The MSI site is located on the east side of Wildlife Travel Corridor #3, but does not form a geographic barrier for the corridor or affect habitat continuity to the extent that is potential for the Mesaba Project. None of the other reasonable and foreseeable projects are anticipated to create barriers to the habitats continuity blocks within the study area.

3. Within the West Range Site study area, there is 400,427 acres of wildlife habitat mostly comprised of timber harvesting tracts, wetlands, and other natural vegetative cover. Cumulative total habitat losses resulting from the reasonable and foreseeable actions are 2,987 acres total. 397,436 acres total of wildlife habitat will remain within the study area after the cumulative effect. Wildlife Travel Corridor #2, relabeled as a habitat continuity block will be potentially disrupted on the north side by the habitat losses associated with the Mesaba Project site. Two additional habitat continuity blocks (Wildlife Travel Corridors #3 and #4) are also located in the study area that will not be affected.

East Range Site

Previous Conditions

Terrestrial Wildlife and Habitat

In the previous conditions (presettlement) there were no anthropogenically driven habitat fragmentation vectors or sources of habitat loss/conversion. Timber harvesting disturbances and perturbations were not present, and no mining had occurred.

Existing Conditions

Terrestrial Wildlife and Habitat

In the existing condition, all of the mine lands shown on the USGS map in **Figure 2** are present, as are the cities, towns, rural development, and linear right of ways including highways and utilities. The Laskin Power Plant is also present. The study area and surrounding region has been subjected to extensive timber harvesting.

Foreseeable Future Conditions

Terrestrial Wildlife and Habitat

The existing conditions, the proposed PolyMet Mining NorthMet Project, Mesabi Nugget Mine project, St. Louis County Road Project, and the Mesaba Energy Project, Phase II define the Foreseeable Future Condition for evaluating the cumulative effects on terrestrial wildlife and habitat in the East Range Study Area.

Terrestrial acreages that will be ***habitat losses/conversion*** include ***807 acres*** of upland and wetland habitats resulting from the **Mesaba Energy Project**, ***6,431 acres*** resulting from the **PolyMet Mining NorthMet Project**, and ***2,820 acres*** from the **Mesabi Nugget Project**. Estimates for the St. Louis County Road Project were not available. **Cumulatively** this yields ***10,058 acres*** total of habitat conversions or direct losses resulting from reasonable and foreseeable actions within the ***103,644 acres*** of wildlife habitat within the study area under the **Existing Condition**. In the **Future Condition**, ***100,824 acres*** of terrestrial wildlife habitat will remain after the cumulative effect. These facilities and the new linear transportation corridor also represent the new wildlife habitat barriers and fragmentation agents.

All four of the new reasonable and foreseeable projects are set amongst habitats that have been highly fragmented and converted by mining. The Mesaba Energy Project is geographically located south of and between two habitat continuity blocks (Wildlife Travel Corridors #10 and 11 shown on **Figure 4**). The PolyMet Mine project is located within existing mine lands south and west of a habitat continuity block (Wildlife Travel Corridor #12 shown on **Figure 4**). Mesabi Nugget is located on the north side of a habitat continuity black (Wildlife Habitat Block #9, **Figure 4**) and is entirely within mine lands. Of these three projects, the Mesaba Energy Project East Range Site will affect the most wildlife habitat. Despite being on mine lands, the PolyMet Mining NorthMet Project will also result in wildlife habitat losses and conversions.

Results Summary – East Range Site Study Area

1. The most measurable cumulative effects on terrestrial wildlife and their habitats that result from the reasonable and foreseeable actions in the East Range Site study area are direct habitat loss/conversion (2,820 Acres total) resulting from construction of the Mesaba Energy Project, the PolyMet Mining NorthMet Expansion Project, the Mesabi Nugget Project, and the St. Louis County Road Project. The area of direct habitat loss also represents the extent of habitat fragmentation.

2. The proposed East Range Site Alternative of the Mesaba Energy facility nor any of the other reasonable and foreseeable actions will not affect any of the four habitat continuity blocks located within the study area.

3. Within the East Range Site study area, there is 103,644 acres of terrestrial wildlife habitat in the Existing Condition comprised of mostly timber harvesting tracts, wetlands, mine lands, and other natural vegetative cover. Cumulative total habitat losses resulting from the reasonable and foreseeable actions are 2,820 acres and 100,824 acres of wildlife habitat will remain in the Future Foreseeable Condition after the cumulative effect.

Summary Comparison West Range and East Range Study Areas

The following comparisons and conclusions on terrestrial wildlife and habitat are based on the findings above:

1. The West Range study area with 400,423 acres of terrestrial wildlife habitat and the East Range study area at 103,644 acres of terrestrial wildlife habitat are located within the same ecological province known as the Laurentian Mixed Forest. Both study areas are similar located in the same type of setting with similar land uses and wildlife habitats.

2. Both study areas have and will continue to be influenced by timber harvesting.

3. Wildlife habitat loss/conversion totals expected from the reasonable and foreseeable projects are expected to be 2,987 acres cumulatively within the West Range Site and 2,820 acres cumulatively within the East Range Site study areas respectively.

4. There are four habitat continuity blocks within the West Range Site and one block (Wildlife Travel Corridor #2 shown in **Figure 3**) will be potentially affected by the Mesaba Energy Project. There are four habitat continuity blocks in the East Range Study area (**Figure 4**) and none are anticipated to be affected by the reasonable and foreseeable projects.

5. Regionally, the cumulative effects within both study areas are such that no effects on terrestrial species of fauna are anticipated besides direct habitat loss. Cumulative effects on wildlife and habitats within both study areas are anticipated to have negligible effects for the following reasons:

    a. There are no large mammal mass migrations or migration routes within the region or study areas. No disruption of wildlife migration of movement is anticipated as a result of the reasonable and foreseeable actions.

    b. Besides permanent habitat loss and conversion, fauna in the immediate areas near the reasonable and foreseeable actions defined may engage in aversion or avoidance behaviors of these facilities, an effect of habitat loss. With the extensive acreage of habitat expected to remain after these actions, these effects are anticipated to be negligible.

    c. The Mesabi Energy Project West Range Site may be a potential barrier located on the north side of a habitat continuity block, representing the only such effect from a reasonable and foreseeable action. Three other habitat continuity blocks will remain undisturbed in the West Range study area and none of the four habitat continuity blocks will be disturbed in the East Range study area. Effects on habitat continuity blocks are anticipated to be negligible due to the extensive amount of

wildlife habitats that will remain after the reasonable and foreseeable actions are expected to occur.

Aerial Habitat and Migratory Birds

West Range Site

Previous Conditions

Aerial Habitat Effects

In the previous conditions, there were no aerial habitat obstructions present that were potential bird collision sources within the Swan River and Prairie River Watersheds, hereafter referred as the study area.

Existing Conditions

Aerial Habitat Effects

In the existing condition, there are no comparable existing aerial habitat obstructions present within the study area. Comparable obstructions are defined as emission stack towers, tall buildings, or other facilities of similar size and magnitude. There are six (6) antenna towers within the study area that are considered a risk for bird collisions and will be included in the evaluation.

Foreseeable Future Conditions

Aerial Habitat Effects

The existing condition six (6) antenna towers, the proposed Minnesota Steel Industry (MSI) project, and the Mesaba Energy Project, Phase II define the Foreseeable Future Condition for evaluating the cumulative effects aerial habitat obstructions on bird flight and aerial habitat.

Literature and Data

A review of the biological sciences literature and data sources confirmed that the majority of the studies and empirical data on bird collisions on stationary structures focused on collisions with radio towers, transmission lines, and windows on buildings. Tower lighting and other light producing structures also generated several studies and data sources. A common thread among these studies is the wide ranging variability of the mortality rates from one site or structure to another. Furthermore, different structures present differing types of mortality. For example, both the poles or towers and the wires produce collision related mortalities on birds on transmission projects. A large body of the bird strike literature addresses bird collisions with moving vehicles, primarily airplanes.

From a bird population perspective, mortality rates in these studies and data sources may number in the thousands, a small percentage of the millions or tens of millions of birds that migrate and have travel flight routes through the study areas of these respective sources. Ecological hypotheses in the literature often focus on addressing acute effects including disproportionate mortalities among certain species, age classes, or temporal periods. Such testing may show that bird collisions can be significant at the species level or during some ecologically driven process.

Lastly, many of these studies, particular those dealing with animal vehicle and bird strikes on airplanes are prevalent in the literature. These studies are conducted from a human safety perspective. Biological effects, if a concern, may often be secondary issues or data in these studies. Some exceptions include studies involving endangered species (e.g. Key deer, bald eagles) or species under some level of threat.

Adequate field sampling and monitoring are required to determine the full cumulative effects of these projects and facilities on bird flight and aerial habitat. Since there is little to no monitoring data results for bird collisions on existing power plant facilities in the Region or beyond and wide variation in the mortality data, calculating a known numerical effect is not possible nor realistic. Instead, this study recognizes the potential for impacts through review and evaluation of these known literature and data sources, followed by projections of potential cumulative effects on bird flight and aerial habitat.

Results – West Range Site Study Area Cumulative Effects on Bird Flight and Aerial Habitat

Data collected on bird collisions with stationary structures show some expected trends (Johnson et al., 2002). Seasonally there are pulses and peaks of collision mortality during the spring and fall migrations. Temporally, collisions peak during night time hours and decline during the day. Ecologically there are differences as well. Migrant passerines often have the highest rates or mortality, a variable driven by a couple of factors including; Passerines include the majority of the bird species found and most migratory birds; passerines are numerically the most abundant bird biomass; and passerines migrate at varying elevations that put them at higher risk for collisions. Behaviorally, certain bird species may be more prone to collisions with structures due to an attractant, mainly lighting. Larger and slower flight birds (e.g. cranes, herons, large raptors) often collide with transmission wires and support wires, another example of a behaviorally driven conflict.

Migrating warbler species often represent the largest numbers of the total passerine mortality in some antenna tower studies (Johnson et. al., Kemper, 1996) . Many authors speculate on and some have investigated the primary causative factors that include behavioral and ecological reason why warblers account for this, and others attempt to demonstrate that the warbler (or similar species) mortality is simply due to their high abundances (Yanagawa, 1999). Behavioral factors are often the sources of collisions with airplanes, for example when gulls or raptors use thermals putting them in zones of conflict and creating species specific disproportionate mortalities in the data.

Several studies on bird collisions with stationary structures have estimated bird mortality rates and the total number of birds in a flight path for comparison. Veltri and Klem (2005) studied the causes of death of birds that collided with antenna towers and windows. They recorded 247 tower confirmed tower collisions during a fall migratory season. The Johnson et.al. studies on bird collisions with wind turbine towers in southwest Minnesota conducted from 1996 to 1999 documented only 55 collision fatalities during this time frame resulting from 354 individual wind towers. After correction factors were applied, they estimated that total annual mortality from the

entire project was 72 birds per year for Phase 1 and 314 birds for Phase 2. The radar data showed that an estimated 3.5 million birds migrate over the project each year.

Numerous studies and data gathering efforts have been conducted in the wind turbine study area of southwest Minnesota on elucidating species specific mortality differences and species significant mortalities from collisions with the stationary towers, some with surprising results. Johnson et. al. conducted studies to determine if there was a potential for disproportionate mortality from tower collisions among the raptors that both nest within and migrate through the wind tower study area. They encountered little to no mortalities of raptors, and none for Swainson's hawks (*Buteo swainsoni*) an uncommon species of hawk in Minnesota. During these and other studies, some noticeably high mortalities were actually observed for a species of bat that migrates seasonally through the wind tower (Kolford, 2005) and bird mortalities were relatively low.

The wind tower study area in southwest Minnesota also sheds important insight into the potential importance of setting and topography. The wind tower setting is geologically and geographically similar to Mesabi Iron Range settings of both the West Range and East Range sites. The Iron Range is essentially comprised of a linear northeast/southwest trending ridge, many miles in length that crosses the north-south migration route on a right angle. The wind tower study area is located on the Coteau des Prairie and on the highest ridge of the Coteau that is known locally as Buffalo Ridge, trending for hundreds of miles on a northwest-southeast axis. Both the Iron Range and Buffalo Ridge are linear ridgelines that are as high as 2,100 feet above sea level and are some of the most prominent relief features in the state.

Studies on radio towers have yielded various results. A particular long term study of radio tower bird mortality in Wisconsin (Kemper, 1996) was conducted between 1957 through 1995 counted 121,560 birds comprising 123 species. During this 38 year period, it was estimated that 2 million birds were flying through the study area annually. Radio antenna tower design and lighting may be a source for the higher mortalities compared to the wind tower studies. Birds may be attracted to the warning light beacons on the towers and also colliding with the numerous guy wires and supporting structures in addition to the tower structure itself. Note that the numbers of dead birds are from a long term sample as well.

Besides these previous examples, other studies focus on the behavioral aspects and visual cues that result in bird collisions with structures. Behavioral aspects primarily focus on windows where birds will strike a window in reaction to a reflective image or perceptions that a there are no obstructions. Visual cues apply more often to power lines or other fine structures that need to be more visible to prevent collisions. Neither of these types of studies are relevant to this discussion.

Within the West Range Site study area, two proposed obstructions will be constructed under the future conditions, including the Mesaba Energy Project and the Minnesota Steel Industry facilities. Despite the absence of previous

studies or numerical data on power plant towers effects on birds, some general conclusions can be made from the other studies and data.

1. Both structures will cause annual mortality of migrating birds as the results of collisions with the structures, and both are aerial habitat obstructions. Bird mortality will likely be seasonal, with the highest rates occurring during the spring and fall migration periods. The wind tower studies in southwest Minnesota suggest that mortalities may be numerically low or non-existent for some species despite both study areas being located in similar geological/geographical settings.

2. Due to the nature of radio towers and based on previous studies, it is expected the bird mortalities will be highest at the six (6) antenna towers and lowest at the MSI and Mesaba facilities located within the West Range study area.

3. Most species specific bird mortalities occur from conflicts with transportation modes and power transmission lines. Collisions with the antenna towers and facilities structures will likely not be species specific and will mostly be comprised of migrating passerines, possibly warblers, vireos, and other neotropical migrants.

4. The potential bird collision mortality rates at both structures could vary widely between sites, annually, or could be very low to non-existent. Long term monitoring will be necessary after construction of these facilities to determine the effects on birds and the significance of mortality.

5. Migratory birds that will fly over and through the study area will number in the millions annually. Even if bird collision mortality rates for cumulatively reach the thousands, additional studies are necessary to determine if and what level of mortality is considered significant. These include studies conducted and data gathered elsewhere. Mortality rates from other sources are far greater then those caused by collisions with stationary objects, and those in themselves are not considered significant (Janss, 1997) impacts on species populations in most cases.

6. Based on the findings summarized in 1 – 5, the following assessment statement is provided;

   Within the West Range Site study area, cumulative effects will occur on aerial habitat and bird migration as a result of the reasonable and foreseeable actions defined within the study area. Based on previous studies and existing data on the subject of bird collisions, the cumulative effect will be assumed to be bird mortality resulting from collisions with fixed stationary structures defined as the reasonable and foreseeable actions in the study area. Previous studies and data suggest that bird mortality rates that are the result of these collisions will be insignificant on bird populations within or migrating through the West Range Site study area, but future studies are needed to further support this finding. Future studies should

evaluate the cumulative effects on higher scales including regionally and globally, and measure against the cumulative effects of actions that extend beyond the West Range Site study area. It's anticipated that mortalities will be highest for neotropical migrants, mostly passerines and these should be the focus of future studies involving power generating facilities similar to the two proposed within the West Range Site study area.

East Range Site

Previous Conditions

Aerial Habitat Effects

In the previous conditions, there were no aerial habitat obstructions present that were potential bird collision sources within the Partridge River Watershed hereafter referred as the study area.

Existing Conditions

Aerial Habitat Effects

In the existing condition, the Laskin Energy Center and the three (3) antenna towers within the study area are considered a risk for bird collisions and will be included in the evaluation.

Foreseeable Future Conditions

Aerial Habitat Effects

The three (3) existing condition antenna towers, Laskin Energy Center, the proposed Mesabi Nugget project, proposed PolyMet Mine Expansion project, and the Mesaba Energy Project, Phase II define the Foreseeable Future Condition for evaluating the cumulative effects aerial habitat obstructions on bird flight and aerial habitat in the East Range Site study area.

Literature and Data

A review of the biological sciences literature and data sources confirmed that the majority of the studies and empirical data on bird collisions on stationary structures focused on collisions with radio towers, transmission lines, and windows on buildings. Tower lighting and other light producing structures also generated several studies and data sources. A common thread among these studies is the wide ranging variability of the mortality rates from one site or structure to another. Furthermore, different structures present differing types of mortality. For example, both the poles or towers and the wires produce collision related mortalities on birds on transmission projects. A large body of the bird strike literature addresses bird collisions with moving vehicles, primarily airplanes.

From a bird population perspective, mortality rates in these studies and data sources may number in the thousands, a small percentage of the millions or tens of millions of birds that migrate and have travel flight routes through the study areas of these respective sources. Ecological hypotheses in the literature often focus on addressing acute effects including disproportionate mortalities among certain species, age classes, or temporal periods. Such

testing may show that bird collisions can be significant at the species level or during some ecologically driven process.

Lastly, many of these studies, particular those dealing with animal vehicle and bird strikes on airplanes are prevalent in the literature. These studies are conducted from a human safety perspective. Biological effects, if a concern, may often be secondary issues or data in these studies. Some exceptions include studies involving endangered species (e.g. Key deer, bald eagles) or species under some level of threat.

Adequate field sampling and monitoring are required to determine the full cumulative effects of these projects and facilities on bird flight and aerial habitat. Since there is little to no monitoring data results for bird collisions on existing power plant facilities in the Region or beyond and wide variation in the mortality data, calculating a known numerical effect is not possible nor realistic. Instead, this study recognizes the potential for impacts through review and evaluation of these known literature and data sources, followed by projections of potential cumulative effects on bird flight and aerial habitat.

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Several studies on bird collisions with stationary structures have estimated bird mortality rates and the total number of birds in a flight path for comparison. Veltri and Klem (2005) studied the causes of death of birds that collided with radio towers and windows. They recorded 247 tower confirmed tower collisions during a fall migratory season. Studies on bird collisions with wind turbine towers in southwest Minnesota (Johnson, et.al, 2002) were conducted from 1996 to 1999 documented only 55 collision fatalities during

this time frame resulting from 354 individual wind towers. After correction factors were applied, they estimated that total annual mortality from the entire project was 72 birds per year for Phase 1 and 314 birds for Phase 2. The radar data showed that an estimated 3.5 million birds migrate over the project each year.

Numerous studies and data gathering efforts have been conducted in the wind turbine study area of southwest Minnesota on elucidating species specific mortality differences and species significant mortalities from collisions with the stationary towers, some with surprising results. Johnson et. al conducted studies to determine if there was a potential for disproportionate mortality from tower collisions among the raptors that both nest within and migrate through the wind tower study area. They encountered little to no mortalities of raptors, and none for Swainson's hawks (*Buteo swainsoni*) an uncommon species of hawk in Minnesota. During these and other studies, some noticeably high mortalities were actually observed for a species of bat that migrates seasonally through the wind tower and bird mortalities were relatively low.

The wind tower study area in southwest Minnesota also sheds important insight into the potential importance of setting and topography. The wind tower setting is geologically and geographically similar to Mesabi Iron Range settings of both the West Range and East Range sites. The Iron Range is essentially comprised of a linear northeast/southwest trending ridge, many miles in length that crosses the north-south migration route on a right angle. The wind tower study area is located on the Coteau des Prairie and on the highest ridge of the Coteau that is known locally as Buffalo Ridge, trending for hundreds of miles on a northwest-southeast axis. Both the Iron Range and Buffalo Ridge are linear ridgelines that are as high as 2,100 feet above sea level and are some of the most prominent relief features in the state.

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Within the East Range Site study area, three new proposed obstructions will be constructed under the future conditions; the Mesaba Energy Project,

PoyMet Mine facilities, and Mesabi nugget facilities. The existing Laskin Energy Center and proposed Mesabi Energy facilities are the most similar, and the PolyMet and Mesabi Nugget projects may not have significant or similar obstructions projected into the aerial flight paths of birds. Despite the absence of previous studies or numerical data on power plant towers effects on birds, some general conclusions can be made from the other studies and data.

1 At least two of the reasonable and foreseeable actions defined within the East Range study area will cause annual mortality of migrating birds as the results of collisions with the structures. The Laskin Power Plant and the Mesaba Energy project are the two actions that include or will include aerial habitat obstructions. Bird mortality will likely be seasonal, with the highest rates occurring during the spring and fall migration periods. The wind tower studies in southwest Minnesota suggest that mortalities may be numerically low or non-existent for some species despite both study areas being located in similar geological/geographical settings.

2 Due to the nature of radio towers and based on previous studies, it is expected the bird mortalities will be highest at the three (3) antenna towers and lowest at the Laskin and Mesaba facilities located within the East Range study area.

3 Most species specific bird mortalities occur from conflicts with transportation modes and power transmission lines. Collisions with the radio towers and facilities structures will likely not be species specific and will mostly be comprised of migrating passerines, possibly warblers, vireos, and other neotropical migrants.

4. The potential bird collision mortality rates at both the Laskin and Mesaba facilities could vary widely between sites, annually, or could be very low to non-existent. Long term monitoring will be necessary after construction of these and other facilities will be needed to determine the effects on birds and the significance of mortality.

5. Migratory birds that will fly over and through the study area will number in the millions annually. Even if bird collision mortality rates cumulatively reach the thousands, additional studies are necessary to determine if and what level of mortality is considered significant. These include studies conducted and data gathered elsewhere. Mortality rates from other sources are far greater then those caused by collisions with stationary objects, and those in themselves are not considered significant (Janss, 2000) impacts on species populations in most cases.

6. Based on the findings summarized in 1 – 5, the following assessment statement is provided;

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of these collisions will be insignificant on bird populations within or migrating through the East Range Site study area, but future studies are needed to further support this finding. Future studies should evaluate the cumulative effects on higher scales including regionally and globally, and measure against the cumulative effects of actions that extend beyond the East Range Site study area. It's anticipated that mortalities will be highest for neotropical migrants, mostly passerines and these should be the focus of future studies involving power generating facilities similar to the two proposed within the East Range Site study area.

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