

## 6.4 East Section

Chapter 5 provides a discussion of general impacts for each resource, and that discussion provides the general nature of the impacts, such as the duration, extent, whether it is direct or indirect and whether it is adverse or beneficial. It also describes the general nature of the disturbances such as tree clearing, soil disturbance, structure placement, access road construction, and other impacts related to components of the proposed Project. Those general details are not repeated in Chapter 6, which focuses on site specific resources and impacts and refers back to the general details of Chapter 5.

As described in Section 4.5 and identified on Map 4-14, the Central Section is composed of five variation areas: Effie, East Bear Lake, Balsam, Dead Man's Pond, and Blackberry. Section 5.5 previously described, in general, the human settlement, land-based economies, archaeological and historic architectural resources, natural environment, rare and unique natural resources, corridor sharing, and electric system reliability, and costs of constructing, operating, and maintaining the facilities as they relate to the Central Section and the potential impacts resulting from construction, operation, maintenance, and emergency repair of the proposed Project. The following sections provide a more detailed description and analysis of the resources present and potential impacts from the proposed Project within the variation areas in the Central Section.

### 6.4.1 Effie Variation Area

The Effie Variation Area encompasses three route alternatives: the Proposed Blue Route, Proposed Orange Route, and the Effie Variation. This section provides a comparison of the potential impacts resulting from construction, operation, maintenance, and emergency repair of the proposed Project within the Effie Variation Area, depending on the route or variation considered.

#### 6.4.1.1 Human Settlement

This section describes the aesthetic resources and zoning and land use compatibility within the Effie Variation Area and the potential impacts from the proposed Project.

#### Aesthetics

Impacts on aesthetic resources within the Effie Variation Area would be determined based largely on the level of increased contrast in views by sensitive viewers as a result of the proposed Project. These impacts are based on the number of visual

resources, including residences, with high visual sensitivity in close proximity to the transmission line that are likely to have views of and be affected by the proposed Project. Aesthetic impacts are likely to be greatest for views of the proposed Project by sensitive viewers at close distances (e.g., in the foreground distance zone, which can extend out to approximately 0.5 miles), but may also be substantial for views from greater distances. The vegetation surrounding high visual sensitivity areas can also affect the degree of aesthetic impact from the proposed Project. Areas with high visual sensitivity located in a densely forested area may be less likely to see the transmission line, even at a close distance, than a high visual sensitivity area located in an open, agricultural area, located at a much greater distance. Because of the difference in site-specific landscape characteristics among areas deemed as having a high visual sensitivity, the actual impact of the proposed Project could vary widely.

Residences and other aesthetic resources within 1,500 feet from the anticipated alignment of the proposed Project would have a high probability of having views of the proposed Project and as described in Section 5.3.1.1, this distance is considered the ROI for aesthetic resources. If existing large transmission lines would be followed, a new transmission line would not require clearing of new corridors, but rather an expansion of existing corridors. By paralleling an existing transmission line with structures of similar design and height, a new transmission line would produce less contrast than a transmission line that does not parallel an existing large transmission line.

Data related to aesthetic resources in the Effie Variation Area are summarized in Table 6-160 and shown on Maps 6-51, 6-52, 6-53, and 6-55.

As indicated in Table 6-160 for the Effie Variation Area, the Proposed Blue Route, Proposed Orange Route, and Effie Variation would cross or be located within 1,500 feet of aesthetic resources with high visual sensitivity, including snowmobile trails, a state trail, and state forests. As previously described in Section 5.3.1.1, high viewer sensitivity is typically assigned to viewer groups engaged in recreational or leisure activities; traveling on scenic routes for pleasure or to or from recreational or scenic areas; experiencing or traveling to or from protected, natural, cultural, or historic areas; or experiencing views from resort areas or their residences. Not including residences, the proposed routes and variation would affect similar numbers of aesthetic resources, **with the Proposed Blue Route affecting 10, the Proposed Orange Route affecting 11, and the Effie Variation affecting 10.** The Proposed Blue

Table 6-160 Aesthetic Resources within the ROI in the Effie Variation Area

| Resource                                  | Evaluation Parameter <sup>(1)</sup>    | Effie Variation Area |                       |                 |
|---|--|----------------------|-----------------------|-----------------|
|   |  | Proposed Blue Route  | Proposed Orange Route | Effie Variation |
| Transmission Line                         | Length (mi)                            | 41.1                 | 44.6                  | 49.8            |
| Existing Transmission Line <sup>(2)</sup> | Percent of Total Length <sup>(3)</sup> | 0                    | 0                     | 80              |
| Residences                                | Count within 0–500 ft                  | 0                    | 1                     | 2               |
|   | Count within 0–1,000 ft                | 1                    | 2                     | 12              |
|   | Count within 0–1,500 ft                | 4                    | 5                     | 16              |
| Historic Architectural Sites              | Count within 0–1,500 ft                | 1                    | 1                     | 0               |
|   | Count within 0–5,280 ft                | 1                    | 1                     | 3               |
| State Trails                              | Count within 0–1,500 ft                | 1                    | 1                     | 1               |
| County/Local Parks                        | Count within 0–1,500 ft                | 1                    | 1                     | 0               |
| State Forests                             | Count within 0–1,500 ft                | 2                    | 2                     | 2               |
| Snowmobile Trails                         | Count within 0–1,500 ft                | 5                    | 6                     | 4               |
| Water Access Points                       | Count within 0–1,500 ft                | 0                    | 0                     | 1               |
| State Water Trails                        | Count within 0–1,500 ft                | 0                    | 0                     | 0               |

Source: Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); Minnesota Power 2014, reference (146); SHPO 2014, reference (147); MnDNR 2003, reference (182); Itasca County, reference (153); MnDNR 2003, reference (148); MnDNR 2010, reference (150); MnDNR 2003, reference (190); MnDNR 2010, reference (183)

Note(s): Totals may not sum due to rounding

- (1) Acre/Count within a distance includes both sides of the anticipated alignment. For example, count within 0–500 ft includes 500 ft on each side of the anticipated alignment.
- (2) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (3) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

Route would cross five snowmobile trails, one state trail, and two state forests and would be located within 1,500 feet of a county park (Map 6-53 and Map 6-55). The Proposed Orange Route would cross six snowmobile trails, one state trail, and two state forests and would be located within 1,500 feet of a county park. The Effie Variation would cross four snowmobile trails, one state trail, and two state forests (Map 6-53 and Map 6-55). It would also be located within 1,500 feet of a water access point. **The Proposed Blue Route and the Proposed Orange Route would both be located within 1,500 feet of a historic architectural site and the Effie Variation would be located within one mile of three historic architectural sites.**

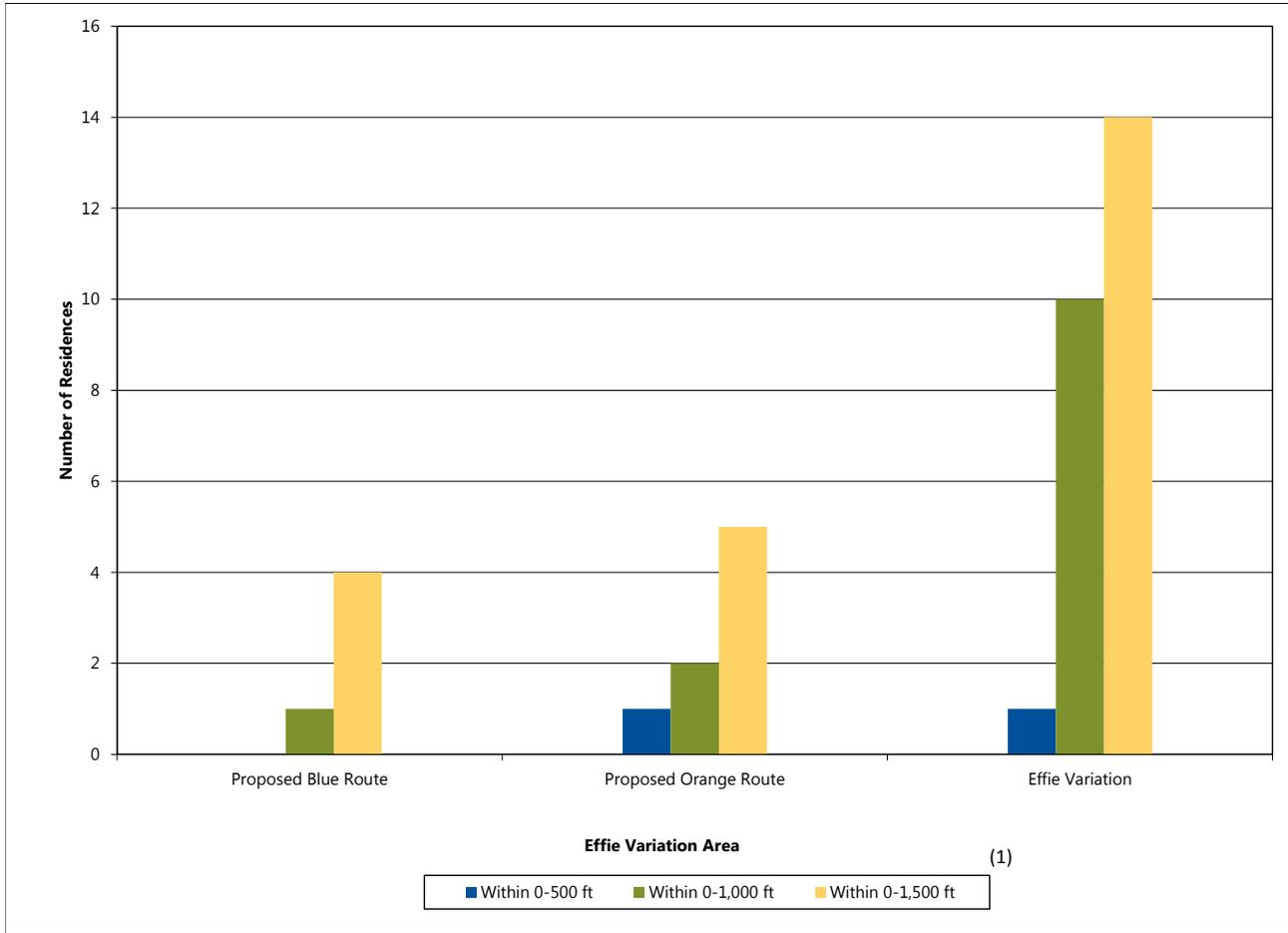
The Effie Variation would be located within 1,500 feet of 16 residences (12 of which are located within 1,000 feet and two of which are within 500 feet), which have potentially high visual sensitivity, whereas the Proposed Blue Route and Proposed Orange Route would be located within 1,500 feet of four (only one residence within 1,000 feet and no residences within 500 feet) and five residences (two within 1,000 feet and one within 500 feet), respectively (Figure 6-99). The Effie Variation has more residences within 1,500 feet of its anticipated alignment that could potentially be impacted

(depending on the surrounding vegetation at each location) and could potentially affect more non-residential aesthetic resources.

The Effie Variation is longer (49.8 miles) than either the Proposed Blue Route (41.1 miles) or the Proposed Orange Route (44.6 miles; Table 6-160). However, the Effie Variation parallels two existing adjacent large transmission lines (both a 500 kV and a 230 kV transmission line) for 80 percent of its length, whereas the other two alternatives do not parallel any existing large transmission lines and would require new corridors to be cleared. By paralleling two existing large transmission lines, the Effie Variation would produce substantially less contrast than either the Proposed Blue Route or the Proposed Orange Route.

Although the Effie Variation would be longer and produce substantially less contrast than the other two routes, **it would affect more residences (16), including 12 within 1,000 feet and two within 500 feet** of the anticipated alignment, and aesthetic resources with high visual sensitivity (three historic architectural sites, one state trail, two state forests, four snowmobile trails, one water access point). However, by paralleling existing multiple large transmission lines already visible from many of the

Figure 6-99 Residences within the ROI in the Effie Variation Area



Source(s): Minnesota Power 2014, reference (146)

Note(s): Totals may not sum due to rounding

(1) Area/Count within a distance includes both sides of the anticipated alignment. For example, count within 0-500 ft includes 500 ft on each side of the anticipated alignment.

residences and other aesthetic resources, it is likely that the addition of a third large transmission line adjacent to the existing transmission lines would result in only an incremental increase in contrast for views of the new transmission line in conjunction with the existing transmission lines. The incremental increase in contrast would be slightly greater where the new transmission line is located between the existing lines and viewers and slightly less where the new transmission line is located on the opposite side of the existing transmission line from viewers. For these reasons, it is likely that despite being longer and affecting more residences and other aesthetic resources with high viewer sensitivity, the Effie Variation would result in less aesthetic impact than either the Proposed Blue Route or Proposed Orange Route in the Effie Variation Area.

Because the Proposed Blue Route and Proposed Orange Route are moderately long at 41.1 and 44.6 miles, respectively, do not parallel existing transmission lines of similar size and design, and

affect several residences (**four to five residences**) and other sensitive visual resources (one historic architectural site each, one state trail, one county/local park, two state forests, and five to six snowmobile trails), potential aesthetic impacts of the Proposed Blue Route and Proposed Orange Route are expected to be significant. Although the Effie Variation parallels an existing large transmission line for much of its length (80 percent), it is moderately long (49.8 miles) and affects **16 residences** and several other sensitive visual resources (three historic architectural sites, one state trail, two state forests, four snowmobile trails, and one water access point). For these reasons, potential aesthetic impacts of the Effie Variation are also expected to be significant.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on aesthetics are summarized in Section 5.3.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize,

or mitigate impacts on these resources from the proposed Project.

**Land Use Compatibility**

As explained in Section 5.3.1.1, the ROI for Land Use Compatibility was determined to be 1,500 feet from the anticipated alignments of the proposed Project.

**Land Uses**

Table 6-161 identifies the amount of each type of land cover within 1,500 feet of the anticipated alignments of the Proposed Blue Route, Proposed Orange Route, and Effie Variation in the Effie Variation Area. Generally, the percentage of each land use is representative of what is present within the ROW. The various land uses present in the variation area are shown in Map 5-19 and residences, churches, cemeteries, and airports near the Proposed Blue Route, Proposed Orange Route, and Effie Variation are shown on Map 6-51.

The Proposed Blue Route, Proposed Orange Route, and Effie Variation ROI are both primarily composed of forested and/or swamp land (Table 6-161). The Effie Variation ROW contains a greater amount of forested/swamp land and developed or disturbed area as compared to the Proposed Blue Route and the Proposed Orange Route.

**Land Ownership and Management**

Table 6-162 and Figure 6-100 show that the Effie Variation ROW contains a greater amount of state forest land and state fee land than the Proposed Blue Route and Proposed Orange Route; with the Proposed Blue Route ROW containing the least amount of these land ownership categories. No impacts to USFWS Interest Lands would occur for the proposed routes or variation. Both the Proposed

Blue Route and Proposed Orange Route would impact a small amount of county land, while the Effie Variation would not impact this land ownership type. The Proposed Blue Route and Proposed Orange Route would impact a similar amount of state conservation land; however, the Effie Variation would impact a greater amount of this land type.

Neither of the proposed routes would parallel an existing corridor; however a small segment of each would parallel a road or fence line). Approximately 80 percent of the Effie Variation would parallel an existing corridor, and therefore would be expected to have less incompatibility with surrounding land uses compared to the proposed routes (see Section 6.4.1.6).

Impacts to land use from the proposed Project in the Effie Variation Area would be similar to those described in Section 6.2.1.1. The Proposed Blue Route, Proposed Orange Route, and the Effie Variation would all result in a long-term change in land use for areas currently forested and/or swamp land and therefore would all have significant impacts on land use. The level of significance is largely related to the amount of forested and/or swamp land, specifically state forest and state fee land that would be within the ROW of the proposed routes and variation. However, the length of the route that would parallel an existing corridor is also important. The Proposed Blue Route avoids a greater amount of state forest and state fee lands than the Proposed Orange Route and the Effie Variation thereby avoiding long-term changes to land use. However, the Effie Variation would parallel a greater length of existing corridor compared to the Proposed Blue Route and Proposed Orange Route and would minimize indirect impacts to state forests and state fee lands such as forest fragmentation.

**Table 6-161 Land Uses within the ROI in the Effie Variation Area**

| Resource   | Type <sup>(1)</sup>    | Evaluation Parameter <sup>(2)</sup> | Effie Variation Area |                       |                 |
|--|------------------------|-------------------------------------|----------------------|-----------------------|-----------------|
|  |                        |                                     | Proposed Blue Route  | Proposed Orange Route | Effie Variation |
| GAP Land Cover Vegetation Class Level - Division 4 | Total                  | Acres within 0–1,500 ft             | 15,085               | 16,344                | 18,273          |
|  | Developed or Disturbed | Acres within 0–1,500 ft             | 239                  | 398                   | 493             |
|  | Agricultural           | Acres within 0–1,500 ft             | 0                    | 0                     | 0               |
|  | Forested and/or Swamp  | Acres within 0–1,500 ft             | 14,723               | 15,801                | 17,696          |
|  | Other                  | Acres within 0–1,500 ft             | 123                  | 145                   | 84              |

Source(s): USGS 2001, reference (151)

Note(s): Totals may not sum due to rounding

- (1) Other category includes: Open water, Great Plains Grassland & Shrubland and Introduced & Semi Natural Vegetation. See detailed summary of all types in Appendix E.
- (2) Acre/Count within a distance includes both sides of the anticipated alignment. For example, count within 0-500 ft includes 500 ft on each side of the anticipated alignment.

**Table 6-162 Land Ownership/Management within the Anticipated ROW in the Effie Variation Area**

| Resource                                  | Type                                    | Evaluation Parameter    | Effie Variation Area |                       |                 |
|---|---|-------------------------|----------------------|-----------------------|-----------------|
|   |   |                         | Proposed Blue Route  | Proposed Orange Route | Effie Variation |
| <b>Total Land</b>                         | --                                      | <b>Acres within ROW</b> | <b>997</b>           | <b>1,081</b>          | <b>1,209</b>    |
| State Forests                             | --                                      | Acres within ROW        | 909                  | 958                   | 1,086           |
| State Fee Lands <sup>(1)</sup><br>Total   | --                                      | Acres within ROW        | 645                  | 694                   | 772             |
| State Fee Lands <sup>(1)</sup><br>by Type | Consolidated Conservation               | Acres within ROW        | 0                    | 0                     | 0               |
|   | Other - Acquired, Tax Forfeit, Volstead | Acres within ROW        | 409                  | 471                   | 507             |
|   | Trust Fund                              | Acres within ROW        | 235                  | 223                   | 265             |
|   | Federal - State Lease                   | Acres within ROW        | 0                    | 0                     | 0               |
| County Lands                              | --                                      | Acres within ROW        | 10                   | 4                     | 0               |
| State Conservation Easements              | --                                      | Acres within ROW        | 200                  | 196                   | 293             |
| <b>Private Lands<sup>(2)</sup></b>        | --                                      | <b>Acres within ROW</b> | <b>342</b>           | <b>383</b>            | <b>437</b>      |

Source(s): MnDNR 2003, reference (148); MnDNR 2014, reference (152); Itasca County 2014, reference (153); MnDNR 2010, reference (184)

Note(s): Totals may not sum due to rounding

(1) This dataset represents state land ownership using public land survey quarter-quarter sections as the smallest unit. In some cases, multiple state lands are located within a single quarter-quarter section. Therefore, features may be duplicated and the analysis results may over-represent potential impacts.

(2) Acreage for private lands was calculated as the difference between total lands and public lands.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on land use are summarized in Section 5.3.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

#### 6.4.1.2 Land-Based Economies

This section describes the land-based economy resources, including agriculture, forestry, and mining, within the Effie Variation Area and the potential impacts from the proposed Project on those resources. Data related to land-based economy resources in the Effie Variation Area are summarized in Table 6-163.

##### Agriculture

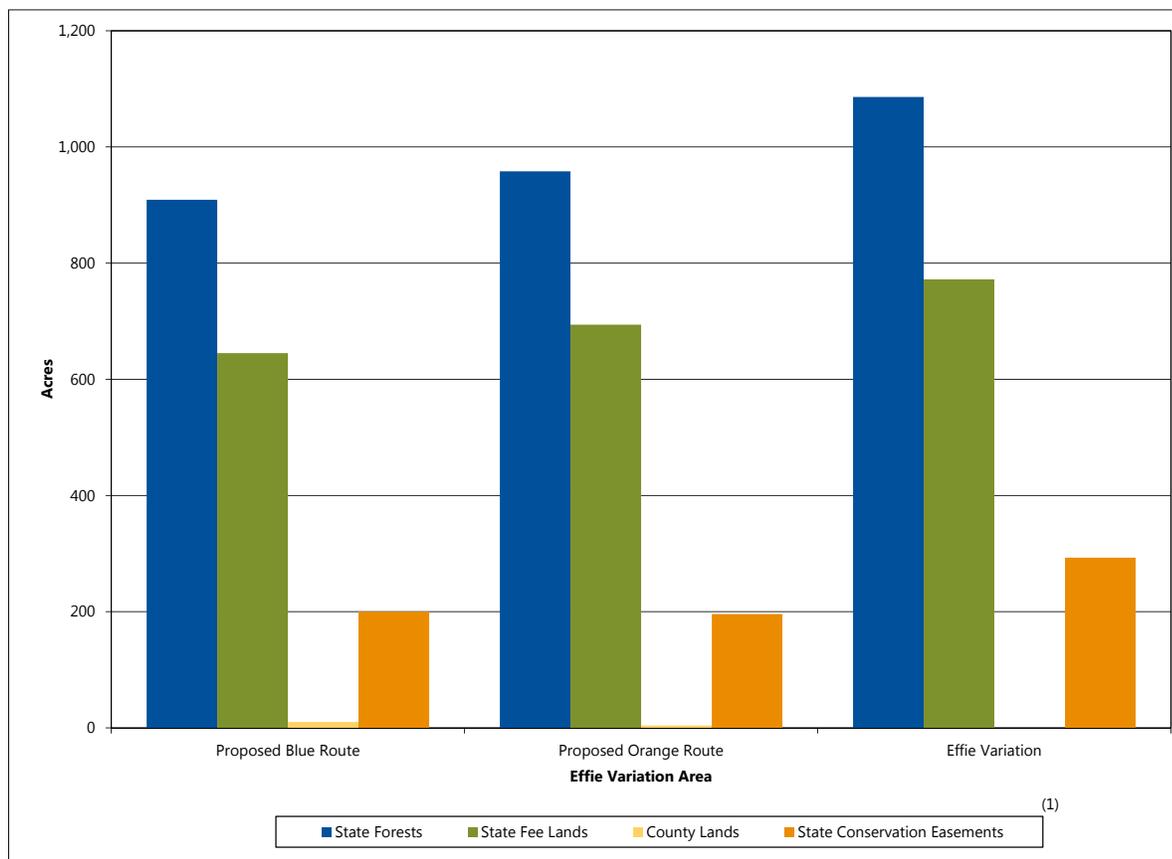
As identified in Section 5.3.2.1, the ROI for evaluating agricultural impacts is the ROW of the transmission line. Table 6-163 and Figure 6-101 show the acreage of USDA-NRCS-classified prime farmland, prime farmland if drained, and farmland of statewide importance that would be impacted by the Proposed Blue Route, Proposed Orange Route and Effie Variation in the ROI.

The Effie Variation, which has the longest length, would pass through the most acres of farmland (Figure 6-101). The Proposed Blue Route, which has the shortest length, would be expected to have the fewest impacts on farmland, farmland of statewide importance, and prime farmland.

As discussed in Section 5.3.2.1, construction activities could limit the use of fields or could affect crops and soil by compacting soil, generating dust, damaging crops or drain tile, or causing erosion. Construction activities would also cause long-term adverse impacts to agriculture by the potential loss of income due to the removal of farmland for transmission line structures and associated facilities. Maintenance and emergency repair activities could result in direct adverse impacts on farmlands from the removal of crops, localized physical disturbance, and soil compaction caused by equipment.

Potential construction, operation, maintenance, and emergency-repair short-term and long-term impacts on agricultural resources are summarized in Section 5.3.2.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

Figure 6-100 Public Land Ownership/Management within the ROI in the Effie Variation Area



Source(s): MnDNR 2003, reference (148); MnDNR 2014, reference (152); Itasca County 2014, reference (153); MnDNR 2010, reference (184)  
 Note(s): Totals may not sum due to rounding

(1) This dataset represents state land ownership using public land survey quarter-quarter sections as the smallest unit. In some cases, multiple state lands are located within a single quarter-quarter section. Therefore, features may be duplicated and the analysis results may over-represent potential impacts.

Table 6-163 Land-Based Economy Resources within the Anticipated ROW in the Effie Variation Area

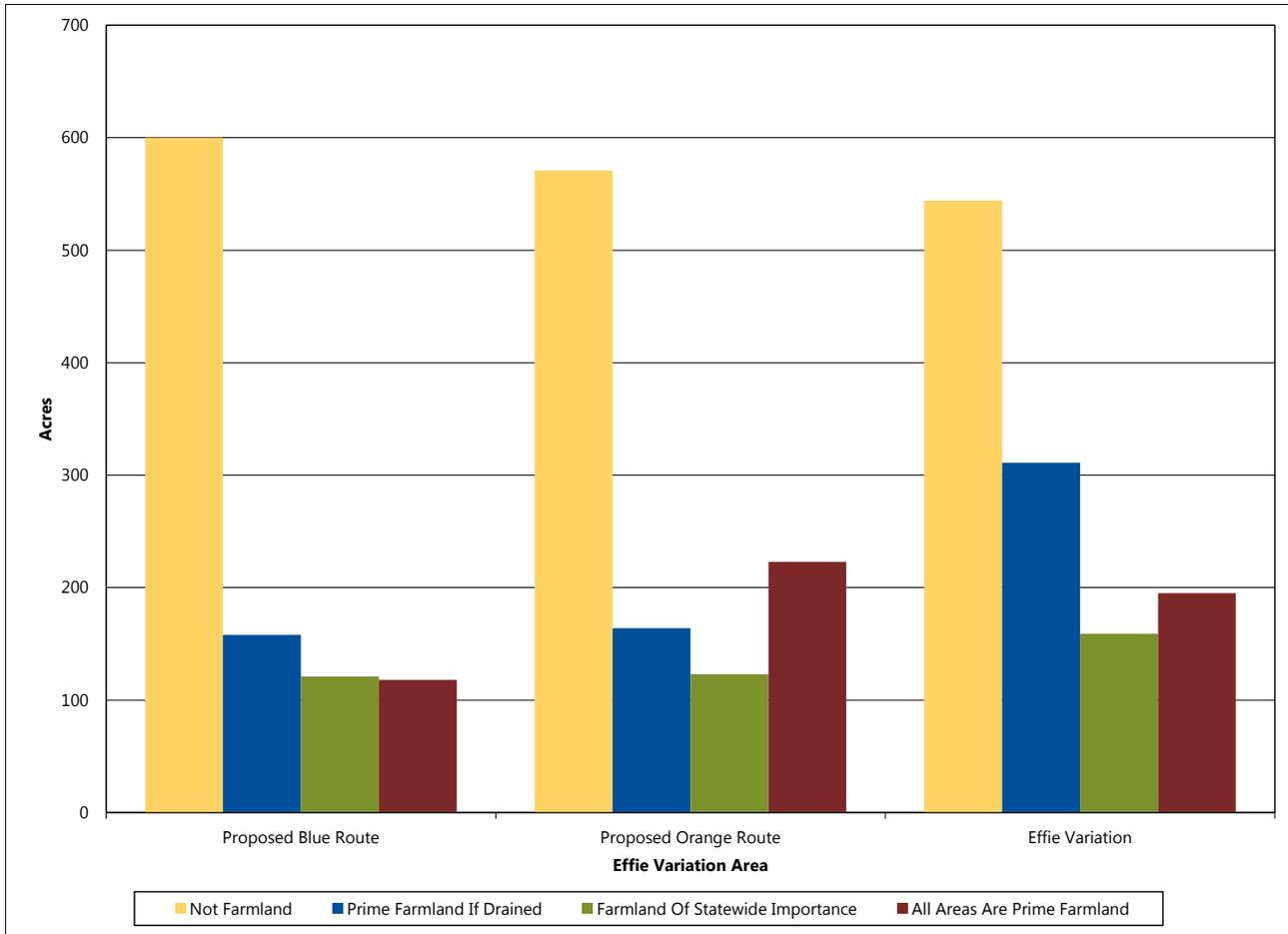
| Resource  | Type                             | Evaluation Parameter                   | Effie Variation Area |                       |                 |
|---|----------------------------------|--|----------------------|-----------------------|-----------------|
|   |                                  |  | Proposed Blue Route  | Proposed Orange Route | Effie Variation |
| Transmission Line                                       | --                               | Length (mi)                            | 41.1                 | 44.6                  | 49.8            |
| Existing Transmission Line <sup>(1)</sup>               | --                               | Percent of Total Length <sup>(2)</sup> | 0                    | 0                     | 80              |
| Farmland  | Not Farmland                     | Acres within ROW                       | 600                  | 571                   | 544             |
|   | Prime Farmland if Drained        | Acres within ROW                       | 158                  | 164                   | 311             |
|   | Farmland of Statewide Importance | Acres within ROW                       | 121                  | 123                   | 159             |
|   | All Areas are Prime Farmland     | Acres within ROW                       | 118                  | 223                   | 195             |
| State Forest  | --                               | Acres within ROW                       | 909                  | 958                   | 1,086           |
| State Mineral Leases (active and/or expired/terminated) | --                               | Acres within ROW                       | 647                  | 819                   | 824             |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); USDA NRCS 2014, reference (154); MnDNR, reference (148); MnDNR 2014, reference (179)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

Figure 6-101 Acres of Farmland by Type within the Anticipated ROW in the Effie Variation Area



Source(s): USDA NRCS 2014, reference (154)

Note(s): Totals may not sum due to rounding

**Forestry**

As identified in Section 5.3.2.2, the ROI for evaluating forestry impacts from the proposed Project is the ROW of the transmission line. Table 6-163 identifies the acreage of state forest land that would be impacted in the ROI by the Proposed Blue Route, Proposed Orange Route, and the Effie Variation. There are no USDA-USFS national forest lands within the ROI of the Proposed Blue Route, Proposed Orange Route, nor the Effie Variation in the Effie Variation Area.

The Effie Variation, which has the longest length, would pass through the most acres of state forest lands — the Koochiching and George Washington State Forests (Figure 6-102, Map 6-53). The Proposed Blue Route, which has the shortest length, would be expected to have the fewest impacts on timber activities in these state forests.

As discussed in Section 5.3.2.2, construction activities could limit timber harvesting efforts, affect timber stands and soil by compaction,

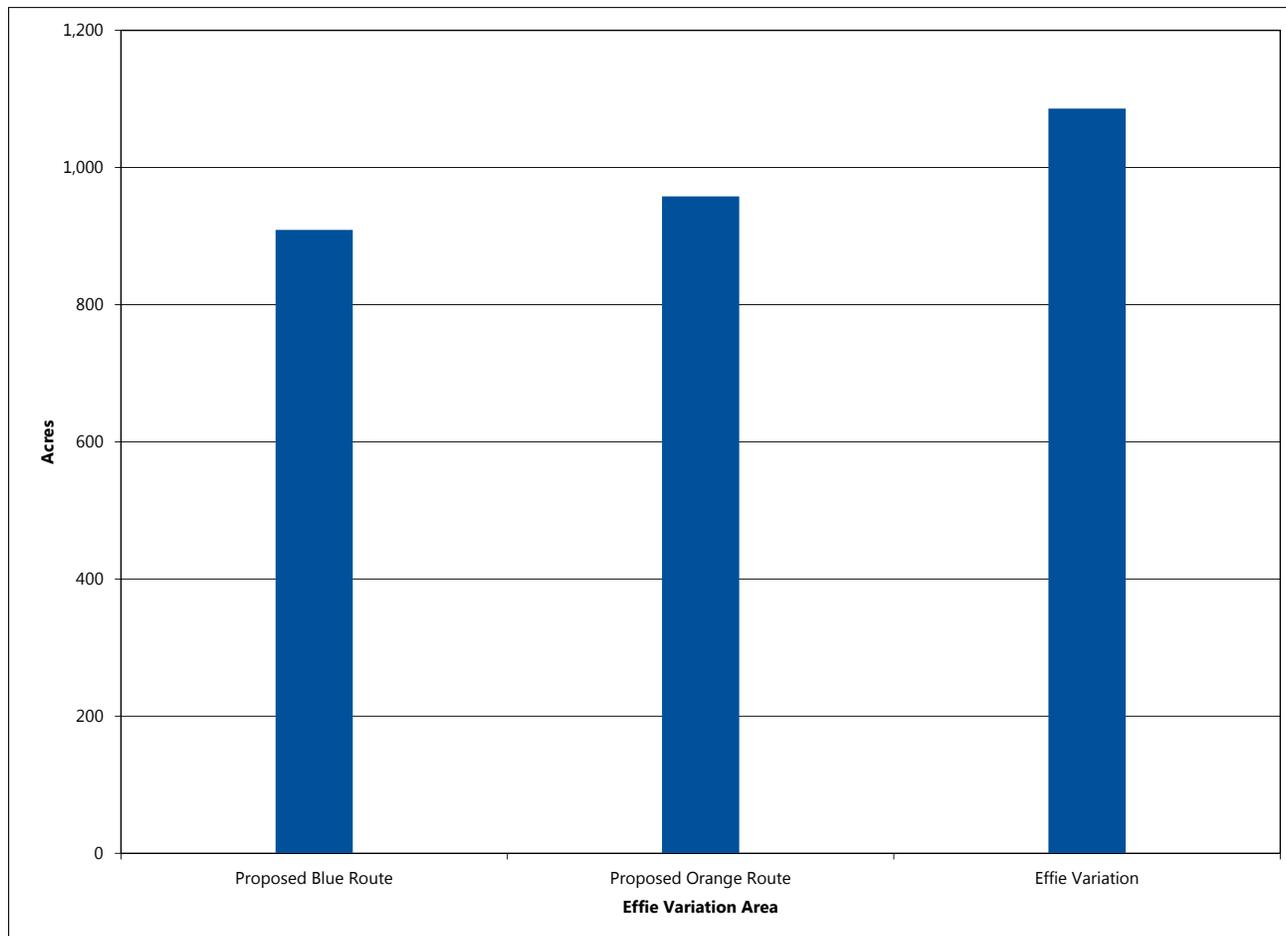
damage trees, or cause erosion. Maintenance and emergency repair activities could also result in direct adverse impacts on forest lands from the removal of vegetation, localized physical disturbance, and compaction caused by equipment. Woody vegetation would routinely need to be cleared from the transmission line ROW in order to maintain low-stature vegetation that would not interfere with the operation of the transmission line.

Potential construction, operation, maintenance, and emergency-repair short-term and long-term impacts on forestry resources are summarized in Section 5.3.2.2. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

**Mining and Mineral Resources**

As identified in Section 5.3.2.3, the ROI for evaluating mining and mineral resource impacts from the proposed Project is the ROW of the transmission line. Table 6-163, Figure 6-103, and Map 6-51 identify the acreage of mining lands with

Figure 6-102 Acres of State Forest Land within the Anticipated ROW in the Effie Variation Area



Source(s): MnDNR 2003, reference (148)

Note(s): Totals may not sum due to rounding

state mineral leases that may be impacted in the Effie Variation Area. There are no known aggregate resources in the ROI of either the proposed routes or Effie Variation.

Both of the proposed routes and the Effie Variation would traverse several acres of mining lands with active and terminated/expired state mineral leases (Table 6-163, Figure 6-103, and Map 6-51). The Effie Variation traverses the most state mineral lease lands; however, it does so adjacent to an existing transmission line corridor, while both of the proposed routes would require the creation of a new corridor through state mineral lease lands (Map 6-51).

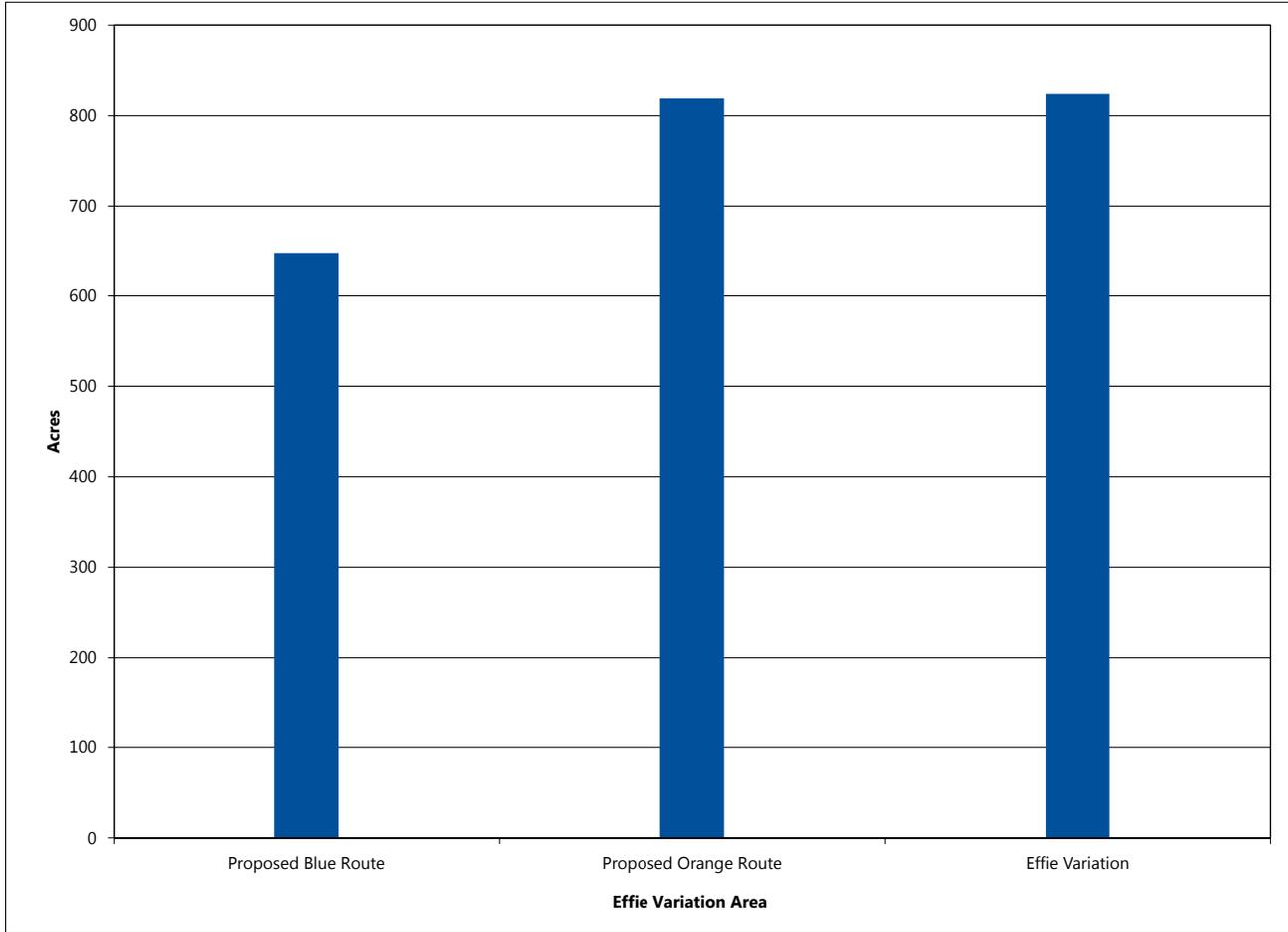
A volcanic belt with known metallic mineral occurrences (gold, copper-zinc-lead, iron) is located in the vicinity of Effie, and approximately 25 miles southeast of Effie. Zones of high mineral potential generally extend southwest to the Chippewa National Forest and northeast into the Lake Vermilion area. The proposed routes and the Effie

Variation would require crossing this volcanic belt. The MnDNR provided comments during the scoping process regarding concerns about the proposed routes and variations crossing these mineral resources. These concerns have been reflected in this EIS, via the consideration of the routing alternatives in this variation area.

As discussed in Section 5.3.2.3, construction of transmission lines could affect future mining operations if the structures interfere with access to mineable resources or the ability to remove these resources.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on mining and mineral resources are summarized in Section 5.3.2.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

Figure 6-103 Acres of State Mineral Leases within the Anticipated ROW in the Effie Variation Area



Source(s): MnDNR 2014, reference (179)

### 6.4.1.3 Archaeology and Historic Architectural Sites

As described in Section 6.2.1.3, the APE for potential direct impacts to archaeological and historic resources includes the ROW of the proposed transmission line; however, potential indirect impacts to historic architectural sites are evaluated within one mile from the anticipated alignment since visual intrusions can change the context and setting of historic architectural sites.

Table 6-164 provides a summary of the previously recorded archaeological **sites** and historic architectural resources within the ROW (direct APE) and within 1,500 feet and one mile of the anticipated alignments (indirect APE) for the Proposed Blue Route, Proposed Orange Route, and the Effie Variation in the Effie Variation Area. A more detailed description of these resources can be found in the Phase IA cultural resources survey report located in Appendix P.

To date, no specific Native American resources have been previously recorded within the ROW (direct APE for cultural resources) or within one mile of the anticipated alignment (indirect APE for historic architectural resources or Native American resources) for the Proposed Blue Route, Proposed Orange Route, and Effie Variation in the Effie Variation Area. However, DOE is continuing to consult with federally recognized Indian tribes to identify Native American resources within the direct and indirect APEs for the proposed Project.

Within the Effie Variation Area, there no previously recorded archaeological **sites** or historic architectural resources located within the ROW of the Proposed Blue Route and Proposed Orange Route; however an archaeological site is present within the ROW of the Effie Variation (Map 6-52). Site 21KCo is an artifact scatter with an unknown NRHP-**eligibility** status. In addition to the archaeological site within the ROW, the Effie Variation also has a higher number of previously recorded historic architectural sites in the indirect APE when compared to **either of the indirect APEs for the Proposed Blue Route**

**Table 6-164 Archaeological and Historic Resources within the Effie Variation Area**

| Resource                     | Evaluation Parameter <sup>(1)</sup> | Effie Variation Area |                       |                 |
|------------------------------|-------------------------------------|----------------------|-----------------------|-----------------|
|                              |                                     | Proposed Blue Route  | Proposed Orange Route | Effie Variation |
| Historic Architectural Sites | Count within ROW                    | 0                    | 0                     | 0               |
|                              | Count within 0–1,500 ft             | 1                    | 1                     | 0               |
|                              | Count within 0–5,280 ft             | 1                    | 1                     | 3               |
| Archaeological Sites         | Count within ROW                    | 0                    | 0                     | 1               |
|                              | Count within 0–1,500 ft             | 0                    | 0                     | 2               |

Source(s): SHPO 2014, reference (147); SHPO 2014, reference (155); SHPO 2014, reference (156)

Note(s): Totals may not sum due to rounding

(1) Acre/Count within a distance includes both sides of the anticipated alignment. For example, count within 0-500 ft includes 500 ft on each side of the anticipated alignment.

and Proposed Orange Route (Map 6-52). Two of the three historic architectural sites within the Effie Variation (IC-BEA-009 and IC-BEA-008) have not been evaluated for NRHP eligibility, while the remaining site (IC-CAR-008) has been recommended not NRHP-eligible. For Effie Proposed Blue Route and Orange Route, the one identified historic architectural site in the indirect APE (IC-CAR-009) has not been evaluated for NRHP eligibility.

There is currently potential for direct, long-term, adverse, **impacts** to the one archaeological site (Site 21KCo) identified within the ROW of the Effie Variation from ground disturbance activities associated with construction of the proposed Project. Indirect, long-term, **adverse visual impacts on three previously recorded historic architectural resources** have the potential to occur for the Proposed Blue Route, Orange Route, and Effie Variation. The indirect impacts are likely to occur wherever the proposed Project is visibly prominent in the landscape or a viewshed and appears inconsistent with the existing setting of the architectural resources or within views to and from the architectural resources. Since the archaeological and **historic architectural resources** within the direct and indirect APEs of the routes and variation have not been evaluated for NRHP-eligibility, the proposed Project may result in direct impacts to the archaeological feature for the Effie Variation and indirect impacts resulting from changes to the setting of the historic architectural sites in the indirect APE for the Proposed Blue Route, Orange Route, and Effie Variation that could be considered an adverse impact under Section 106 of the NHPA if these archaeological and historic architectural sites are determined NRHP-eligible and if setting is determined to be a character defining feature that contributes to the significance of the resource.

**The Proposed Blue Route, Proposed Orange Route, and Effie Variation have not been surveyed for cultural resources. As such, archaeological surveys, architectural surveys or inventories, and surveys or inventories for Native American resources will be required as part of cultural resources investigations conducted in compliance with federal and/or state regulations for archaeological resources and historic architectural sites.** These cultural resources investigations will be implemented as part of the DOE’s Draft PA (Appendix V) that will establish a process to identify cultural resources within the direct and indirect APE for the proposed Project, evaluate the NRHP-eligibility of identified cultural resources, and develop measures to avoid, minimize, and mitigate potential adverse impacts to cultural resources from and operation construction of the proposed Project.

**Potential short-term and long-term** adverse impacts from construction, operation, maintenance, and emergency repair related to historic and cultural properties are summarized in Section 5.3.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate adverse **impacts** to these resources, including TCPs, from the proposed Project.

#### 6.4.1.4 Natural Environment

This section describes the water, vegetation, and wildlife resources within the Effie Variation Area and the potential impacts from the proposed Project.

#### Water Resources

As explained in Section 5.3.4.1, the ROI for water resources was determined to be the ROW of the transmission line. Data related to the ROI for water resources in the Effie Variation Area are summarized in Table 6-165 and shown on Map 6-53. Additional,

**Table 6-165 Water Resources within the Anticipated ROW in the Effie Variation Area**

| Resource                      | Evaluation Parameter | Effie Variation Area |                       |                 |
|-------------------------------|----------------------|----------------------|-----------------------|-----------------|
|                               |                      | Proposed Blue Route  | Proposed Orange Route | Effie Variation |
| Transmission Line             | Length (mi)          | 41.1                 | 44.6                  | 49.8            |
| PWI Waters <sup>(1)</sup>     | Number of Crossings  | 10                   | 13                    | 13              |
| Non-PWI Waters <sup>(2)</sup> | Number of Crossings  | 9                    | 11                    | 15              |
| Floodplains <sup>(3)</sup>    | Acres within ROW     | 3                    | 3                     | 0               |
| NWI Wetlands                  | Acres within ROW     | 443                  | 391                   | 413             |

Sources: USFWS 1997, reference (157); USGS 2014, reference (158); USGS 2014, reference (159); Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); MnDNR 2008, reference (160); MnDNR 2008, reference (161); MnDNR 2008, reference (162); Minnesota Power 2014, reference (163)

Note(s): Totals may not sum due to rounding

- (1) PWI waters include watercourses, waterbodies, and wetlands, as described in Chapter 5. The number of each type of PWI water the Proposed Route and variations would cross are described in the text and figure below.
- (2) Non-PWI waters were calculated by removing the PWI-listed waters from the NHD dataset.
- (3) Floodplain acreage includes combined total 100-year and 500-year floodplain acreage. The acreage of floodplain by type that the Proposed Route and variations would cross is described in the text and figure below.

water resources data beyond those resources present in the ROI of this variation area are provided in Appendix E.

The number of water crossings, the need to place transmissions structures in floodplains and wetlands, and the quantity of wetland type conversion are the primary water resources impacts that would differ across the Proposed Blue Route, the Proposed Orange Route, and the Effie Variation. The Proposed Blue Route, the Proposed Orange Route, and the Effie Variation would not require crossing impaired waters.

The Proposed Blue Route, the Proposed Orange Route, and the Effie Variation would all require one or more crossings of the Bear River, Prairie River, and tributaries to the Bear River, all of which are PWI watercourses. Additional PWI waters that would be crossed by the Proposed Blue Route include the West Fork of the Prairie River, Deer Creek, Deer Lake, a tributary to the Big Fork River, and an unnamed stream. PWI watercourses that would be crossed by the Proposed Orange Route include the East River (3 crossings), Deer Creek, Day Brook (3 crossings), and a tributary to the Big Fork River. PWI watercourses crossed by the Effie Variation include the East River (3 crossings), Valley River, Venning Creek, and Day Brook. The Proposed Blue Route and Proposed Orange Route would both cross PWI Deer Lake, and the Proposed Orange Route would also cross PWI Klingendiel Lake. As shown in Figure 6-104, the Proposed Orange Route and the Variation would require the most PWI water crossings. The proposed routes and Effie Variation would not cross PWI wetlands.

The Proposed Blue Route, the Proposed Orange Route, and the Effie Variation would all cross several non-PWI watercourses and waterbodies. None

of these routes would cross ditches. As shown in Figure 6-105, the Effie Variation would cross the most non-PWI waters.

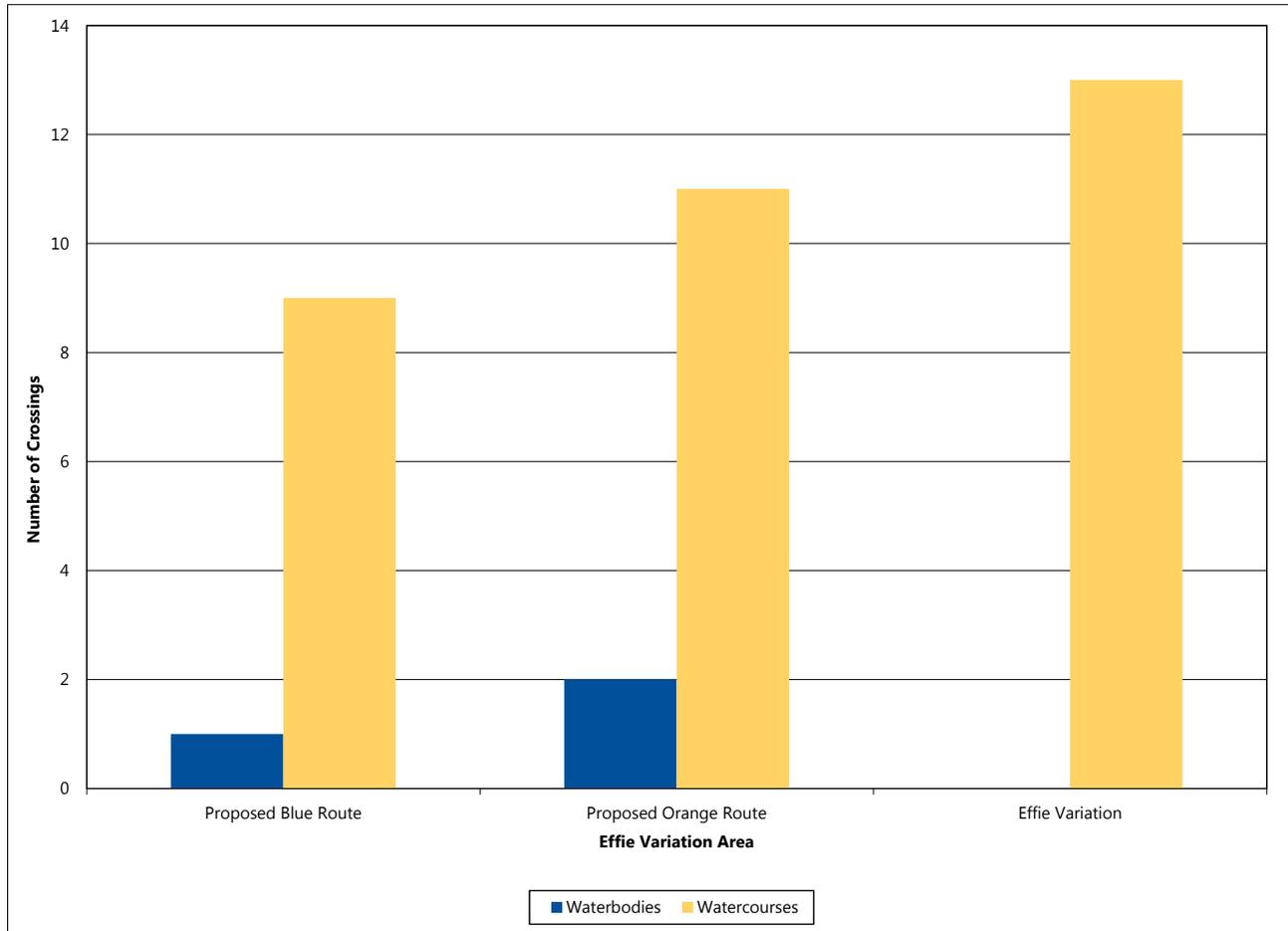
The Effie Variation would cross six MnDNR-designated trout streams: Valley River, Venning Creek, and four unnamed tributaries to the Bear River. Neither the Proposed Blue Route nor the Proposed Orange Route would cross any designated trout streams.

It is anticipated that PWI crossings, non-PWI water crossings, and trout streams are spannable (crossings would be less than the average spanning length of 1,250 feet) and transmission structures would not be placed within them.

The Effie Variation would not traverse a floodplain; however, the Proposed Blue Route and the Proposed Orange Route would cross the Zone A floodplain of an unnamed tributary to the Big Fork River. Though the Proposed Blue Route and the Proposed Orange Route would cross floodplains, the crossings would be less than the average spanning length of 1,250 feet. Therefore, it would be expected that the floodplain crossings would be spanned and transmission structures would not be placed within floodplains.

Based on the NWI, the Proposed Blue Route, the Proposed Orange Route, and the Effie Variation would all require conversion of forested and shrub wetland areas to an herbaceous wetland type through removal of woody vegetation in the ROW. As shown in Figure 6-106, the Proposed Blue Route contains the most combined forested and shrub wetland and would result in the greatest amount of wetland type conversion. While these direct, adverse

Figure 6-104 PWI Water Crossings by Type in the Effie Variation Area



Source(s): USGS 2014, reference (158); USGS 2014, reference (159); MnDNR 2008, reference (160); MnDNR 2008, reference (161); MnDNR 2008, reference (162)

Note(s): Totals may not sum due to rounding

impacts to forested and shrub wetlands would be permanent and may change wetland functions within the ROW, e.g. altering the hydrology and habitat, they are expected to be minimal because of the amount of surrounding shrub and forested wetlands in the region. Changes in wetland function are discussed in Section 5.3.4.1. The Applicant would need to mitigate for these impacts as summarized in Section 5.3.4.1. The Proposed Blue Route, Proposed Orange Route, and the Effie Variation would all require placement of fill in wetlands for construction of transmission structures, but this impact would be expected to be minimal because of its localized extent (33 square feet per structure). Impacts associated with fill would be minimized by spanning wetlands to the extent practical; however, this impact cannot be completely avoided by spanning due to the high number of wetland crossings that would be needed in the East Section. Due to the number of wetland complexes in the area, it would be expected that the Proposed Blue Route, the Proposed Orange Route, and the Effie Variation would all require temporary construction access through wetlands,

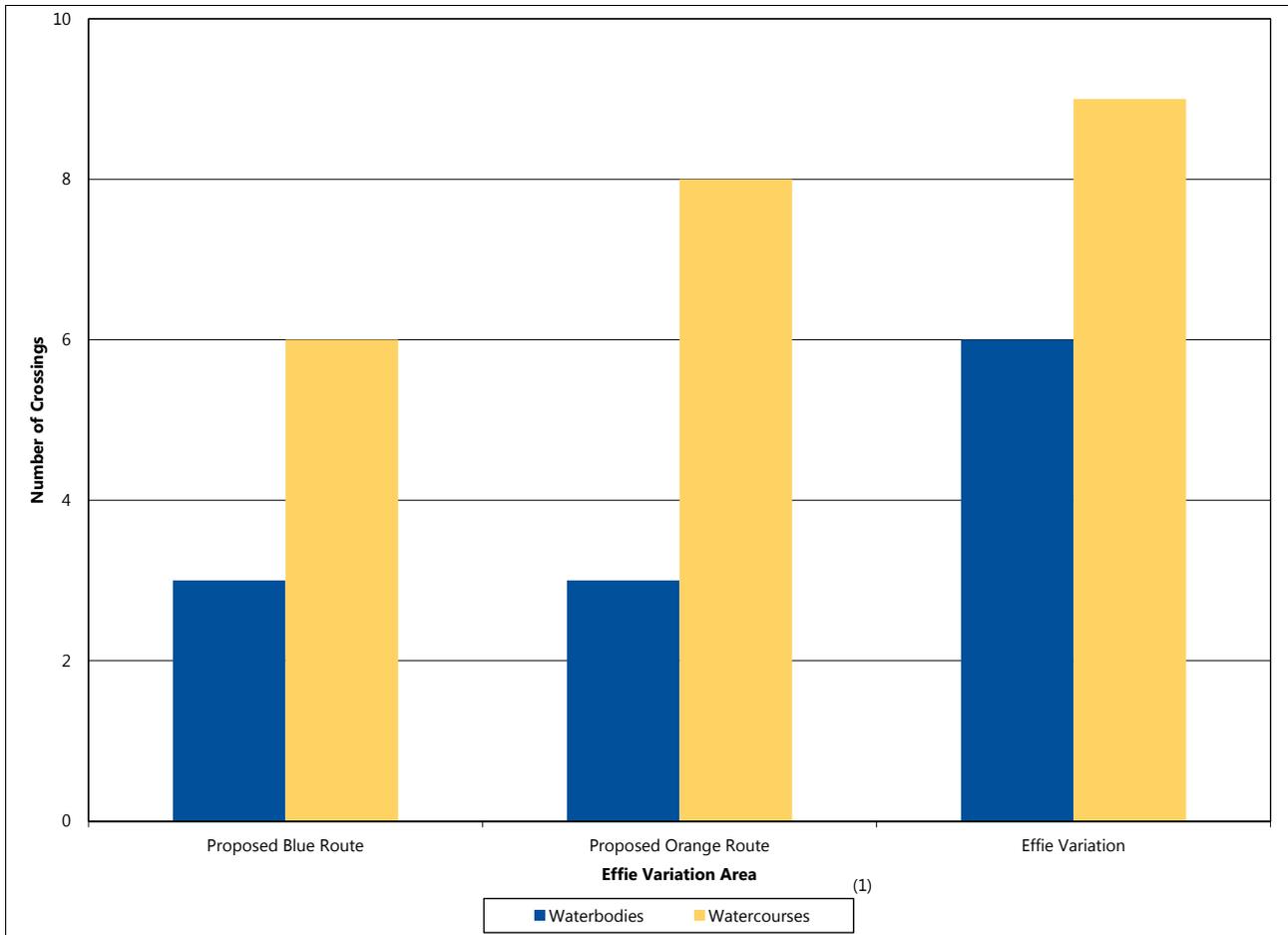
which would be expected to be minimal due to the short-term, localized nature of the impact, and the Applicant’s intended use of minimization measures, such as matting.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on water resources are summarized in Section 5.3.4.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

**Vegetation**

In Section 5.3.4.2, the ROI to assess impacts to vegetation was determined to be the ROW of the proposed transmission line. Data related to the ROI for vegetation in the Effie Variation Area are summarized in Table 6-166 and shown on Maps 5-19 and 6-53. Additional vegetation data beyond the dominant land cover types present in the ROI in this variation area are provided in Appendix E.

Figure 6-105 Non-PWI Water Crossings by Type in the Effie Variation Area



Source(s): : USGS 2014, reference (158); USGS 2014, reference (159); MnDNR 2008, reference (160); MnDNR 2008, reference (161); MnDNR 2008, reference (162)

Note(s): Totals may not sum due to rounding

(1) Non-PWI waters were calculated by removing the PWI-listed waters from the NHD dataset.

The primary impact on vegetation that would differ across the Proposed Blue Route, the Proposed Orange Route, and the Effie Variation is the loss or fragmentation of forest. As discussed in Section 5.3.4.2, the Applicant would permanently clear woody vegetation from the ROW during construction and the ROW would be maintained as low-stature vegetation in order to reduce interference with the maintenance and function of the transmission line.

As indicated in Table 6-166 and Figure 6-107, the Effie Variation would pass through more forested land, including state forest land, relative to the Proposed Blue Route and the Proposed Orange Route. Although the Proposed Blue Route and the Proposed Orange Route are shorter in length, they would require creation of new corridor for their entire length, while the Effie Variation would parallel an existing transmission line corridor for the majority of its length (Table 6-166). Because of this, the Effie Variation would likely result in

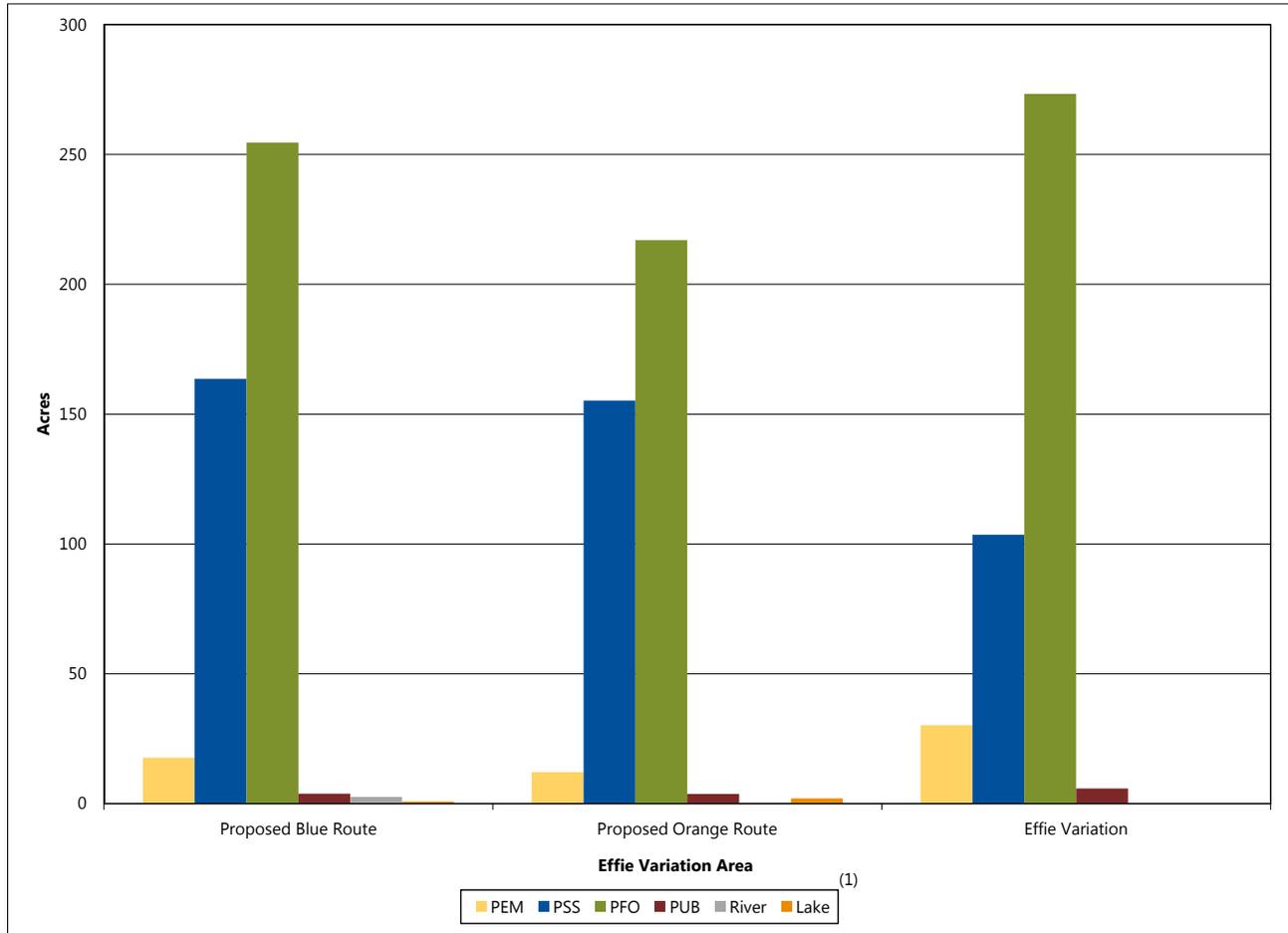
less impact on intact forested areas. While direct, adverse impacts to forested areas would be long-term, contiguous forest is abundant in the region surrounding the proposed Project (Map 5-19).

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on vegetation resources are summarized in Section 5.3.4.2. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project. Section 6.2.1.4 (Wildlife) discusses additional suggested measures to avoid, minimize, or mitigate impacts on wildlife are summarized.

**Wildlife**

The ROI for wildlife was determined in Section 5.3.4.3 to be the ROW of the proposed transmission line. Data related to wildlife resources in the Effie Variation Area are summarized in Table 6-167 and shown on Map 6-53. Additional,

Figure 6-106 Acres of Wetland by Type within the Anticipated ROW in the Effie Variation Area



Source(s): USFWS 1997, reference (157)

Note(s): Totals may not sum due to rounding

(1) Palustrine emergent wetland (PEM), palustrine shrub wetland (PSS), palustrine forested wetland (PFO), palustrine unconsolidated bottom pond (PUB).

more detailed data related to wildlife resources in this variation area are provided in Appendix E.

The primary impacts on wildlife resources that would differ between the Proposed Blue Route, the Proposed Orange Route, and the Effie Variation include loss and fragmentation of natural and managed wildlife habitat and proximity of the proposed routes and Variation to these areas. A detailed description of fragmentation is found in Section 5.3.4.3, but, in general, an increase in habitat fragmentation would result in the reduction in habitat connectivity. This reduction would have a greater impact on smaller species, such as turtles, and have less of an impact on larger animals, such as deer. While these indirect, long-term adverse impacts would be greater for the Proposed Blue Route and Proposed Orange Route, they are expected to be minimal because of the available contiguous habitat in the region. As discussed in Section 5.3.4.3, the proposed Project would expand existing corridor and/or create

new corridor; this would result in conversion from forest to low-stature open vegetation communities, favoring wildlife species that prefer more open vegetation communities. Section 6.4.1.4 (Vegetation) summarizes potential impacts on forested vegetation from the Proposed Blue Route, the Proposed Orange Route, and the Effie Variation.

The Proposed Blue Route and the Proposed Orange Route would pass through the Chippewa Plains Important Bird Area and require creation of new corridor for their entire length, while the Effie Variation avoids the Chippewa Plains Important Bird Area and would parallel an existing transmission line corridor for the majority of its length (Table 6-167; Map 6-53). Because of this, the Effie Variation would result in less fragmentation of forested habitats, and subsequent displacement of wildlife species associated with those forest communities, such as the birds associated with the Chippewa Plains Important Bird Area.

**Table 6-166 Vegetation Resources within the Anticipated ROW in the Effie Variation Area**

| Resource  | Evaluation Parameter                   | Effie Variation Area |                       |                 |
|---|--|----------------------|-----------------------|-----------------|
|   |  | Proposed Blue Route  | Proposed Orange Route | Effie Variation |
| Transmission Line                               | Length (mi)                            | 41.1                 | 44.6                  | 49.8            |
| Existing Transmission Line <sup>(1)</sup>       | Percent of Total Length <sup>(2)</sup> | 0                    | 0                     | 80              |
| State Forest                                    | Acres within ROW                       | 909                  | 958                   | 1086            |
| Total Forested GAP Land Cover                   | Acres within ROW                       | 978                  | 1047                  | 1164            |
| GAP Land Cover - Dominant Types <sup>(3)</sup>  |  |                      |                       |                 |
| North American Boreal Forest                    | Acres within ROW                       | 473                  | 569                   | 556             |
| North American Boreal Flooded and Swamp Forest  | Acres within ROW                       | 399                  | 339                   | 364             |
| Eastern North American Cool Temperate Forest    | Acres within ROW                       | 25                   | 40                    | 35              |
| Eastern North American Flooded and Swamp Forest | Acres within ROW                       | 81                   | 99                    | 208             |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); MnDNR 2003, reference (148); USGS 2001, reference (151)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.
- (3) Data presented here only includes dominant GAP types; see Appendix E for additional land cover types within the ROW.

Creation of a new corridor in the Chippewa Plains Important Bird Area would likely result in both short-term and long-term direct and indirect adverse impacts on birds and other wildlife associated with the area. The short-term indirect impacts would be associated with construction and alteration of the birds' habitat while the long-term direct impacts would be associated with the operation of the proposed Project, which could result in avian collisions and electrocutions discussed in more detail in Section 5.3.4.3. The short-term indirect impacts are expected to be minimal because of the large amount of similar habitat in the surrounding region, and the long-term direct impacts are expected to be minimized through use of Applicant-proposed minimization measures (Section 2.13).

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on wildlife resources are summarized in Section 5.3.4.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project. Section 6.2.1.4 (Wildlife) discusses additional suggested measures to avoid, minimize, or mitigate impacts on wildlife are summarized.

#### 6.4.1.5 Rare and Unique Natural Resources

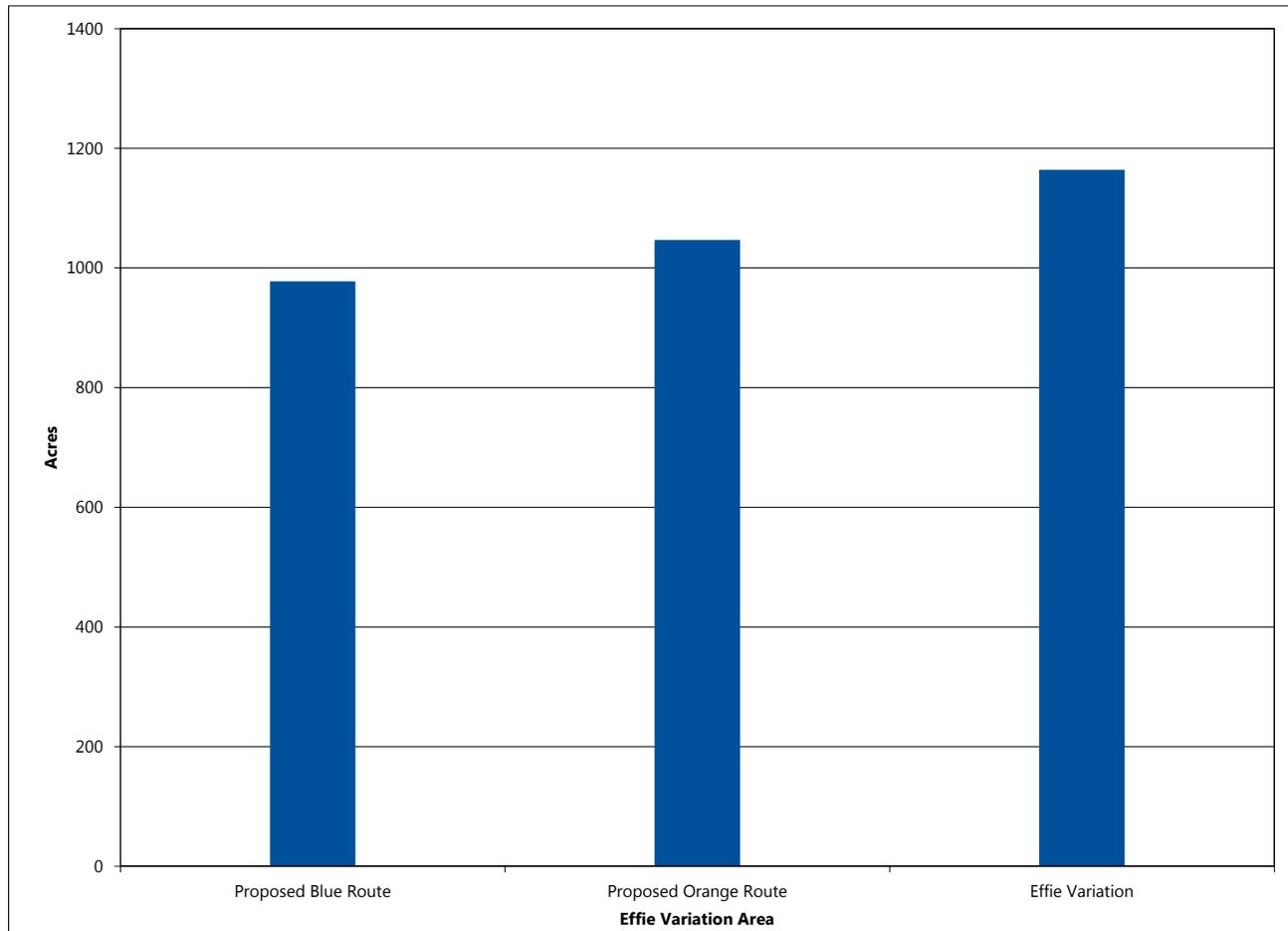
Rare and unique natural resources are divided into rare species and rare communities. Rare species encompass federally listed or state endangered, threatened, or special concern species while rare communities may include state-designated features, such as SNAs, MBS Sites of Biodiversity Significance, MnDNR High Conservation Value Forest, MnDNR Ecologically Important Lowland Conifer stands, and MBS native plant communities.

##### Rare Species

The ROI for rare species is described in Section 5.3.5, which states that for impacts to federally and state-listed species, the ROI includes a one-mile buffer surrounding the proposed routes and variations. Data related to rare species in the Effie Variation Area are summarized in Table 6-168; additional data on rare species, such as the presence of MnDNR tracked species, is provided in Appendix F. As a condition of the license agreement with MnDNR for access to the NHIS database, data pertaining to the documented locations of rare species are not shown on a map.

Proximity of state endangered, threatened, or special concern species differs between the Proposed Blue

**Figure 6-107 Acres of all Forested GAP Land Cover Types within the Anticipated ROW in the Effie Variation Area**



Source(s): USGS 2001, reference (151)

Note(s): Totals may not sum due to rounding

**Table 6-167 Wildlife Resources within the Vicinity of the Effie Variation Area**

| Resource                                  | Evaluation Parameter                   | Effie Variation Area |                       |                 |
|---|--|----------------------|-----------------------|-----------------|
|   |  | Proposed Blue Route  | Proposed Orange Route | Effie Variation |
| Transmission Line                         | Length (mi)                            | 41.1                 | 44.6                  | 49.8            |
| Existing Transmission Line <sup>(1)</sup> | Percent of Total Length <sup>(2)</sup> | 0                    | 0                     | 80              |
| Important Bird Areas                      | Acres within ROW                       | 69                   | 69                    | 0               |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); Audubon Society 2014, reference (181)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

Route, the Proposed Orange Route, and the Effie Variation. As discussed in Section 5.3.5, potential long-term impacts on rare species from the proposed Project include the direct or indirect loss of individuals or conversion of associated habitats and increased habitat fragmentation, including critical habitat designated for gray wolf.

As indicated in Table 6-168, more rare species have been documented within one mile of the Proposed Blue Route and the Proposed Orange Route relative to the Effie Variation. Furthermore, the rare species documented within one mile of the Effie Variation are aquatic species; because it is anticipated that all waterbodies and watercourses would be spanned, impacts to these aquatic species are not expected.

Two colonial waterbird nesting sites have been documented within one mile of the Effie Variation, one of which is located within 1,500 feet of the anticipated alignments. Three colonial waterbird nesting sites have been documented within one mile of the Proposed Blue Route and the Proposed Orange Route, two of which are located within 1,500 feet of the anticipated alignments. As discussed under Wildlife in Section 6.4.1.4 (Wildlife), the Proposed Blue Route and the Proposed Orange Route would also pass through the Chippewa Plains Important Bird Area (Map 6-53).

The Proposed Blue Route and the Proposed Orange Route would require establishment of new corridor for their entire length, while the Effie

Variation would parallel an existing transmission line corridor for the majority of its length. Clearing of forested areas to create new corridor could have impacts on rare species associated with forest or shrub communities. Because the Proposed Blue Route and the Proposed Orange Route would require creation of new corridor for their entire length and a higher concentration of rare species has been documented within one mile of them, the Proposed Blue Route and the Proposed Orange Route would likely result in more impacts on rare species relative to the Effie Variation; however, the full extent of potential impacts from the Proposed Blue Route, the Proposed Orange Route, and the Effie Variation cannot be determined without pre-construction field surveys, which would likely occur as a condition of a MN PUC Route Permit. The MN PUC Route Permit could also require the development of a Vegetation Management Plan as a permit condition, which could include plant surveys along the permitted ROW.

The Proposed Blue Route, Proposed Orange Route, and the Effie Variation would cross critical habitat designated for gray wolf. The Proposed Blue Route and Proposed Orange Route would both cross this habitat for approximately 15 miles, along new transmission line corridor, while the Effie Variation would cross this habitat for approximately 25 miles and would parallel an existing transmission line corridor. Although the Effie Variation would cross more critical habitat designated for gray wolf

**Table 6-168 Rare Species Documented within One Mile of the Anticipated ROW in the Effie Variation Area**

| Scientific Name <sup>(1)</sup>           | Common Name                     | Federal Status | State Status    | Type              | Effie Variation Area |                       |                 |
|--|---------------------------------|----------------|-----------------|-------------------|----------------------|-----------------------|-----------------|
|  |                                 |                |                 |                   | Proposed Blue Route  | Proposed Orange Route | Effie Variation |
| <i>Eleocharis robbinsii</i>              | Robbin's Spike-rush             | None           | Threatened      | Vascular Plant    | X                    |                       |                 |
| <i>Carex ormostachya</i>                 | Necklace Spike Sedge            | None           | Special Concern | Vascular Plant    |                      | X                     |                 |
| <i>Lasmigona compressa</i>               | Creek Heelsplitter              | None           | Special Concern | Mussel            | X                    | X                     | X               |
| <i>Ligumia recta</i>                     | Black Sandshell                 | None           | Special Concern | Mussel            | X                    | X                     |                 |
| <i>Najas gracillima</i>                  | Thread-like Naiad               | None           | Special Concern | Vascular Plant    |                      | X                     | X               |
| <i>Najas guadalupensis ssp. olivacea</i> | Guadalupe waternymph            | None           | Special Concern | Vascular Plant    | X                    | X                     |                 |
| Colonial Waterbird Nesting Area          | Colonial Waterbird Nesting Site | --             | --              | Animal Assemblage | X                    | X                     | X               |

Source(s): MnDNR 2015, reference (132)

(1) Canada lynx and gray wolf records are not documented in the NHIS database.

than the proposed routes, it would be expected to have less potential impact on this resource because it would cross in an area where critical habitat designated for gray wolf has already been fragmented.

Any indirect impacts to rare species from the proposed Project are expected to be minimal because of the amount of surrounding habitat. Through use of Applicant proposed avoidance and minimization measures, direct impacts to rare species are not expected. DOE’s informal consultation under Section 7 of the ESA with USFWS is currently on-going and a Biological Assessment has been prepared to assess potential impacts on federally listed species (Appendix R).

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on rare species are summarized in Section 5.3.5. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

**Rare Communities**

The ROI for the analysis of impacts to rare communities was described within Section 5.3.5 and includes the ROW of the proposed transmission line. Data related to rare communities and resources in the Effie Variation Area are summarized in Table 6-169 and shown on Map 6-54; additional, more detailed data on rare communities and resources is provided in Appendix E.

The primary impact on rare communities and resources that would differ across the Proposed Blue Route, the Proposed Orange Route, and the Effie Variation is the loss or conversion of native vegetation. As discussed in Section 5.3.5, the

Applicant would permanently remove vegetation at each structure footprint and within portions of the ROW that are currently dominated by forest or other woody vegetation.

As indicated on Map 6-54 and in Table 6-169, the Proposed Orange Route would pass through the most MBS Sites of Biodiversity Significance. The Effie Variation would parallel an existing transmission line corridor for much of its length, while the Proposed Blue Route and the Proposed Orange Route would require creation of new corridor for their entire length. Because of this, the Proposed Blue Route and the Proposed Orange Route would result in more fragmentation of intact forest in areas where forest vegetation is present.

The rare communities and resources listed in Table 6-169 and detailed above show that the proposed Project may result in direct, long-term, localized adverse impacts to rare communities. Some of these impacts may also have regional effects, because of the limited regional abundance and distribution of some of the rare communities affected. Therefore, adverse impacts to rare communities are expected to be significant if localized adverse impacts would result in a broader regional depletion of certain rare communities. The MN PUC Route Permit could require the development of a Vegetation Management Plan as a permit condition, which could include plant surveys along the permitted ROW.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on rare communities are summarized in Section 5.3.5. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

**Table 6-169 Rare Communities and Resources within the Vicinity of the Effie Variation Area**

| Resource  | Evaluation Parameter                   | Effie Variation Area |                       |                 |
|---|--|----------------------|-----------------------|-----------------|
|   |  | Proposed Blue Route  | Proposed Orange Route | Effie Variation |
| Transmission Line                                     | Length (mi)                            | 41.1                 | 44.6                  | 49.8            |
| Existing Transmission Line <sup>(1)</sup>             | Percent of Total Length <sup>(2)</sup> | 0                    | 0                     | 80              |
| MBS Sites of Biodiversity Significance <sup>(3)</sup> | Acres within ROW                       | 422                  | 490                   | 427             |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); MBS 2015, reference (167)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.
- (3) MBS Sites of Biodiversity Significance data are preliminary in this portion of the proposed Project. Because of the preliminary status and/or unknown ranks, biodiversity significance ranks are not distinguished from one another here.

**6.4.1.6 Corridor Sharing**

Sharing or paralleling existing corridors or linear features minimizes fragmentation of the landscape and can minimize impacts to adjacent property. The ROI for the analysis of corridor sharing generally includes infrastructure corridors within approximately 0.25 miles of the proposed routes and variations, as described in Section 5.3.6. Map 6-55 shows areas where the proposed route and variations would parallel corridors with existing transportation, transmission line, or other linear features in the Effie Variation Area.

Table 6-170 identifies the percentage of total transmission line length that the Proposed Blue Route, Proposed Orange Route, and Effie Variation parallel an existing corridor or linear feature in the Effie Variation Area.

The Effie Variation would parallel an existing transmission line corridor for over two thirds of its length (Table 6-170 and Figure 6-108). The Proposed Blue Route parallels existing corridors or linear features for less than one-tenth of its length and the Proposed Orange Route would parallel existing corridors or linear features for just under one-fifth of its length (Table 6-170 and Figure 6-108).

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on corridor sharing are summarized

in Section 5.3.6. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on corridor sharing from the proposed Project.

**6.4.1.7 Electrical System Reliability**

As explained in Section 5.3.7, the ROI for Electrical System Reliability was determined to be the corridors for the existing transmission lines. Data related to electrical system reliability in the Effie Variation Area are shown on Map 6-55.

The Proposed Blue Route and the Proposed Orange Route would not parallel an existing transmission line in the Effie Variation Area. The Effie Variation, however, would parallel the 500 kV and 230 kV transmission lines for 80 percent of its length. (Table 6-170) Therefore, the Effie Variation would result in three parallel high-voltage transmission lines in adjacent corridors in this area.

The configuration of the Effie Variation may decrease the reliability of the proposed Project. When facilities are located in close proximity, there is a greater risk that a single event can take out multiple lines. Additionally, the close proximity of the lines can make repairing the lines more difficult. These difficulties could increase outage times, should an outage occur. Adverse impacts are possible as a result of the operation of three high-voltage transmission lines under one variation in the East Section.

**Table 6-170 Corridor Sharing in the Effie Variation Area**

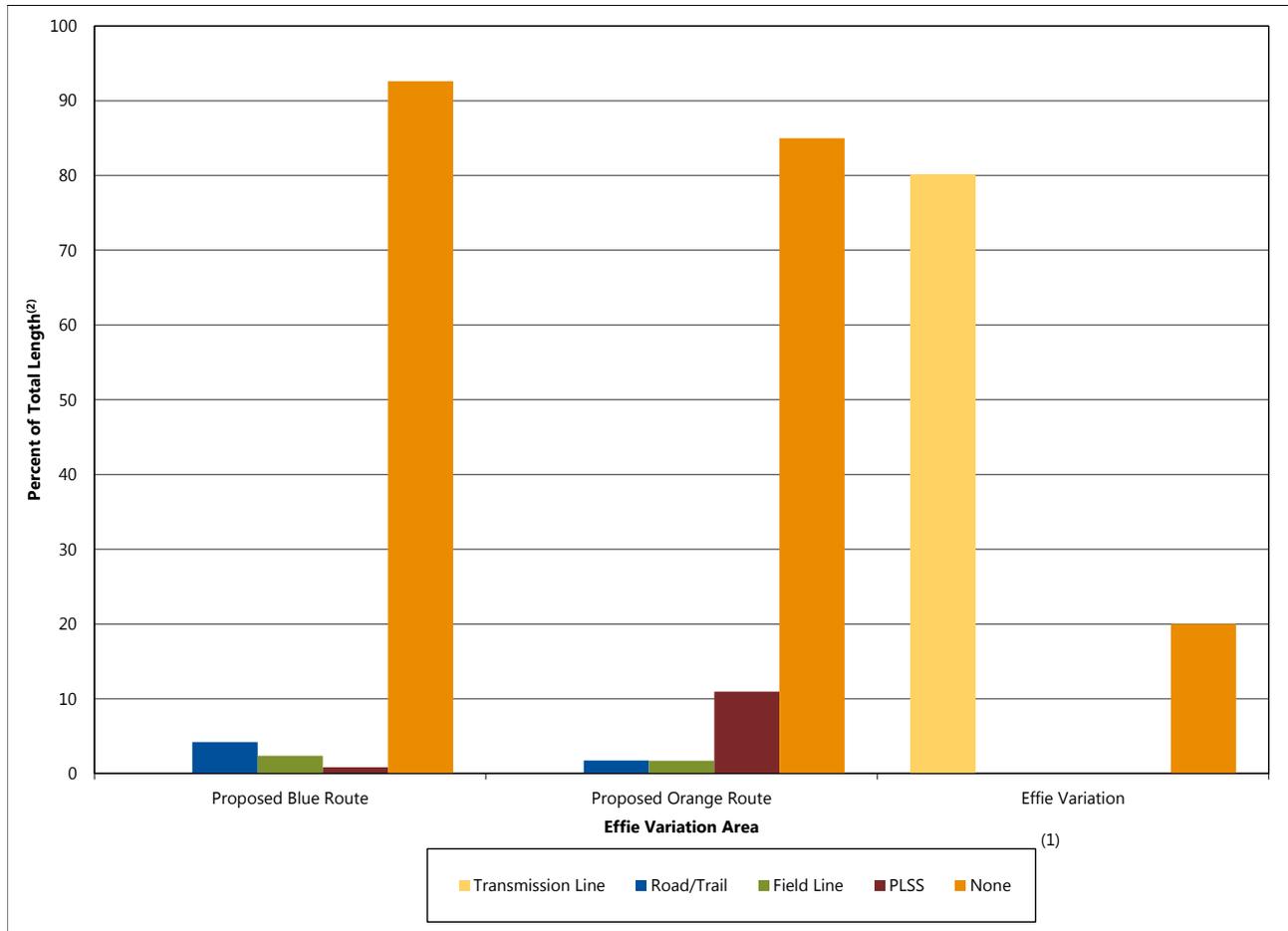
| Feature Sharing Corridor <sup>(1)</sup>  | Evaluation Parameter                   | Effie Variation Area |                       |                 |
|--|--|----------------------|-----------------------|-----------------|
|  |  | Proposed Blue Route  | Proposed Orange Route | Effie Variation |
| Transmission Line (other linear features may be present within the transmission line corridor; i.e., road, trail, field line, PLSS)      | Percent of Total Length <sup>(2)</sup> | 0                    | 0                     | 80              |
| Road/Trail (other linear features, but not transmission lines, may be present within the road/trail corridor; i.e., PLSS, field line)    | Percent of Total Length <sup>(2)</sup> | 4                    | 2                     | 0               |
| Field Line (other linear features, but not transmission lines or road/trails, may be present within the field line corridor; i.e., PLSS) | Percent of Total Length <sup>(2)</sup> | 2                    | 2                     | 0               |
| PLSS Only  | Percent of Total Length <sup>(2)</sup> | 1                    | 11                    | 0               |
| None   | Percent of Total Length <sup>(2)</sup> | 93                   | 85                    | 20              |

Source(s): : USDA et al 2013, reference (170); MN DOC 2014, reference (145); MNDOT 2010, reference (171); MnDNR 2010, reference (172); MnDNR 2009 reference (173); MnDNR et al 2014, reference (174); MnDNR et al 2013, reference (175); MnDNR 2013, reference (176); MnDNR et al 2009, reference (177)

Note(s): Totals may not sum due to rounding

- (1) More than one feature may share the corridor; the primary feature within the corridor is identified, other features that may share the corridor are listed in parenthesis. Appendix E provides a detailed summary of all shared features.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

Figure 6-108 Corridor Sharing in the Effie Variation Area



Source(s): USDA et al 2013, reference (170); MN DOC 2014, reference (145); MNDOT 2010, reference (171); MnDNR 2010, reference (172); MnDNR 2009 reference (173); MnDNR et al 2014, reference (174); MnDNR et al 2013, reference (175); MnDNR 2013, reference (176); MnDNR et al 2009, reference (177)

Note(s): Totals may not sum due to rounding

- (1) Transmission Line (other linear features may be present within the transmission line corridor; i.e., road, trail, field line, PLSS); Road Trail (other linear features, but not transmission lines, may be present within the road/trail corridor; i.e., PLSS, field line); Field Line (other linear features, but not transmission lines or roads/trails, may be present within the field line corridor; i.e., PLSS).
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on electrical system reliability are summarized in Section 5.3.7. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on electrical system reliability.

#### 6.4.1.8 Costs of Constructing, Operating, and Maintaining the Facility which are Dependent on Design and Route

Information related to construction, operation, and maintenance costs associated with the proposed Project is provided in Section 5.3.8. Table 6-171 summarizes the costs associated with constructing the Proposed Blue Route, Proposed Orange Route, and Effie Variation in the Effie Variation Area. As

indicated in Table 6-171, the Effie Variation would cost the most to construct, while the Proposed Blue Route would cost the least to construct.

The cost for routine maintenance would depend on the topology and the type of maintenance required, but typically runs from \$1,100 to \$1,600 per mile annually (Minnesota Power 2013). Using the \$1,600 per mile for operation and maintenance, the estimated cost would range from \$65,000 to \$80,000 annually for these alternatives in the Effie Variation Area.

#### 6.4.2 East Bear Lake Variation Area

The East Bear Lake Variation Area encompasses two route alternatives: the Proposed Orange Route and the East Bear Lake Variation. This section provides a comparison of the potential impacts resulting

from construction, operation, maintenance, and emergency repair of the proposed Project within the East Bear Lake Variation Area, depending on the route or variation considered.

#### 6.4.2.1 Human Settlement

This section describes the aesthetic resources and zoning and land use compatibility within the East Bear Lake Variation Area and the potential impacts from the proposed Project.

#### Aesthetics

As described in the Aesthetics discussion for the Effie Variation Area (see Section 6.4.1.1), impacts on aesthetic resources would be determined based largely on the level of increased contrast produced by the proposed Project in views by sensitive viewers. Residences and other aesthetic resources within 1,500 feet of the anticipated alignment would have a high probability of having views of the proposed Project and as described in Section 5.3.1.1, this distance is considered the ROI. Data related to aesthetic resources in the East Bear Lake Variation Area are summarized in Table 6-172 and shown on Maps 6-56, 6-57, 6-58, and 6-60.

As indicated in Table 6-172 for the East Bear Lake Variation Area, the Proposed Orange Route and East Bear Lake Variation would cross or be located within 1,500 feet of aesthetic resources with high visual sensitivity, including snowmobile trails, a state trail, water access point, and a state forest. Both the Proposed Orange Route and East Bear Lake Variation would cross three snowmobile trails, one state trail, and one state forest (Maps 6-58 and 6-60). In addition, the East Bear Lake Variation would cross within 1,500 feet of a water access point for Little Moose Lake (Map 6-58). The Proposed Orange Route and East Bear Lake Variation would affect similar numbers of aesthetic resources. Neither the Proposed Orange Route nor East Bear Lake Variation would be located within 1,500 feet of any residences, which also have high visual sensitivity.

The East Bear Lake Variation is slightly longer (10.5 miles) than the Proposed Orange Route (8.9 miles; Table 6-172). However, the East Bear Lake Variation parallels two existing adjacent large transmission lines (a 500 kV and a 230 kV transmission line) for 42 percent of its length, whereas the Proposed Orange Route does not parallel any existing large transmission lines and would require a new corridor to be cleared. By paralleling two existing large

**Table 6-171 Construction Costs in the Effie Variation Area**

| Variation Area | Name in the EIS       | Cost (Total) | Average Cost (per mile) | Length (mi) |
|----------------|-----------------------|--------------|-------------------------|-------------|
| Effie          | Proposed Blue Route   | \$46,649,600 | \$1,135,027             | 41.1        |
|                | Proposed Orange Route | \$49,488,323 | \$1,109,604             | 44.6        |
|                | Effie Variation       | \$57,353,305 | \$1,149,365             | 49.8        |

Source(s): Minnesota Power 2015, reference (9); Minnesota Power 2015, reference (186)

**Table 6-172 Aesthetic Resources within the ROI in the East Bear Lake Variation Area**

| Resource                                  | Evaluation Parameter <sup>(1)</sup>    | East Bear Lake Variation Area |                          |
|---|--|-------------------------------|--------------------------|
|   |  | Proposed Orange Route         | East Bear Lake Variation |
| Transmission Line                         | Length (mi)                            | 8.9                           | 10.5                     |
| Existing Transmission Line <sup>(2)</sup> | Percent of Total Length <sup>(3)</sup> | 0                             | 42                       |
| State Trails                              | Count within 0–1,500 ft                | 1                             | 1                        |
| State Forests                             | Count within 0–1,500 ft                | 1                             | 1                        |
| Snowmobile Trails                         | Count within 0–1,500 ft                | 3                             | 3                        |
| Water Access Points                       | Count within 0–1,500 ft                | 0                             | 1                        |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); MnDNR 2003, reference (182); MnDNR 2003, reference (148); MnDNR 2010, reference (150); MnDNR 2003, reference (190)

Note(s): Totals may not sum due to rounding

- (1) Acre/Count within a distance includes both sides of the anticipated alignment. For example, count within 0–500 ft includes 500 ft on each side of the anticipated alignment.
- (2) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (3) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

transmission lines, the East Bear Lake Variation would produce substantially less contrast than the Proposed Orange Route.

Although the East Bear Lake Variation would be slightly longer (10.5 miles) and affects one additional aesthetic resource (water access point), it would produce substantially less contrast than the Proposed Orange Route because of the existing transmission lines. By paralleling multiple existing large transmission lines for a large portion of its length that are already visible from many of the aesthetic resources, it is likely that the addition of a third large transmission line adjacent to the existing transmission lines would result in only an incremental increase in contrast for views of the new transmission line. The incremental increase in contrast would be slightly greater where the new transmission line is located between the existing transmission lines and viewers and slightly less where the new transmission line is located on the opposite side of the existing transmission line from viewers. For these reasons, the East Bear Lake Variation would result in less aesthetic impact than the Proposed Orange Route in the East Bear Lake Variation Area.

The Proposed Orange Route does not parallel an existing large transmission line of similar size and design, it is short in length (8.9 miles) and affects no residences and only a few other sensitive visual resources (one state trail, one state forest, and three snowmobile trails). Although the East Bear Lake Variation is longer in length, it parallels an existing large transmission line for 42 percent of its length, and affects no residences, and affects only a few other sensitive visual resources (one state trail, one state forest, three snowmobile trails, and one water access point), potential aesthetic impacts of the East Bear Lake Variation are expected to be minimal.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on aesthetics are summarized in Section 5.3.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

**Land Use Compatibility**

As explained in Section 5.3.1.1, the ROI for Land Use Compatibility was determined to be 1,500 feet from the anticipated alignments of the proposed Project.

**Land Uses**

Table 6-173 identifies the amount of each type of land cover within 1,500 feet of the anticipated alignments of the Proposed Orange Route and East Bear Lake Variation in the East Bear Lake Variation Area. Generally, the percentage of each land use is representative of what is present within the ROW. The various land uses present in the East Bear Lake Variation Area are shown in Map 5-19 and residences, churches, cemeteries, and airports near the Proposed Orange Route and East Bear Lake Variation are shown on Map 6-56.

The Proposed Orange Route and East Bear Lake Variation ROI are both primarily composed of forested and/or swamp land (Table 6-173). The East Bear Lake Variation ROW contains a greater amount of forested/swamp and developed or disturbed land than the Proposed Orange Route.

**Land Ownership and Management**

Table 6-174 and Figure 6-109 show that the East Bear Lake Variation ROW contains more state forest land and state fee land than the Proposed Orange Route. No impacts to county lands, state conservation easements, or USFWS Interest Lands

**Table 6-173 Land Uses within the ROI in the East Bear Lake Variation Area**

| Resource   | Type <sup>(1)</sup>    | Evaluation Parameter <sup>(2)</sup> | East Bear Lake Variation Area |                          |
|--|------------------------|-------------------------------------|-------------------------------|--------------------------|
|  |                        |                                     | Proposed Orange Route         | East Bear Lake Variation |
| GAP Land Cover Vegetation Class Level - Division 4 | Total                  | Acres within 0–1,500 ft             | 3,407                         | 3,981                    |
|  | Developed or Disturbed | Acres within 0–1,500 ft             | 19                            | 58                       |
|  | Agricultural           | Acres within 0–1,500 ft             | 0                             | 0                        |
|  | Forested and/or Swamp  | Acres within 0–1,500 ft             | 3,381                         | 3,910                    |
|  | Other                  | Acres within 0–1,500 ft             | 7                             | 13                       |

Source(s): USGS 2001, reference (151)

Note(s): Totals may not sum due to rounding

- (1) Other category includes: Open water, Great Plains Grassland and Shrubland and Introduced and Semi Natural Vegetation. See detailed summary of all types in Appendix E.
- (2) Acre/Count within a distance includes both sides of the anticipated alignment. For example, count within 0-500 ft includes 500 ft on each side of the anticipated alignment.

**Table 6-174 Land Ownership/Management within the Anticipated ROW in the East Bear Lake Variation Area**

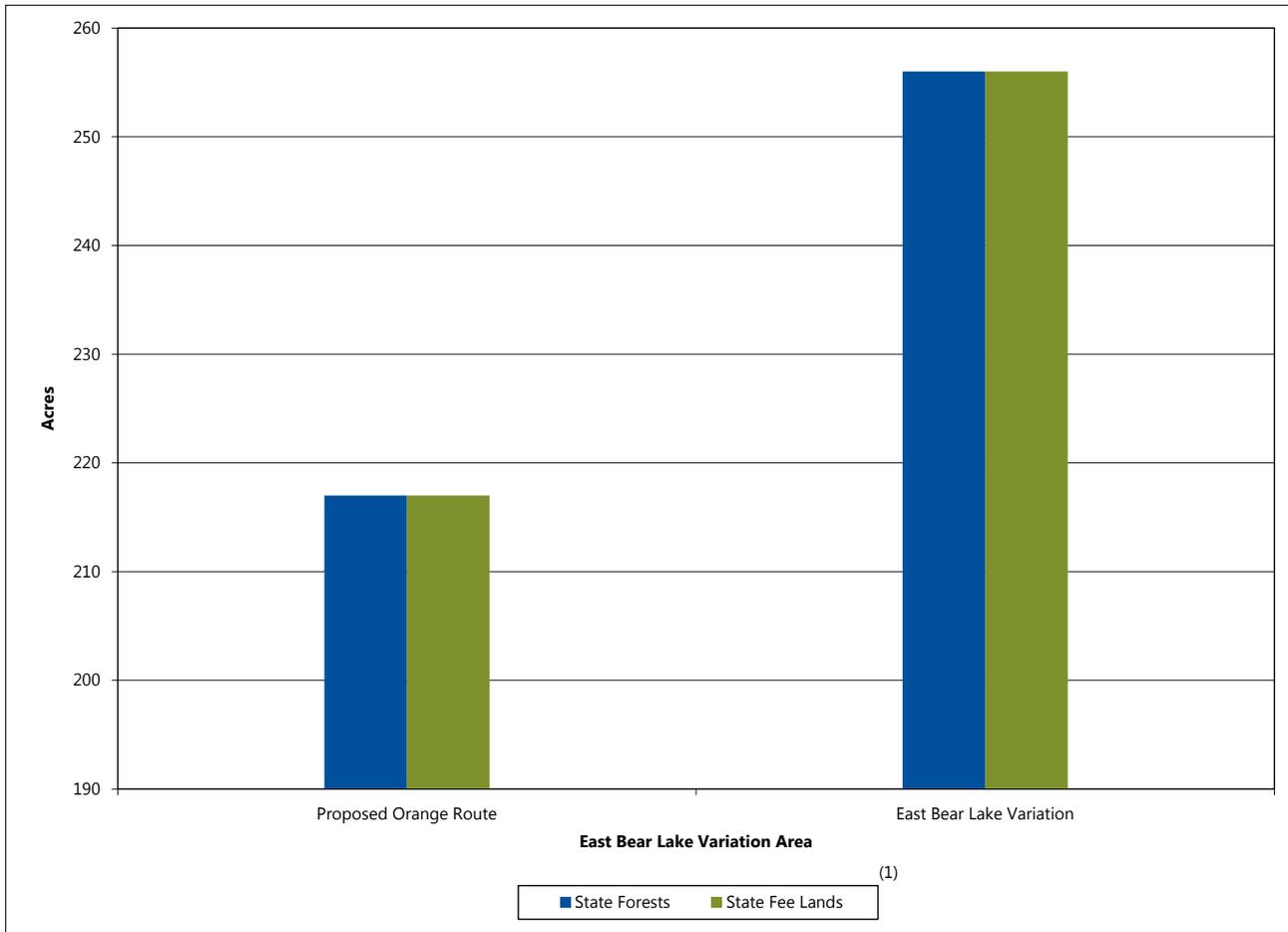
| Resource                               | Type                                    | Evaluation Parameter | East Bear Lake Variation Area |                          |
|--|---|----------------------|-------------------------------|--------------------------|
|  |   |                      | Proposed Orange Route         | East Bear Lake Variation |
| Total Lands                            | --                                      | Acres within ROW     | 217                           | 256                      |
| State Forests                          | --                                      | Acres within ROW     | 217                           | 256                      |
| State Fee Lands <sup>(1)</sup> Total   | --                                      | Acres within ROW     | 217                           | 256                      |
| State Fee Lands <sup>(1)</sup> by Type | Consolidated Conservation               | Acres within ROW     | 0                             | 0                        |
|  | Other - Acquired, Tax Forfeit, Volstead | Acres within ROW     | 164                           | 180                      |
|  | Trust Fund                              | Acres within ROW     | 52                            | 76                       |
|  | Federal - State Lease                   | Acres within ROW     | 0                             | 0                        |
| Private Lands                          | --                                      | Acres within ROW     | 0                             | 0                        |

Source(s): MnDNR 2003, reference (148); MnDNR 2014, reference (152)

Note(s): Totals may not sum due to rounding

- (1) This dataset represents state land ownership using public land survey quarter-quarter sections as the smallest unit. In some cases, multiple state lands are located within a single quarter-quarter section. Therefore, features may be duplicated and the analysis results may over-represent potential impacts.
- (2) Acreage for private lands was calculated as the difference between total lands and public lands.

**Figure 6-109 Public Land Ownership/Management within the ROI in the East Bear Lake Variation Area**



Source(s): MnDNR 2003, reference (148); MnDNR 2014, reference (152)

Note(s): Totals may not sum due to rounding

- (1) This dataset represents state land ownership using public land survey quarter-quarter sections as the smallest unit. In some cases, multiple state lands are located within a single quarter-quarter section. Therefore, features may be duplicated and the analysis results may over-represent potential impacts.

would occur under the Proposed Orange Route or the East Bear Lake Variation Area.

The Proposed Orange Route would not parallel an existing corridor, however, approximately 42 percent of the East Bear Lake Variation would parallel an existing corridor (see Section 6.4.2.6); and therefore would be expected to have less incompatibility with surrounding land uses compared to the Proposed Orange Route.

Impacts to land use from the proposed Project in the East Bear Lake Variation Area would be similar to those described in Section 6.2.1.1. The Proposed Orange Route and East Bear Lake Variation would both result in a long-term change in land use for areas currently forested and/or swamp land, but these changes would be limited in extent, and there would still be extensive forest and swamp lands in the surrounding area; so these changes are expected to have a minimal impact on land use. The length of the route that would parallel an existing corridor is also important. The Proposed Orange Route avoids a greater amount of state forest and state fee lands than the East Bear Lake Variation thereby avoiding long-term changes to land use. However, the Proposed Orange Route does not parallel an existing corridor, while the East Bear Lake Variation does for approximately 42 percent of its length.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on land use are summarized in Section 5.3.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

### 6.4.2.2 Land-Based Economies

This section describes the land-based economy resources, including agriculture, forestry, and mining, within the East Bear Lake Variation Area and the potential impacts from the proposed Project on those resources. Data related to land-based economy resources in the East Bear Lake Variation Area are summarized in Table 6-175.

#### Agriculture

As identified in Section 5.3.2.1, the ROI for evaluating agricultural impacts is the ROW of the transmission line. Table 6-175 and Figure 6-110 show the acreage of USDA-NRCS-classified prime farmland, prime farmland if drained, and farmland of statewide importance that would be impacted by the Proposed Orange Route and East Bear Lake Variation in the ROI.

The East Bear Lake Variation would pass through more acres of farmland, including prime farmland (Figure 6-110). The Proposed Orange Route and East Bear Lake Variation would not impact any acres of statewide importance. The East Bear Lake Variation, because it parallels existing corridors for close to half of its length, may have fewer impacts on farmland.

As discussed in Section 5.3.2.1, construction activities could limit the use of fields or could affect crops and soil by compacting soil, generating dust, damaging crops or drain tile, or causing erosion. Construction activities would also cause long-term adverse impacts to agriculture by the potential loss of income due to the removal of farmland for transmission line structures and associated facilities. Maintenance and emergency repair activities could result in direct adverse impacts on farmlands from the removal of crops, localized physical disturbance, and soil compaction caused by equipment.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on agricultural resources are summarized in Section 5.3.2.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

#### Forestry

As identified in Section 5.3.2.2, the ROI for evaluating forestry impacts from the proposed Project is the ROW of the transmission line. Table 6-175 identifies the acreage of state forest land that would be impacted in the ROI by the Proposed Orange Route and the East Bear Lake Variation. There are no USDA-USFS national forest lands within the ROI of the Proposed Orange Route or the East Bear Lake Variation in the East Bear Lake Variation Area.

The East Bear Lake Variation would pass through more acres of state forest lands – the George Washington State Forest (Figure 6-111, Map 6-58). The East Bear Lake Variation, because it parallels existing corridors for close to one-half of its length, would be expected to have the fewest impacts on timber activities in the George Washington State Forest.

As discussed in Section 5.3.2.2, construction activities could limit timber harvesting efforts, affect timber stands and soil by compaction, damage trees, or cause erosion. Maintenance and emergency repair activities could also result in direct adverse impacts on forest lands from the removal of vegetation, localized physical disturbance,

Table 6-175 Land-Based Economy Resources within the Anticipated ROW in the East Bear Lake Variation Area

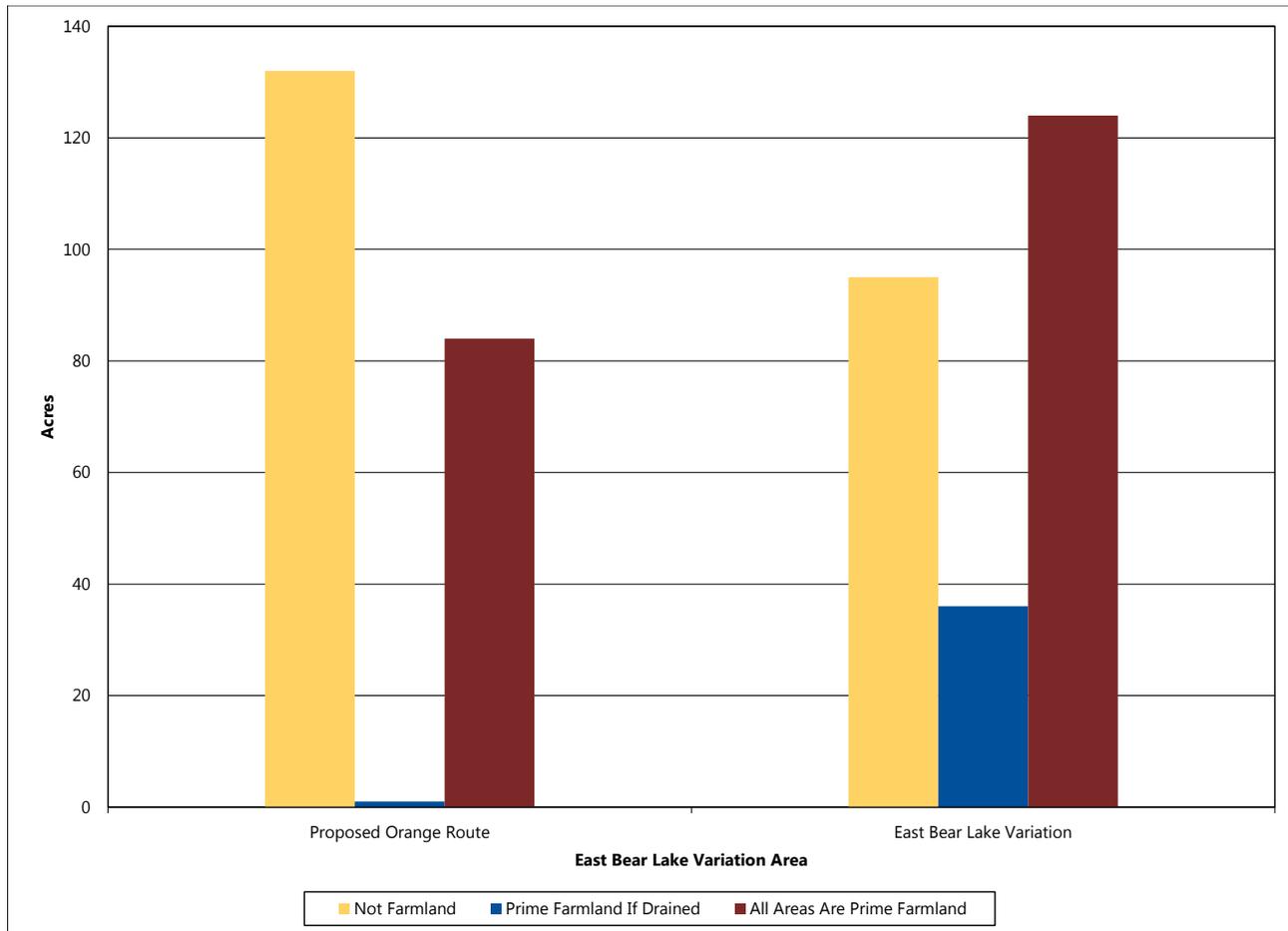
| Resource  | Type                             | Evaluation Parameter                   | East Bear Lake Variation Area |                          |
|---|----------------------------------|--|-------------------------------|--------------------------|
|   |                                  |  | Proposed Orange Route         | East Bear Lake Variation |
| Transmission Line                                       | --                               | Length (mi)                            | 8.9                           | 10.5                     |
| Existing Transmission Line <sup>(1)</sup>               | --                               | Percent of Total Length <sup>(2)</sup> | 0                             | 42                       |
| Farmland  | Not Farmland                     | Acres within ROW                       | 132                           | 95                       |
|   | Prime Farmland if Drained        | Acres within ROW                       | 1                             | 36                       |
|   | Farmland of Statewide Importance | Acres within ROW                       | 0                             | 0                        |
|   | All Areas are Prime Farmland     | Acres within ROW                       | 84                            | 124                      |
| State Forest  | --                               | Acres within ROW                       | 217                           | 256                      |
| State Mineral Leases (active and/or expired/terminated) | --                               | Acres within ROW                       | 96                            | 193                      |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); USDA NRCS 2014, reference (154); MnDNR, reference (148); MnDNR 2014, reference (179)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

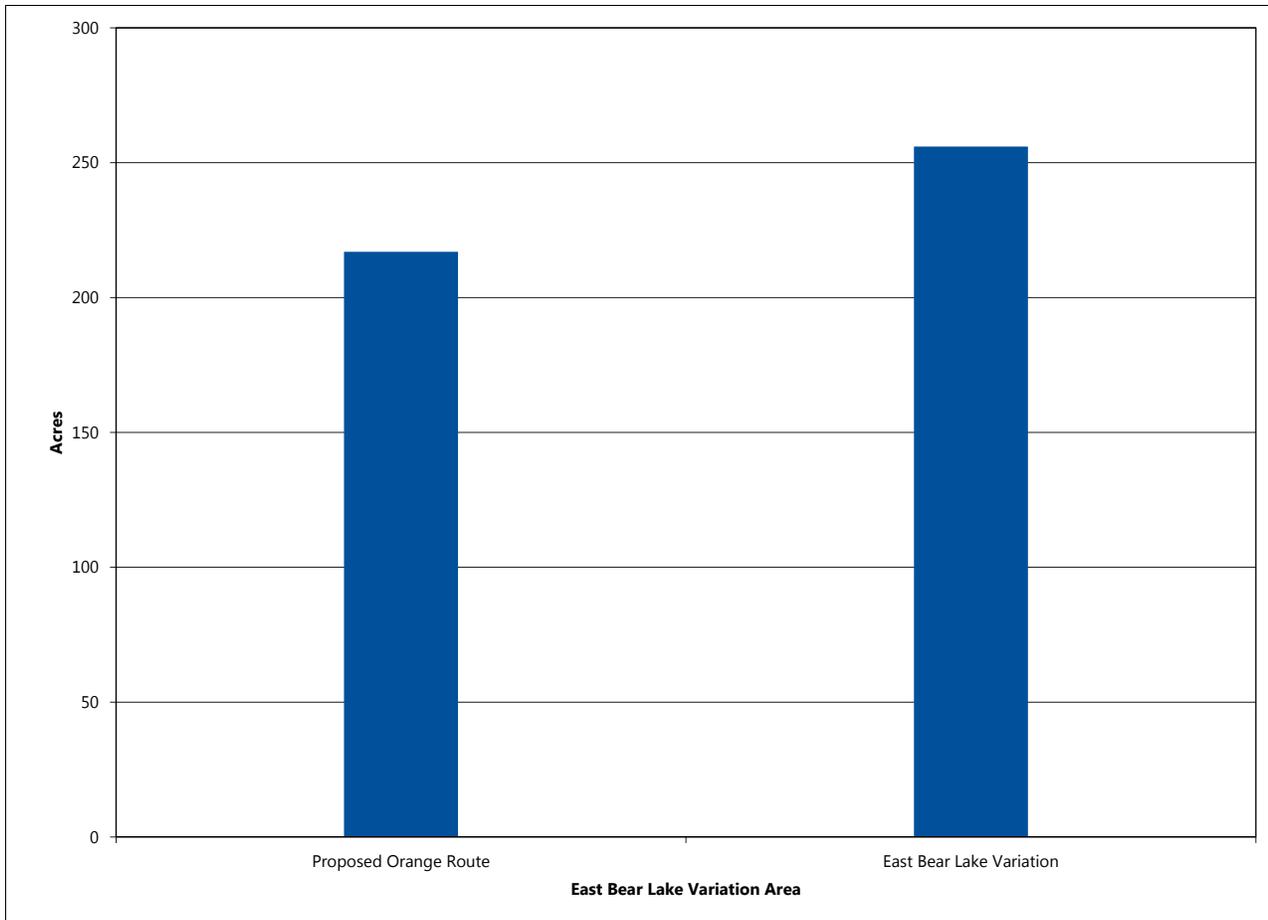
Figure 6-110 Acres of Farmland by Type within the Anticipated ROW in the East Bear Lake Variation Area



Source(s): USDA NRCS 2014, reference (154)

Note(s): Totals may not sum due to rounding

Figure 6-111 Acres of State Forest Land within the Anticipated ROW in the East Bear Lake Variation Area



Source(s): MnDNR 2003, reference (148)

Note(s): Totals may not sum due to rounding

and compaction caused by equipment. Woody vegetation would routinely need to be cleared from the transmission line ROW in order to maintain low-stature vegetation that would not interfere with the operation of the transmission line.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on forestry resources are summarized in Section 5.3.2.2. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

### Mining and Mineral Resources

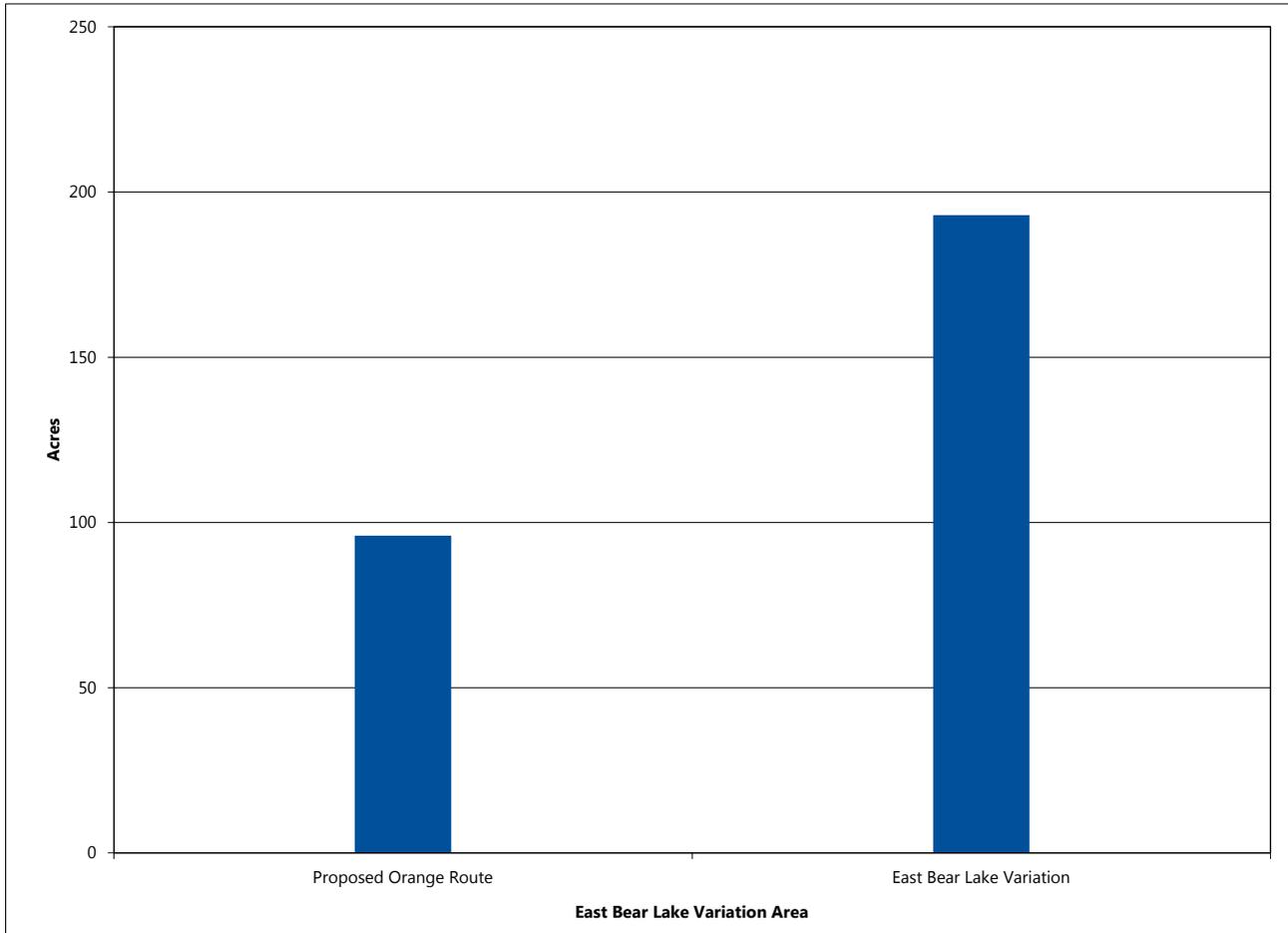
As identified in Section 5.3.2.3, the ROI for evaluating mining and mineral resource impacts from the proposed Project is the ROW of the transmission line. Table 6-175, Figure 6-112, and Map 6-56 identify the acreage of mining lands with **active and** terminated/expired state mineral leases that may be impacted in the East Bear Lake Variation Area. There are no known aggregate resources

or current mining lands in the ROI of either the Proposed Orange Route or the East Bear Lake Variation.

Both the Proposed Orange Route and the East Bear Lake Variation would traverse mining lands with terminated/expired state mineral leases, with the East Bear Lake Variation passing through approximately twice as much **active** state mineral lease land as the Proposed Orange Route (Table 6-175, Figure 6-112, and Map 6-56). However, the East Bear Lake Variation would pass through a large portion of **active** state mineral lease land adjacent to an existing transmission line corridor, while the Proposed Orange Route would require the creation of a new corridor. Both the Proposed Orange Route and the East Bear Lake Variation could potentially interfere with future mining activities in this area.

As discussed in Section 5.3.2.3, construction of transmission lines could affect future mining operations if the structures interfere with access to mineable resources or the ability to remove these resources.

Figure 6-112 Acres of State Mineral Leases within the Anticipated ROW in the East Bear Lake Variation Area



Source(s): MnDNR 2014, reference (179)

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on mining and mineral resources are summarized in Section 5.3.2.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

#### 6.4.2.3 Archaeology and Historic Architectural Sites

Neither the Proposed Orange Route nor the East Bear Lake Variation ROW have previously recorded archaeological or historic resources in the East Bear Lake Variation Area (Map 6-57). **Additionally, no specific Native American resources have been previously recorded within the ROW (direct APE for cultural resources) or within one mile of the anticipated alignment (indirect APE for historic architectural resources or Native American resources) for the Proposed Orange Route and the East Bear Lake Variation in the East Bear Lake Variation Area. However, DOE is continuing to consult with federally recognized Indian tribes**

**to identify Native American resources within the direct and indirect APEs for the proposed Project.**

However, since the Proposed Orange Route and East Bear Lake Variation have not been surveyed **for cultural resources, archaeological surveys, architectural surveys or inventories, and surveys or inventories for Native American resources** would be required as part of cultural resources investigations conducted in compliance with federal and/or state regulations for archaeological resources and historic architectural properties. These cultural resources investigations would be implemented as part of DOE's **Draft PA (Appendix V)** that would establish a process to identify cultural resources within the APE for the proposed Project, evaluate the NRHP-eligibility of identified cultural resources, and develop measures to avoid, minimize, or mitigate potential adverse impacts on historic architectural properties as a result of implementation of the proposed Project.

Potential **short-term and long-term** adverse impacts from construction, operation, maintenance, and emergency repair related **activities** to historic and

cultural properties are summarized in Section 5.3.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate adverse impacts to these resources, including TCPs, from the proposed Project.

**6.4.2.4 Natural Environment**

This section describes the water, vegetation, and wildlife resources within the East Bear Lake Variation Area and the potential impacts from the proposed Project.

**Water Resources**

As explained in Section 5.3.4.1, the ROI for water resources was determined to be the ROW of the transmission line. Data related to the ROI for water resources in the East Bear Lake Variation Area are summarized in Table 6-176 and shown on Map 6-58. Additional, water resources data beyond those resources present in the ROI of this variation area are provided in Appendix E.

The number of water crossings, the need to place transmission structures in wetlands, and the quantity of wetland type conversion are the primary water resources impacts that would differ between the Proposed Orange Route and East Bear Lake Variation. Neither the Proposed Orange Route nor the East Bear Lake Variation ROWs contain trout streams, impaired waters, or floodplains.

The Proposed Orange Route and East Bear Lake Variation would each cross the Prairie River and Day Brook; however, the Proposed Orange Route would cross Day Brook three times and result in the most PWI watercourse crossings (Table 6-176). Neither the Proposed Orange Route nor the East Bear Lake Variation would cross PWI waterbodies or wetlands.

The East Bear Lake Variation would require crossing three additional, non-PWI, unnamed watercourses,

while the Proposed Orange Route would not cross any additional non-PWI waters.

It is anticipated that PWI crossings and non-PWI watercourse crossings are spannable (crossings would be less than the average spanning length of 1,250 feet) and transmission structures would not be placed within them.

Based on the NWI, the Proposed Orange Route and the East Bear Lake Variation would both require conversion of forested and shrub wetland areas to an herbaceous wetland type through removal of woody vegetation in the ROW. As shown in Figure 6-113, the Proposed Orange Route contains the most combined forested and shrub wetland and would result in the greatest amount of wetland type conversion. While these direct, adverse impacts to forested and shrub wetlands would be permanent and may change wetland functions within the ROW, e.g. altering the hydrology and habitat, they are expected to be minimal because of the amount of surrounding shrub and forested wetlands in the region. Changes in wetland function are discussed in Section 5.3.4.1.

The Applicant would need to mitigate for these impacts as summarized in Section 5.3.4.1. The Proposed Orange Route and the East Bear Lake Variation would both require placement of fill in wetlands for construction of transmission structures. This impact cannot be avoided by spanning as wetland crossings in the East Section generally exceed the average spanning length allowable for structures, but impacts to wetlands from permanent fill would be expected to be minimal because of the localized extent of the impact (33 square feet per structure). Due to the number of wetland complexes in the area, it would be expected that the Proposed Orange Route and the East Bear Lake Variation would both require temporary construction access through wetlands, which would be expected to be minimal due to the short-term, localized nature

**Table 6-176 Water Resources within the Anticipated ROW in the East Bear Lake Variation Area**

| Resource                      | Evaluation Parameter | East Bear Lake Variation Area |                          |
|-------------------------------|----------------------|-------------------------------|--------------------------|
|                               |                      | Proposed Orange Route         | East Bear Lake Variation |
| Transmission Line             | Length (mi)          | 8.9                           | 10.5                     |
| PWI Waters <sup>(1)</sup>     | Number of Crossings  | 4                             | 2                        |
| Non-PWI Waters <sup>(2)</sup> | Number of Crossings  | 0                             | 3                        |
| NWI Wetlands                  | Acres within ROW     | 104                           | 89                       |

Sources: USFWS 1997, reference (157); USGS 2014, reference (158); USGS 2014, reference (159); Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); MnDNR 2008, reference (160); MnDNR 2008, reference (161); MnDNR 2008, reference (162)

Note(s): Totals may not sum due to rounding

- (1) PWI waters include watercourses, waterbodies, and wetlands, as described in Chapter 5. The number of each type of PWI water the Proposed Route and variations would cross are described in the text and figure below.
- (2) Non-PWI waters were calculated by removing the PWI-listed waters from the NHD dataset.

of the impact, and the Applicant’s intended use of minimization measures, such as matting.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on water resources are summarized in Section 5.3.4.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

**Vegetation**

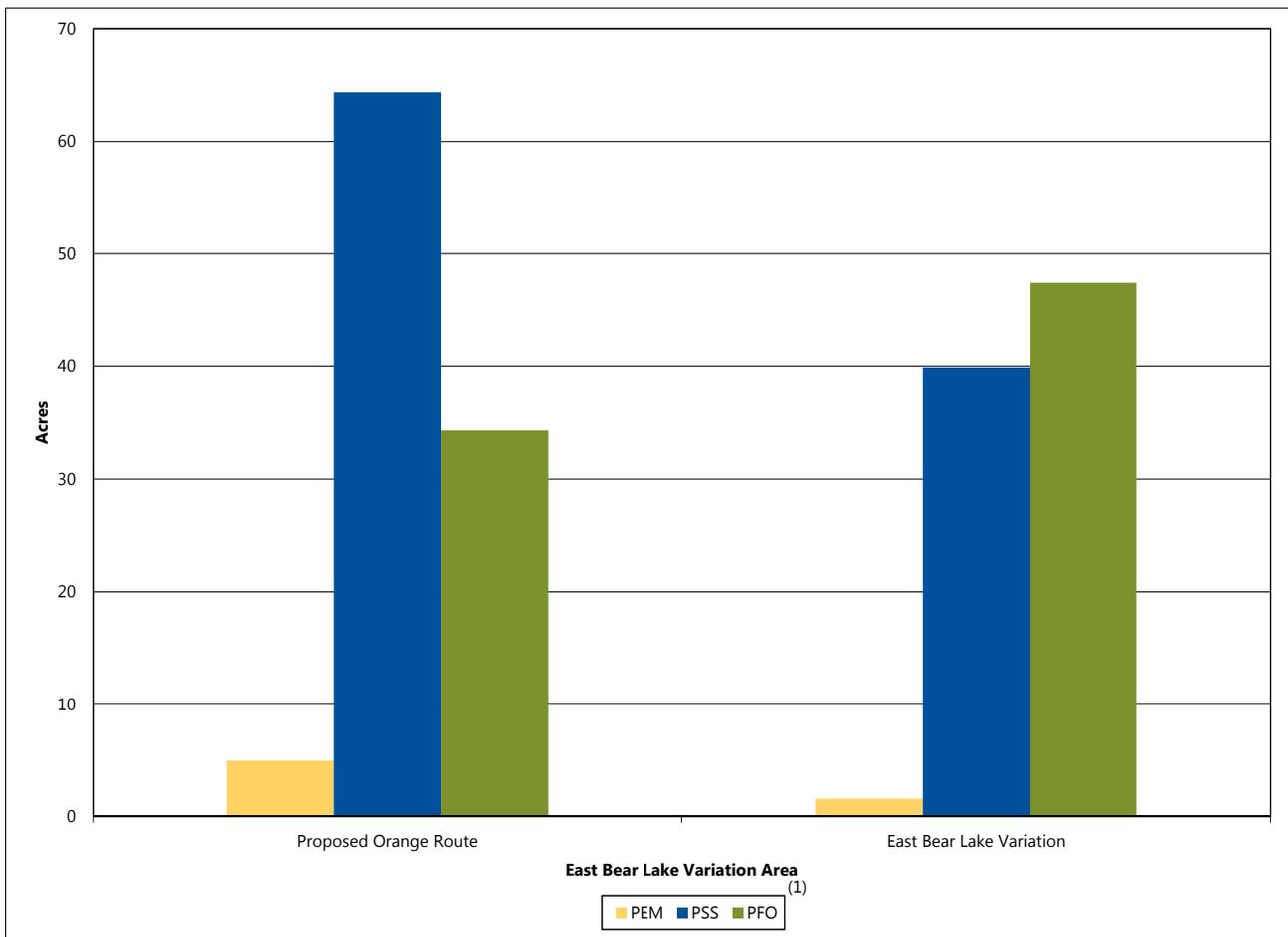
In Section 5.3.4.2, the ROI to assess impacts to vegetation was determined to be the ROW of the proposed transmission line. Data related to the ROI for vegetation in the East Bear Variation Area are summarized in Table 6-177 and shown on Maps 5-19 and 6-58. Additional vegetation data beyond the dominant land cover types present in the ROI in this variation area are provided in Appendix E.

The primary impact on vegetation that would differ between the Proposed Orange Route and East

Bear Lake Variation is the loss or fragmentation of forest. As discussed in Section 5.3.4.2, the Applicant would permanently clear woody vegetation from the ROW during construction and the ROW would be maintained as low-stature vegetation in order to reduce interference with the maintenance and function of the transmission line.

As indicated in Table 6-177 and Figure 6-114, the East Bear Lake Variation would pass through more forested land, including state forest land, relative to the Proposed Orange Route, therefore resulting in more permanent removal of forested vegetation. Although the Proposed Orange Route is shorter in length, it would require creation of new corridor for its entire length, while the East Bear Lake Variation would parallel an existing transmission line corridor for over 40 percent of its length (Table 6-177). Because of this, the East Bear Lake Variation would likely result in less impact on intact forested areas. While direct, adverse impacts to forested areas would be long-term, contiguous forest is abundant

**Figure 6-113 Acres of Wetland by Type within the Anticipated ROW in the East Bear Lake Variation Area**



Source(s): USFWS 1997, reference (157)

Note(s): Totals may not sum due to rounding

(1) Palustrine emergent wetland (PEM), palustrine shrub wetland (PSS), palustrine forested wetland (PFO).

**Table 6-177 Vegetation Resources within the Anticipated ROW in the East Bear Lake Variation Area**

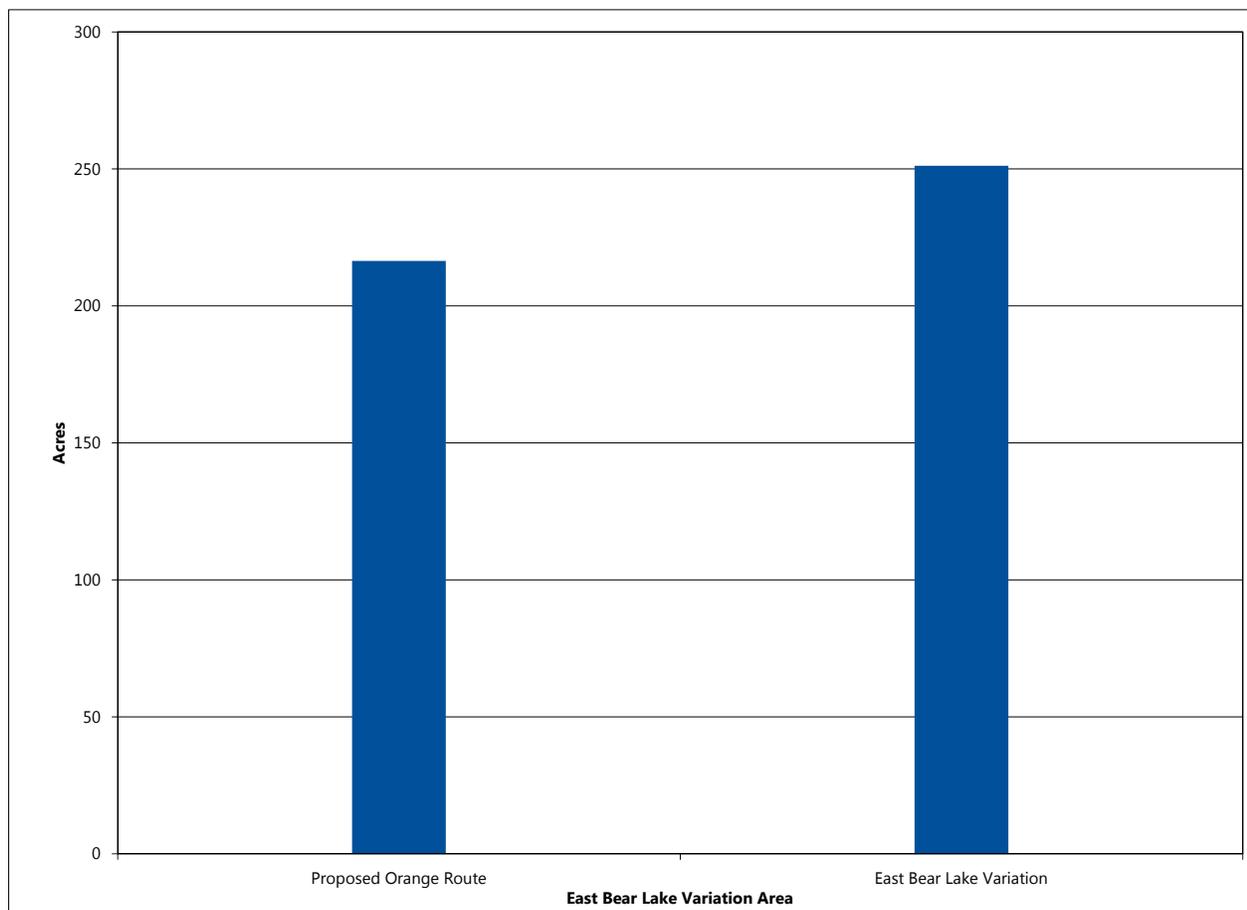
| Resource                                       | Evaluation Parameter                   | East Bear Lake Variation Area |                          |
|--|--|-------------------------------|--------------------------|
|  |  | Proposed Orange Route         | East Bear Lake Variation |
| Transmission Line                              | Length (mi)                            | 8.9                           | 10.5                     |
| Existing Transmission Line <sup>(1)</sup>      | Percent of Total Length <sup>(2)</sup> | 0                             | 42                       |
| State Forest                                   | Acres within ROW                       | 217                           | 256                      |
| Total Forested GAP Land Cover                  | Acres within ROW                       | 216                           | 251                      |
| GAP Land Cover - Dominant Types <sup>(3)</sup> |  |                               |                          |
| North American Boreal Forest                   | Acres within ROW                       | 103                           | 140                      |
| North American Boreal Flooded and Swamp Forest | Acres within ROW                       | 94                            | 77                       |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); MnDNR 2003, reference (148); USGS 2001, reference (151)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.
- (3) Data presented here only includes dominant GAP types; see Appendix E for additional land cover types within the ROW.

**Figure 6-114 Acres of all Forested GAP Land Cover Types within the Anticipated ROW in the East Bear Lake Variation Area**



Source(s): USGS 2001, reference (151)

Note(s): Totals may not sum due to rounding

in the region surrounding the proposed Project (Map 5-19).

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on vegetation resources are summarized in Section 5.3.4.2. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

### Wildlife

The ROI for wildlife was determined in Section 5.3.4.3 to be the ROW of the proposed transmission line. Wildlife resources in the East Bear Variation Area consist of natural habitat, including forest, wetlands, and open areas (Map 6-58). Data associated with potential impacts on wildlife resources in the East Bear Variation Area are summarized in Table 6-178.

The primary impacts on wildlife resources that would differ between the Proposed Orange Route and East Bear Lake Variation include loss and fragmentation of natural habitat and proximity of the Proposed Orange Route and East Bear Lake Variation to these areas. As discussed in Section 5.3.4.3, the proposed Project would expand existing corridor or create new corridor; this would result in conversion from forest to low-stature open vegetation communities, favoring wildlife species that prefer more open vegetation communities. Section 6.4.2.4 (Vegetation) summarizes potential impacts on forested vegetation from the Proposed Orange Route and East Bear Lake Variation.

Although the Proposed Orange Route is shorter in length, it would require creation of new corridor for its entire length, while the East Bear Lake Variation would parallel an existing transmission line corridor for just under half of its length (Table 6-178; Map 6-58). Because of this, the East Bear Lake Variation would result in less fragmentation of forested habitats, and subsequent displacement

of wildlife species associated with those forest communities.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on wildlife resources are summarized in Section 5.3.4.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project. Section 6.2.1.4 (Wildlife) discusses additional suggested measures to avoid, minimize, or mitigate impacts on wildlife are summarized.

#### 6.4.2.5 Rare and Unique Natural Resources

Rare and unique natural resources are divided into rare species and rare communities. Rare species encompass federally listed or state endangered, threatened, or special concern species while rare communities may include state-designated features, such as SNAs, MBS Sites of Biodiversity Significance, MnDNR High Conservation Value Forest, MnDNR Ecologically Important Lowland Conifer stands, and MBS native plant communities.

#### Rare Species

The ROI for rare species is described in Section 5.3.5, which states that for impacts to federally and state-listed species, the ROI includes a one-mile buffer surrounding the proposed routes and variations. Data related to rare species in the East Bear Variation Area are summarized in Table 6-179; additional data on rare species, such as the presence of MnDNR tracked species, is provided in Appendix F. As a condition of the license agreement with MnDNR for access to the NHIS database, data pertaining to the documented locations of rare species are not shown on a map.

Proximity of state endangered, threatened, or special concern species is similar between the Proposed Orange Route and the East Bear Lake Variation. As discussed in Section 5.3.5, potential long-term impacts on rare species from the proposed Project

**Table 6-178 Information Relevant to Wildlife Resources in the Vicinity of the East Bear Variation Area**

| Resource                                  | Evaluation Parameter                   | East Bear Lake Variation Area |                          |
|---|--|-------------------------------|--------------------------|
|   |  | Proposed Orange Route         | East Bear Lake Variation |
| Transmission Line                         | Length (mi)                            | 8.9                           | 10.5                     |
| Existing Transmission Line <sup>(1)</sup> | Percent of Total Length <sup>(2)</sup> | 0                             | 42                       |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

include the direct or indirect loss of individuals or conversion of associated habitats and increased habitat fragmentation from construction.

As indicated in Table 6-179, two state-concern mussel species have been documented within one mile of the Proposed Orange Route, one of which was also documented within one mile of the East Bear Lake Variation. Because it is anticipated that all watercourses would be spanned, impacts to these rare mussels are not expected. The state-special concern necklace spike sedge was documented within one mile of both the Proposed Orange Route and East Bear Lake Variation. Although the Proposed Orange Route is shorter in length, it would require establishment of new corridor for its entire length, while the East Bear Lake Variation would parallel an existing transmission line corridor for just under half of its length (Map 6-59). Clearing of forested areas to create new corridor could have impacts on rare species associated with forest or shrub communities, such as the necklace spike sedge. Because the Proposed Orange Route would require creation of new corridor for its entire length it would likely result in more impacts on rare species relative to the East Bear Lake Variation; however, the full extent of potential impacts from either the Proposed Orange Route or East Bear Lake Variation cannot be determined without pre-construction field surveys, which would likely occur as a condition of a MN PUC Route Permit. The MN PUC Route Permit could also require the development of a Vegetation Management Plan as a permit condition, which could include plant surveys along the permitted ROW.

Any indirect impacts to rare species from the proposed Project are expected to be minimal because of the amount of surrounding habitat. Through use of Applicant proposed avoidance and minimization measures, direct impacts to rare species are not expected. DOE's informal consultation under Section 7 of the ESA with USFWS is currently on-going and a Biological Assessment

has been prepared to assess potential impacts on federally listed species (Appendix R).

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on rare species are summarized in Section 5.3.5. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

### Rare Communities

The ROI for the analysis of impacts to rare communities was described within Section 5.3.5 and includes the ROW of the proposed transmission line. Data related to rare communities and resources in the East Bear Variation Area are summarized in Table 6-180 and shown on Map 6-59; additional, more detailed data on rare communities and resources is provided in Appendix E.

The primary impact on rare communities and resources that would differ between the Proposed Orange Route and East Bear Lake Variation is the loss or conversion of native vegetation. As discussed in Section 5.3.5, the Applicant would permanently remove vegetation at each structure footprint and within portions of the ROW that are currently dominated by forest or other woody vegetation.

As indicated on Map 6-59 and in Table 6-180, the East Bear Lake Variation would pass through more MBS Sites of Biodiversity Significance. However, the East Bear Lake Variation would parallel an existing transmission line corridor for over 40 percent of its length, while the Proposed Orange Route would require creation of new corridor for its entire length. Because of this, the Proposed Orange Route would result in more impacts on native vegetation and fragmentation of intact forest in areas where forest vegetation is present.

The rare communities and resources listed in Table 6-180 and detailed above show that the

**Table 6-179 Rare Species Documented within One Mile of the Anticipated ROW in the East Bear Variation Area**

| Scientific Name <sup>(1)</sup> | Common Name          | Federal Status | State Status    | Type           | East Bear Lake Variation Area |                          |
|--------------------------------|----------------------|----------------|-----------------|----------------|-------------------------------|--------------------------|
|                                |                      |                |                 |                | Proposed Orange Route         | East Bear Lake Variation |
| <i>Carex ormostachya</i>       | Necklace Spike Sedge | None           | Special Concern | Vascular Plant | X                             | X                        |
| <i>Lasmigona compressa</i>     | Creek Heelsplitter   | None           | Special Concern | Mussel         | X                             | X                        |
| <i>Ligumia recta</i>           | Black Sandshell      | None           | Special Concern | Mussel         | X                             |                          |

Source(s): MnDNR 2015, reference (132)

(1) Canada lynx and gray wolf records are not documented in the NHIS database.

**Table 6-180 Rare Communities and Resources within the Vicinity of the East Bear Lake Variation Area**

| Resource  | Evaluation Parameter                   | East Bear Lake Variation Area |                          |
|---|--|-------------------------------|--------------------------|
|   |  | Proposed Orange Route         | East Bear Lake Variation |
| Transmission Line                                     | Length (mi)                            | 8.9                           | 10.5                     |
| Existing Transmission Line <sup>(1)</sup>             | Percent of Total Length <sup>(2)</sup> | 0                             | 42                       |
| MBS Sites of Biodiversity Significance <sup>(3)</sup> | Acres within ROW                       | 217                           | 255                      |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); MBS 2015, reference (167)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.
- (3) MBS Sites of Biodiversity Significance data are preliminary in this portion of the proposed Project. Because of the preliminary status and/or unknown ranks, biodiversity significance ranks are not distinguished from one another here.

proposed Project may result in direct, long-term, localized adverse impacts to rare communities. Some of these impacts may also have regional effects, because of the limited regional abundance and distribution of some of the rare communities affected. Therefore, adverse impacts to rare communities are expected to be significant if localized adverse impacts would result in a broader regional depletion of certain rare communities. The MN PUC Route Permit could require the development of a Vegetation Management Plan as a permit condition, which could include plant surveys along the permitted ROW.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on rare communities are summarized in Section 5.3.5. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

#### 6.4.2.6 Corridor Sharing

Sharing or paralleling existing corridors or linear features minimizes fragmentation of the landscape and can minimize impacts to adjacent property. The ROI for the analysis of corridor sharing generally includes infrastructure corridors within approximately 0.25 miles of the proposed routes and variations, as described in Section 5.3.6. Map 6-60 shows areas where the proposed route and variations would parallel corridors with existing transportation, transmission line, or other linear features in the East Bear Lake Variation Area.

Table 6-181 identifies the percentage of total transmission line length the Proposed Orange Route and East Bear Lake Variation parallel an existing corridor or linear feature in the East Bear Lake WMA Variation Area.

The Proposed Orange Route would parallel existing corridors for over half of the length (Figure 6-115). The East Bear Lake Variation would parallel existing transmission line corridor for just under half of its length.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on corridor sharing are summarized in Section 5.3.6. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on corridor sharing from the proposed Project.

#### 6.4.2.7 Electrical System Reliability

As explained in Section 5.3.7, the ROI for Electrical System Reliability was determined to be the corridors for the existing transmission lines. Data related to electrical system reliability in the East Bear Lake Variation Area are shown on Map 6-60.

The Proposed Orange Route would not parallel an existing transmission line in the East Bear Lake Variation Area. The East Bear Lake Variation would parallel 230 kV and 500 kV transmission lines for approximately 42 percent of their length in the northern portion of the East Bear Lake Variation Area (Table 6-181); therefore, three transmission lines would be in adjacent corridors.

The configuration may decrease the reliability of the proposed Project. When facilities are located in close proximity, there is a greater risk that a single event can take out multiple lines. Additionally, the close proximity of the lines can make repairing the lines more difficult. These difficulties could increase outage times, should an outage occur. Adverse impacts are possible as a result of the construction and operation of three high-voltage transmission lines under one variation in the East Section.

**Table 6-181 Corridor Sharing in the East Bear Lake Variation Area**

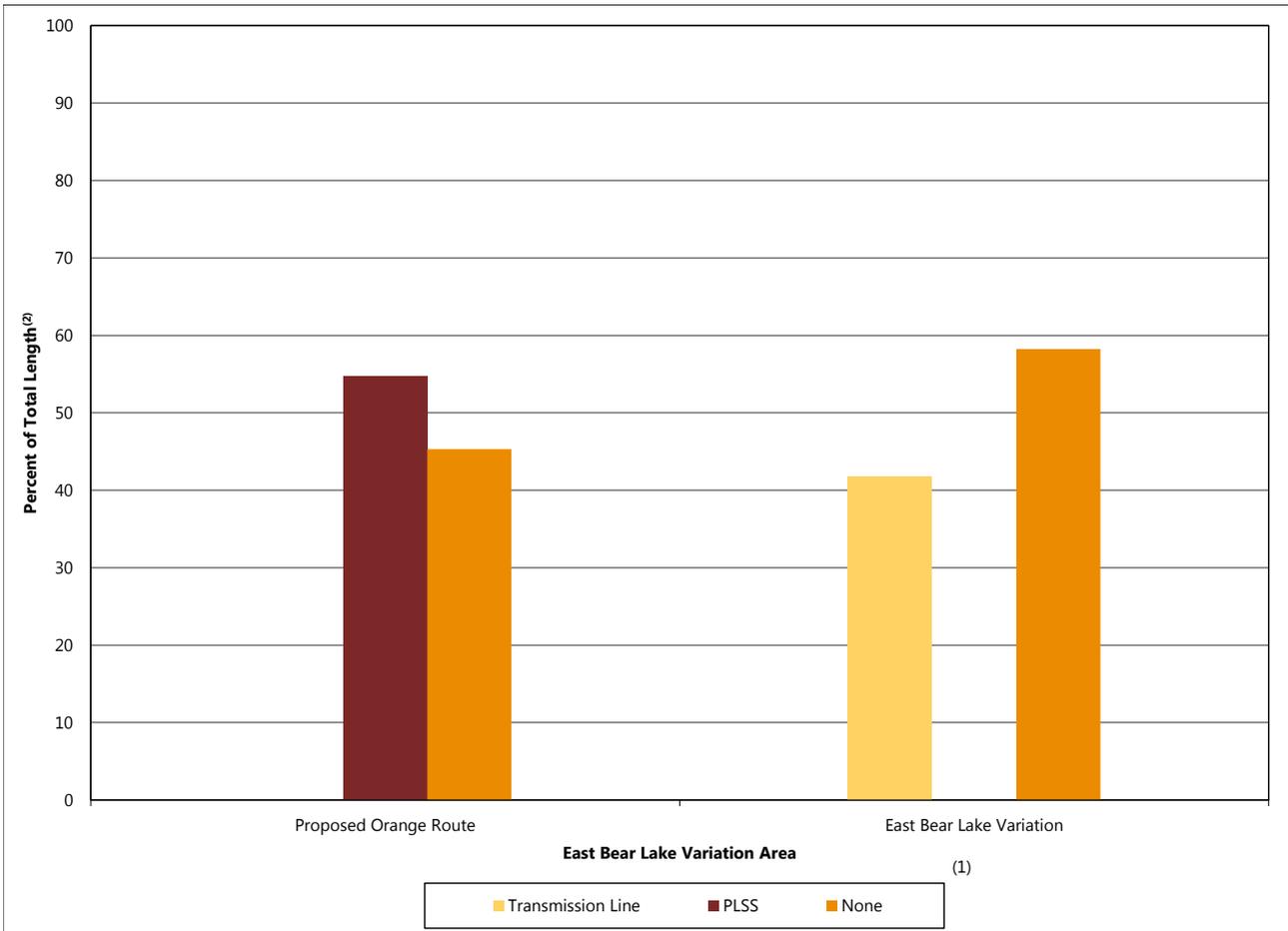
| Feature Sharing Corridor <sup>(1)</sup>   | Evaluation Parameter                   | East Bear Lake Variation Area |                          |
|---|--|-------------------------------|--------------------------|
|   |  | Proposed Orange Route         | East Bear Lake Variation |
| Transmission Line (other linear features may be present within the transmission line corridor; i.e., road, trail, field line, PLSS) | Percent of Total Length <sup>(2)</sup> | 0                             | 42                       |
| PLSS Only   | Percent of Total Length <sup>(2)</sup> | 55                            | 0                        |
| None  | Percent of Total Length <sup>(2)</sup> | 45                            | 58                       |

Source(s): USDA et al 2013, reference (170); MN DOC 2014, reference (145); MNDOT 2010, reference (171); MnDNR 2010, reference (172); MnDNR 2009 reference (173); MnDNR et al 2014, reference (174); MnDNR et al 2013, reference (175); MnDNR 2013, reference (176); MnDNR et al 2009, reference (177)

Note(s): Totals may not sum due to rounding

- (1) More than one feature may share the corridor; the primary feature within the corridor is identified, other features that may share the corridor are listed in parenthesis. Appendix E provides a detailed summary of all shared features.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

**Figure 6-115 Corridor Sharing in the East Bear Lake Variation Area**



Source(s): USDA et al 2013, reference (170); MN DOC 2014, reference (145); MNDOT 2010, reference (171); MnDNR 2010, reference (172); MnDNR 2009 reference (173); MnDNR et al 2014, reference (174); MnDNR et al 2013, reference (175); MnDNR 2013, reference (176); MnDNR et al 2009, reference (177)

Note(s): Totals may not sum due to rounding

- (1) **Transmission Line (other linear features may be present within the transmission line corridor; i.e., road, trail, field line, PLSS).**
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on electrical system reliability are summarized in Section 5.3.7. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on electrical system reliability.

#### 6.4.2.8 Costs of Constructing, Operating, and Maintaining the Facility which are Dependent on Design and Route

Information related to construction, operation, and maintenance costs associated with the proposed Project is provided in Section 5.3.8. Table 6-182 summarizes the costs associated with constructing the Proposed Orange Route and East Bear Lake Variation in the East Bear Lake Variation Area. As indicated in Table 6-182, the East Bear Lake Variation would cost more to construct relative to the Proposed Orange Route.

The cost for routine maintenance would depend on the topology and the type of maintenance required, but typically runs from \$1,100 to \$1,600 per mile annually (Minnesota Power 2013). Using the \$1,600 per mile for operation and maintenance, the estimated cost would range from \$14,000 to \$17,000 annually for these alternatives in the East Bear Lake Variation Area.

#### 6.4.3 Balsam Variation Area

The Balsam Variation Area encompasses three route alternatives: the Proposed Blue Route, Proposed Orange Route, and the Balsam Variation. This section provides a comparison of the potential impacts resulting from construction, operation, maintenance, and emergency repair of the proposed Project within the Balsam Variation Area, depending on the route or variation considered.

##### 6.4.3.1 Human Settlement

This section describes the aesthetic resources and zoning and land use compatibility within the Balsam Variation Area and the potential impacts from the proposed Project.

#### Aesthetics

As described in the Aesthetics discussion for the Effie Variation Area (see Section 6.4.1.1), impacts on aesthetic resources would be determined based largely on the level of increased contrast produced by the proposed Project in views by sensitive viewers. Residences and other aesthetic resources within 1,500 feet of the anticipated alignment would have a high probability of having views of the proposed Project and as described in Section 5.3.1.1, this distance is considered the ROI. Data related to aesthetic resources in the Balsam Variation Area are summarized in Table 6-183 and shown on Maps 6-61, 6-62, 6-63, and 6-65.

As indicated in Table 6-183 for the Balsam Variation Area, the Proposed Blue Route, Proposed Orange Route, and Balsam Variation would cross or be located within 1,500 feet of aesthetic resources with high visual sensitivity, including snowmobile trails and historic architectural sites (Map 6-62 and Map 6-65). The Proposed Blue Route would cross two snowmobile trails and be located within one mile (5, 280 ft) of 13 historic architectural sites (Map 6-62 and Map 6-65). The Proposed Orange Route would cross two snowmobile trails and be located within one mile of 24 historic architectural sites (Map 6-62 and Map 6-65). The Balsam Variation would cross three snowmobile trails and be located within one mile of 28 historic architectural sites (Map 6-62 and Map 6-65).

Overall, the Proposed Blue Route would affect fewer aesthetic resources than the other alternatives. The Proposed Orange Route would be located near a reserve with recreation facilities located along the east side of Scenic Highway 7 near Balsam Memorial Hall, to the northeast of Snaptail Lake (6-63). This recreation area has a large fenced ball field, play structures, tennis courts, pavilions, and other recreation and community facilities and is an aesthetic resource with high visual sensitivity. Viewpoint 03 in Appendix N shows the existing view looking east-northeast from a position next to the ball field. Viewpoint 03 in Appendix N shows the existing view looking east-northeast from a position next to the ball field. The first picture for Viewpoint 03 in Appendix N shows the existing view looking east-northeast from a position next to the ball

**Table 6-182 Construction Costs in the East Bear Lake Variation Area**

| Variation Area | Name in the EIS          | Cost (Total) | Average Cost (per mile) | Length (mi) |
|----------------|--------------------------|--------------|-------------------------|-------------|
| East Bear Lake | Proposed Orange Route    | \$9,736,790  | \$1,090,346             | 8.9         |
|                | East Bear Lake Variation | \$13,279,079 | \$1,264,674             | 10.5        |

Source(s): Minnesota Power 2015, reference (9)

**Table 6-183 Aesthetic Resources within the ROI in the Balsam Variation Area**

| Resource                                  | Evaluation Parameter <sup>(1)</sup>    | Balsam Variation Area |                       |                  |
|---|--|-----------------------|-----------------------|------------------|
|   |  | Proposed Blue Route   | Proposed Orange Route | Balsam Variation |
| Transmission Line                         | Length (mi)                            | 12.9                  | 13.7                  | 17.8             |
| Existing Transmission Line <sup>(2)</sup> | Percent of Total Length <sup>(3)</sup> | 15                    | 14                    | 0                |
| Abandoned Transmission Line               | Percent of Total Length <sup>(3)</sup> | 0                     | 22                    | 66               |
| Residences                                | Count within 0–500 ft                  | 0                     | 2                     | 2                |
|   | Count within 0–1,000 ft                | 3                     | 10                    | 6                |
|   | Count within 0–1,500 ft                | 7                     | 21                    | 12               |
| Historic Architectural Sites              | Count within 0–1,500 ft                | 0                     | 0                     | 4                |
|   | Count within 0–5,280 ft                | 13                    | 24                    | 28               |
| Snowmobile Trails                         | Count within 0–1,500 ft                | 2                     | 2                     | 3                |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); Minnesota Power 2014, reference (146); SHPO 2014, reference (147); MnDNR 2010, reference (150)

Note(s): Totals may not sum due to rounding

- (1) Acre/Count within a distance includes both sides of the anticipated alignment. For example, count within 0-500 ft includes 500 ft on each side of the anticipated alignment.
- (2) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (3) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

field. The second picture shows Viewpoint 03 as a photosimulation of the same view after construction of the Proposed Orange Route. The third figure shows Viewpoint 03c a photosimulation of the same view after construction of the Proposed Orange Route, with the transmission line and structures indicated in yellow. In this view, the Proposed Orange Route would be located approximately 0.25 mile away. As indicated in the photosimulation, the Proposed Orange Route would be screened from view from this viewpoint by dense forest and therefore the visual character and quality of views from this area is not diminished.

The Proposed Blue Route would be located within 1,500 feet of the least number of residences (seven residences, three of which are located within 1,000 feet of the anticipated alignment) which have high visual sensitivity, whereas the Proposed Orange Route could potentially affect the most residences as 21 residences are within 1,500 feet of the anticipated alignment, including 10 within 1,000 feet and two within 500 feet. The Balsam Variation could potentially affect 12 residences, six of which are within 1,000 feet and two are within 500 feet of the anticipated alignment (Figure 6-116). Of the three routes in the Balsam Variation Area, the Proposed Blue Route would affect fewer residences (seven) and snowmobile trails within 1,500 feet (two) and fewer historic architectural sites within one mile (13).

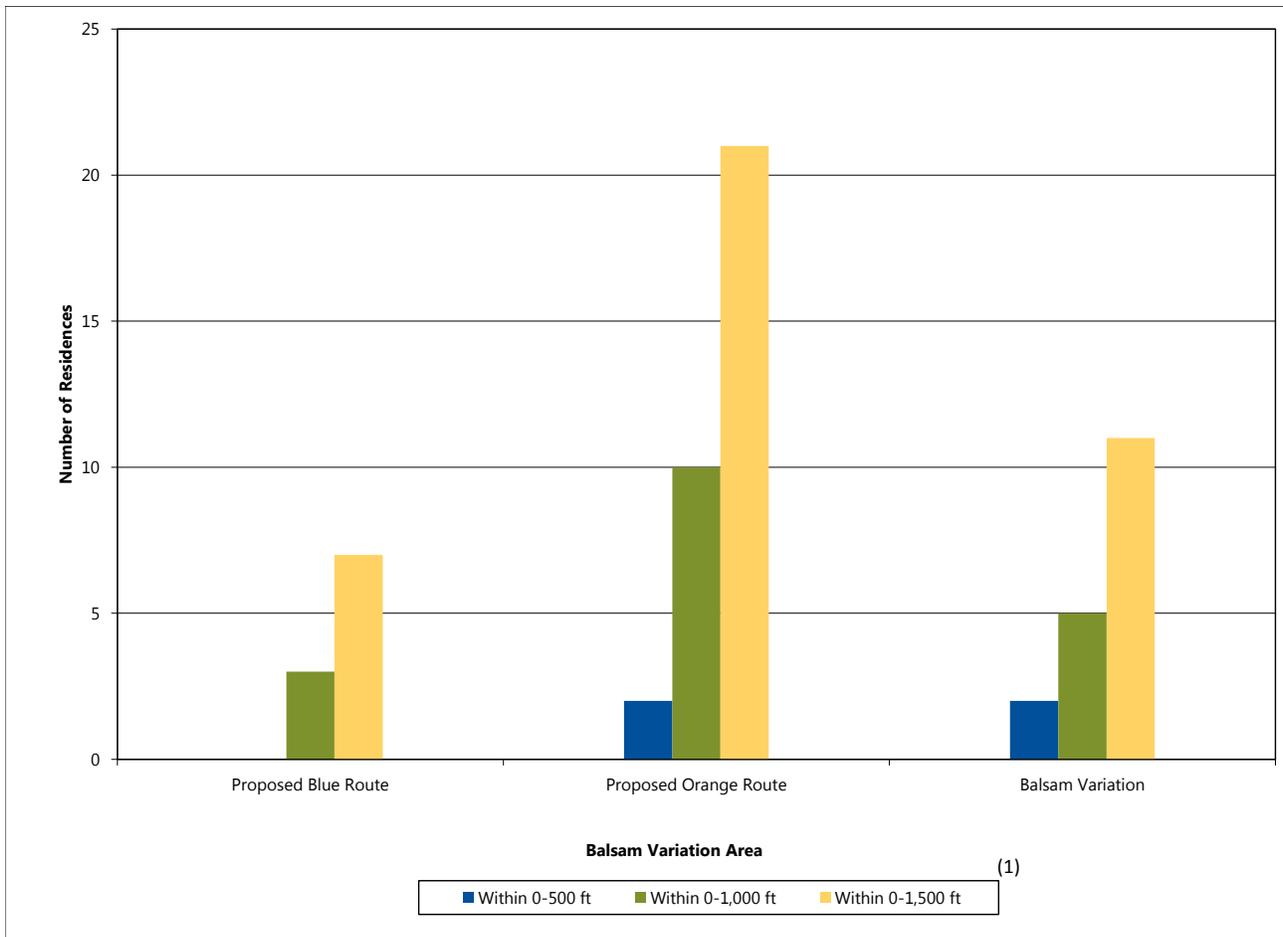
The Balsam Variation is longer (17.8 miles) than either the Proposed Blue Route (12.9 miles) or the

Proposed Orange Route (Table 6-183). In addition, the Balsam Variation does not parallel any existing large transmission lines and would require new corridors to be cleared. The Proposed Blue Route and Proposed Orange Route each parallel an existing 69 kV or 115 kV transmission line for a short distance, 15 and 14 percent, respectively (Table 6-183). By paralleling an existing large transmission line corridor, the Proposed Blue Route and Proposed Orange Route would produce less contrast than the Balsam Variation.

Overall, the Proposed Blue Route and Proposed Orange Route would produce less contrast than the Balsam Variation due to both being shorter and paralleling an existing large transmission line for part of their lengths. However, the Proposed Blue Route also affects fewer aesthetic resources (13 historic architectural sites, two snowmobile trails) and residences (seven) with high viewer sensitivity than either the Balsam Variation or the Proposed Orange Route. For these reasons, the Proposed Blue Route would result in less aesthetic impact than either the Proposed Orange Route or the Balsam Variation in the Balsam Variation Area.

Although the Proposed Blue Route and Proposed Orange Route are moderately short in length, they parallel existing transmission lines for part of their lengths and affect numerous residences and other sensitive visual resources. For these reasons, potential aesthetic impacts of the Proposed Blue Route and Proposed Orange Route are expected

Figure 6-116 Residences within the ROI in the Balsam Variation Area



Source(s): Minnesota Power 2014, reference (146)

Note(s): Totals may not sum due to rounding

(1) Area/Count within a distance includes both sides of the anticipated alignment. For example, count within 0–500 ft includes 500 ft on each side of the anticipated alignment.

to be significant. Because the Balsam Variation is longer in length, does not parallel an existing large transmission line, and affects numerous residences and other sensitive visual resources, potential aesthetic impacts of the Balsam Variation are also expected to be significant.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on aesthetics are summarized in Section 5.3.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

**Land Use Compatibility**

As explained in Section 5.3.1.1, the ROI for Land Use Compatibility was determined to be 1,500 feet from the anticipated alignments of the proposed Project.

**Land Uses**

Table 6-184 identifies the amount of each type of land cover within 1,500 feet of the anticipated alignments of the Proposed Blue Route, Proposed Orange Route, and Balsam Variation in the Balsam Variation Area. Generally, the percentage of each land use is representative of what is present within the ROW. The various land uses present in the Balsam Variation Area are shown in Map 5-19 and residences, churches, cemeteries, and airports near the Proposed Blue Route, Proposed Orange Route, and Balsam Variation are shown on Map 6-61.

The Proposed Blue Route, Proposed Orange Route, and Balsam Variation ROI are both primarily composed of forested and/or swamp land (Table 6-184). The Balsam Variation ROW contains a greater amount of forested/swamp land, developed or disturbed land, and agricultural land than the Proposed Blue Route and the Proposed Orange Route.

**Table 6-184 Land Uses within the ROI in the Balsam Variation Area**

| Resource   | Type <sup>(1)</sup>    | Evaluation Parameter <sup>(2)</sup> | Balsam Variation Area |                       |                  |
|--|------------------------|-------------------------------------|-----------------------|-----------------------|------------------|
|  |                        |                                     | Proposed Blue Route   | Proposed Orange Route | Balsam Variation |
| GAP Land Cover Vegetation Class Level - Division 4 | Total                  | Acres within 0–1,500 ft             | 4,859                 | 5,130                 | 6,638            |
|  | Developed or Disturbed | Acres within 0–1,500 ft             | 169                   | 212                   | 291              |
|  | Agricultural           | Acres within 0–1,500 ft             | 4                     | 70                    | 72               |
|  | Forested and/or Swamp  | Acres within 0–1,500 ft             | 4,541                 | 4,828                 | 6,189            |
|  | Other                  | Acres within 0–1,500 ft             | 145                   | 20                    | 86               |

Source(s): USGS 2001, reference (151)

Note(s): Totals may not sum due to rounding

- (1) Other category includes: Open water, Great Plains Grassland & Shrubland and Introduced & Semi Natural Vegetation. See detailed summary of all types in Appendix E.
- (2) Acre/Count within a distance includes both sides of the anticipated alignment. For example, count within 0–500 ft includes 500 ft on each side of the anticipated alignment.

**Table 6-185 Land Ownership/Management within the Anticipated ROW in the Balsam Variation Area**

| Resource                               | Type                                    | Evaluation Parameter    | Balsam Variation Area |                       |                  |
|--|---|-------------------------|-----------------------|-----------------------|------------------|
|  |   |                         | Proposed Blue Route   | Proposed Orange Route | Balsam Variation |
| <b>Total Lands</b>                     | --                                      | <b>Acres within ROW</b> | <b>314</b>            | <b>332</b>            | <b>433</b>       |
| State Fee Lands <sup>(1)</sup> Total   | --                                      | Acres within ROW        | 55                    | 38                    | 107              |
| State Fee Lands <sup>(1)</sup> by Type | Consolidated Conservation               | Acres within ROW        | 0                     | 0                     | 0                |
|  | Other - Acquired, Tax Forfeit, Volstead | Acres within ROW        | 53                    | 38                    | 50               |
|  | Trust Fund                              | Acres within ROW        | 2                     | 0                     | 57               |
|  | Federal - State Lease                   | Acres within ROW        | 0                     | 0                     | 0                |
| State Conservation Easements           | --                                      | Acres within ROW        | 0                     | 3                     | 0                |
| Private Lands <sup>(2)</sup>           | --                                      | <b>Acres within ROW</b> | <b>260</b>            | <b>294</b>            | <b>326</b>       |

Source(s): MnDNR 2014, reference (152), MnDNR 2010, reference (184)

Note(s): Totals may not sum due to rounding

- (1) This dataset represents state land ownership using public land survey quarter-quarter sections as the smallest unit. In some cases, multiple state lands are located within a single quarter-quarter section. Therefore, features may be duplicated and the analysis results may over-represent potential impacts.
- (2) Acreage for private lands was calculated as the difference between total lands and public lands.

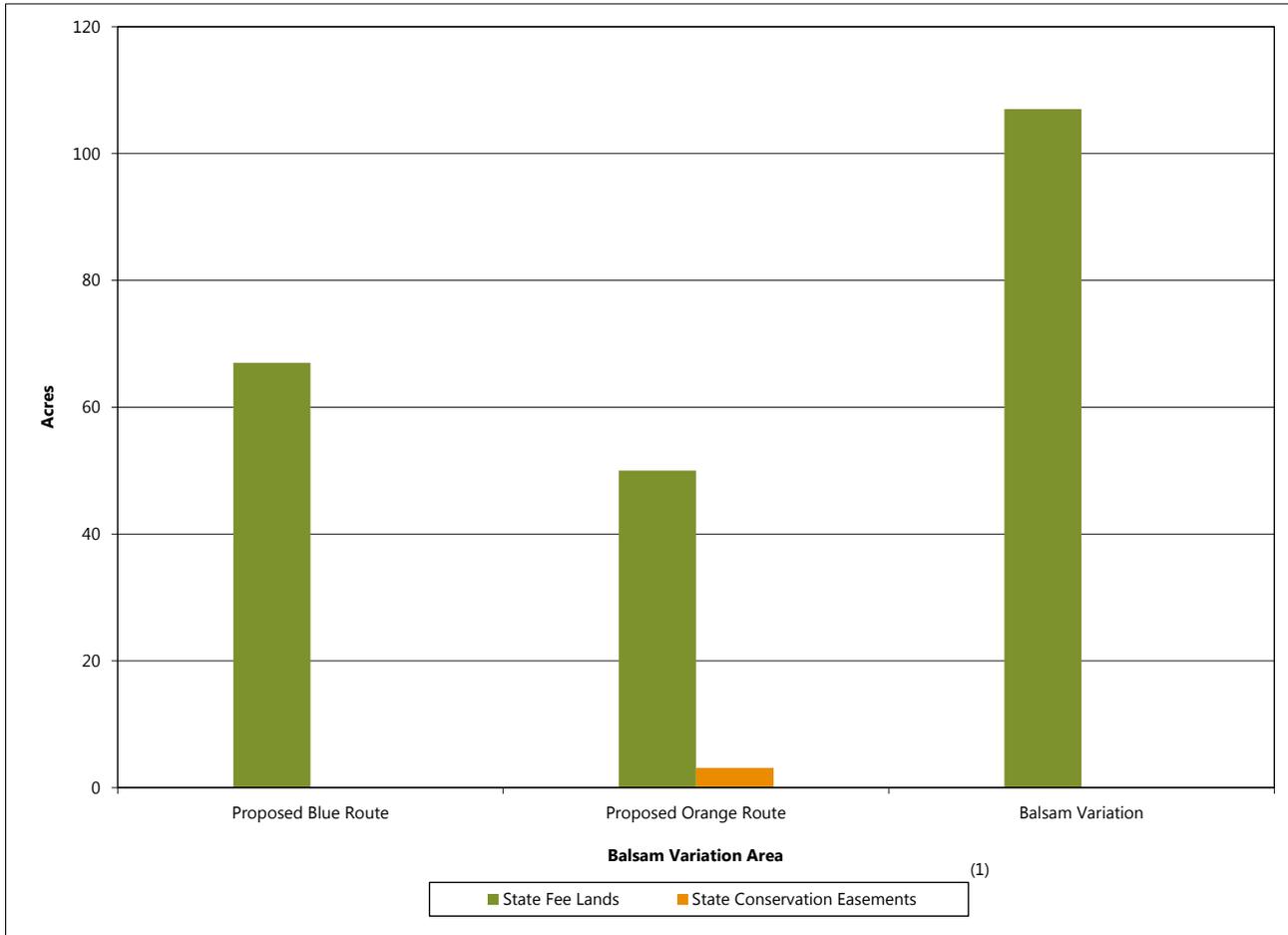
### Land Ownership and Management

As shown in Table 6-185 and Figure 6-117, no state forest land would be located in the proposed routes or variation; however, each would contain some state fee land, with the greatest amount located in the Balsam Variation. No impacts to county lands, or USFWS Interest Lands would occur under the Proposed Blue Route, Proposed Orange Route, or Balsam Variation. The Proposed Orange Route would impact a few acres of state conservation land, while the Proposed Blue Route and Balsam Variation would not impact this land type.

The Proposed Blue Route and Proposed Orange Route would both parallel an existing corridor and road/trail for approximately 20 percent of their total length (see Section 6.4.3.6). The Balsam Variation would parallel a road/trail for approximately 36 percent of its length.

Impacts to land use from the proposed Project in the Balsam Variation Area would be similar to those described in Section 6.2.1.1. The Proposed Blue Route, Proposed Orange Route, and Balsam Variation would all result in a long-term change in land use for areas currently forested and/or swamp land, but these changes would be limited in extent, and there would still be extensive forest and swamp

Figure 6-117 Public Land Ownership/Management within the ROI in the Balsam Variation Area



Source(s): MnDNR 2014, reference (152); MnDNR 2010, reference (184)

Note(s): Totals may not sum due to rounding

(1) This dataset represents state land ownership using public land survey quarter-quarter sections as the smallest unit. In some cases, multiple state lands are located within a single quarter-quarter section. Therefore, features may be duplicated and the analysis results may over-represent potential impacts.

lands in the surrounding area; so these changes are expected to have a minimal impact on land use. The length of the route that would parallel an existing corridor is also important. The Proposed Orange Route avoids more state forest and state fee lands than the Proposed Blue Route or the Balsam Variation thereby avoiding long-term changes to land use. However, the Balsam Variation parallel an existing road/trail for a greater percentage of its length than either the Proposed Blue Route or Proposed Orange Route.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on land use are summarized in Section 5.3.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

### 6.4.3.2 Land-Based Economies

This section describes the land-based economy resources, including agriculture, forestry, and mining, within the Balsam Lake Variation Area and the potential impacts from the proposed Project on those resources. Data related to land-based economy resources in the Balsam Variation Area are summarized in Table 6-186.

#### Agriculture

As identified in Section 5.3.2.1, the ROI for evaluating agricultural impacts is the ROW of the transmission line. Table 6-186 and Figure 6-118 show the acreage of USDA-NRCS-classified prime farmland, prime farmland if drained, and farmland of statewide importance that would be impacted by the Proposed Blue Route, Proposed Orange Route, and Balsam Variation in the ROI.

**Table 6-186 Land-Based Economy Resources within the Anticipated ROW in the Balsam Variation Area**

| Resource  | Type                             | Evaluation Parameter                   | Balsam Variation Area |                       |                  |
|---|----------------------------------|--|-----------------------|-----------------------|------------------|
|   |                                  |  | Proposed Blue Route   | Proposed Orange Route | Balsam Variation |
| Transmission Line                                       | --                               | Length (mi)                            | 12.9                  | 13.7                  | 17.8             |
| Existing Transmission Line <sup>(1)</sup>               | --                               | Percent of Total Length <sup>(2)</sup> | 15                    | 14                    | 0                |
| Abandon Transmission Line                               | --                               | Percent of Total Length <sup>(2)</sup> | 0                     | 22                    | 66               |
| Farmland  | Not Farmland                     | Acres within ROW                       | 109                   | 115                   | 230              |
|   | Prime Farmland if Drained        | Acres within ROW                       | 50                    | 46                    | 61               |
|   | Farmland of Statewide Importance | Acres within ROW                       | 0                     | 12                    | 1                |
|   | All Areas are Prime Farmland     | Acres within ROW                       | 156                   | 159                   | 141              |
| State Mineral Leases (active and/or expired/terminated) | --                               | Acres within ROW                       | 0                     | 0                     | 89               |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); USDA NRCS 2014, reference (154); MnDNR 2014, reference (179)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

The Proposed Orange Route, which would parallel existing corridors for approximately one third of its length, would impact the most acres of farmland (Figure 6-118). While the Proposed Orange Route would have the greatest impact on farmland of statewide importance, the Proposed Blue Route would not have any impact on these farmlands. The Balsam Variation, which would be located in an abandoned transmission line corridor for approximately two-thirds of its length, would be expected to have the fewest impacts on farmland.

As discussed in Section 5.3.2.1, construction activities could limit the use of fields or could affect crops and soil by compacting soil, generating dust, damaging crops or drain tile, or causing erosion. Construction activities would also cause long-term adverse impacts to agriculture by the potential loss of income due to the removal of farmland for transmission line structures and associated facilities. Maintenance and emergency repair activities could result in direct adverse impacts on farmlands from the removal of crops, localized physical disturbance, and soil compaction caused by equipment.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on agricultural resources are summarized in Section 5.3.2.1. Section 2.13 summarizes Applicant-

proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

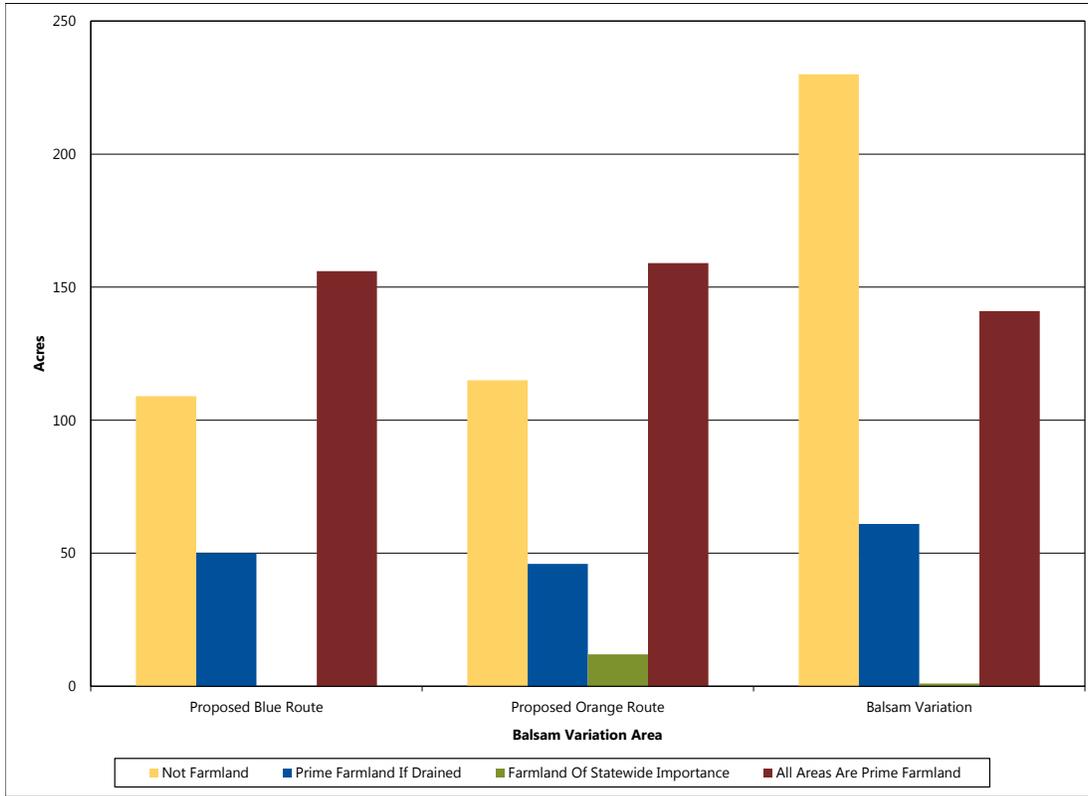
### Forestry

As identified in Section 5.3.2.2, the ROI for evaluating forestry impacts from the proposed Project is the ROW of the transmission line. Table 6-186 identifies the acreage of state forest land that would be impacted in the ROI by the Proposed Blue Route, Proposed Orange Route, and Balsam Variation. There are no USDA-USFS national forest lands or state forest lands within the ROI of the Proposed Blue Route, Proposed Orange Route, and Balsam Variation in the Balsam Variation Area.

### Mining and Mineral Resources

As identified in Section 5.3.2.3, the ROI for evaluating mining and mineral resource impacts from the proposed Project is the ROW of the transmission line. Table 6-186, Figure 6-119, and Map 6-61 identify the acreage of mining lands with active and terminated/expired state mineral leases that may be impacted in the Balsam Variation Area. There are no known aggregate resources in the ROI of either the proposed routes or the Balsam Variation. **The southern portion of the Balsam Variation crosses known mineral resources leased by the MnDNR.**

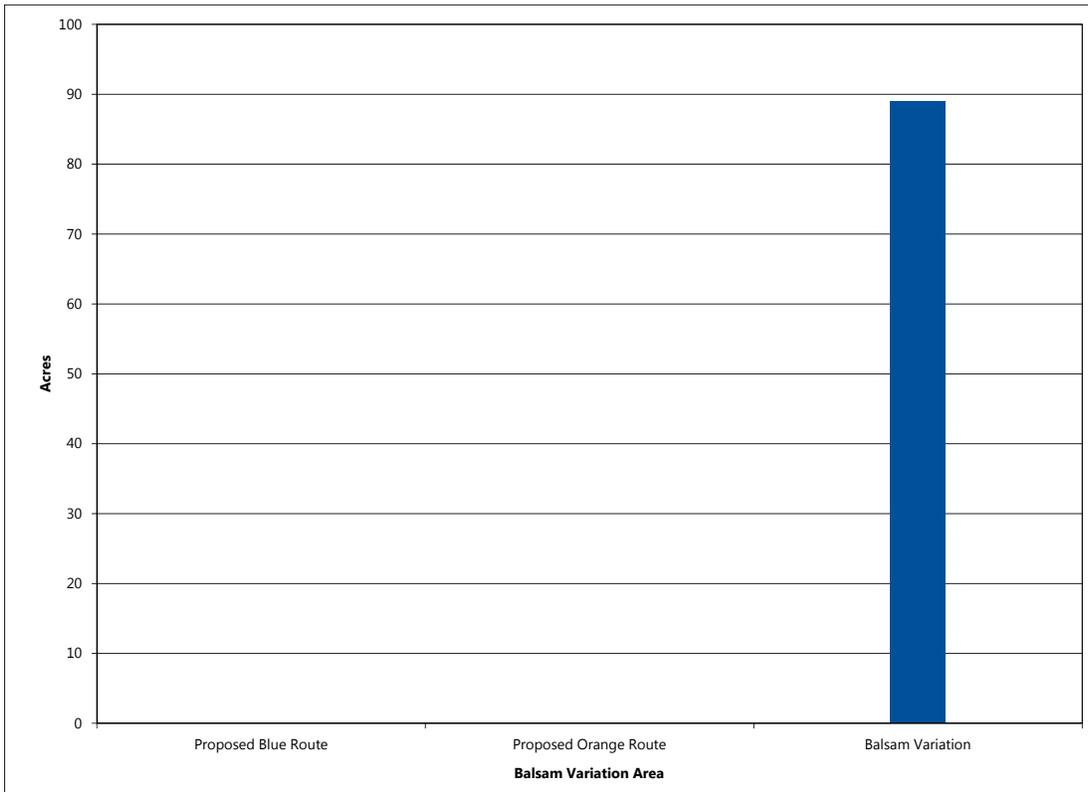
Figure 6-118 Acres of Farmland by Type within the Anticipated ROW in the Balsam Variation Area



Source(s): USDA NRCS 2014, reference (154)

Note(s): Totals may not sum due to rounding

Figure 6-119 Acres of State Mineral Leases within the Anticipated ROW in the Balsam Variation Area



Source(s): MnDNR 2014, reference (179)

The Balsam Variation would traverse mining lands with **active and terminated/expired** state mineral leases associated with the Mesabi Iron Range, while the two proposed routes would not traverse any mining lands with **active and terminated/expired** state mineral leases (Table 6-186, Figure 6-119, and Map 6-61). The Balsam Variation could potentially interfere with mining activities in this area.

As discussed in Section 5.3.2.3, construction of transmission lines could affect future mining operations if the structures **encumber the lease or interfere with access to mineable resources or the ability to remove these resources. If a conflict were to arise, the transmission line and structures would need to be relocated to allow access to the mineral resources.**

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on mining and mineral resources are summarized in Section 5.3.2.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

### 6.4.3.3 Archaeology and Historic Architectural Sites

As described in Section 6.2.1.3, the APE for potential direct impacts to archaeological and historic architectural resources includes the ROW of the proposed transmission line; however, potential indirect impacts to historic architectural sites are evaluated within one mile from the anticipated alignment since visual intrusions can change the context and setting of historic architectural sites.

Table 6-187 provides a summary of the previously recorded archaeological **sites** and historic architectural resources within the ROW and within 1,500 feet and one mile of the anticipated alignments for the Proposed Blue Route, Proposed Orange Route,

and Balsam Variation in the Balsam Variation Area (Map 6-62). A more detailed description of these resources can be found in the Phase IA cultural resources survey report located in Appendix P.

**To date, no specific Native American resources have been previously recorded within the ROW (direct APE for cultural resources) or within one mile of the anticipated alignment (indirect APE for historic architectural resources or Native American resources) for the Proposed Blue Route, Proposed Orange Route, and Balsam Variation in the Balsam Variation Area. However, DOE is continuing to consult with federally recognized Indian tribes to identify Native American resources within the direct and indirect APEs for the proposed Project.**

Within the Balsam Variation Area, there are no known archaeological or historic architectural **resources** located within the ROW of the Proposed Blue Route, Proposed Orange Route, or Balsam Variation, although cultural resource investigations have not yet occurred for the Proposed Route or variations. The Balsam Variation has the most sites architectural sites when compared to those potentially present within the Proposed Blue Route and Proposed Orange Route indirect APEs. While several of the historic architectural **resources** located within the indirect APE of the routes and variation are recommended as not NRHP-eligible, there are numerous properties that have either not been evaluated for NRHP-eligibility or were recommended potentially NRHP eligible, recommended NRHP eligible, or considered NRHP eligible.

There is currently no known potential for direct, long-term adverse **impacts** from the proposed Project as there are no previously recorded archaeological **sites** and **historic architectural resources** within the Balsam Variation Area direct APE. Indirect, long-term, adverse visual **impacts to previously recorded historic architectural resources**

**Table 6-187 Archaeological and Historic Resources within the Balsam Variation Area**

| Resource                     | Evaluation Parameter <sup>(1)</sup> | Balsam Variation Area |                       |                  |
|------------------------------|-------------------------------------|-----------------------|-----------------------|------------------|
|                              |                                     | Proposed Blue Route   | Proposed Orange Route | Balsam Variation |
| Historic Architectural Sites | Count within ROW                    | 0                     | 0                     | 0                |
|                              | Count within 0–1,500 ft             | 0                     | 0                     | 4                |
|                              | Count within 0–5,280 ft             | 13                    | 24                    | 28               |
| Archaeological Sites         | Count within ROW                    | 0                     | 0                     | 0                |
|                              | Count within 0–1,500 ft             | 0                     | 0                     | 1                |

Source(s): SHPO 2014, reference (147); SHPO 2014, reference (155); SHPO 2014, reference (156)

Note(s): Totals may not sum due to rounding

(1) Acre/Count within a distance includes both sides of the anticipated alignment. For example, count within 0-500 ft includes 500 ft on each side of the anticipated alignment.

within the indirect APEs for the Proposed Blue Route, Orange Route, and Balsam Variation are likely to occur wherever the proposed Project is visibly prominent in the landscape or a viewshed and appears inconsistent with the existing setting of the architectural resources or within views to and from the architectural resources. Since the indirect APEs for the Proposed Blue Route, Proposed Orange Route, and Balsam Variation contain historic architectural resources that have either not been evaluated for NRHP-eligibility or have been previously recommended potentially NRHP eligible, have been previously recommended NRHP eligible, or are considered NRHP eligible, the proposed Project may result in changes to the setting of these resources that could be considered an adverse impact under Section 106 of the NHPA if these historic architectural resources are determined NRHP-eligible and if setting is determined to be a character defining feature that contributes to the significance of the resource.

**The Proposed Blue Route, Proposed Orange Route, and Balsam Variation have not been surveyed for cultural resources. As such, archaeological surveys, architectural surveys or inventories, and surveys or inventories for Native American resources will be required as part of cultural resources investigations conducted in compliance with federal and/or state regulations for archaeological resources and historic architectural sites. These cultural resources investigations will be implemented as part of the DOE's Draft PA (Appendix V) that will establish a process to identify cultural resources within the APE for the proposed Project, evaluate the NRHP-eligibility of identified cultural resources, and develop measures to avoid, minimize, or mitigate potential adverse impacts on historic architectural sites as a result of implementation of the proposed Project.**

Potential **short-term and long-term** adverse impacts from construction, operation, maintenance, and emergency repair related to historic and cultural properties are summarized in Section 5.3.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate adverse impacts to these resources, including TCPs, from the proposed Project.

#### 6.4.3.4 Natural Environment

This section describes the water, vegetation, and wildlife resources within the Balsam Variation Area and the potential impacts from the proposed Project.

#### Water Resources

As explained in Section 5.3.4.1, the ROI for water resources was determined to be the ROW of the transmission line. Data related to the ROI for water resources in the Balsam Variation Area are summarized in Table 6-188 and shown on Map 6-63. Additional, water resources data beyond those resources present in the ROI of this variation area are provided in Appendix E.

The number of water crossings, need to place transmission structures in floodplains and wetlands, and quantity of wetland type conversion are the primary water resources impacts that would differ across the Proposed Blue Route, the Proposed Orange Route, and the Balsam Variation. The Proposed Blue Route, the Proposed Orange Route, and the Balsam Variation would not require crossing trout streams or impaired waters.

As shown in Figure 6-120, the Proposed Blue Route would cross the most PWIs, including Sucker Brook, three tributaries to Sucker Brook, two unnamed

**Table 6-188 Water Resources within the Anticipated ROW in the Balsam Variation Area**

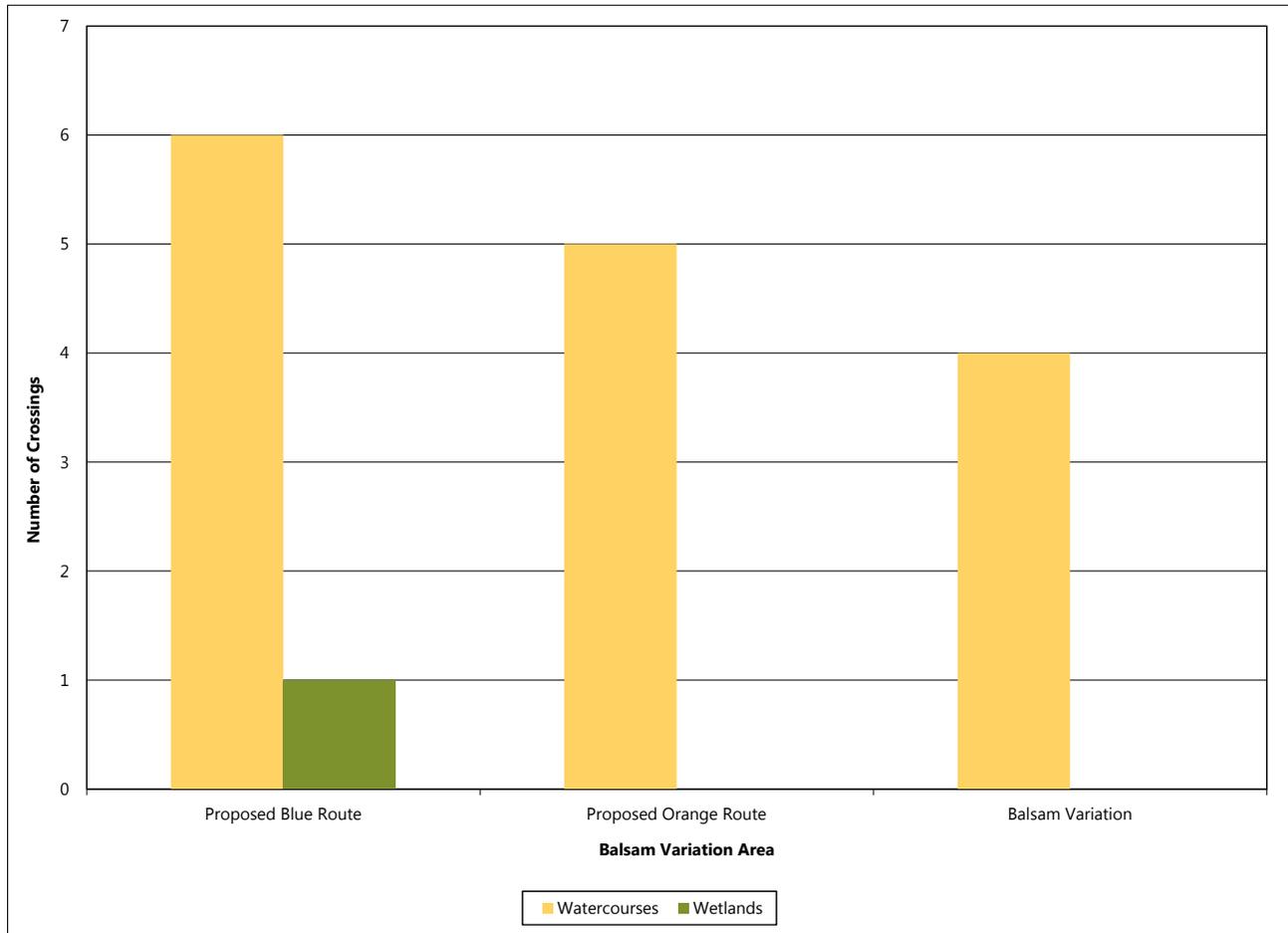
| Resource                      | Evaluation Parameter | Balsam Variation Area |                       |                  |
|-------------------------------|----------------------|-----------------------|-----------------------|------------------|
|                               |                      | Proposed Blue Route   | Proposed Orange Route | Balsam Variation |
| Transmission Line             | Length (mi)          | 12.9                  | 13.7                  | 17.8             |
| PWI Waters <sup>(1)</sup>     | Number of Crossings  | 7                     | 5                     | 4                |
| Non-PWI Waters <sup>(2)</sup> | Number of Crossings  | 1                     | 4                     | 3                |
| Floodplains <sup>(3)</sup>    | Acres within ROW     | 0                     | 26                    | 22               |
| NWI Wetlands                  | Acres within ROW     | 54                    | 69                    | 96               |

Sources: USFWS 1997, reference (157); USGS 2014, reference (158); USGS 2014, reference (159); Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); MnDNR 2008, reference (160); MnDNR 2008, reference (161); MnDNR 2008, reference (162); Minnesota Power 2014, reference (163)

Note(s): Totals may not sum due to rounding

- (1) PWI waters include watercourses, waterbodies, and wetlands, as described in Chapter 5. The number of each type of PWI water the Proposed Route and variations would cross are described in the text and figure below.
- (2) Non-PWI waters were calculated by removing the PWI-listed waters from the NHD dataset.
- (3) Floodplain acreage includes combined total 100-year and 500-year floodplain acreage. The acreage of floodplain by type that the Proposed Route and variations would cross is described in the text and figure below.

Figure 6-120 PWI Water Crossings by Type in the Balsam Variation Area



Source(s): USGS 2014, reference (158); USGS 2014, reference (159); MnDNR 2008, reference (160); MnDNR 2008, reference (161); MnDNR 2008, reference (162)

Note(s): Totals may not sum due to rounding

watercourses, and wetlands of Grass Lake. The Proposed Orange Route’s PWI crossings would include two crossings of the Prairie River, Balsam Creek, Sucker Brook, and one tributary to Sucker Brook. The Balsam Variation would also cross the Prairie River twice, as well as Balsam Creek and one tributary to Sucker Brook.

The Proposed Blue Route and the Proposed Orange Route and the Balsam Variation would all require crossing non-PWI waters. As shown in Figure 6-121, the Proposed Orange Route would require the most non-PWI water crossings.

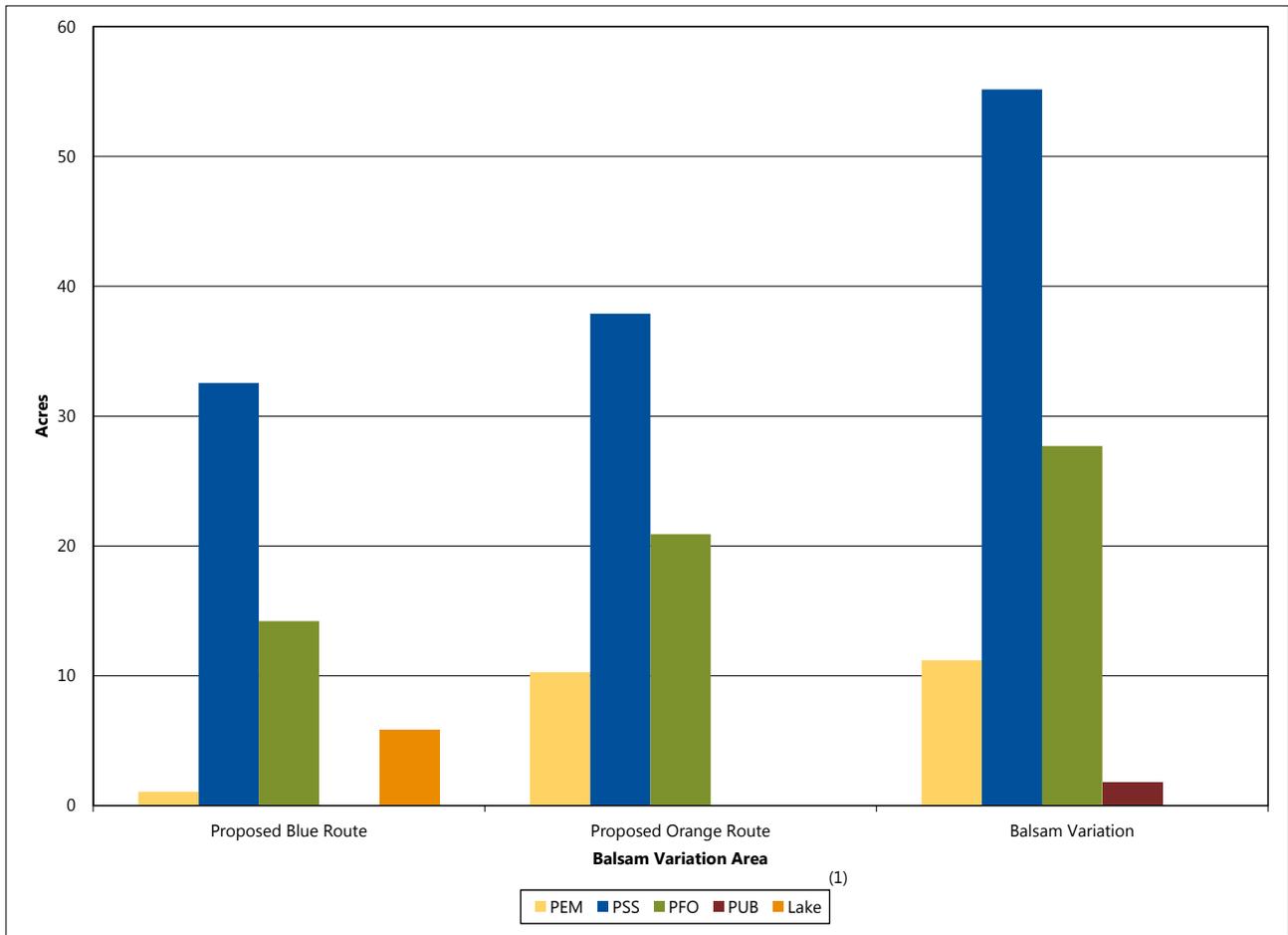
It is anticipated that PWI crossings and non-PWI water crossings are spannable (crossings would be less than the average spanning length of 1,250 feet) and transmission structures would not be placed within them.

Though the Proposed Blue Route would not traverse floodplains, both the Proposed Orange Route and the Balsam Variation would require construction and placement of transmission structures in Zone

A floodplain of the Prairie River. Placement of transmission structures in this floodplain could not be avoided by spanning as floodplain crossing distances exceed the average spanning length of 1,250 feet.

Based on the NWI, the Proposed Blue Route, the Proposed Orange Route, and the Balsam Variation would all require conversion of forested and shrub wetland areas to an herbaceous wetland type through removal of woody vegetation in the ROW. As shown in Figure 6-122, the Balsam Variation contains the most forested and shrub wetland and would result in the greatest amount of wetland type conversion. While these direct, adverse impacts to forested and shrub wetlands would be permanent and may change wetland functions within the ROW, e.g. altering the hydrology and habitat, they are expected to be minimal because of the amount of surrounding shrub and forested wetlands in the region. Changes in wetland function are discussed in Section 5.3.4.1.

Figure 6-122 Acres of Wetland by Type within the Anticipated ROW in the Balsam Variation Area



Source(s): USFWS 1997, reference (157)

Note(s): Totals may not sum due to rounding

(1) Palustrine emergent wetland (PEM), palustrine shrub wetland (PSS), palustrine forested wetland (PFO, palustrine unconsolidated bottom pond (PUB).

The Applicant would need to mitigate for these impacts as summarized in Section 5.3.4.1. The Proposed Blue Route, Proposed Orange Route, and the Balsam Variation would all require placement of fill in wetlands for construction of transmission structures. This impact cannot be avoided by spanning as wetland crossings in the East Section generally exceed the average spanning length allowable for structures, but impacts to wetlands from permanent fill would be expected to be minimal because of the localized extent of the impact (33 square feet per structure). Due to the number of wetland complexes in the area, it would be expected that the Proposed Blue Route, the Proposed Orange Route, and the Balsam Variation would all require temporary construction access through wetlands, which would be expected to be minimal due to the short-term, localized nature of the impact, and the Applicant’s intended use of minimization measures, such as matting.

Potential construction, operation, maintenance, and emergency repair related short-term and long-term impacts on water resources are summarized in Section 5.3.4.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

**Vegetation**

In Section 5.3.4.2, the ROI to assess impacts to vegetation was determined to be the ROW of the proposed transmission line. Data related to the ROI for vegetation in the Balsam Variation Area are summarized in Table 6-189 and shown on Maps 5-19 and 6-63. Additional vegetation data beyond the dominant land cover types present in the ROI in this variation area are provided in Appendix E.

The primary impact on vegetation that would differ across the Proposed Blue Route, the Proposed Orange Route, and Balsam Variation is the loss or fragmentation of forest. As discussed in Section 5.3.4.2, the Applicant would permanently

**Table 6-189 Vegetation Resources within the Anticipated ROW in the Balsam Variation Area**

| Resource  | Evaluation Parameter                   | Balsam Variation Area |                       |                  |
|---|--|-----------------------|-----------------------|------------------|
|   |  | Proposed Blue Route   | Proposed Orange Route | Balsam Variation |
| Transmission Line                               | Length (mi)                            | 12.9                  | 13.7                  | 17.8             |
| Existing Transmission Line <sup>(1)</sup>       | Percent of Total Length <sup>(2)</sup> | 15                    | 14                    | 0                |
| Abandoned Transmission Line                     | Percent of Total Length <sup>(2)</sup> | 0                     | 22                    | 66               |
| Total Forested GAP Land Cover                   | Acres within ROW                       | 299                   | 318                   | 401              |
| GAP Land Cover - Dominant Types <sup>(3)</sup>  |  |                       |                       |                  |
| North American Boreal Forest                    | Acres within ROW                       | 205                   | 208                   | 234              |
| North American Boreal Flooded and Swamp Forest  | Acres within ROW                       | 12                    | 15                    | 40               |
| Eastern North American Cool Temperate Forest    | Acres within ROW                       | 53                    | 47                    | 60               |
| Eastern North American Flooded and Swamp Forest | Acres within ROW                       | 29                    | 47                    | 68               |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); USGS 2001, reference (151)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.
- (3) Data presented here only includes dominant GAP types; see Appendix E for additional land cover types within the ROW.

clear woody vegetation from the ROW during construction and the ROW would be maintained as low-stature vegetation in order to reduce interference with the maintenance and function of the transmission line.

As indicated in Table 6-189 and Figure 6-123, the Balsam Variation would pass through more forested land, relative to the Proposed Blue Route and the Proposed Orange Route, therefore resulting in more permanent removal of forested vegetation. The Proposed Blue Route and the Proposed Orange Route are shorter in length and would require creation of new corridor for most of their length. The Balsam Variation would **be located in an abandoned transmission line corridor** (Table 6-189; Map 6-65). Because the Balsam Variation would follow the location of an abandoned transmission line for much of its length it would likely result in less impact on intact forested areas. While direct, adverse impacts to forested areas would be long-term, contiguous forest is abundant in the region surrounding the proposed Project (Map 5-19).

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on vegetation resources are summarized in Section 5.3.4.2. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

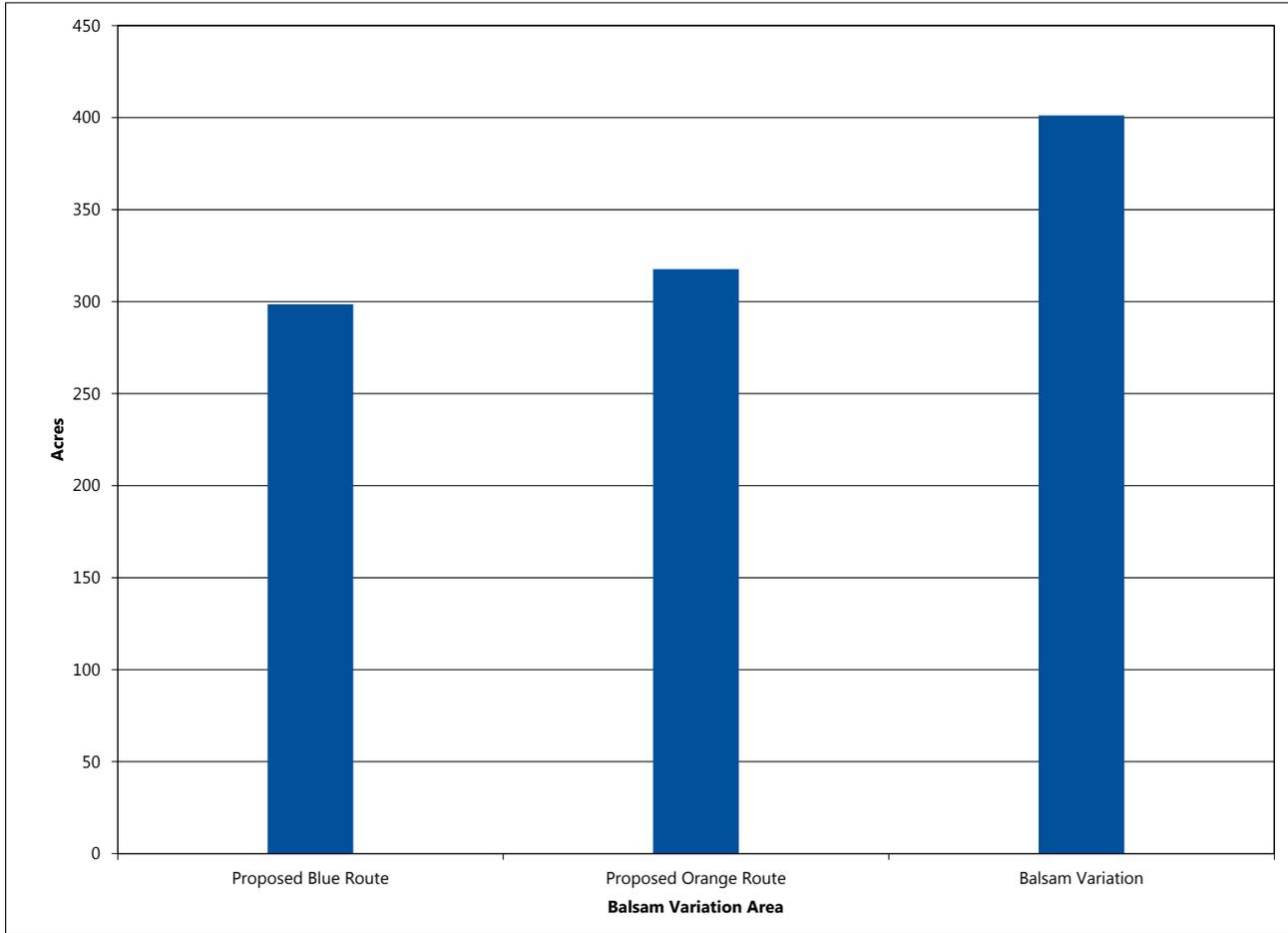
### Wildlife

The ROI for wildlife was determined in Section 5.3.4.3 to be the ROW of the proposed transmission line. Data related to wildlife resources in the Balsam Variation Area are summarized in Table 6-190 and shown on Map 6-63.

The primary impacts on wildlife resources that would differ between the Proposed Blue Route, the Proposed Orange Route, and the Balsam Variation include loss and fragmentation of wildlife habitat and proximity of the Proposed Blue Route, the Proposed Orange Route, and the Balsam Variation to these areas. As discussed in Section 5.3.4.3, the proposed Project would expand existing corridor or create new corridor; this would result in conversion from forest to low-stature open vegetation communities, favoring wildlife species that prefer more open vegetation communities. Section 6.4.3.4 (Vegetation) summarizes potential impacts on forested vegetation from the proposed routes and Balsam Variation.

As indicated in Table 6-190, the Proposed Blue Route and the Proposed Orange Route are shorter in length and would require creation of new corridor for most of their length. The Balsam Variation **would be located in an abandoned transmission line corridor** for over half of its length (Table 6-190; Map 6-65). Because the Balsam Variation would **be located in an abandoned**

**Figure 6-123 Acres of all Forested GAP Land Cover Types within the Anticipated ROW in the Balsam Variation Area**



Source(s): USGS 2001, reference (151)

Note(s): Totals may not sum due to rounding

**Table 6-190 Information Relevant to Wildlife Resources in the Vicinity of the Balsam Variation Area**

| Resource                                  | Evaluation Parameter                   | Balsam Variation Area |                       |                  |
|---|--|-----------------------|-----------------------|------------------|
|   |  | Proposed Blue Route   | Proposed Orange Route | Balsam Variation |
| Transmission Line                         | Length (mi)                            | 12.9                  | 13.7                  | 17.8             |
| Existing Transmission Line <sup>(1)</sup> | Percent of Total Length <sup>(2)</sup> | 15                    | 14                    | 0                |
| Abandoned Transmission Line               | Percent of Total Length <sup>(2)</sup> | 0                     | 22                    | 66               |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

transmission line corridor for much of its length it would likely result in less fragmentation of forested habitats, and subsequent displacement of wildlife species associated with those forest communities. However, clearing the location of the abandoned transmission line for the Balsam Variation may impact some wildlife inhabiting the area, resulting in temporary and/or permanent displacement of some wildlife.

The Balsam Variation would run within approximately 500 feet of the Chippewa Plains Important Bird Area and would require a new transmission line corridor at this point and throughout its entire length (Map 5-22 and Map 6-65). The Balsam Variation may result in more impacts on birds and other wildlife associated with the Chippewa Plains Important Bird Area because it would require creation of more corridor in this area.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on wildlife resources are summarized in Section 5.3.4.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project. Section 6.2.1.4 (Wildlife) discusses additional suggested measures to avoid, minimize, or mitigate impacts on wildlife are summarized.

### 6.4.3.5 Rare and Unique Natural Resources

Rare and unique natural resources are divided into rare species and rare communities. Rare species encompass federally listed or state endangered, threatened, or special concern species while rare communities may include state-designated features, such as SNAs, MBS Sites of Biodiversity Significance, MnDNR High Conservation Value Forest, MnDNR Ecologically Important Lowland Conifer stands, and MBS native plant communities.

### Rare Species

The ROI for rare species is described in Section 5.3.5, which states that for impacts to federally and state-listed species, the ROI includes a one-mile buffer surrounding the proposed routes and variations. Data related to rare species in the Balsam Variation Area are summarized in Table 6-191; additional data on rare species, such as the presence of MnDNR tracked species, is provided in Appendix F. As a condition of the license agreement with MnDNR for access to the NHIS database, data pertaining to the documented locations of rare species are not shown on a map.

Proximity of state endangered, threatened, or special concern species is similar between the proposed routes and Balsam Variation. As discussed in Section 5.3.5, potential long-term impacts on rare species from the proposed Project include the direct or indirect loss of individuals or conversion of associated habitats and increased habitat fragmentation from construction.

As indicated in Table 6-191, the three state-special concern species documented within one mile of the Proposed Blue Route, the Proposed Orange Route, and the Balsam Variation are aquatic species. It is anticipated that all watercourses and waterbodies would be spanned; because of this impacts to these state-special concern species is not expected. As discussed under Wildlife in Section 6.4.3.4, the Balsam Variation would run within approximately 500 feet of the Chippewa Plains Important Bird Area (Map 6-63); because of this, the Balsam Variation may result in more impacts on rare birds and other wildlife associated with the Chippewa Plains Important Bird Area.

The Proposed Blue Route and the Proposed Orange Route would require establishment of new corridor for most of their length, while the Balsam Variation would be located in an abandoned transmission

**Table 6-191 Rare Species Documented within One Mile of the Anticipated ROW in the Balsam Variation Area**

| Scientific Name <sup>(1)</sup> | Common Name        | Federal Status | State Status    | Type           | Balsam Variation Area |                       |                  |
|--------------------------------|--------------------|----------------|-----------------|----------------|-----------------------|-----------------------|------------------|
|                                |                    |                |                 |                | Proposed Blue Route   | Proposed Orange Route | Balsam Variation |
| <i>Lasmigona compressa</i>     | Creek Heelsplitter | None           | Special Concern | Mussel         |                       | X                     | X                |
| <i>Ligumia recta</i>           | Black Sandshell    | None           | Special Concern | Mussel         | X                     | X                     | X                |
| <i>Najas gracillima</i>        | Thread-like Naiad  | None           | Special Concern | Vascular Plant | X                     |                       |                  |

Source(s): MnDNR 2015, reference (132)

(1) Canada lynx and gray wolf records are not documented in the NHIS database.

line corridor for over half of its length. Because the Balsam Variation would be located in an abandoned transmission line corridor for much of its length, it would likely result in less fragmentation of forested habitats, and subsequent impacts on rare species that may be associated with those forest communities. However, clearing the location of the abandoned transmission line for the Balsam Variation may impact rare species that may inhabit the area. However, the full extent of potential impacts from the Proposed Blue Route, the Proposed Orange Route, and the Balsam Variation cannot be determined without pre-construction field surveys, which would likely occur as a condition of a MN PUC Route Permit. The MN PUC Route Permit could also require the development of a Vegetation Management Plan as a permit condition, which could include plant surveys along the permitted ROW.

Any indirect impacts to rare species from the proposed Project are expected to be minimal because of the amount of surrounding habitat. Through use of Applicant proposed avoidance and minimization measures, direct impacts to rare species are not expected. DOE's informal consultation under Section 7 of the ESA with USFWS is currently on-going and a Biological Assessment has been prepared to assess potential impacts on federally listed species (Appendix R).

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on rare species are summarized in Section 5.3.5. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

## Rare Communities

The ROI for the analysis of impacts to rare communities was described within Section 5.3.5 and includes the ROW of the proposed transmission line. Data related to rare communities and resources in the Balsam Variation Area are summarized in Table 6-192 and shown on Map 6-64; additional, more detailed data on rare communities and resources is provided in Appendix E.

The primary impact on rare communities and resources that would differ across the Proposed Blue Route, the Proposed Orange Route, and the Balsam Variation is the loss or conversion of native vegetation. As discussed in Section 5.3.5, the Applicant would permanently remove vegetation at each structure footprint and within portions of the ROW that are currently dominated by forest or other woody vegetation.

As indicated on Map 6-64 and in Table 6-192, the Proposed Orange Route would pass through the most MBS Sites of Biodiversity Significance. The Balsam Variation would be located in an abandoned transmission line corridor for over half of its length, while the Proposed Blue Route and the Proposed Orange Route would require creation of new corridor for the majority of their lengths. Because of this, the Proposed Blue Route and the Proposed Orange Route would result in more impacts on native vegetation and fragmentation of intact forest in areas where forest vegetation is present.

The rare communities and resources listed in Table 6-192 and detailed above show that the proposed Project may result in direct, long-term, regional localized adverse impacts to rare communities. Some of these impacts may also have regional effects, because of the limited regional

**Table 6-192 Rare Communities and Resources within the Vicinity of the Balsam Variation Area**

| Resource  | Evaluation Parameter                   | Balsam Variation Area |                       |                  |
|---|--|-----------------------|-----------------------|------------------|
|   |  | Proposed Blue Route   | Proposed Orange Route | Balsam Variation |
| Transmission Line                                     | Length (mi)                            | 12.9                  | 13.7                  | 17.8             |
| Existing Transmission Line <sup>(1)</sup>             | Percent of Total Length <sup>(2)</sup> | 15                    | 14                    | 0                |
| Abandoned Transmission Line                           | Percent of Total Length <sup>(2)</sup> | 0                     | 22                    | 66               |
| MBS Sites of Biodiversity Significance <sup>(3)</sup> | Acres within ROW                       | 78                    | 105                   | 95               |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); MBS 2015, reference (167)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.
- (3) MBS Sites of Biodiversity Significance data are preliminary in this portion of the proposed Project. Because of the preliminary status and/or unknown ranks, biodiversity significance ranks are not distinguished from one another here.

abundance and distribution of some of the rare communities affected. Therefore, adverse impacts to rare communities are expected to be significant if localized adverse impacts would result in a broader regional depletion of certain rare communities. The MN PUC Route Permit could require the development of a Vegetation Management Plan as a permit condition, which could include plant surveys along the permitted ROW.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on rare communities are summarized in Section 5.3.5. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

### 6.4.3.6 Corridor Sharing

Sharing or paralleling existing corridors or linear features minimizes fragmentation of the landscape and can minimize impacts to adjacent property. The ROI for the analysis of corridor sharing generally includes infrastructure corridors within approximately 0.25 miles of the proposed routes and variations, as described in Section 5.3.6. Map 6-65 shows areas where the Proposed Blue Route, Proposed Orange Route, and Balsam Variation would parallel corridors with existing transportation, transmission line, or other linear features in the Balsam Variation Area.

Table 6-193 and Figure 6-124 identifies the percentage of total transmission line length that the Proposed Blue Route, Proposed Orange Route, and Balsam Variation parallel an existing corridor or linear feature in the Balsam Variation Area.

The Balsam Variation would be located in an **abandoned transmission line corridor** for over half of its length (Table 6-193). The Proposed Blue Route and Proposed Orange Route each would parallel an existing corridor for one-quarter of their lengths; however the Proposed Orange Route would be **located in an abandoned transmission line corridor** for another one-quarter of its length.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on corridor sharing are summarized in Section 5.3.6. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on corridor sharing from the proposed Project.

### 6.4.3.7 Electrical System Reliability

As explained in Section 5.3.7, the ROI for Electrical System Reliability was determined to be the corridors for the existing transmission lines. Data related to electrical system reliability in the Balsam Variation Area are shown on Map 6-65.

The Balsam Variation would not parallel an existing transmission line in the Balsam Variation Area. The Proposed Blue Route and Proposed Orange Route would parallel two 115 kV transmission lines for approximately 15 percent of their length in the southern portion of the Balsam Variation Area (Table 6-193); therefore, three transmission lines would be in adjacent corridors.

The configuration may decrease the reliability of the proposed Project. When facilities are located in close proximity, there is a greater risk that a single event can take out multiple lines. Additionally, the close proximity of the lines can make repairing the

**Table 6-193 Corridor Sharing in the Balsam Variation Area**

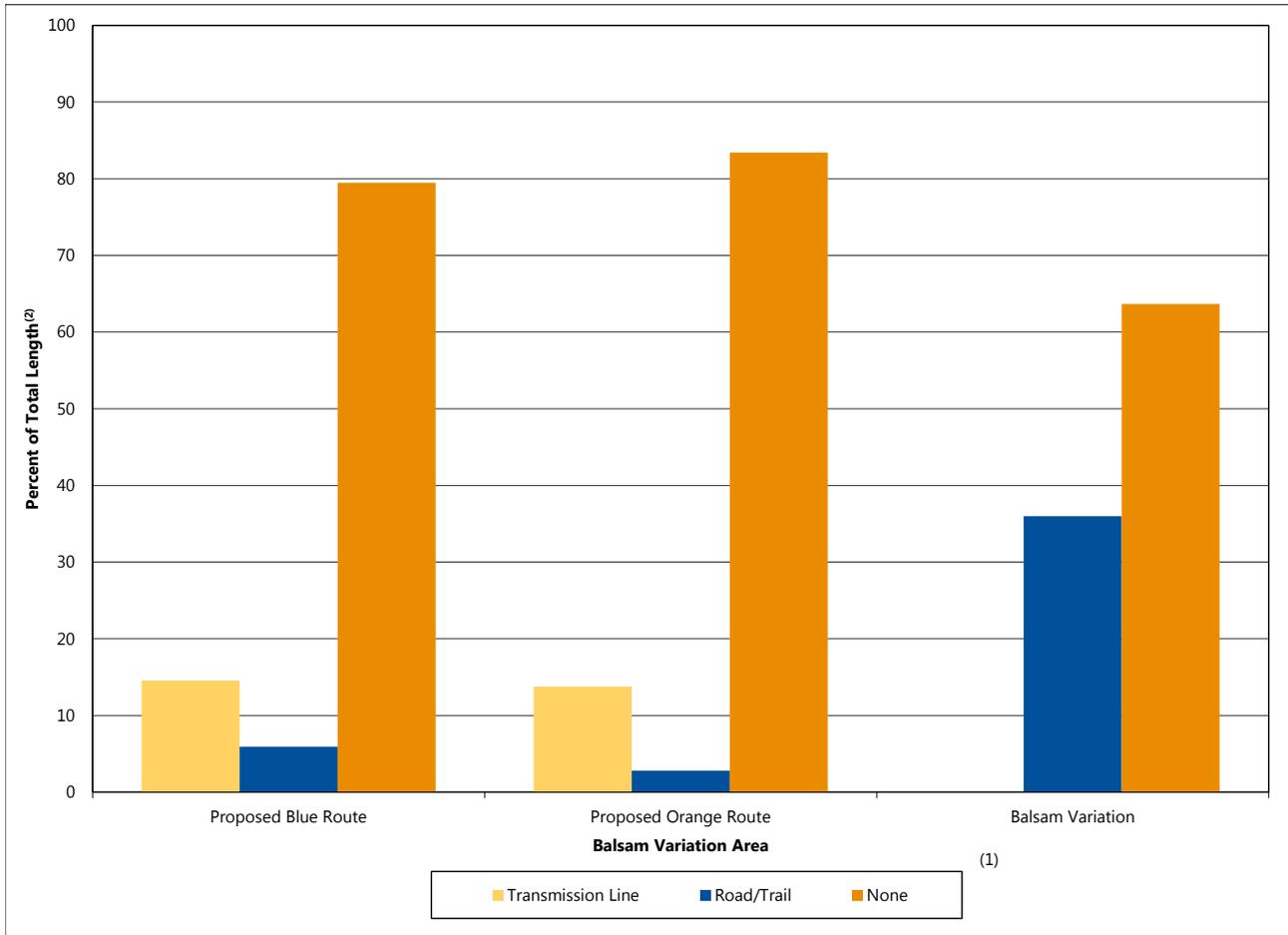
| Feature Sharing Corridor <sup>(1)</sup>   | Evaluation Parameter                   | Balsam Variation Area |                       |                  |
|---|--|-----------------------|-----------------------|------------------|
|   |  | Proposed Blue Route   | Proposed Orange Route | Balsam Variation |
| Transmission Line (other linear features may be present within the transmission line corridor; i.e., road, trail, field, line, PLSS)  | Percent of Total Length <sup>(2)</sup> | 15                    | 14                    | 0                |
| Road/Trail (other linear features, but not transmission lines, may be present within the road/trail corridor; i.e., PLSS, field line) | Percent of Total Length <sup>(2)</sup> | 6                     | 3                     | 36               |
| None  | Percent of Total Length <sup>(2)</sup> | 79                    | 83                    | 64               |

Source(s): USDA et al 2013, reference (170); MN DOC 2014, reference (145); MNDOT 2010, reference (171); MnDNR 2010, reference (172); MnDNR 2009 reference (173); MnDNR et al 2014, reference (174); MnDNR et al 2013, reference (175); MnDNR 2013, reference (176); MnDNR et al 2009, reference (177)

Note(s): Totals may not sum due to rounding

- (1) More than one feature may share the corridor; the primary feature within the corridor is identified, other features that may share the corridor are listed in parenthesis. Appendix E provides a detailed summary of all shared features.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

Figure 6-124 Corridor Sharing in the Balsam Variation Area



Source(s): USDA et al 2013, reference (170); MN DOC 2014, reference (145); MNDOT 2010, reference (171); MnDNR 2010, reference (172); MnDNR 2009 reference (173); MnDNR et al 2014, reference (174); MnDNR et al 2013, reference (175); MnDNR 2013, reference (176); MnDNR et al 2009, reference (177)

Note(s): Totals may not sum due to rounding

- (1) Transmission Line (other linear features may be present within the transmission line corridor; i.e., road, trail, field line, PLSS); Road/Trail (other linear features, but not transmission lines, may be present within the road/trail corridor, i.e., PLSS, field line).
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

lines more difficult. These difficulties could increase outage times, should an outage occur. Adverse impacts are possible as a result of the construction of the construction and operation of three high-voltage transmission lines under one variation in the East Section.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on electrical system reliability are summarized in Section 5.3.7. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on electrical system reliability.

### 6.4.3.8 Costs of Constructing, Operating, and Maintaining the Facility which are Dependent on Design and Route

Information related to construction, operation, and maintenance costs associated with the proposed Project is provided in Section 5.3.8. Table 6-194 summarizes the costs associated with constructing the Proposed Blue Route, Proposed Orange Route, and Balsam Variation in the Balsam Variation Area. As indicated in Table 6-194, the Balsam Variation would cost the most to construct, while the Proposed Blue Route would cost the least to construct.

The cost for routine maintenance would depend on the topology and the type of maintenance required, but typically runs from \$1,100 to \$1,600 per mile annually (Minnesota Power 2013). Using

**Table 6-194 Construction Costs in the Balsam Variation Area**

| Variation Area | Name in the EIS       | Cost (Total) | Average Cost (per mile) | Length (mi) |
|----------------|-----------------------|--------------|-------------------------|-------------|
| Balsam         | Proposed Blue Route   | \$15,121,621 | \$1,172,219             | 12.9        |
|                | Proposed Orange Route | \$16,018,490 | \$1,169,233             | 13.7        |
|                | Balsam Variation      | \$19,502,472 | \$1,095,644             | 17.8        |

Source(s): Minnesota Power 2015, reference (9)

the \$1,600 per mile for operation and maintenance, the estimated cost would range from \$20,000 to \$29,000 annually for these alternatives in the Balsam Variation Area.

#### 6.4.4 Dead Man’s Pond Variation Area

The Dead Man’s Pond Variation Area encompasses two route alternatives: the Proposed Blue Route and the Dead Man’s Pond Variation. This section provides a comparison of the potential impacts resulting from construction, operation, maintenance, and emergency repair of the proposed Project within the Dead Man’s Pond Variation Area, depending on the route or variation considered.

##### 6.4.4.1 Human Settlement

This section describes the aesthetic resources and zoning and land use compatibility within the Dead Man’s Pond Variation Area and the potential impacts from the proposed Project.

##### Aesthetics

As described in the Aesthetics discussion for the Effie Variation Area (see Section 6.4.1.1), impacts on aesthetic resources would be determined based largely on the level of increased contrast produced by the proposed Project in views by sensitive viewers. Residences and other aesthetic resources within 1,500 feet of the anticipated alignment would have a high probability of having views of the proposed Project and as described in Section 5.3.1.1, this distance is considered the ROI. Data related to aesthetic resources in the Dead Man’s Pond Variation Area are summarized in Table 6-195 and shown on Maps 6-61, 6-62, 6-63, and 6-65.

As indicated in Table 6-195 for the Dead Man’s Pond Variation Area, the Proposed Blue Route and Dead Man’s Pond Variation would both be located within one mile of a historic architectural site, an aesthetic resource with high visual sensitivity. In addition, both routes would be located within 1,500 feet of residences, which also have high visual sensitivity (Figure 6-125). The Proposed Blue Route would be located within 1,500 feet of two residences, one of which is within 1,000 feet of the transmission

line, and the Dead Man’s Pond Variation would be located within 1,500 feet of four residences, one of which is within 1,000 feet of the transmission line. Therefore, Dead Man’s Pond Variation could affect more residences with high visual sensitivity.

Both the Proposed Blue Route and Dead Man’s Pond Variation are approximately the same length, with the Dead Man’s Pond Variation slightly longer (2.3 miles) than the Proposed Blue Route (2.2 miles; Table 6-195). Neither the Proposed Blue Route nor Dead Man’s Variation parallel an existing large transmission line. Therefore, contrast for both routes would be similar, with the Dead Man’s Pond Variation producing slightly more contrast due to its slightly greater length.

Because the Proposed Blue Route would produce slightly less contrast and affect fewer residences (two) than the Dead Man’s Pond Variation (four), the Proposed Blue Route would result in less aesthetic impact than the Dead Man’s Pond Variation in the Dead Man’s Pond Variation Area.

Although the Proposed Blue Route and Dead Man’s Pond Variation do not parallel an existing large transmission line of similar size and design, they are short in length and affect few residences (two and four, respectively) and very few other sensitive visual resources (one historic architectural site).

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on aesthetics are summarized in Section 5.3.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

##### Land Use Compatibility

As explained in Section 5.3.1.1, the ROI for Land Use Compatibility was determined to be 1,500 feet from the anticipated alignments of the proposed Project.

##### Land Uses

Table 6-196 identifies the amount of each type of land cover within 1,500 feet of the anticipated

**Table 6-195 Aesthetic Resources within the ROI in the Dead Man’s Pond Variation Area**

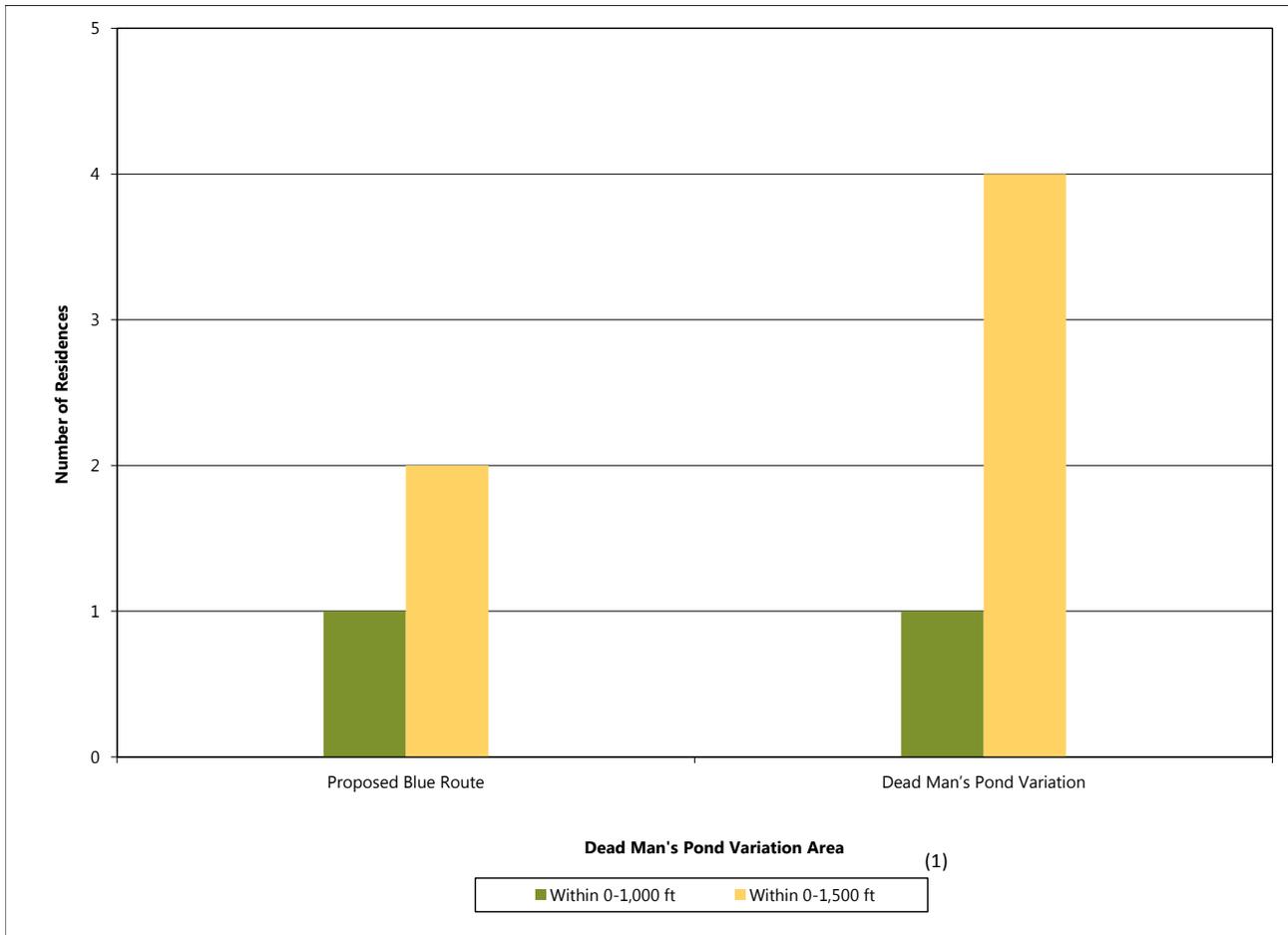
| Resource                                  | Evaluation Parameter <sup>(1)</sup>    | Dead Man’s Pond Variation Area |                           |
|---|--|--------------------------------|---------------------------|
|   |  | Proposed Blue Route            | Dead Man’s Pond Variation |
| Transmission Line                         | Length (mi)                            | 2.2                            | 2.3                       |
| Existing Transmission Line <sup>(2)</sup> | Percent of Total Length <sup>(3)</sup> | 0                              | 0                         |
| Residences                                | Count within 0-500 ft                  | 0                              | 0                         |
|   | Count within 0-1,000 ft                | 1                              | 1                         |
|   | Count within 0-1,500 ft                | 2                              | 4                         |
| Historic Architectural Sites              | Count within 0-1,500 ft                | 0                              | 0                         |
|   | Count within 0-5,280 ft                | 1                              | 1                         |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); Minnesota Power 2014, reference (146); SHPO 2014, reference (147)

Note(s): Totals may not sum due to rounding

- (1) Acre/Count within a distance includes both sides of the anticipated alignment. For example, count within 0–500 ft includes 500 ft on each side of the anticipated alignment.
- (2) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (3) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

**Figure 6-125 Residences within the ROI in the Dead Man’s Pond Variation Area**



Source(s): Minnesota Power 2014, reference (146)

Note(s): Totals may not sum due to rounding

- (1) Area/Count within a distance includes both sides of the anticipated alignment. For example, count within 0-500 ft includes 500 ft on each side of the anticipated alignment.

alignments of the Proposed Blue Route and Dead Man’s Pond Variation in the Dead Man’s Pond Variation Area. Generally, the percentage of each land use is representative of what is present within the ROW. The various land uses present in the Dead Man’s Pond Variation Area are shown in Map 5-19 and residences, churches, cemeteries, and airports near the Proposed Blue Route and Dead Man’s Pond Variation are shown on Map 6-61.

The Proposed Blue Route and Dead Man’s Pond Variation ROI are both primarily composed of forested and/or swamp land (Table 6-196). The Dead Man’s Pond Variation ROI contains a greater amount of forested/swamp land than the Proposed Blue Route, and both would contain a similar amount of developed or disturbed land.

### Land Ownership and Management

Table 6-197 and Figure 6-126 identify that the Dead Man’s Pond Variation contains a greater amount of state fee land than the Proposed Blue Route. None of the land within either ROW is state forest land. No impacts to county lands, state conservation easements or USFWS interest lands would occur under the Proposed Blue Route or Dead Man’s Pond Variation.

Neither the Proposed Blue Route nor the Dead Man’s Pond Variation would parallel an existing corridor; however, the Proposed Blue Route would follow a road/trail for a portion of its length (see Section 6.4.4.6). Therefore, the Proposed Blue Route would be expected to have slightly less incompatibility with surrounding land uses compared to the Dead Man’s Pond Variation.

Impacts to land use from the proposed Project in the Dead Man’s Pond Variation Area would

be similar to those described in Section 6.2.1.1. The Proposed Blue Route and Dead Man’s Pond Variation would both result in a long-term change in land use for areas currently forested and/or swamp land, but these changes would be limited in extent, and there would still be extensive forest and swamp lands in the surrounding area; so these changes are expected to have a minimal impact on land use. The length of the route that would parallel an existing corridor is also important. The Proposed Blue Route avoids a greater amount of state forest and state fee lands than the Dead Man’s Pond Variation therefore avoiding long-term changes to land use; further, the Proposed Blue Route parallels an existing road/trail for a portion of its length whereas the Dead Man’s Pond Variation does not parallel an existing corridor.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on land use are summarized in Section 5.3.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

### 6.4.4.2 Land-Based Economies

This section describes the land-based economy resources, including agriculture, forestry, and mining, within the Dead Man’s Pond Lake Variation Area and the potential impacts from the proposed Project on those resources. Data related to land-based economy resources in the Dead Man’s Pond Variation Area are summarized in Table 6-198.

#### Agriculture

As identified in Section 5.3.2.1, the ROI for evaluating agricultural impacts is the ROW of the transmission line. Table 6-198 and Figure 6-127 show the acreage of USDA-NRCS-classified prime

**Table 6-196 Land Uses within the ROI in the Dead Man’s Pond Variation Area**

| Resource   | Type <sup>(1)</sup>    | Evaluation Parameter <sup>(2)</sup> | Dead Man’s Pond Variation Area |                           |
|--|------------------------|-------------------------------------|--------------------------------|---------------------------|
|  |                        |                                     | Proposed Blue Route            | Dead Man’s Pond Variation |
| GAP Land Cover Vegetation Class Level - Division 4 | Total                  | Acres within 0–1,500 ft             | 961                            | 987                       |
|  | Developed or Disturbed | Acres within 0–1,500 ft             | 35                             | 33                        |
|  | Agricultural           | Acres within 0–1,500 ft             | 0                              | 2                         |
|  | Forested and/or Swamp  | Acres within 0–1,500 ft             | 905                            | 925                       |
|  | Other                  | Acres within 0–1,500 ft             | 21                             | 27                        |

Source(s): USGS 2001, reference (151)

Note(s): Totals may not sum due to rounding

- (1) Other category includes: Open water, Great Plains Grassland and Shrubland and Introduced and Semi-Natural Vegetation. See detailed summary of all types in Appendix E.
- (2) Acre/Count within a distance includes both sides of the anticipated alignment. For example, count within 0–500 ft includes 500 ft on each side of the anticipated alignment.

**Table 6-197 Land Ownership/Management within the Anticipated ROW in the Dead Man's Pond Variation Area**

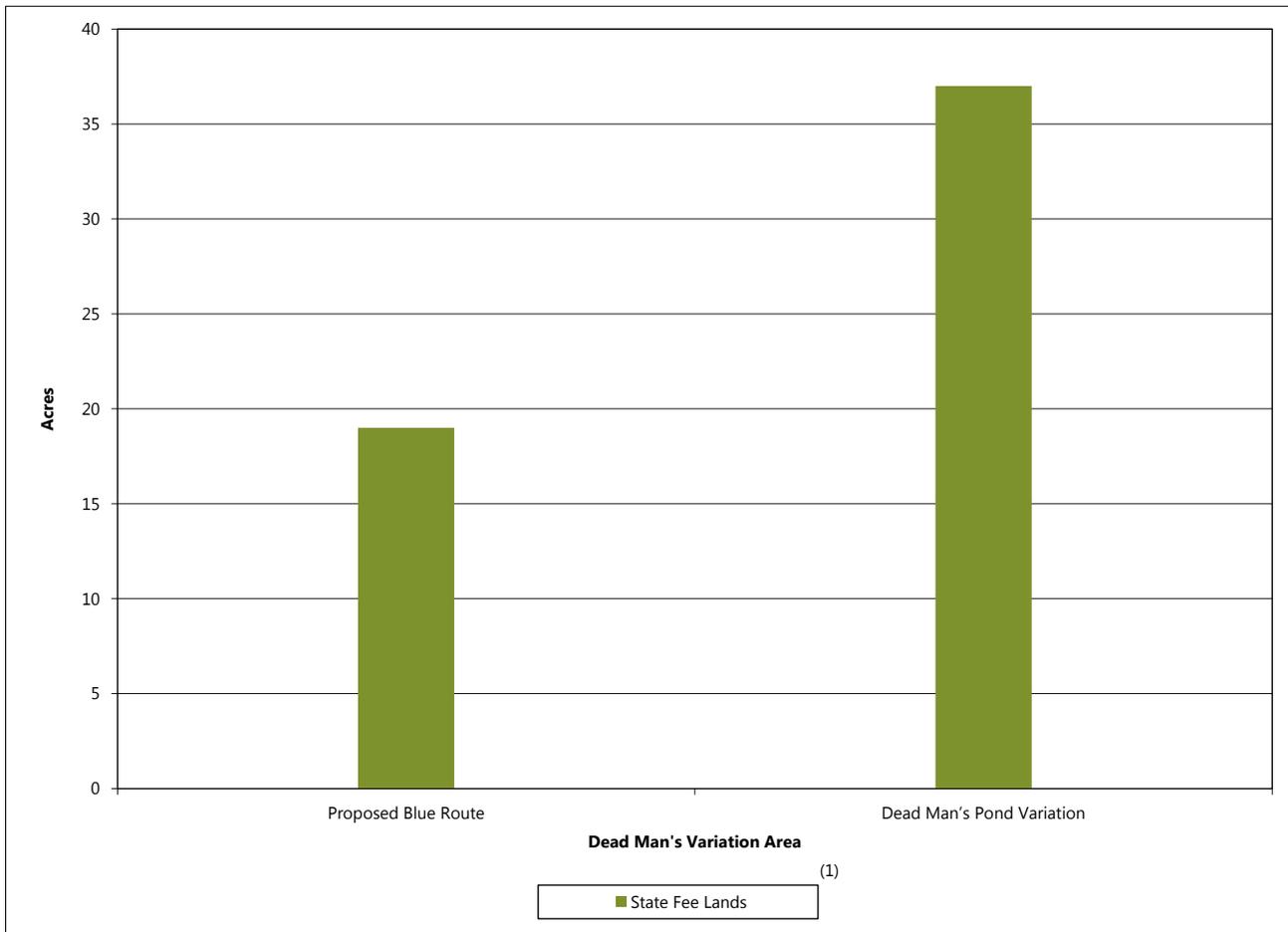
| Resource                               | Type                                    | Evaluation Parameter | Dead Man's Pond Variation Area |                           |
|--|---|----------------------|--------------------------------|---------------------------|
|  |   |                      | Proposed Blue Route            | Dead Man's Pond Variation |
| Total Lands                            | --                                      | Acres within ROW     | 54                             | 56                        |
| State Fee Lands <sup>(1)</sup> Total   | --                                      | Acres within ROW     | 19                             | 37                        |
| State Fee Lands <sup>(1)</sup> by Type | Consolidated Conservation               | Acres within ROW     | 0                              | 0                         |
|  | Other - Acquired, Tax Forfeit, Volstead | Acres within ROW     | 19                             | 37                        |
|  | Trust Fund                              | Acres within ROW     | 0                              | 0                         |
|  | Federal - State Lease                   | Acres within ROW     | 0                              | 0                         |
| Private Lands <sup>(2)</sup>           | --                                      | Acres within ROW     | 35                             | 19                        |

Source(s): MnDNR 2014, reference (152)

Note(s): Totals may not sum due to rounding

- (1) This dataset represents state land ownership using public land survey quarter-quarter sections as the smallest unit. In some cases, multiple state lands are located within a single quarter-quarter section. Therefore, features may be duplicated and the analysis results may over-represent potential impacts.
- (2) Acreage for private lands was calculated as the difference between total lands and public lands.

**Figure 6-126 Public Land Ownership/Management within the ROI in the Dead Man's Pond Variation Area**



Source(s): MnDNR 2014, reference (152)

Note(s): Totals may not sum due to rounding

- (1) This dataset represents state land ownership using public land survey quarter-quarter sections as the smallest unit. In some cases, multiple state lands are located within a single quarter-quarter section. Therefore, features may be duplicated and the analysis results may over-represent potential impacts.

**Table 6-198 Land-Based Economy Resources within the Anticipated ROW in the Dead Man’s Pond Variation Area**

| Resource                                  | Type                             | Evaluation Parameter                   | Dead Man’s Pond Variation Area |                           |
|---|----------------------------------|--|--------------------------------|---------------------------|
|   |                                  |  | Proposed Blue Route            | Dead Man’s Pond Variation |
| Transmission Line                         | --                               | Length (mi)                            | 2.2                            | 2.3                       |
| Existing Transmission Line <sup>(1)</sup> | --                               | Percent of Total Length <sup>(2)</sup> | 0                              | 0                         |
| Farmland                                  | Not Farmland                     | Acres within ROW                       | 34                             | 17                        |
|   | Prime Farmland if Drained        | Acres within ROW                       | 9                              | 1                         |
|   | Farmland of Statewide Importance | Acres within ROW                       | 0                              | 0                         |
|   | All Areas are Prime Farmland     | Acres within ROW                       | 11                             | 38                        |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); USDA NRCS 2014, reference (154)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

farmland, prime farmland if drained, and farmland of statewide importance that would be impacted by the Proposed Blue Route and Dead Man’s Pond Variation in the ROI.

The Dead Man’s Pond Variation would pass through more farmland, including prime farmland (Figure 6-127). The Proposed Blue Route and Dead Man’s Pond Variation would not impact farmland of statewide importance.

As discussed in Section 5.3.2.1, construction activities could limit the use of fields or could affect crops and soil by compacting soil, generating dust, damaging crops or drain tile, or causing erosion. Construction activities would also cause long-term adverse impacts to agriculture by the potential loss of income due to the removal of farmland for transmission line structures and associated facilities. Maintenance and emergency repair activities could result in adverse direct impacts on farmlands from the removal of crops, localized physical disturbance, and soil compaction caused by equipment.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on agricultural resources are summarized in Section 5.3.2.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

### Forestry

As identified in Section 5.3.2.2, the ROI for evaluating forestry impacts from the proposed Project is the ROW of the transmission line. There are no state forests lands or USDA-USFS national forest lands within the ROI of the Proposed Blue Route or Dead Man’s Pond Variation in the Dead Man’s Pond Variation Area.

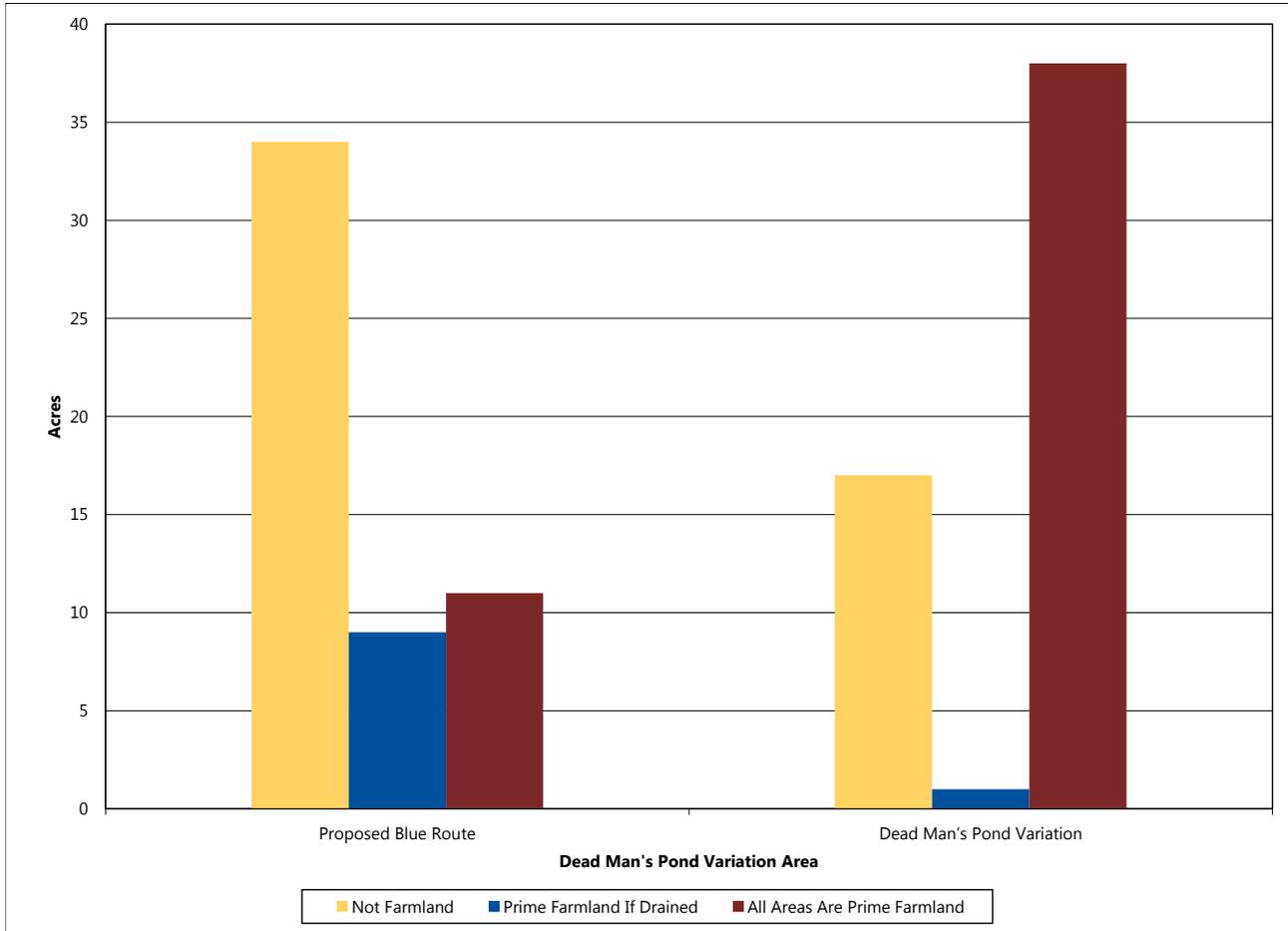
### Mining and Mineral Resources

As identified in Section 5.3.2.3, the ROI for evaluating mining and mineral resource impacts from the proposed Project is the ROW of the transmission line. There are no active or expired/terminated state mineral leases, records of current mineral mining, or known aggregate resources that would be impacted by the Proposed Blue Route or Dead Man’s Pond Variation within the Dead Man’s Pond Variation Area.

As discussed in Section 5.3.2.3, construction of transmission lines could affect future mining operations if the structures interfere with access to mineable resources or the ability to remove these resources. However, such impacts are not expected from the proposed Project because such activities do not exist nor are planned in this area.

Potential construction, operation, maintenance, and emergency-repair short-term and long-term impacts on mining and mineral resources are summarized in Section 5.3.2.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

Figure 6-127 Acres of Farmland by Type within the Anticipated ROW in the Dead Man's Pond Variation Area



Source(s): USDA NRCS 2014, reference (154)

Note(s): Totals may not sum due to rounding

### 6.4.4.3 Archaeology and Historic Architectural Sites

As described in Section 6.2.1.3, the APE for potential direct impacts to archaeological and historic architectural resources includes the ROW of the proposed transmission line, however, potential indirect impacts to historic architectural sites are evaluated within one mile from the anticipated alignment since visual intrusions can change the context and setting of historic architectural sites. Table 6-199 provides a summary of the previously recorded **archaeological sites and historic architectural resources within the ROW** (direct APE) and within 1,500 feet and one mile of the anticipated alignments (indirect APE) for the Proposed Blue Route and Dead Man's Pond Variation in the Dead Man's Pond Variation Area (Map 6-62). A more detailed description of these resources can be found in the Phase IA cultural resources survey report located in Appendix P.

**To date, no specific Native American resources have been previously recorded within the ROW**

(direct APE for cultural resources) or within one mile of the anticipated alignment (indirect APE for historic architectural resources or Native American resources) for the Proposed Blue Route and Dead Man's Pond Variation in the Dead Man's Pond Variation Area. However, DOE is continuing to consult with federally recognized Indian tribes to identify Native American resources within the direct and indirect APEs for the proposed Project.

Within the Dead Man's Pond Variation Area, there are no archaeological sites or historic architectural resources located within the ROW of the Proposed Blue Route or Dead Man's Pond Variation. One historic architectural resource (IC-NWT-003) is located within the indirect APEs of both the Proposed Blue Route and Dead Man's Pond Variation. This site has not been evaluated for NRHP eligibility.

There is currently no known potential for direct, long-term adverse impacts to archaeological and historic resource sites within the Dead Man's Pond Variation Area as none have been identified. Indirect,

long-term, adverse visual impacts on the historic architectural resources within the indirect APEs for the Proposed Blue Route or Dead Man’s Pond Variation are likely to occur wherever the proposed Project is visibly prominent in the landscape or a viewshed and appears inconsistent with the existing setting of the architectural resources or within views to and from the architectural resources. Since the indirect APEs for both the Proposed Blue Route and Dead Man’s Pond Variation contain historic architectural sites that have not been evaluated for NRHP-eligibility, the proposed Project may result in changes to the setting of these resources that could be considered an adverse impact under Section 106 of the NHPA if these historic architectural sites are determined NRHP-eligible and if setting is determined to be a character defining feature that contributes to the significance of the resource.

As the Proposed Blue Route and Dead Man’s Pond Variation have not been surveyed for cultural resources, archaeological surveys, architectural surveys or inventories, and surveys or inventories for Native American resources will be required as part of cultural resources investigations conducted in compliance with federal and/or state regulations for archaeological resources and historic architectural properties. These cultural resource investigations will be implemented as part of DOE’s Draft PA (Appendix V) that will establish a process to identify cultural resources within the APE for

the proposed Project, evaluate the NRHP-eligibility of identified cultural resources, and develop measures to avoid, minimize, or mitigate potential adverse impacts on historic properties as a result of implementation of the proposed Project.

Potential short-term and long-term adverse impacts from construction, operation, maintenance, and emergency-repair related activities to historic and cultural properties are summarized in Section 5.3.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate adverse impacts to these resources, including TCPs, from the proposed Project.

#### 6.4.4.4 Natural Environment

This section describes the water, vegetation, and wildlife resources within the Dead Man’s Pond Variation Area and the potential impacts from the proposed Project.

#### Water Resources

As explained in Section 5.3.4.1, the ROI for water resources was determined to be the ROW of the transmission line. Data related to the ROI for water resources in the Dead Man’s Pond Variation Area are summarized in Table 6-200 and shown on Map 6-63. Additional, water resources data beyond those resources present in the ROI of this variation area are provided in Appendix E.

**Table 6-199 Archaeological and Historic Resources within the Dead Man’s Pond Variation Area**

| Resource                     | Evaluation Parameter <sup>(1)</sup> | Dead Man’s Pond Variation Area |                           |
|------------------------------|-------------------------------------|--------------------------------|---------------------------|
|                              |                                     | Proposed Blue Route            | Dead Man’s Pond Variation |
| Historic Architectural Sites | Count within ROW                    | 0                              | 0                         |
|                              | Count within 0–1,500 ft             | 0                              | 0                         |
|                              | Count within 0–5,280 ft             | 1                              | 1                         |
| Archaeological Sites         | Count within ROW                    | 0                              | 0                         |
|                              | Count within 0–1,500 ft             | 0                              | 0                         |

Source(s): SHPO 2014, reference (147); SHPO 2014, reference (155); SHPO 2014, reference (156)

Note(s): Totals may not sum due to rounding

(1) Acre/Count within a distance includes both sides of the anticipated alignment. For example, count within 0–500 ft includes 500 ft on each side of the anticipated alignment.

**Table 6-200 Water Resources within the Anticipated ROW in the Dead Man’s Pond Variation Area**

| Resource          | Evaluation Parameter | Dead Man’s Pond Variation Area |                           |
|-------------------|----------------------|--------------------------------|---------------------------|
|                   |                      | Proposed Blue Route            | Dead Man’s Pond Variation |
| Transmission Line | Length (mi)          | 2.2                            | 2.3                       |
| NWI Wetlands      | Acres within ROW     | 14                             | 4                         |

Sources: USFWS 1997, reference (157); Minnesota Power 2014, reference (144)

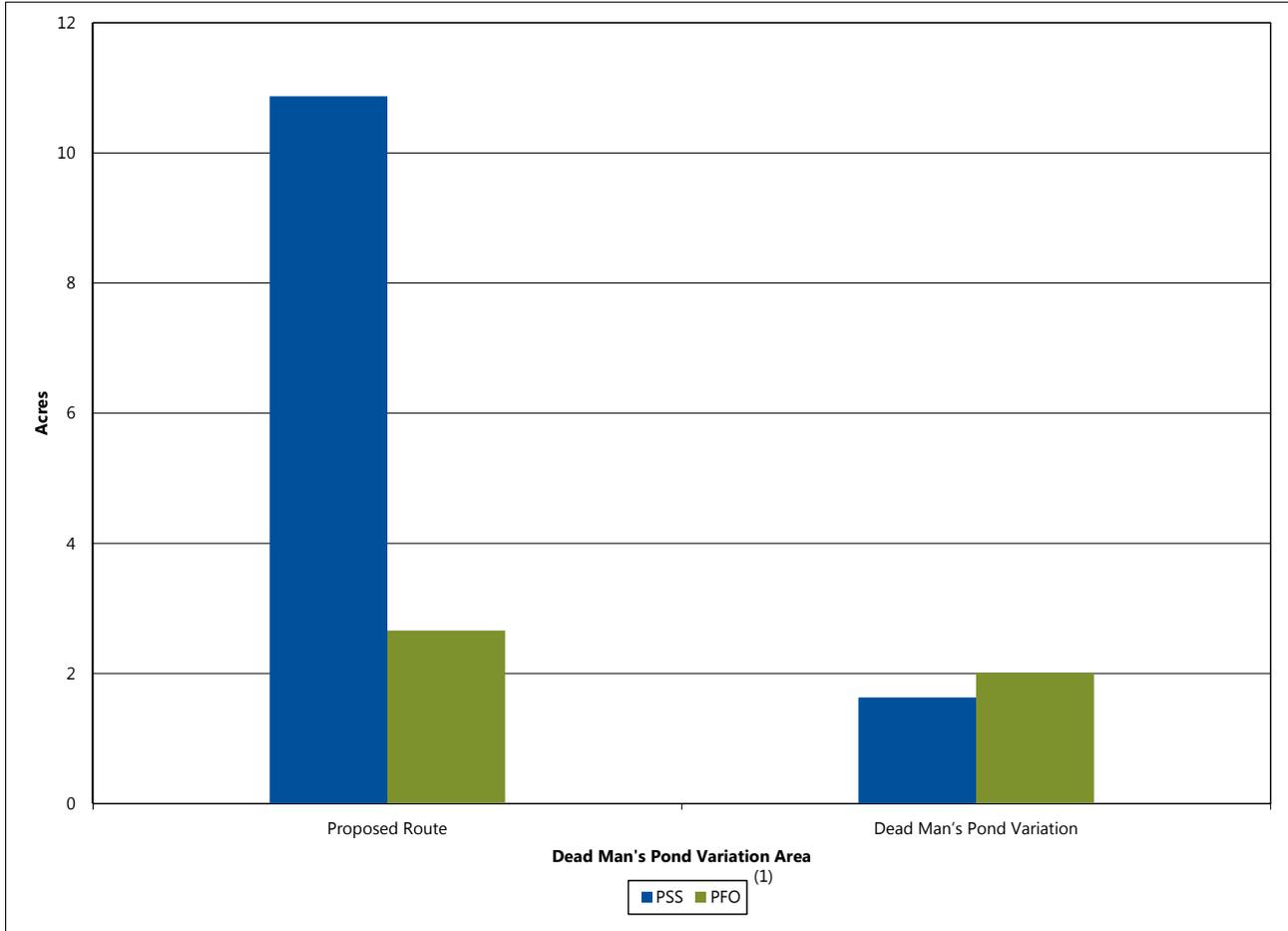
Note(s): Totals may not sum due to rounding

The potential need to place transmission structures in wetlands and the quantity of wetland type conversion are the primary water resources impacts that would differ between the Proposed Blue Route and the Dead Man’s Pond Variation. Neither the Proposed Blue Route nor the Dead Man’s Pond Variation ROWs contain PWIs, non-PWI waters, trout streams, impaired waters, or floodplains.

Based on the NWI, the Proposed Blue Route and the Dead Man’s Pond Variation would both require conversion of forested and shrub wetland areas to an herbaceous wetland type through removal of woody vegetation in the ROW. As shown in Figure 6-128, the Proposed Blue Route contains the most forested and shrub wetland and would result in the greatest amount of wetland type conversion. While these direct, adverse impacts to forested and shrub wetlands would be permanent and may change wetland functions within the ROW, e.g. altering the hydrology and habitat, they are expected to be minimal because of the amount of surrounding shrub

and forested wetlands in the region. Changes in wetland function are discussed in Section 5.3.4.1. The Applicant would need to mitigate for these impacts, as summarized in Section 5.3.4.1. The Proposed Blue Route would likely require placement of fill in wetlands for construction of transmission structures. Impacts associated with fill would be minimized by spanning wetlands to the extent practical; however, this impact cannot be completely avoided by spanning due to the high number of wetland crossings that would be needed in the East Section. There are fewer wetlands along the Dead Man’s Pond Variation and it would be expected that these areas may be spanned, avoiding placement of transmission structures in the wetland areas. Due to the number of wetland complexes in the area, it would be expected that the Proposed Blue Route and the Dead Man’s Pond Variation would both require temporary construction access through wetlands, which is also likely be minimal due to the short-term, localized nature of the impact, and the Applicant’s intended use of minimization measures, such as matting.

**Figure 6-128 Acres of Wetland by Type within the Anticipated ROW in the Dead Man’s Pond Variation Area**



Source(s): USFWS 1997, reference (157)

Note(s): Totals may not sum due to rounding

(1) Palustrine emergent wetland (PEM), palustrine shrub wetland (PSS), palustrine forested wetland (PFO).

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on water resources are summarized in Section 5.3.4.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

**Vegetation**

In Section 5.3.4.2, the ROI to assess impacts to vegetation was determined to be the ROW of the proposed transmission line. Data related to the ROI for vegetation in the Dead Man’s Pond Variation Area are summarized in Table 6-201 and shown on Maps 5-19 and 6-63. Additional vegetation data beyond the dominant land cover types present in the ROI in this variation area are provided in Appendix E.

In general, loss or fragmentation of forest would be similar with either the Proposed Blue Route or Dead Man’s Pond Variation. As discussed in Section 5.3.4.2, the Applicant would permanently clear woody vegetation from the ROW during construction and the ROW would be maintained as low-stature vegetation in order to reduce interference with the maintenance and function of the transmission line.

As indicated in Table 6-201, the Proposed Blue Route and Dead Man’s Pond Variation would pass through a similar amount of forested land. Both the Proposed Blue Route and Dead Man’s Pond Variation would require new corridor for their entire lengths. Because of this both the Proposed Blue Route and Dead Man’s Pond Variation would result in similar fragmentation of intact forest in areas

where forest vegetation is present. While direct, adverse impacts to forested areas would be long-term, contiguous forest is abundant in the region surrounding the proposed Project (Map 5-19).

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on vegetation resources are summarized in Section 5.3.4.2. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

**Wildlife**

The ROI for wildlife was determined in Section 5.3.4.3 to be the ROW of the proposed transmission line. Wildlife resources in the Dead Man’s Pond Variation Area consist of natural habitat, including forest, wetlands, and Dead Man’s Pond (Map 6-63). As discussed in Section 5.3.4.3, the proposed Project would expand existing corridor or create new corridor; this would result in conversion from forest to low-stature open vegetation communities, favoring wildlife species that prefer more open vegetation communities. Section 6.4.4.4 (Vegetation) summarizes potential impacts on forested vegetation from the Proposed Blue Route and Dead Man’s Pond Variation.

Because the Proposed Blue Route and Dead Man’s Pond Variation are similar in length and do not parallel existing transmission line corridors, the impacts related to fragmentation of forested habitats, and subsequent displacement of wildlife species associated with those forest communities would be similar.

**Table 6-201 Vegetation Resources within the Anticipated ROW in the Dead Man’s Pond Variation Area**

| Resource                                       | Evaluation Parameter                   | Dead Man’s Pond Variation Area |                           |
|--|--|--------------------------------|---------------------------|
|  |  | Proposed Blue Route            | Dead Man’s Pond Variation |
| Transmission Line                              | Length (mi)                            | 2.2                            | 2.3                       |
| Existing Transmission Line <sup>(1)</sup>      | Percent of Total Length <sup>(2)</sup> | 0                              | 0                         |
| Total Forested GAP Land Cover                  | Acres within ROW                       | 50                             | 54                        |
| GAP Land Cover - Dominant Types <sup>(3)</sup> |  |                                |                           |
| North American Boreal Forest                   | Acres within ROW                       | 34                             | 43                        |
| Eastern North American Cool Temperate Forest   | Acres within ROW                       | 14                             | 6                         |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); USGS 2001, reference (151)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.
- (3) Data presented here only includes dominant GAP types; see Appendix E for additional land cover types within the ROW.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on wildlife resources are summarized in Section 5.3.4.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project. Section 6.2.1.4 (Wildlife) discusses additional suggested measures to avoid, minimize, or mitigate impacts on wildlife are summarized.

#### 6.4.4.5 Rare and Unique Natural Resources

Rare and unique natural resources are divided into rare species and rare communities. Rare species encompass federally listed or state endangered, threatened, or special concern species while rare communities may include state-designated features, such as SNAs, MBS Sites of Biodiversity Significance, MnDNR High Conservation Value Forest, MnDNR Ecologically Important Lowland Conifer stands, and MBS native plant communities.

##### Rare Species

The ROI for rare species is described in Section 5.3.5, which states that for impacts to federally and state-listed species, the ROI includes a one-mile buffer surrounding the proposed routes and variations. As discussed in Section 5.3.5, potential long-term impacts on rare species from the proposed Project include the direct or indirect loss of individuals or conversion of associated habitats and increased habitat fragmentation. **One state-threatened fish, the pugnose shiner (*Notropis anogenus*) has been documented within one mile of the Dead Man's Pond Variation. Because it is anticipated that all waterbodies and watercourses would be spanned, impacts to this aquatic species are not expected.** However, the full extent of potential impacts from either the Proposed Blue Route or Dead Man's Pond Variation cannot be determined without pre-construction field surveys, which would likely occur as a condition of a MN PUC Route Permit. The MN PUC Route Permit could require the development of a Vegetation Management Plan as a permit condition, which could include plant surveys along the permitted ROW.

Any indirect impacts to rare species from the proposed Project are expected to be minimal because of the amount of surrounding habitat. Through use of Applicant proposed avoidance and minimization measures, direct impacts to rare species are not expected. DOE's informal consultation under Section 7 of the ESA with USFWS is currently on-going and a Biological Assessment has been prepared to assess potential

impacts on federally listed species (Appendix R). Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on rare species are summarized in Section 5.3.5. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

##### Rare Communities

As discussed in Section 5.3.5, the Applicant would permanently remove vegetation at each structure footprint and within portions of the ROW that are currently dominated by forest or other woody vegetation. While both the Proposed Blue Route and Dead Man's Pond Variation in the Dead Man's Pond Variation Area pass through native vegetation, at present, there are no documented rare communities within either ROW (ROI for rare communities). The MN PUC Route Permit could require the development of a Vegetation Management Plan as a permit condition, which could include plant surveys along the permitted ROW.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on rare communities are summarized in Section 5.3.5. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

#### 6.4.4.6 Corridor Sharing

Sharing or paralleling existing corridors or linear features minimizes fragmentation of the landscape and can minimize impacts to adjacent property. The ROI for the analysis of corridor sharing generally includes infrastructure corridors within approximately 0.25 miles of the proposed routes and variations, as described in Section 5.3.6. Map 6-65 shows areas where the proposed route and variations would parallel corridors with existing transportation, transmission line, or other linear features in the Dead Man's Pond Variation Area.

Table 6-202 and Figure 6-129 identify the percentage of total transmission line length that the Proposed Blue Route and Dead Man's Pond Variation parallel an existing corridor or linear feature in the Dead Man's Pond Variation Area.

The Proposed Blue Route would parallel existing road/trail corridors for approximately one sixth of its length (Table 6-202). The Dead Man's Pond Variation would not parallel any existing corridors.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-

Table 6-202 Corridor Sharing in the Dead Man's Pond Variation Area

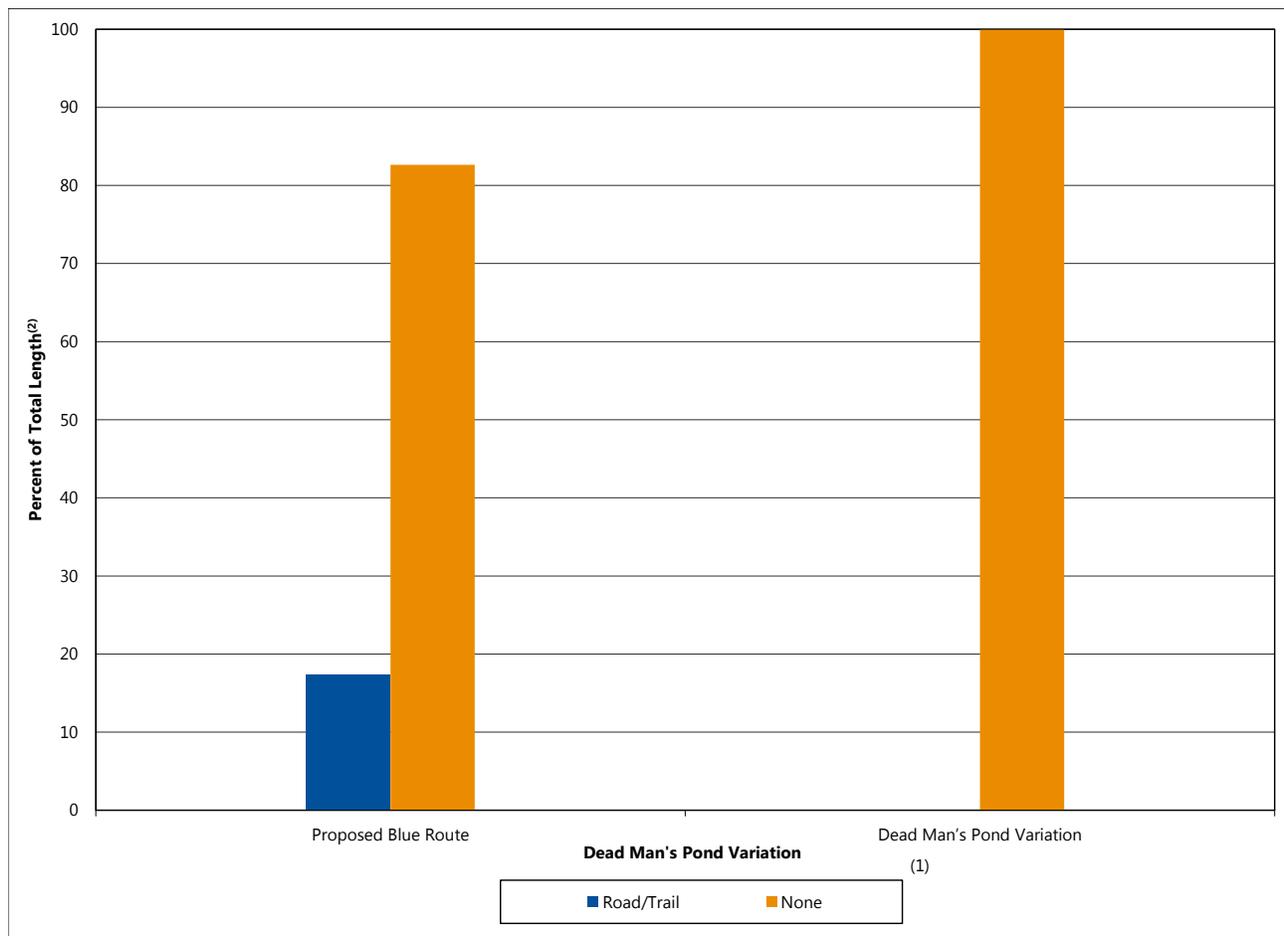
| Feature Sharing Corridor <sup>(1)</sup>   | Evaluation Parameter                   | Dead Mans's Pond Variation Area |                           |
|---|--|---------------------------------|---------------------------|
|   |  | Proposed Blue Route             | Dead Man's Pond Variation |
| Transmission Line (other linear features may be present within the transmission line corridor; i.e., road, trail, field line, PLSS)   | Percent of Total Length <sup>(2)</sup> | 0                               | 0                         |
| Road/Trail (other linear features, but not transmission lines, may be present within the road/trail corridor; i.e., PLSS, field line) | Percent of Total Length <sup>(2)</sup> | 17                              | 0                         |
| None  | Percent of Total Length <sup>(2)</sup> | 83                              | 100                       |

Source(s): USDA et al 2013, reference (170); MN DOC 2014, reference (145); MNDOT 2010, reference (171); MnDNR 2010, reference (172); MnDNR 2009 reference (173); MnDNR et al 2014, reference (174); MnDNR et al 2013, reference (175); MnDNR 2013, reference (176); MnDNR et al 2009, reference (177)

Note(s): Totals may not sum due to rounding

- (1) More than one feature may share the corridor; the primary feature within the corridor is identified, other features that may share the corridor are listed in parenthesis. Appendix E provides a detailed summary of all shared features.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

Figure 6-129 Corridor Sharing in the Dead Man's Pond Variation Area



Source(s): : USDA et al 2013, reference (170); MN DOC 2014, reference (145); MNDOT 2010, reference (171); MnDNR 2010, reference (172); MnDNR 2009 reference (173); MnDNR et al 2014, reference (174); MnDNR et al 2013, reference (175); MnDNR 2013, reference (176); MnDNR et al 2009, reference (177)

Note(s): Totals may not sum due to rounding

- (1) Road/Trail (other linear features, but not transmission lines, may be present within the road/trail corridor; i.e., PLSS, field line).
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

term impacts on corridor sharing are summarized in Section 5.3.6. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on corridor sharing from the proposed Project.

**6.4.4.7 Costs of Constructing, Operating, and Maintaining the Facility which are Dependent on Design and Route**

Information related to construction, operation, and maintenance costs associated with the proposed Project is provided in Section 5.3.8. Table 6-203 summarizes the costs associated with constructing the Proposed Blue Route and Dead Man’s Pond Variation in the Dead Man’s Pond Variation Area. As indicated in Table 6-203, the Dead Man’s Pond Variation would cost more to construct relative to the Proposed Blue Route.

The cost for routine maintenance would depend on the topology and the type of maintenance required, but typically runs from \$1,100 to \$1,600 per mile annually (Minnesota Power 2013). Using the \$1,600 per mile for operation and maintenance, the estimated cost would range from \$3,500 to \$3,700 annually for these alternatives in the Dead Man’s Pond Variation Area.

**6.4.5 Blackberry Variation Area**

The Blackberry Variation Area encompasses two route alternatives: the Proposed Blue Route and the Proposed Orange Route. This section provides a comparison of the potential impacts resulting from construction, operation, maintenance, and emergency repair of the proposed Project within the Blackberry Variation Area, depending on the route or variation considered.

**6.4.5.1 Human Settlement**

This section describes the aesthetic resources and zoning and land use compatibility within the Blackberry Variation Area and the potential impacts from the proposed Project.

**Aesthetics**

As described in the Aesthetics discussion for the Effie Variation Area (see Section 6.4.1.1), impacts on aesthetic resources would be determined based largely on the level of increased contrast produced by the proposed Project in views by sensitive viewers. Residences and other aesthetic resources within 1,500 feet of the anticipated alignment would have a high probability of having views of the proposed Project and as described in Section 5.3.1.1, this distance is considered the ROI. Data related to aesthetic resources in the Blackberry Variation Area are summarized in Table 6-204 and shown on Maps 6-61, 6-62, 6-63, and 6-65.

As indicated in Table 6-204 for the Blackberry Variation Area, both the Proposed Blue Route and Proposed Orange Route would cross or be located within 1,500 feet of a snowmobile trail and within one mile of historic architectural sites (Map 6-62 and Map 6-65), which are aesthetic resources with high visual sensitivity. The Proposed Blue Route would be located within one mile of six historic architectural sites, whereas the Proposed Orange Route would be located within one mile of one historic architectural site (Map 6-62). Therefore, the Proposed Orange Route would affect fewer aesthetic resources than the Proposed Blue Route.

In addition, the alternatives would be located within 1,500 feet of a number of residences, which also have high visual sensitivity (Figure 6-130). Of the two proposed routes in the Blackberry Variation Area, the Proposed Blue Route would affect fewer total residences (11) within 1,500 feet than the Proposed Orange Route (22). While there are no residences located within the ROW of the Proposed Blue Route, there are two residences located within 500 feet of the anticipated alignment, which would have high visual sensitivity.

The Proposed Orange Route is slightly longer (6.1 miles) than the Proposed Blue Route (5.4 miles; Table 6-204) and both alternatives parallel existing large transmission lines for a portion of their entire lengths at 37 and 20 percent, respectively. Although the Proposed Orange Route parallels an existing large transmission line for a greater percentage of its length than the Proposed Blue Route (Table 6-204),

**Table 6-203 Construction Costs in the Dead Man’s Pond Variation Area**

| Variation Area  | Name in the EIS           | Cost (Total) | Average Cost (per mile) | Length (mi) |
|-----------------|---------------------------|--------------|-------------------------|-------------|
| Dead Man's Pond | Proposed Blue Route       | \$2,873,223  | \$1,306,011             | 2.2         |
|                 | Dead Man’s Pond Variation | \$4,409,841  | \$1,934,141             | 2.3         |

Source(s): Minnesota Power 2015, reference (9)

**Table 6-204 Aesthetic Resources within the ROI in the Blackberry Variation Area**

| Resource                                  | Evaluation Parameter <sup>(1)</sup>    | Blackberry Variation Area |                       |
|---|--|---------------------------|-----------------------|
|   |  | Proposed Blue Route       | Proposed Orange Route |
| Transmission Line                         | Length (mi)                            | 5.4                       | 6.1                   |
| Existing Transmission Line <sup>(2)</sup> | Percent of Total Length <sup>(3)</sup> | 20                        | 37                    |
| Residences                                | Count within 0–500 ft                  | 2                         | 0                     |
|   | Count within 0–1,000 ft                | 6                         | 5                     |
|   | Count within 0–1,500 ft                | 11                        | 22                    |
| Historic Architectural Sites              | Count within 0–1,500 ft                | 0                         | 0                     |
|   | Count within 0–5,280 ft                | 6                         | 1                     |
| Snowmobile Trails                         | Count within 0–1,500 ft                | 1                         | 1                     |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); Minnesota Power 2014, reference (146); SHPO 2014, reference (147); MnDNR 2010, reference (150)

Note(s): Totals may not sum due to rounding

- (1) Acre/Count within a distance includes both sides of the anticipated alignment. For example, count within 0-500 ft includes 500 ft on each side of the anticipated alignment.
- (2) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (3) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

the Proposed Blue Route parallels a 230 kV line with a more similar structure design, while the Proposed Orange Route parallels a 69 kV or 115 kV line which has a somewhat different structure design. By paralleling an existing 230 kV line of more similar design, the Proposed Blue Route is likely to produce slightly less design contrast in terms of its form, line, and scale than the Proposed Orange Route. However, given that the Proposed Orange Route parallels an existing large transmission line for nearly twice the distance as the Proposed Blue Route, the Proposed Orange Route would likely produce less contrast overall than the Proposed Blue Route.

Although the Proposed Orange Route affects more residences within 1,500 feet of it (22) than the Proposed Blue Route (11), it affects slightly fewer other aesthetic resources (one historic architectural sites and one snowmobile trail) and would likely produce less contrast by paralleling an existing large transmission line for a greater percentage of its length than the Proposed Blue Route. For these reasons, the Proposed Orange Route is likely to result in slightly less aesthetic impact than the Proposed Blue Route in the Blackberry Variation Area.

The Proposed Blue Route and Proposed Orange Route are short in length, they only parallel existing transmission lines of similar size and design for moderately short portions of their overall lengths, and affect a moderate number of residences and several other sensitive visual resources. For these reasons, potential aesthetic impacts of the Proposed Blue Route and Proposed Orange Route are expected to be significant.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on aesthetics are summarized in Section 5.3.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

### Land Use Compatibility

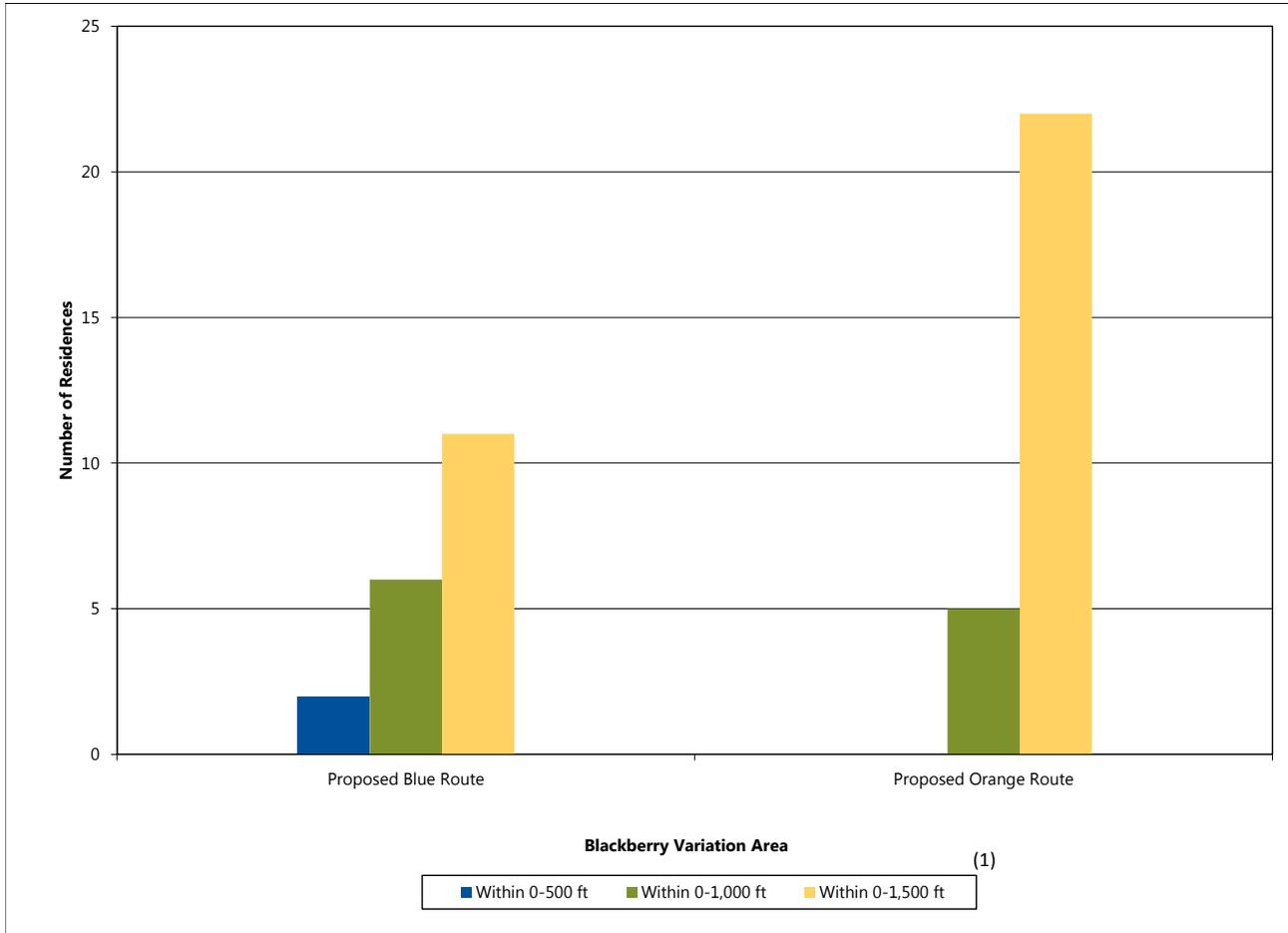
As explained in Section 5.3.1.1, the ROI for Land Use Compatibility was determined to be 1,500 feet from the anticipated alignments of the proposed Project.

### Land Uses

Table 6-205 identifies the amount of each type of land cover within 1,500 feet of the anticipated alignments of the Proposed Blue Route and Proposed Orange Route in the Blackberry Variation Area. Generally, the percentage of each land use is representative of what is present within the ROW. The various land uses present in the variation area are shown in Map 5-19 and residences, churches, cemeteries, and airports near the Proposed Blue Route and Proposed Orange Route are shown on Map 6-61.

The Proposed Blue Route and Proposed Orange Routes ROI are both primarily composed of forested and/or swamp land (Table 6-205). The Proposed Orange Route ROI contains slightly less forested/swamp land, agricultural land, and developed or disturbed land compared to the Proposed Blue Route.

Figure 6-130 Residences within the ROI in the Blackberry Variation Area



Source(s): Minnesota Power 2014, reference (146)

Note(s): Totals may not sum due to rounding

(1) Area/Count within a distance includes both sides of the anticipated alignment. For example, count within 0-500 ft includes 500 ft on each side of the anticipated alignment.

Table 6-205 Land Uses within the ROI in the Blackberry Variation Area

| Resource   | Type <sup>(1)</sup>    | Evaluation Parameter <sup>(2)</sup> | Blackberry Variation Area |                       |
|--|------------------------|-------------------------------------|---------------------------|-----------------------|
|  |                        |                                     | Proposed Blue Route       | Proposed Orange Route |
| GAP Land Cover Vegetation Class Level - Division 4 | Total                  | Acres within 0–1,500 ft             | 2,127                     | 2,353                 |
|  | Developed or Disturbed | Acres within 0–1,500 ft             | 56                        | 78                    |
|  | Agricultural           | Acres within 0–1,500 ft             | 50                        | 192                   |
|  | Forested and/or Swamp  | Acres within 0–1,500 ft             | 2,004                     | 1,982                 |
|  | Other                  | Acres within 0–1,500 ft             | 17                        | 101                   |

Source(s): USGS 2001, reference (151)

Note(s): Totals may not sum due to rounding

(1) Other category includes: Open water, Great Plains Grassland and Shrubland and Introduced and Semi-Natural Vegetation. See detailed summary of all types in Appendix E.

(2) Acre/Count within a distance includes both sides of the anticipated alignment. For example, count within 0–500 ft includes 500 ft on each side of the anticipated alignment.

### Land Ownership and Management

Table 6-206 and Figure 6-131 show that the Proposed Orange Route has a slightly greater amount of state fee land compared to the Proposed Blue Route. None of the land within either ROW is state forest land. No impacts to county lands, state conservation easements or USFWS Interest Lands would occur under the Proposed Blue Route or Proposed Orange Route.

Approximately 37 percent of the Proposed Orange Route and 20 percent of the Proposed Blue Route would parallel an existing corridor (see Section 6.4.5.6). Therefore the Proposed Orange Route would be expected to have slightly less incompatibility with surrounding land uses compared to the Proposed Blue Route.

Impacts to land use from the proposed Project in the Blackberry Variation Area would be similar to those described in Section 6.2.1.1. The Proposed Blue Route and Proposed Orange Route would both result in a long-term change in land use for areas currently forested and/or swamp land, but these changes would be limited in extent, and there would still be extensive forest and swamp lands in the surrounding area; so these changes are expected to have a minimal impact on land use. The length of the alternative that would parallel an existing corridor is also important. The Proposed Blue Route avoids a greater amount of state forest and state fee lands than the Proposed Orange Route thereby avoiding long-term changes to land use. However, the Proposed Orange Route parallels an existing corridor for a greater percentage of its length as compared to the Proposed Blue Route.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on land use are summarized in Section 5.3.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

#### 6.4.5.2 Land-Based Economies

This section describes the land-based economy resources, including agriculture, forestry, and mining, within the Blackberry Lake Variation Area and the potential impacts from the proposed Project on those resources. Data related to land-based economy resources in the Blackberry Variation Area are summarized in Table 6-207.

#### Agriculture

As identified in Section 5.3.2.1, the ROI for evaluating agricultural impacts is the ROW of the

transmission line. Table 6-207 and Figure 6-132 show the acreage of USDA-NRCS-classified prime farmland, prime farmland if drained, and farmland of statewide importance that would be impacted by the Proposed Blue Route and Proposed Orange Route in the ROI.

The Proposed Orange Route would pass through more farmland, including prime farmland (Figure 6-132). The Proposed Orange Route and Proposed Blue Route would each impact less than 15 acres of farmland of statewide importance. The Proposed Blue Route, which would have the shorter length, would be expected to have fewer impacts on farmland.

As discussed in Section 5.3.2.1, construction activities could limit the use of fields or could affect crops and soil by compacting soil, generating dust, damaging crops or drain tile, or causing erosion. Construction activities would also cause long-term adverse impacts to agriculture by the potential loss of income due to the removal of farmland for transmission line structures and associated facilities. Maintenance and emergency repair activities could result in direct adverse impacts on farmlands from the removal of crops, localized physical disturbance, and soil compaction caused by equipment.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on agricultural resources are summarized in Section 5.3.2.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

#### Forestry

As identified in Section 5.3.2.2, the ROI for evaluating forestry impacts from the proposed Project is the ROW of the transmission line. There are no state forest lands or USDA-USFS national forest lands within the ROI of the Proposed Blue Route, Proposed Orange Route in the Blackberry Variation Area.

#### Mining and Mineral Resources

As identified in Section 5.3.2.3, the ROI for evaluating mining and mineral resource impacts from the proposed Project is the ROW of the transmission line. Table 6-207, Figure 6-133, and Map 6-61 identify the acreage of mining lands with terminated/expired state mineral leases that may be impacted in the Blackberry Variation Area. There are no **active mineral leases**, known aggregate resources or current mining lands in the ROI of either of the proposed routes in the Blackberry Variation.

**Table 6-206 Land Ownership/Management within the Anticipated ROW in the Blackberry Variation Area**

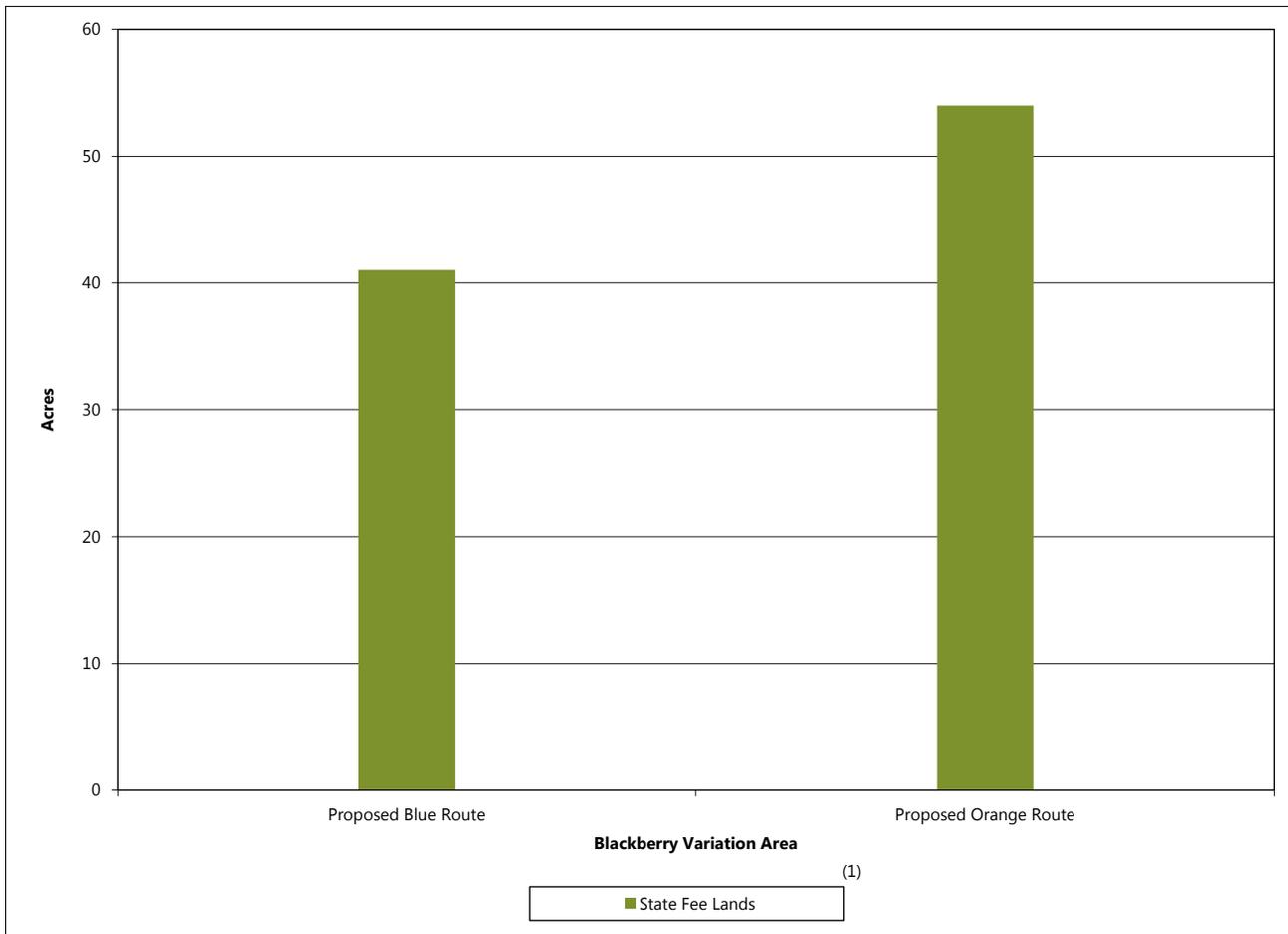
| Resource                               | Type                                    | Evaluation Parameter | Blackberry Variation Area |                       |
|--|---|----------------------|---------------------------|-----------------------|
|  |   |                      | Proposed Blue Route       | Proposed Orange Route |
| Total Lands                            | --                                      | Acres within ROW     | 133                       | 147                   |
| State Fee Lands <sup>(1)</sup> Total   | --                                      | Acres within ROW     | 41                        | 54                    |
| State Fee Lands <sup>(1)</sup> by Type | Consolidated Conservation               | Acres within ROW     | 0                         | 0                     |
|  | Other - Acquired, Tax Forfeit, Volstead | Acres within ROW     | 17                        | 49                    |
|  | Trust Fund                              | Acres within ROW     | 24                        | 5                     |
|  | Federal - State Lease                   | Acres within ROW     | 0                         | 0                     |
| Private Land <sup>(2)</sup>            | --                                      | Acres within ROW     | 92                        | 93                    |

Source(s): MnDNR 2014, reference (152)

Note(s): Totals may not sum due to rounding

- (1) This dataset represents state land ownership using public land survey quarter-quarter sections as the smallest unit. In some cases, multiple state lands are located within a single quarter-quarter section. Therefore, features may be duplicated and the analysis results may over-represent potential impacts.
- (2) Acreage for private lands was calculated as the difference between total lands and public lands.

**Figure 6-131 Public Land Ownership/Management within the ROI in the Blackberry Variation Area**



Source(s): MnDNR 2014, reference (152)

Note(s): Totals may not sum due to rounding

- (1) This dataset represents state land ownership using public land survey quarter-quarter sections as the smallest unit. In some cases, multiple state lands are located within a single quarter-quarter section. Therefore, features may be duplicated and the analysis results may over-represent potential impacts.

**Table 6-207 Land-Based Economy Resources within the Anticipated ROW in the Blackberry Variation Area**

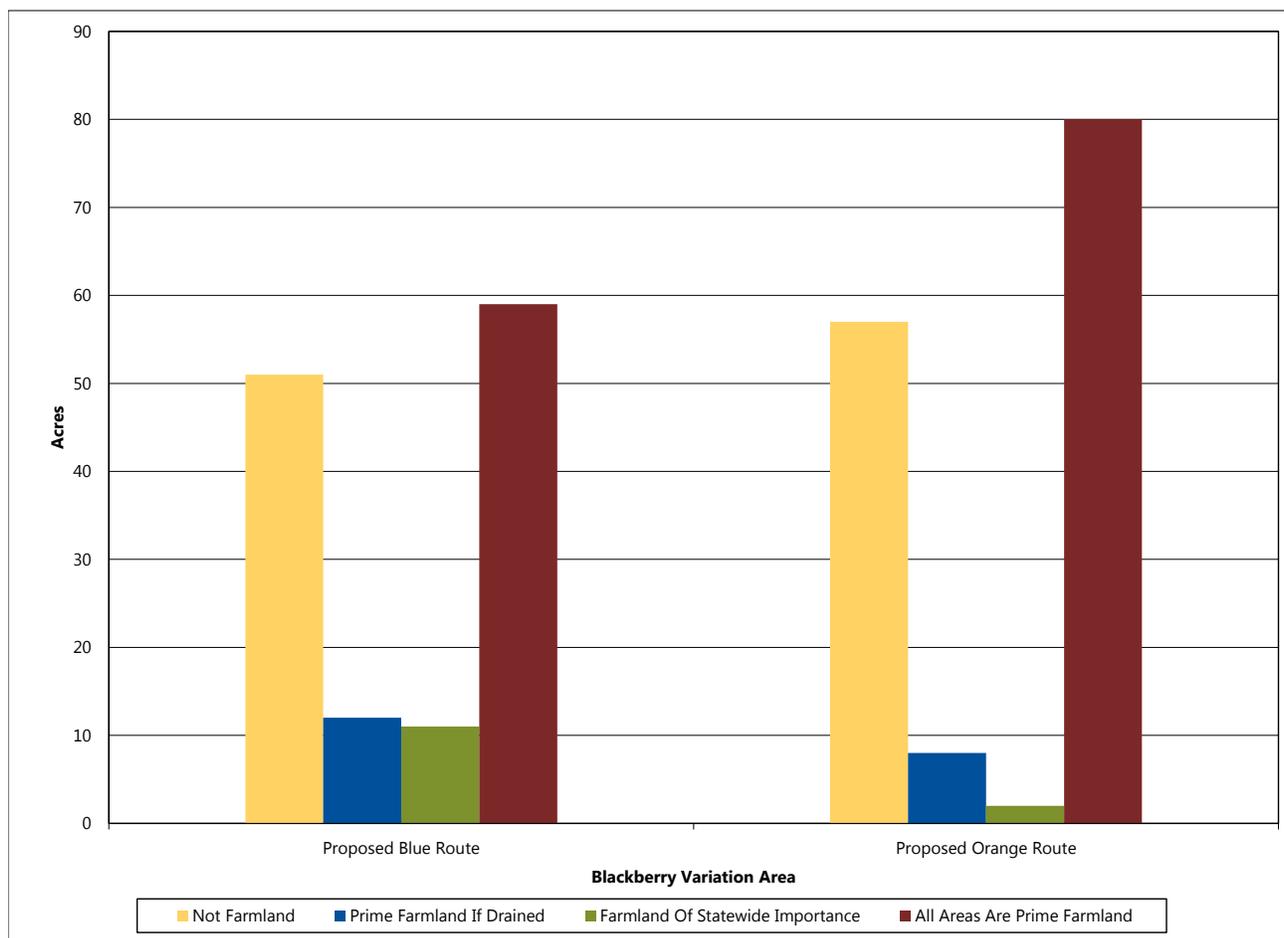
| Resource  | Type                             | Evaluation Parameter                   | Blackberry Variation Area |                       |
|---|----------------------------------|--|---------------------------|-----------------------|
|   |                                  |  | Proposed Blue Route       | Proposed Orange Route |
| Transmission Line                                       | --                               | Length (mi)                            | 5.4                       | 6.1                   |
| Existing Transmission Line <sup>(1)</sup>               | --                               | Percent of Total Length <sup>(2)</sup> | 20                        | 37                    |
| Farmland  | Not Farmland                     | Acres within ROW                       | 51                        | 57                    |
|   | Prime Farmland if Drained        | Acres within ROW                       | 12                        | 8                     |
|   | Farmland of Statewide Importance | Acres within ROW                       | 11                        | 2                     |
|   | All Areas are Prime Farmland     | Acres within ROW                       | 59                        | 80                    |
| State Mineral Leases (active/and/or expired/terminated) | --                               | Acres within ROW                       | 37                        | 33                    |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); USDA NRCS 2014, reference (154); MnDNR 2014, reference (179)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

**Figure 6-132 Acres of Farmland by Type within the Anticipated ROW in the Blackberry Variation Area**



Source(s): USDA NRCS 2014, reference (154)

Note(s): Totals may not sum due to rounding

Both the Proposed Blue Route and the Proposed Orange Route would traverse mining lands with terminated/expired state mineral leases, with the Proposed Blue Route passing through slightly more acres than the Proposed Orange Route (Table 6-207, Figure 6-133, and Map 6-61). Both of the proposed routes in the Blackberry Variation Area could potentially interfere with future mining activities in this area.

As discussed in Section 5.3.2.3, construction of transmission lines could affect future mining operations if the structures interfere with access to mineable resources or the ability to remove these resources.

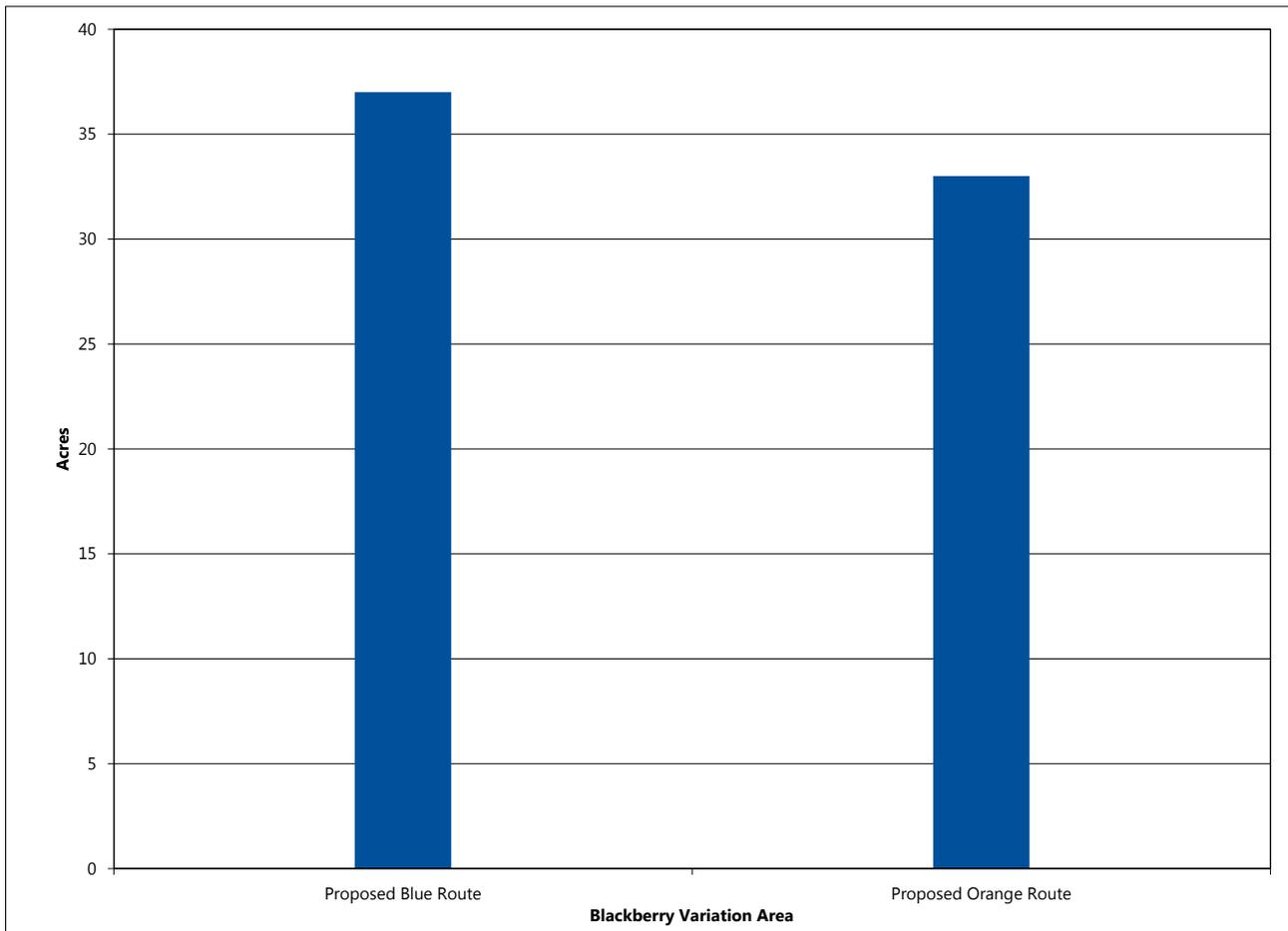
Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on mining and mineral resources are summarized in Section 5.3.2.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

### 6.4.5.3 Archaeology and Historic Architectural Sites

As described in Section 6.2.1.3, the APE for potential direct impacts to archaeological and historic architectural resources includes the ROW of the proposed transmission line; however, potential indirect impacts to historic architectural sites are evaluated within one mile from the anticipated alignment since visual intrusions can change the context and setting of historic architectural sites.

Table 6-208 provides a summary of the previously recorded archaeological sites and historic architectural resources within the ROW (direct APE) and within 1,500 feet and one mile of the anticipated alignments (indirect APE) for the Proposed Blue Route and Proposed Orange Route in the Blackberry Variation Area (Map 6-62). A more detailed description of these resources can be found in the Phase IA cultural resources survey report located in Appendix P.

**Figure 6-133 Acres of State Mineral Leases within the Anticipated ROW in the Blackberry Variation Area**



Source(s): MnDNR 2014, reference (179)

**Table 6-208 Archaeological and Historic Resources within the Blackberry Variation Area**

| Resource                     | Evaluation Parameter <sup>(1)</sup> | Blackberry Variation Area |                       |
|------------------------------|-------------------------------------|---------------------------|-----------------------|
|                              |                                     | Proposed Blue Route       | Proposed Orange Route |
| Historic Architectural Sites | Count within ROW                    | 0                         | 0                     |
|                              | Count within 0–1,500 ft             | 0                         | 0                     |
|                              | Count within 0–5,280 ft             | 6                         | 1                     |
| Archaeological Sites         | Count within ROW                    | 0                         | 0                     |
|                              | Count within 0–1,500 ft             | 0                         | 0                     |

Source(s): SHPO 2014, reference (147); SHPO 2014, reference (155); SHPO 2014, reference (156)

Note(s): Totals may not sum due to rounding

(1) Acre/Count within a distance includes both sides of the anticipated alignment. For example, count within 0–500 ft includes 500 ft on each side of the anticipated alignment.

**To date, no specific Native American resources have been previously recorded within the ROW (direct APE for cultural resources) or within one mile of the anticipated alignment (indirect APE for historic architectural resources or Native American resources) for the Proposed Blue Route and Proposed Orange Route in the Blackberry Variation Area. However, DOE is continuing to consult with federally recognized Indian tribes to identify Native American resources within the direct and indirect APEs for the proposed Project.**

Within the Blackberry Variation Area, there are no archaeological sites or historic architectural resources within the ROW of either the Proposed Blue Route or the Proposed Orange Route. More historic architectural sites are potentially present within the Proposed Blue Route than the indirect APE for the Proposed Orange Route. None of the six previously recorded historic architectural resources located within the Proposed Blue Route indirect APE (IC-UOG-013, IC-TLT-011, IC-TLT-004, IC-TLT-005, IC-TLT-009, and IC-TLT-010) have been evaluated for NRHP eligibility. The Proposed Orange Route also contains IC-TLT-0110 within the indirect APE, which has not been evaluated for NRHP eligibility.

There is currently no known potential for direct, long-term adverse impacts as there are no previously recorded archaeological sites or historic resources located within the ROW of the proposed Blue Route or Orange Route. Indirect, long-term, adverse visual impacts on the previously recorded historic architectural resources within the indirect APE are likely to occur wherever the proposed Project is visibly prominent in the landscape or a viewshed and appears inconsistent with the existing setting of the architectural resources or within views to and from the architectural resources. Since the indirect APEs for both the Proposed Blue Route and the Proposed Orange Route contain historic architectural sites that have not been evaluated for

NRHP-eligibility, the proposed Project may result in changes to the setting of these resources that could be considered an adverse impact under Section 106 of the NHPA if these historic architectural sites are determined NRHP-eligible and if setting is determined to be a character defining feature that contributes to the significance of the resource.

**The Proposed Blue Route and Proposed Orange Route have not been surveyed for cultural resources. As such, archaeological surveys, architectural surveys or inventories, and surveys or inventories for Native American resources will be required as part of cultural resources investigations conducted in compliance with federal and/or state regulations for archaeological resources and historic architectural sites. These cultural resource investigations will be implemented as part of DOE's Draft PA (Appendix V) that will establish a process to identify cultural resources within the APE for the proposed Project, evaluate the NRHP-eligibility of identified cultural resources, and develop measures to avoid, minimize, or mitigate potential adverse impacts on historic properties as a result of construction and operation of the proposed Project.**

**Potential short-term and long-term adverse impacts from construction, operation, maintenance, and emergency-repair related activities to historic and cultural properties are summarized in Section 5.3.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate adverse impacts to these resources, including TCPs, from the proposed Project.**

#### 6.4.5.4 Natural Environment

This section describes the water, vegetation, and wildlife resources within the Blackberry Variation Area and the potential impacts from the proposed Project.

**Water Resources**

As explained in Section 5.3.4.1, the ROI for water resources was determined to be the ROW of the transmission line. Data related to the ROI for water resources in the Blackberry Variation Area are summarized in Table 6-209 and shown on Map 6-63. Additional, water resources data beyond those resources present in the ROI of this variation area are provided in Appendix E.

The need to place transmission structures in wetlands, type of water crossings, and quantity of wetland type conversion are the primary water resources impacts that would differ between the Proposed Blue Route and the Proposed Orange Route in the Blackberry Variation Area. Neither the Proposed Blue Route nor the Proposed Orange Route ROWs contain non-PWI waters, trout streams, or floodplains.

The Proposed Blue Route and the Proposed Orange Route would each cross the Swan River, which is both a PWI water and a MPCA-listed impaired water (Table 5-32). The Proposed Orange Route would also cross a PWI unnamed tributary to the Swan River and Foot Lake (Figure 6-134).

It is anticipated that all PWI crossings are spannable (crossings would be less than the average spanning length of 1,250 feet) and that transmission structures would not be placed within them.

Based on the NWI, the Proposed Blue Route and the Proposed Orange Route would both require conversion of forested and shrub wetland areas to an herbaceous wetland type through removal of woody vegetation in the ROW. As shown in Figure 6-135, the Proposed Blue Route contains the most forested and shrub wetland and would result in the greatest amount of wetland type conversion. While these direct, adverse impacts to forested and shrub wetlands would be permanent and may change wetland functions within the ROW, e.g. altering the hydrology and habitat, they are

expected to be minimal because of the amount of surrounding shrub and forested wetlands in the region. Changes in wetland function are discussed in Section 5.3.4.1.

The Applicant would need to mitigate for these impacts, as summarized in Section 5.3.4.1. The Proposed Blue Route and the Proposed Orange Route would both require placement of fill in wetlands for construction of transmission structures, but this impact would be expected to be minimal because of its localized extent (33 square feet per structure). Impacts associated with fill would be minimized by spanning wetlands to the extent practical; however, this impact cannot be completely avoided by spanning due to the high number of wetland crossings that would be needed in the East Section. Due to the number of wetland complexes in the area, it would be expected that the Proposed Blue Route and the Proposed Orange Route would both require temporary construction access through wetlands, which would be expected to be minimal due to the short-term, localized nature of the impact.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on water resources are summarized in Section 5.3.4.1. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

**Vegetation**

In Section 5.3.4.2, the ROI to assess impacts to vegetation was determined to be the ROW of the proposed transmission line. Data related to the ROI for vegetation in the Blackberry Variation Area are summarized in Table 6-210 and shown on Maps 5-19 and 6-63. Additional vegetation data beyond the dominant land cover types present in the ROI in this variation area are provided in Appendix E.

In general, loss or fragmentation of forest would be similar with either of the Proposed Blue Route

**Table 6-209 Water Resources within the Anticipated ROW in the Blackberry Variation Area**

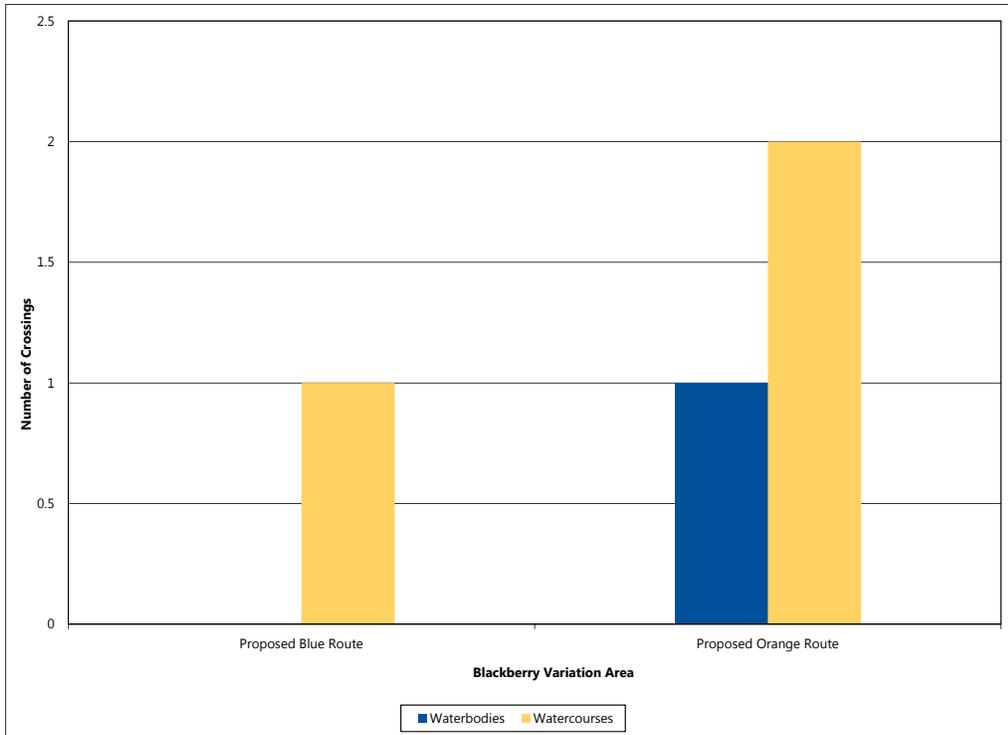
| Resource                      | Evaluation Parameter | Blackberry Variation Area |                       |
|-------------------------------|----------------------|---------------------------|-----------------------|
|                               |                      | Proposed Blue Route       | Proposed Orange Route |
| Transmission Line             | Length (mi)          | 5.4                       | 6.1                   |
| Non-PWI Waters <sup>(1)</sup> | Number of Crossings  | 1                         | 3                     |
| Impaired Waters               | Number of Crossings  | 1                         | 1                     |
| NWI Wetlands                  | Acres within ROW     | 51                        | 40                    |

Sources: USFWS 1997, reference (157); USGS 2014, reference (158); USGS 2014, reference (159); Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); MnDNR 2008, reference (160); MnDNR 2008, reference (161); MnDNR 2008, reference (162); MPCA 2014, reference (119); MPCA 2014, reference (118)

Note(s): Totals may not sum due to rounding

(1) PWI waters include watercourses, waterbodies, and wetlands, as described in Chapter 5. The number of each type of PWI water that the Proposed Route and variations would cross are described in the text and Figure 6-134.

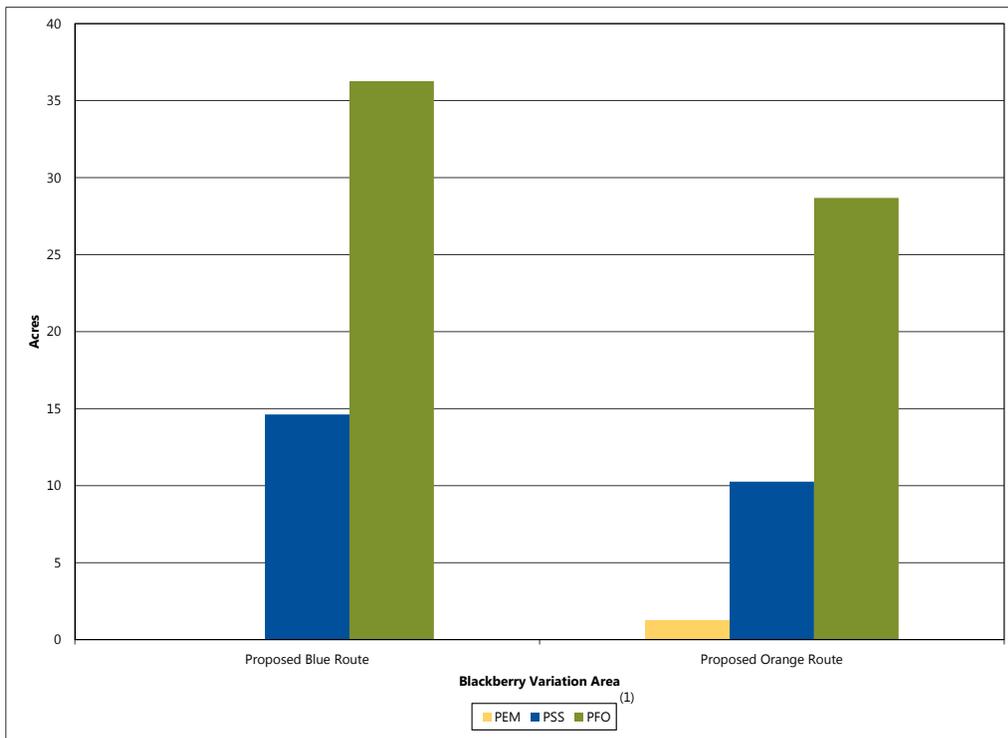
**Figure 6-134 PWI Water Crossings by type in the Blackberry Variation Area**



Source(s): USGS 2014, reference (158); USGS 2014, reference (159); MnDNR 2008, reference (160); MnDNR 2008, reference (161); MnDNR 2008, reference (162)

Note(s): Totals may not sum due to rounding

**Figure 6-135 Acres of Wetland by Type within the Anticipated ROW in the Blackberry Variation Area**



Source(s): USFWS 1997, reference (157)

Note(s): Totals may not sum due to rounding

(1) Palustrine emergent wetland (PEM), palustrine shrub wetland (PSS), palustrine forested wetland (PFO).

and the Proposed Orange Route in the Blackberry Variation Area. As discussed in Section 5.3.4.2, the Applicant would permanently clear woody vegetation from the ROW during construction and the ROW would be maintained as low-stature vegetation in order to reduce interference with the maintenance and function of the transmission line.

As indicated in Table 6-210, the Proposed Blue Route and the Proposed Orange Route would pass through a similar amount of forested land. The Proposed Blue Route is 0.7 miles shorter than the Proposed Orange Route but it only parallels an existing transmission line corridor for 20 percent of its length, while the Proposed Orange would parallel an existing transmission line for 37 percent of its length. Proposed Blue Route and Proposed Orange Route would likely result in similar fragmentation of intact forest in areas where forest vegetation is present. While direct, adverse impacts to forested areas would be long-term, contiguous forest is abundant in the region surrounding the proposed Project (Map 5-19).

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on vegetation resources are summarized in Section 5.3.4.2. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

**Wildlife**

The ROI for wildlife was determined in Section 5.3.4.3 to be the ROW of the proposed transmission line. Data related to wildlife resources in the Blackberry Variation Area are summarized in Table 6-211 and shown on Map 6-63. Wildlife resources in the

Blackberry Variation Area consist of natural habitat, including forest, wetlands, and small lakes.

The primary impact on wildlife resources that would differ between the Proposed Blue Route and the Proposed Orange Route in the Blackberry Variation Area includes proximity to wildlife habitat. As discussed in Section 5.3.4.3, the proposed Project would expand existing corridor or create new corridor; this would result in conversion from forest to low-stature open vegetation communities, favoring wildlife species that prefer more open vegetation communities. Section 6.4.5 (Vegetation) summarizes potential impacts on forested vegetation from the Proposed Blue Route and the Proposed Orange Route.

The Proposed Blue Route is just under a mile shorter in length but would require creation of new corridor for a greater portion of its length than the Proposed Orange Route (Table 6-211; Map 6-63). Because of this, the impacts related to fragmentation of forested habitats, and subsequent displacement of wildlife species associated with those forest communities would be similar with either proposed route.

Several small lakes/ponds are present in the Blackberry Variation Area, including a MnDNR designated unnamed shallow lake (Map 6-63). The Proposed Orange Route would traverse an area where these waterbodies are more dominant. Although none of these waterbodies are present within the ROW of either the Proposed Blue Route or the Proposed Orange Route, the proximity of these waterbodies to the Proposed Orange Route could result in greater impacts on wildlife that are associated with these waterbodies.

**Table 6-210 Vegetation Resources within the Anticipated ROW in the Blackberry Variation Area**

| Resource                                       | Evaluation Parameter                   | Blackberry Variation Area |                       |
|--|--|---------------------------|-----------------------|
|  |  | Proposed Blue Route       | Proposed Orange Route |
| Transmission Line                              | Length (mi)                            | 5.4                       | 6.1                   |
| Existing Transmission Line <sup>(1)</sup>      | Percent of Total Length <sup>(2)</sup> | 20                        | 37                    |
| Total Forested GAP Land Cover                  | Acres within ROW                       | 129                       | 130                   |
| GAP Land Cover - Dominant Types <sup>(3)</sup> |  |                           |                       |
| North American Boreal Forest                   | Acres within ROW                       | 60                        | 52                    |
| North American Boreal Flooded and Swamp Forest | Acres within ROW                       | 30                        | 26                    |
| Eastern North American Cool Temperate Forest   | Acres within ROW                       | 33                        | 49                    |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); USGS 2001, reference (151)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.
- (3) Data presented here only includes dominant GAP types; see Appendix E for additional land cover types within the ROW.

**Table 6-211 Wildlife Resources within the Vicinity of the Blackberry Variation Area**

| Resource                                  | Evaluation Parameter                   | Blackberry Variation Area |                       |
|---|--|---------------------------|-----------------------|
|   |  | Proposed Blue Route       | Proposed Orange Route |
| Transmission Line                         | Length (mi)                            | 5.4                       | 6.1                   |
| Existing Transmission Line <sup>(1)</sup> | Percent of Total Length <sup>(2)</sup> | 20                        | 37                    |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

**Table 6-212 Rare Species Documented within One Mile of the Anticipated ROW in the Blackberry Variation Area**

| Scientific Name <sup>(1)</sup>                | Common Name             | Federal Status | State Status    | Type           | Blackberry Variation Area |                       |
|---|-------------------------|----------------|-----------------|----------------|---------------------------|-----------------------|
|   |                         |                |                 |                | Proposed Blue Route       | Proposed Orange Route |
| <i>Platanthera flava</i> var. <i>herbiola</i> | Tuberclad Rein-orchid   | None           | Threatened      | Vascular Plant | X                         | X                     |
| <i>Spiranthes casei</i> var. <i>casei</i>     | Cases's Ladies'-tresses | None           | Threatened      | Vascular Plant | X                         | X                     |
| <i>Accipiter gentilis</i>                     | Northern Goshawk        | None           | Special Concern | Bird           |                           | X                     |

Source(s): MnDNR 2015, reference (132)

- (1) Canada lynx and gray wolf records are not documented in the NHIS database.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on wildlife resources are summarized in Section 5.3.4.3. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project. Section 6.2.1.4 (Wildlife) discusses additional suggested measures to avoid, minimize, or mitigate impacts on wildlife are summarized.

**6.4.5.5 Rare and Unique Natural Resources**

Rare and unique natural resources are divided into rare species and rare communities. Rare species encompass federally listed or state endangered, threatened, or special concern species while rare communities may include state-designated features, such as SNAs, MBS Sites of Biodiversity Significance, MnDNR High Conservation Value Forest, MnDNR Ecologically Important Lowland Conifer stands, and MBS native plant communities.

**Rare Species**

The ROI for rare species is described in Section 5.3.5, which states that for impacts to federally and state-listed species, the ROI includes a one-mile buffer surrounding the proposed routes and variations. Data related to rare species in the Blackberry Variation Area are summarized in Table 6-212; additional data on rare species, such as the

presence of MnDNR tracked species, is provided in Appendix F. As a condition of the license agreement with MnDNR for access to the NHIS database, data pertaining to the documented locations of rare species are not shown on a map.

In general, proximity of state endangered, threatened, or special concern species is similar between the Proposed Blue Route and the Proposed Orange Route in the Blackberry Variation Area. As discussed in Section 5.3.5, potential long-term impacts on rare species from the proposed Project include the direct or indirect loss of individuals or conversion of associated habitats and increased habitat fragmentation from construction.

As indicated in Table 6-212, two state-threatened vascular plants have been documented within one mile of the Proposed Blue Route and the Proposed Orange Route. In addition, the northern goshawk has been documented within one mile of the Proposed Orange Route; however, preferred habitat for the northern goshawk (mature, closed canopy forest) is also likely available within the vicinity of the Proposed Blue Route.

Although the Proposed Blue Route is just under a mile shorter in length than the Proposed Orange Route, it would require creation of new corridor for a greater percentage of its length relative to the

Proposed Orange Route (Table 6-213). Clearing of forested areas to create new corridor could have impacts on rare species associated with forest communities, such as the northern goshawk. However, the full extent of potential impacts on rare species from either the Proposed Blue Route or the Proposed Orange Route cannot be determined without pre-construction field surveys, which would likely occur as a condition of a MN PUC Route Permit. The MN PUC Route Permit could require the development of a Vegetation Management Plan as a permit condition, which could include plant surveys along the permitted ROW.

Any indirect impacts to rare species from the proposed Project are expected to be minimal because of the amount of surrounding habitat. Through use of Applicant proposed avoidance and minimization measures, direct impacts to rare species are not expected. DOE’s informal consultation under Section 7 of the ESA with USFWS is currently on-going and a Biological Assessment has been prepared to assess potential impacts on federally listed species (Appendix R).

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on rare species are summarized in Section 5.3.5. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

**Rare Communities**

The ROI for the analysis of impacts to rare communities was described within Section 5.3.5 and includes the ROW of the proposed transmission line. Data related to rare communities and resources in the Blackberry Variation Area are summarized in Table 6-213 and shown on Map 6-64; additional, more detailed data on rare communities and resources is provided in Appendix E.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts are summarized in Section 5.3.5. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts.

Loss or conversion of native vegetation would likely be similar between the Proposed Blue Route and the Proposed Orange Route in the Blackberry Variation Area. As discussed in Section 5.3.5, the Applicant would permanently remove vegetation at each structure footprint and within portions of the ROW that are currently dominated by forest or other woody vegetation.

As indicated on Map 6-64 and in Table 6-213, the Proposed Orange Route would pass through more MBS Sites of Biodiversity Significance. However, both Proposed Blue Route and the Proposed Orange Route would pass through a similar amount of Sites of Biodiversity Significance along new transmission line corridor because the Proposed Orange Route would parallel an existing transmission line corridor through a portion of the Sites of Biodiversity Significance it traverses.

The rare communities and resources listed in Table 6-213 and detailed above show that the proposed Project may result in direct, long-term, localized adverse impacts to rare communities. Some of these impacts may also have regional effects, because of the limited regional abundance and distribution of some of the rare communities affected. Therefore, adverse impacts to rare communities may be significant, because localized adverse impacts would result in a broader regional depletion of certain rare communities. The MN PUC Route Permit could require the development of a Vegetation Management Plan as a permit condition, which could include plant surveys along the permitted ROW.

**Table 6-213 Rare Communities and Resources within the Vicinity of the Blackberry Variation Area**

| Resource  | Evaluation Parameter                   | Blackberry Variation Area |                       |
|---|--|---------------------------|-----------------------|
|   |  | Proposed Blue Route       | Proposed Orange Route |
| Transmission Line                                     | Length (mi)                            | 5.4                       | 6.1                   |
| Existing Transmission Line <sup>(1)</sup>             | Percent of Total Length <sup>(2)</sup> | 20                        | 37                    |
| MBS Sites of Biodiversity Significance <sup>(3)</sup> | Acres within ROW                       | 57                        | 79                    |

Source(s): Minnesota Power 2014, reference (144); MN DOC 2014, reference (145); MBS 2015, reference (167)

Note(s): Totals may not sum due to rounding

- (1) More than one feature often shares the corridor; a detailed summary of all the shared features are listed in Appendix E. This feature includes all situations where an existing transmission line is present.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.
- (3) MBS Sites of Biodiversity Significance data are preliminary in this portion of the proposed Project. Because of the preliminary status and/or unknown ranks, biodiversity significance ranks are not distinguished from one another here.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on rare communities are summarized in Section 5.3.5. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on these resources from the proposed Project.

**6.4.5.6 Corridor Sharing**

Sharing or paralleling existing corridors or linear features minimizes fragmentation of the landscape and can minimize impacts to adjacent property. The ROI for the analysis of corridor sharing generally includes infrastructure corridors within approximately 0.25 miles of the proposed routes and variations, as described in Section 5.3.6. Map 6-65 shows areas where the proposed route and variations would parallel corridors with existing transportation, transmission line, or other linear features in the Blackberry Variation Area.

Table 6-214 identifies the percentage of total transmission line length that the Proposed Blue Route and the Proposed Orange Route parallel an existing corridor or linear feature in the Blackberry Variation Area.

The Proposed Orange Route would parallel an existing transmission line corridor for less than half of the length (Figure 6-136). The Proposed Blue Route would parallel an existing transmission line corridor for one fifth of its length.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on corridor sharing are summarized in Section 5.3.6. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts on corridor sharing from the proposed Project.

**6.4.5.7 Electrical System Reliability**

As explained in Section 5.3.7, the ROI for Electrical System Reliability was determined to be the corridors for the existing transmission lines. Data related to electrical system reliability in the Blackberry Variation Area are shown on Map 6-65.

The Proposed Blue Route would parallel 230 kV and 115 kV transmission lines for approximately 20 percent of its length in the southern portion of the Blackberry Variation Area. The Proposed Orange Route would parallel two 115 kV transmission lines for approximately 40 percent of its length in the southern portion of the Balsam Variation Area (Table 6-214); therefore, for both proposed routes, there are three transmission lines are parallel in adjacent corridors.

The configuration may decrease the reliability of the proposed Project. When facilities are located in close proximity, there is a greater risk that a single event can take out multiple lines. Additionally, the close proximity of three lines can make repairing the lines more difficult. These difficulties could increase outage times, should an outage occur. Adverse impacts are possible as a result of the construction of the construction and operation of three high-voltage transmission lines under one variation in the East Section.

Potential construction, operation, maintenance, and emergency-repair related short-term and long-term impacts on electrical system reliability are summarized in Section 5.3.7. Section 2.13 summarizes Applicant-proposed measures to avoid, minimize, or mitigate impacts to electrical system reliability.

**Table 6-214 Corridor Sharing in the Blackberry Variation Area**

| Feature Sharing Corridor <sup>(1)</sup>   | Evaluation Parameter                   | Blackberry Variation Area |                       |
|---|--|---------------------------|-----------------------|
|   |  | Proposed Blue Route       | Proposed Orange Route |
| Transmission Line (other linear features may be present within the transmission line corridor; i.e., road, trail, field line, PLSS) | Percent of Total Length <sup>(2)</sup> | 20                        | 37                    |
| Road/Trail (other linear features, but not transmission lines, may be present within the road/trail corridor; i.e., PLSS)           | Percent of Total Length <sup>(2)</sup> | 2                         | 0                     |
| None  | Percent of Total Length <sup>(2)</sup> | 79                        | 63                    |

Source(s): USDA et al 2013, reference (170); MN DOC 2014, reference (145); MNDOT 2010, reference (171); MnDNR 2010, reference (172); MnDNR 2009 reference (173); MnDNR et al 2014, reference (174); MnDNR et al 2013, reference (175); MnDNR 2013, reference (176); MnDNR et al 2009, reference (177)

Note(s): Totals may not sum due to rounding

- (1) More than one feature may share the corridor; the primary feature within the corridor is identified, other features that may share the corridor are listed in parenthesis. Appendix E provides a detailed summary of all shared features.
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

**6.4.5.8 Costs of Constructing, Operating, and Maintaining the Facility which are Dependent on Design and Route**

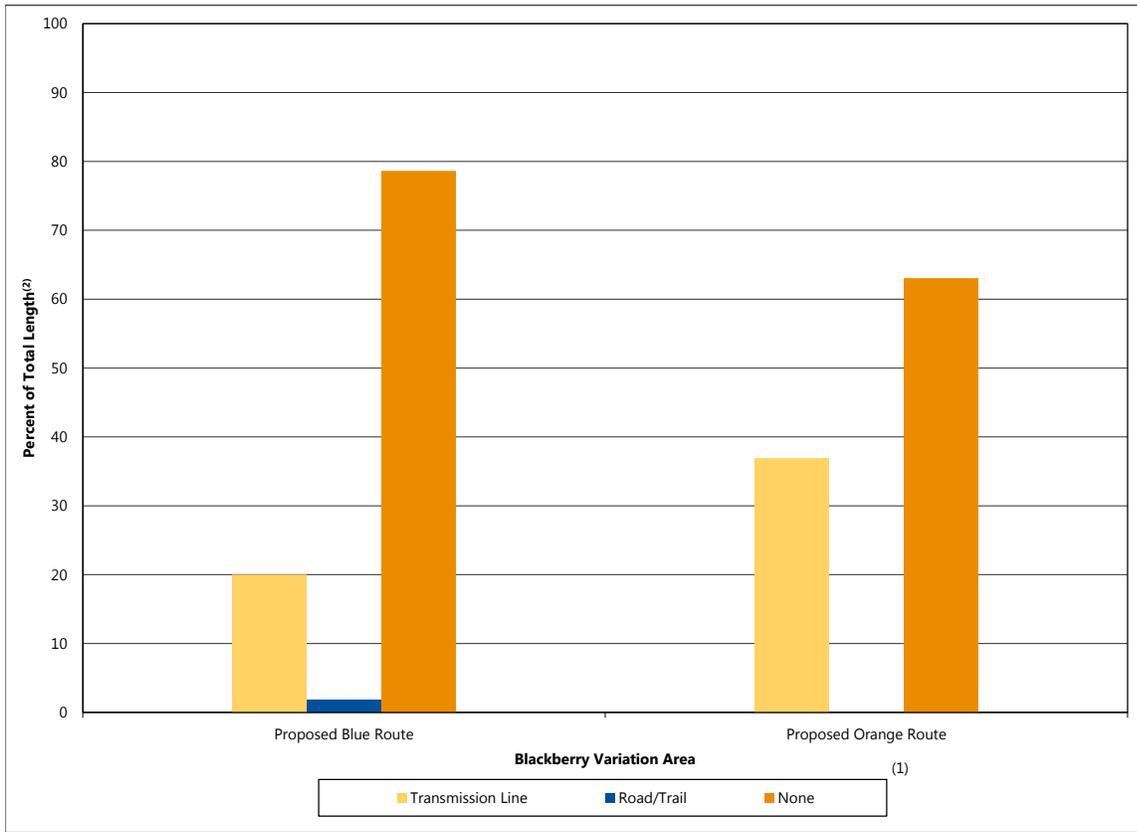
Information related to construction, operation, and maintenance costs associated with the proposed Project is provided in Section 5.3.8. Table 6-215 summarizes the costs associated with constructing the Proposed Blue Route and Proposed Orange Route in the Blackberry Variation Area. As indicated in Table 6-215, the Proposed Orange Route would cost more to construct relative to the Proposed Blue Route.

The cost for routine maintenance would depend on the topology and the type of maintenance required, but typically runs from \$1,100 to \$1,600 per mile annually (Minnesota Power 2013). Using the \$1,600 per mile for operation and maintenance, the estimated cost would range from \$8,600 to \$9,800 annually for these alternatives in the Blackberry Variation Area.

**6.4.6 Relative Merits Summary**

As discussed in Section 1.2.1.1, the MN PUC is charged with selecting routes that minimize adverse

**Figure 6-136 Corridor Sharing in the Blackberry Variation Area**



Source(s): USDA et al 2013, reference (170); MN DOC 2014, reference (145); MNDOT 2010, reference (171); MnDNR 2010, reference (172); MnDNR 2009 reference (173); MnDNR et al 2014, reference (174); MnDNR et al 2013, reference (175); MnDNR 2013, reference (176); MnDNR et al 2009, reference (177)

Note(s): Totals may not sum due to rounding

- (1) Transmission Line (other linear features may be present within the transmission line corridor; i.e., road, trail, field line, PLSS); Road Trail (other linear features, but not transmission lines, may be present within the road/trail corridor; i.e., PLSS field line).
- (2) Percent of total length was calculated by rounding any values less than 0.5 to 0, this may result in a total of slightly more or less than 100 percent.

**Table 6-215 Construction Costs in the Blackberry Variation Area**

| Variation Area | Name in the EIS       | Cost (Total) | Average Cost (per mile) | Length (mi) |
|----------------|-----------------------|--------------|-------------------------|-------------|
| Blackberry     | Proposed Blue Route   | \$8,380,680  | \$1,540,566             | 5.4         |
|                | Proposed Orange Route | \$10,148,060 | \$1,663,616             | 6.1         |

Source(s): Minnesota Power 2015, reference (9)

human and environmental impacts while ensuring continuing electric power system reliability and integrity. MN PUC must take into account the 14 factors identified in Minnesota Rules, part 7850.4100 when making a decision on a Route Permit. See Section 6.2.6 for additional details on the relative merits analysis methodology.

### 6.4.6.1 Effie Variation Area

The Effie Variation would have the most impacts on the aesthetics element of the human settlement factor because it would pass by the most residences; however, impacts would be moderated to some extent because it would parallel two existing transmission line corridors for most of its length. The Effie Variation may have more impacts on the archaeological and historic architectural resources factor, as it crosses sections identified as containing known archaeological sites and has the most historic architectural sites within one mile. The Effie Variation would have the most impacts on the water resources element of the natural environment factor because it crosses more water courses, including trout streams.

The Proposed Blue Route and the Proposed Orange Route may have more impact on the wildlife element of the natural environment factor because these alternatives would cross an Important Bird Area. These two alternatives may have the most impact on the federal and state listed species element of the rare and unique natural resources factor because they have the most NHIS records within one mile. These two alternatives also parallel minimal existing corridor, while the Effie Variation parallels existing corridor for most of its length. Because of its longer length, the Effie Variation would cost the most to construct.

The Applicant has indicated that paralleling an existing transmission line corridor (with two existing transmission lines) along the Effie Variation could reduce electric system reliability because three high voltage transmission lines would be in parallel corridors, which may increase vulnerability to simultaneous outages and increase safety risks associated with transmission line maintenance and repair.

Table 6-216 provides an overview of this relative merits assessment for the alternatives in the Effie Variation Area. Appendix X provides the underlying data used in the color graphic determination for each alternative in each variation area. For the most comprehensive information on the comparative environmental consequences for

each variation area, see the appropriate sections in Chapter 6.

### 6.4.6.2 East Bear Lake Variation Area

Similar to the Effie Variation, the East Bear Lake Variation in the East Bear Variation would parallel an existing transmission line corridor for just under one-half its length, therefore reducing impacts to the elements of the natural environment factor and the rare communities element of the rare and unique resources factor by avoiding habitat fragmentation, and the MBS Sites of Biodiversity Significance in the Bear Wolf Peatland. Because of its slightly longer length and need for angle structures, the East Bear Lake Variation would be more expensive to construct than the Proposed Orange Route.

The Applicant has indicated that paralleling an existing transmission line corridor (with two existing transmission lines) along the East Bear Lake Variation could reduce electric system reliability because three high voltage transmission lines would be in parallel corridors, which may increase vulnerability to simultaneous outages and increase safety risks associated with transmission line maintenance and repair.

Table 6-217 provides an overview of this relative merits assessment for the alternatives in the East Bear Lake Variation Area. Appendix X provides the underlying data used in the color graphic determination for each alternative in each variation area. For the most comprehensive information on the comparative environmental consequences for each variation area, see the appropriate sections in Chapter 6.

### 6.4.6.3 Balsam Variation Area

The Proposed Blue Route and Balsam Variation avoid impacts to the aesthetics element of human settlement factor as they are located further from communities in Balsam and Lawrence townships and pass by fewer residences than the Proposed Orange Route. The Proposed Orange Route would cost the most to construct.

The Balsam Variation would have more potential impacts to the mining and mineral resources element of the land-based economies factor as it would cross more active and expired/terminated state mineral lease lands. The Balsam Variation may have more impacts on the archaeological and historic architectural resources factor, as it would cross a section identified as containing known archaeological sites and also has the most historic architectural sites within one mile.

The Proposed Orange Route and the Balsam Variation may have the most impacts on the water resources element of the natural environment factor, as they would cross the most FEMA-designated floodplains, most of which are too large to span.

The Balsam Variation may result in fewer impacts to the **vegetation and wildlife** elements of the natural resource factor as it would **be located in an** abandoned transmission line corridor for much of its length and may result in fewer impacts associated with new habitat fragmentation than the Proposed Blue Route or Proposed Orange Route.

The Applicant has indicated that corridor sharing along the Proposed Blue Route and Proposed Orange Route may reduce electric system reliability because it would place three high voltage transmission lines parallel along the same corridor, which may increase vulnerability to simultaneous outages and increase safety risks associated with transmission line maintenance and repair.

Table 6-218 provides an overview of this relative merits assessment for the alternatives in the Balsam Variation Area. **Appendix X provides the underlying data used in the color graphic determination for each alternative in each variation area. For the most comprehensive information on the comparative environmental consequences for each variation area, see the appropriate sections in Chapter 6.**

#### 6.4.6.4 Dead Man's Pond Variation Area

Within the Dead Man's Pond Variation Area, the Dead Man's Pond Variation would create more potential impacts to the aesthetics element of the human settlement factor than the Proposed Blue Route by passing closer to more residences. The Proposed Blue Route may have more impacts on the water resources element of the natural environment factor, as it would cross wetlands too large to span and would cross more shrub wetlands, resulting in more wetland type conversion.

The Proposed Blue Route may result in fewer impacts to the **vegetation and wildlife** elements of the natural resource factor as it parallels a corridor for part of its length and may result in fewer impacts associated with new habitat fragmentation than the Dead Man's Pond Variation. Because it would likely require more angle structures, the Dead Man's Pond Variation would also be more expensive to construct.

Table 6-219 provides an overview of this relative merits assessment for the alternatives in the Dead Man's Pond Variation Area. **Appendix X provides the underlying data used in the color graphic determination for each alternative in each variation area. For the most comprehensive information on the comparative environmental consequences for each variation area, see the appropriate sections in Chapter 6.**

#### 6.4.6.5 Blackberry Variation Area

In the Blackberry Variation Area, the Proposed Orange Route would result in more impacts to the aesthetics element of the human settlement factor, as it would pass by more residences. In addition, the Proposed Orange Route is a slightly longer route and would likely require more angle structures than the Proposed Blue Route, so it would cost more to construct.

The Proposed Blue Route may have more impact on the archaeological and historic resources factor, as it has more historic architectural sites located within one mile than that the Proposed Orange Route.

While both alternatives parallel existing transmission line corridor, the Proposed Orange Route parallels more corridor than the Proposed Blue Route. The Applicant has indicated that corridor sharing along the Proposed Blue Route and Proposed Orange Route could reduce electric system reliability because three high voltage transmission lines would be in parallel corridors, which may increase vulnerability to simultaneous outages and increase safety risks associated with transmission line maintenance and repair.

Table 6-220 provides an overview of this relative merits assessment for the alternatives in the Blackberry Variation Area. **Appendix X provides the underlying data used in the color graphic determination for each alternative in each variation area. For the most comprehensive information on the comparative environmental consequences for each variation area, see the appropriate sections in Chapter 6.**

Table 6-216 Relative Merits Assessment for the Effie Variation Area

| Relative Merits <sup>(1)</sup>   |                                  | Effie Variation Area |                       |                 |  |
|--|----------------------------------|----------------------|-----------------------|-----------------|--|
| Factor   | Element                          | Proposed Blue Route  | Proposed Orange Route | Effie Variation | Notes  |
| Human settlement   | Aesthetics                       |                      |                       |                 | Effie Variation would pass by the most residences within 1,500 feet of the anticipated alignment.  |
|  | Land use compatibility           |                      |                       |                 | There are no land use compatibility issues identified for the alternatives. All alternatives cross a relatively similar amount of private land.  |
| Land-Based economies   | Agriculture                      |                      |                       |                 | All alternatives would cross a relatively similar amount of farmland. Effie Variation parallels an existing transmission line corridor for 80% of its length. The other alternatives parallel minimal existing corridor.   |
|  | Forestry                         |                      |                       |                 | All alternatives would cross a relatively similar amount of state forest land. Effie Variation parallels an existing transmission line corridor for 80% of its length. The other alternatives parallel minimal existing corridor.  |
|  | Mining and mineral resources     |                      |                       |                 | All alternatives would cross a relatively similar amount of active and expired/terminated mineral lease lands.   |
| Archaeological and historic architectural resources  |                                  |                      |                       |                 | Effie Variation would cross sections identified as containing known archaeological sites, while the other alternatives would not. The Effie Variation has more historic architectural sites within 1 mile than the Proposed Blue Route and Proposed Orange Route.  |
| Natural environment  | Water resources                  |                      |                       |                 | Effie Variation would cross the most watercourses/ waterbodies; including six trout streams. All crossings are expected to be spanned, although clearing vegetation adjacent to trout streams could result in increased water temperature, potentially resulting in less suitable trout habitat. Proposed Blue Route and the Proposed Orange Route would cross FEMA-designated floodplains; however the areas are small and would be spanned. All alternatives would cross relatively similar areas of wetlands that are too large to span and would result in relatively similar areas of shrub and forested wetland type conversion. |
|  | Vegetation                       |                      |                       |                 | All alternatives would cross a relatively similar amount of forested land cover. Effie Variation parallels an existing transmission line corridor for 80% of its length. The other alternatives parallel minimal existing corridor.  |
|  | Wildlife                         |                      |                       |                 | Proposed Blue Route and Proposed Orange Route would cross the important Bird Area.   |
| Rare and unique natural resources  | Federal and state-listed species |                      |                       |                 | The alternatives cross critical habitat designated for gray wolf. Proposed Orange Route has the most NHIS records within 1 mile. Proposed Blue Route has more NHIS records than the Effie Variation. Effie Variation would also minimize impacts by paralleling existing corridor.   |
|  | State rare communities           |                      |                       |                 | All alternatives would cross a relatively similar amount of MBS Sites of Biodiversity Significance.  |
| Paralleling of existing ROWs   |                                  |                      |                       |                 | Proposed Blue Route and Proposed Orange Route would cross the Important Bird Area.   |
| Electrical system reliability  |                                  |                      |                       |                 | Effie Variation would parallel existing 500 kV and 230 kV transmission line corridors for the entire length.   |
| Costs of constructing, operating, and maintaining the facility which are dependent on design and route |                                  |                      |                       |                 | The cost for the Proposed Orange Route is within 20% of the cost of the Proposed Blue Route. The cost of the Effie Variation is more than 20% above the cost of the Proposed Blue Route.   |

- (1) Colors represent least impacts (green), moderate impacts (yellow), greatest impacts (red), and no impacts/similar impacts (gray) relative to the specific Factor.
- (2) Appendix X provides the underlying data used in the color graphic determination for each alternative in each variation area. For the most comprehensive information on the comparative environmental consequences for each variation area, see the appropriate sections in Chapter 6.

**Table 6-217 Relative Merits Assessment for the East Bear Lake Variation Area**

| Relative Merits <sup>(1)</sup>   |                                  | East Bear Lake Variation Area |                       |   |
|--|----------------------------------|-------------------------------|-----------------------|---|
| Factor   | Element                          | Proposed Blue Route           | Proposed Orange Route | Notes   |
| Human settlement   | Aesthetics                       |                               |                       | No residences are present within 1,500 feet of the anticipated alignment for either alternative.  |
|  | Land use compatibility           |                               |                       | There are no land use compatibility issues identified for the alternatives. Neither alternative would cross private land.   |
| Land-Based economies   | Agriculture                      |                               |                       | Both alternatives would cross a relatively similar amount of farmland. East Bear Lake Variation would parallel existing corridors for nearly half of its length.  |
|  | Forestry                         |                               |                       | Both alternatives would cross a relatively similar amount of state forest land. East Bear Lake Variation would parallel existing corridors for nearly half of its length.   |
|  | Mining and mineral resources     |                               |                       | Both alternatives would cross a relatively similar amount of active and expired/terminated mineral lease lands. East Bear Lake Variation would parallel existing corridors for nearly half of its length.   |
| Archaeological and historic architectural resources  |                                  |                               |                       | There are no known archaeological and historic architectural resources that would be affected by the alternatives.  |
| Natural environment  | Water resources                  |                               |                       | Both alternatives would cross relatively similar numbers of watercourses/waterbodies; however, all crossings are expected to be spanned. Neither alternative would cross floodplains. Both alternatives would cross relatively similar areas of wetlands that are too large to span and would result in relatively similar areas of shrub and forested wetland type conversion. |
|  | Vegetation                       |                               |                       | Both alternatives would cross a relatively similar amount of forested land cover. East Bear Lake Variation would parallel existing corridors for nearly half of its length.   |
|  | Wildlife                         |                               |                       | Neither alternative would cross designated wildlife resources.  |
| Rare and unique natural resources  | Federal and state-listed species |                               |                       | There are no federally listed species identified for these alternatives. All alternatives would have a relatively similar number of NHIS records within 1 mile. Neither alternative has threatened or endangered NHIS records within 1 mile.  |
|  | State rare communities           |                               |                       | Both alternatives would cross a relatively similar amount of MBS Sites of Biodiversity Significance.  |
| Paralleling of existing ROWs   |                                  |                               |                       | East Bear Lake Variation would parallel existing transmission line, roadway, and/or trail corridor, while the Proposed Orange Route would not parallel these corridors.   |
| Electrical system reliability  |                                  |                               |                       | East Bear Lake Variation would parallel existing 500 kV and 230 kV transmission line corridors for 42% of its length.   |
| Costs of constructing, operating, and maintaining the facility which are dependent on design and route |                                  |                               |                       | The cost of the East Bear Lake Variation is more than 20% above the cost of the Proposed Orange Route.  |

- (1) Colors represent least impacts (green), moderate impacts (yellow), greatest impacts (red), and no impacts/similar impacts (gray) relative to the specific Factor.
- (2) Appendix X provides the underlying data used in the color graphic determination for each alternative in each variation area. For the most comprehensive information on the comparative environmental consequences for each variation area, see the appropriate sections in Chapter 6.

Table 6-21, Relative Merits Assessment for the Balsam Variation Area

| Relative Merits <sup>(1)</sup>   |                                  | Balsam Variation Area |                       |                  |  |
|--|----------------------------------|-----------------------|-----------------------|------------------|--|
| Factor   | Element                          | Proposed Blue Route   | Proposed Orange Route | Balsam Variation | Notes  |
| Human settlement   | Aesthetics                       |                       |                       |                  | Proposed Orange Route would pass by the most residences within 1,500 feet of the anticipated alignment.  |
|  | Land use compatibility           |                       |                       |                  | There are no land use compatibility issues identified for the alternatives. All alternatives would cross a relatively similar amount of private land.  |
| Land-Based economies   | Agriculture                      |                       |                       |                  | All alternatives cross a relatively similar amount of farmland.  |
|  | Forestry                         |                       |                       |                  | None of the alternatives cross state forest land.  |
|  | Mining and mineral resources     |                       |                       |                  | Balsam Variation would cross active and expired/terminated mineral lease lands while the proposed routes would not cross any mineral lease lands.  |
| Archaeological and historic architectural resources  |                                  |                       |                       |                  | Balsam Variation would cross a section identified as containing known archaeological sites, while the other alternatives would not. Balsam Variation has the most historic architectural sites within 1 mile.  |
| Natural environment  | Water resources                  |                       |                       |                  | All alternatives would cross relatively similar numbers of watercourses/waterbodies; however, all crossings are expected to be spanned. All alternatives would cross FEMA-designated floodplains large enough that they cannot be spanned; Proposed Orange Route would cross the most floodplain. All alternatives would cross relatively similar areas of wetlands that are too large to span and would result in relatively similar areas of shrub and forested wetland type conversion. |
|  | Vegetation                       |                       |                       |                  | All alternatives would cross a relatively similar amount of forested land cover. Balsam Variation parallels existing transmission line, roadway, or field corridor for a greater proportion of its length than the proposed routes.  |
|  | Wildlife                         |                       |                       |                  | None of the alternatives would cross designated wildlife resources.  |
| Rare and unique natural resources  | Federal and state-listed species |                       |                       |                  | There are no federally listed species identified for these alternatives. The alternatives have the same number of NHIS records within 1 mile, none of which are threatened or endangered species.  |
|  | State rare communities           |                       |                       |                  | All alternatives would cross a relatively similar amount of MBS Sites of Biodiversity Significance.  |
| Paralleling of existing ROWs   |                                  |                       |                       |                  | All alternatives would parallel existing transmission line, roadway, and/or trail corridor. Balsam Variation would be located in an abandoned transmission line corridor for 66% of its length.  |
| Electrical system reliability  |                                  |                       |                       |                  | Proposed Blue Route and Proposed Orange Route would parallel two existing 115 kV transmission line corridors for 15% of their lengths.   |
| Costs of constructing, operating, and maintaining the facility which are dependent on design and route |                                  |                       |                       |                  | The cost for the Proposed Orange Route is within 20% of the cost of the Proposed Blue Route. The cost of the Balsam Variation is more than 20% above the cost of the Proposed Blue Route.  |

- (1) Colors represent least impacts (green), moderate impacts (yellow), greatest impacts (red), and no impacts/similar impacts (gray) relative to the specific Factor.
- (2) Appendix X provides the underlying data used in the color graphic determination for each alternative in each variation area. For the most comprehensive information on the comparative environmental consequences for each variation area, see the appropriate sections in Chapter 6.

Table 6-219 Relative Merits Assessment for the Dead Man’s Pond Variation Area

| Relative Merits <sup>(1)</sup>   |                                  | Dead Man’s Pond Variation Area |                           |  |
|--|----------------------------------|--------------------------------|---------------------------|--|
| Factor   | Element                          | Proposed Blue Route            | Dead Man’s Pond Variation | Notes  |
| Human settlement   | Aesthetics                       |                                |                           | Dead Man’s Pond Variation would pass by more residences within 1,500 feet of the anticipated alignment.  |
|  | Land use compatibility           |                                |                           | There are no land use compatibility issues identified for the alternatives. Both alternatives would cross a relatively similar amount of private land.   |
| Land-Based economies   | Agriculture                      |                                |                           | Both alternatives would cross a relatively similar amount of farmland.   |
|  | Forestry                         |                                |                           | Neither alternative would cross state forest land.   |
|  | Mining and mineral resources     |                                |                           | No active or expired/terminated mineral lease lands or aggregate resources are present in the ROW of any alternative.  |
| Archaeological and historic architectural resources  |                                  |                                |                           | There are no known archaeological sites that would be affected by the alternatives. Both alternatives have one historic architectural site within 1 mile.  |
| Natural environment  | Water resources                  |                                |                           | There would be no differences between the alternatives for crossing watercourses, waterbodies, and floodplains. Proposed Blue Route would cross wetlands that are too large to span, while Dead Man’s Pond Variation would be able to span wetlands. Both alternatives would result in relatively similar areas of forested wetland type conversion. Proposed Blue Route would have the most shrub wetland; therefore, would require the most shrub wetland type conversion. |
|  | Vegetation                       |                                |                           | Both alternatives would cross a relatively similar amount of forested land cover.  |
|  | Wildlife                         |                                |                           | Neither alternative would cross designated wildlife resources.   |
| Rare and unique natural resources  | Federal and state-listed species |                                |                           | There are no federally listed species identified for these alternatives. There is 1 threatened NHIS record within 1 mile of the Dead Man’s Pond Variation. However, this species is a fish and because it is anticipated that all waterbodies and watercourses would be spanned, impacts to this aquatic species are not expected.   |
|  | State rare communities           |                                |                           | No known rare and unique natural resources were identified for the alternatives.   |
| Paralleling of existing ROWs   |                                  |                                |                           | Proposed Blue Route parallels some existing transmission line, roadway, and/or trail corridor, while the Dead Man’s Pond Variation does not parallel any of these existing corridors.  |
| Electrical system reliability  |                                  |                                |                           | There are no issues with electrical reliability since there would not be three transmission lines paralleling the same corridor.   |
| Costs of constructing, operating, and maintaining the facility which are dependent on design and route |                                  |                                |                           | The cost of the Dead Man’s Pond Variation is more than 20% above the cost of the Proposed Blue Route.  |

- (1) Colors represent least impacts (green), moderate impacts (yellow), greatest impacts (red), and no impacts/similar impacts (gray) relative to the specific Factor.
- (2) Appendix X provides the underlying data used in the color graphic determination for each alternative in each variation area. For the most comprehensive information on the comparative environmental consequences for each variation area, see the appropriate sections in Chapter 6.

**Table 6-220 Relative Merits Assessment for the Blackberry Variation Area**

| Relative Merits <sup>(1)</sup>   |                                  | Blackberry Variation Area |                       |  |
|--|----------------------------------|---------------------------|-----------------------|--|
| Factor   | Element                          | Proposed Blue Route       | Proposed Orange Route | Notes  |
| Human settlement   | Aesthetics                       |                           |                       | Proposed Orange Route would pass by more residences within 1,500 feet of the anticipated alignment.  |
|  | Land use compatibility           |                           |                       | There are no land use compatibility issues identified for the alternatives. Both alternatives would cross a relatively similar amount of private land.   |
| Land-Based economies   | Agriculture                      |                           |                       | Both alternatives would cross a relatively similar amount of farmland.   |
|  | Forestry                         |                           |                       | Neither alternative would cross state forest land.   |
|  | Mining and mineral resources     |                           |                       | Proximity to expired/terminated mineral lease lands are relatively similar between the alternatives.   |
| Archaeological and historic architectural resources  |                                  |                           |                       | There are no known archaeological resources that would be affected by the alternatives. Proposed Blue Route has more historic architectural sites within 1 mile.   |
| Natural environment  | Water resources                  |                           |                       | Proposed Orange Route would cross the most watercourses/waterbodies; however, all crossings are expected to be spanned. There would be no differences between the alternatives for crossing floodplains. Both alternatives would cross relatively similar areas of wetlands that are too large to span and would result in relatively similar areas of forested wetland type conversion. Proposed Blue Route would have the most shrub wetland; therefore, would require the most shrub wetland type conversion. |
|  | Vegetation                       |                           |                       | Both alternatives would cross a relatively similar amount of forested land cover. Proposed Orange Route parallels more existing transmission line corridor.  |
|  | Wildlife                         |                           |                       | Neither alternative would cross designated wildlife resources.   |
| Rare and unique natural resources  | Federal and state-listed species |                           |                       | There are no federally listed species identified for these alternatives. Both alternatives have a relatively similar number of NHIS records, including threatened or endangered NHIS records, within 1 mile.   |
|  | State rare communities           |                           |                       | Both alternatives would cross a relatively similar amount of MBS Sites of Biodiversity Significance.   |
| Paralleling of existing ROWs   |                                  |                           |                       | Both alternatives would parallel a relatively similar amount of transmission line, roadway, and/or trail corridor.   |
| Electrical system reliability  |                                  |                           |                       | Both alternatives would parallel 2 existing high voltage transmission lines for a relatively similar proportion of their length.   |
| Costs of constructing, operating, and maintaining the facility which are dependent on design and route |                                  |                           |                       | The cost of the Proposed Orange Route is more than 20% above the cost of the Proposed Blue Route.  |

- (1) Colors represent least impacts (green), moderate impacts (yellow), greatest impacts (red), and no impacts/similar impacts (gray) relative to the specific Factor.
- (2) Appendix X provides the underlying data used in the color graphic determination for each alternative in each variation area. For the most comprehensive information on the comparative environmental consequences for each variation area, see the appropriate sections in Chapter 6.