



# Big Bend to Witten 230-kV Transmission Project Environmental Assessment



Prepared for:

Rural Utilities Service



Western Area Power Administration



Basin Electric Power Cooperative



November 2014

# **Big Bend to Witten 230-kV Transmission Project Environmental Assessment**

**November 2014**

## List of Acronyms

|                 |                                                              |
|-----------------|--------------------------------------------------------------|
| AES             | alternative evaluation study                                 |
| amsl            | above mean sea level                                         |
| APE             | area of potential effects                                    |
| APLIC           | Avian Power Line Interaction Committee                       |
| AWBP            | Aransas-Wood Buffalo Population                              |
| BA              | biological assessment                                        |
| Basin Electric  | Basin Electric Power Cooperative                             |
| BIA             | Bureau of Indian Affairs                                     |
| CEQ             | Council on Environmental Quality                             |
| CESA            | cumulative effects study area                                |
| CFR             | Code of Federal Regulations                                  |
| cfs             | cubic foot per second                                        |
| CRO             | Cultural Resources Office, Lower Brule Sioux Tribe           |
| CWA             | Clean Water Act                                              |
| CWS             | Canadian Wildlife Service                                    |
| dba             | A-weighted decibel                                           |
| DENR            | South Dakota Department of Environment and Natural Resources |
| DoS             | Department of State                                          |
| EA              | environmental assessment                                     |
| EMF             | electric magnetic field                                      |
| EO              | Executive Order                                              |
| ESA             | Endangered Species Act of 1973                               |
| EXPN            | non-essential experimental population                        |
| FCC             | Federal Communications Commission                            |
| FEMA            | Federal Emergency Management Agency                          |
| FERC            | Federal Energy Regulatory Commission                         |
| FIRMS           | Flood Insurance Rate Maps                                    |
| FPA             | Federal Power Act                                            |
| FPPA            | Farmland Protection Policy Act                               |
| FR              | Federal Register                                             |
| ft <sup>2</sup> | square feet                                                  |
| GAP             | Gap Analysis Project                                         |
| GIS             | Geographic Information System                                |
| HMA             | habitat management area                                      |
| HUC             | hydrologic unit code                                         |
| I-90            | Interstate-90                                                |
| kV              | kilovolt                                                     |
| KXL             | Keystone XL Pipeline Project                                 |
| LBST            | Lower Brule Sioux Tribe                                      |
| MBTA            | Migratory Bird Treaty Act of 1918                            |

|         |                                                 |
|---------|-------------------------------------------------|
| MCS     | macro-corridor study                            |
| mg/L    | milligrams per liter                            |
| MLRA    | Major Land Resource Area                        |
| MW      | megawatt                                        |
| NAAQS   | National Ambient Air Quality Standards          |
| NEP     | non-essential population                        |
| NEPA    | National Environmental Policy Act               |
| NFIP    | National Flood Insurance Program                |
| NHPA    | National Historic Preservation Act              |
| NESC    | National Electrical Safety Code                 |
| NOI     | Notice of Intent                                |
| NPDES   | National Pollutant Discharge Elimination System |
| NPP     | Nebraska Public Power                           |
| NRCS    | Natural Resources Conservation Service          |
| NRHP    | National Register of Historic Places            |
| NWE     | NorthWestern Energy Pipeline                    |
| NWI     | National Wetlands Inventory                     |
| OEM     | Office of Emergency Management                  |
| OPGW    | optical groundwire                              |
| OSHA    | Occupational Health and Safety Administration   |
| PEM     | palustrine emergent                             |
| PFO     | palustrine forested                             |
| Project | Big Bend to Witten Transmission Line Project    |
| PSS     | palustrine scrub-shrub                          |
| RCRA    | Resource Conservation and Recovery Act          |
| RFFA    | reasonably foreseeable future actions           |
| ROW     | right-of-way                                    |
| RUS     | Rural Utilities Service                         |
| SAR     | sodium adsorption ratio                         |
| SDBWG   | South Dakota Bat Working Group                  |
| SDDA    | South Dakota Department of Agriculture          |
| SDGFP   | South Dakota Game, Fish, and Parks Department   |
| SDIP    | South Dakota Intrastate Pipeline                |
| SDNHP   | South Dakota Natural Heritage Program           |
| SHPO    | State Historic Preservation Office              |
| SH      | State Highway                                   |
| SpC     | specific conductivity                           |
| SPCC    | Spill Prevention, Control, and Countermeasure   |
| SSURGO  | Soil Survey Geographic Database                 |
| SWPP    | Stormwater Pollution Prevention Plan            |
| TCP     | Traditional Cultural Property                   |
| TDS     | total dissolved solids                          |
| TSS     | total suspended solids                          |
| U.S.    | United States                                   |



|                  |                                      |
|------------------|--------------------------------------|
| $\mu\text{S/cm}$ | microSiemens per centimeter          |
| USACE            | U.S. Army Corps of Engineers         |
| USC              | United States Code                   |
| USDA             | U.S. Department of Agriculture       |
| USEPA            | U.S. Environmental Protection Agency |
| USFWS            | U.S. Fish and Wildlife Service       |
| USGS             | U.S. Geological Survey               |
| West Central     | West Central Electric Cooperative    |
| Western          | Western Area Power Administration    |
| WUS              | Waters of the U.S.                   |
| $\text{yd}^3$    | cubic yard                           |

## Contents

|            |                                                                                |            |
|------------|--------------------------------------------------------------------------------|------------|
| <b>1.0</b> | <b>Introduction .....</b>                                                      | <b>1-1</b> |
| 1.1        | Project Overview .....                                                         | 1-1        |
| 1.2        | Agency Actions and Decisions .....                                             | 1-1        |
| 1.2.1      | Rural Utilities Service .....                                                  | 1-3        |
| 1.2.2      | Western Area Power Administration .....                                        | 1-3        |
| 1.2.3      | Lower Brule Sioux Tribe .....                                                  | 1-3        |
| 1.2.4      | Bureau of Indian Affairs .....                                                 | 1-3        |
| 1.3        | Project Purpose and Need .....                                                 | 1-4        |
| 1.4        | Public and Agency Coordination .....                                           | 1-5        |
| 1.4.1      | Early Consultation and Coordination .....                                      | 1-5        |
| 1.4.2      | Notification .....                                                             | 1-7        |
| 1.4.3      | Consultation and Coordination with Federal, State, and Local Governments ..... | 1-7        |
| 1.4.4      | Tribal Government-to-Government Consultation .....                             | 1-8        |
| 1.4.5      | Project Scoping .....                                                          | 1-8        |
| <b>2.0</b> | <b>Alternatives Analysis .....</b>                                             | <b>2-1</b> |
| 2.1        | Development of Alternatives .....                                              | 2-1        |
| 2.2        | Macro-Corridor Study and Alternative Evaluation Study .....                    | 2-1        |
| 2.3        | Route Alternatives .....                                                       | 2-6        |
| 2.3.1      | Alternative Route Screening Analysis .....                                     | 2-6        |
| 2.3.2      | Selection of Alternative Routes .....                                          | 2-7        |
| 2.4        | Structure Alternatives .....                                                   | 2-12       |
| 2.5        | Proposed Action and Alternative Routes .....                                   | 2-13       |
| 2.5.1      | Transmission Lines .....                                                       | 2-13       |
| 2.5.2      | Lower Brule Switchyard and Witten Substation Expansion .....                   | 2-23       |
| 2.5.3      | Big Bend Double-Circuit Structure and Transmission Line .....                  | 2-26       |
| 2.6        | No Action Alternative .....                                                    | 2-27       |
| <b>3.0</b> | <b>Affected Environment and Environmental Consequences .....</b>               | <b>3-1</b> |
| 3.1        | Jurisdictions, Land Use, and Agricultural Practices .....                      | 3-1        |
| 3.1.1      | Affected Environment .....                                                     | 3-1        |
| 3.1.2      | Environmental Consequences .....                                               | 3-3        |
| 3.2        | Geology, Minerals, Paleontological Resources, and Soils .....                  | 3-4        |
| 3.2.1      | Affected Environment .....                                                     | 3-4        |
| 3.2.2      | Environmental Consequences .....                                               | 3-11       |
| 3.3        | Vegetation and Noxious Weeds .....                                             | 3-14       |
| 3.3.1      | Affected Environment .....                                                     | 3-14       |
| 3.3.2      | Environmental Consequences .....                                               | 3-19       |

|        |                                                                           |      |
|--------|---------------------------------------------------------------------------|------|
| 3.4    | Fish and Wildlife Resources .....                                         | 3-21 |
| 3.4.1  | Affected Environment.....                                                 | 3-21 |
| 3.4.2  | Environmental Consequences .....                                          | 3-25 |
| 3.5    | Special Status Wildlife Species, Including Federally Listed Species ..... | 3-29 |
| 3.5.1  | Affected Environment.....                                                 | 3-29 |
| 3.5.2  | Federally Listed Threatened and Endangered Species .....                  | 3-30 |
| 3.5.3  | State-Listed Species .....                                                | 3-38 |
| 3.5.4  | Environmental Consequences .....                                          | 3-39 |
| 3.6    | Wetlands.....                                                             | 3-46 |
| 3.6.1  | Affected Environment.....                                                 | 3-46 |
| 3.6.2  | Environmental Consequences .....                                          | 3-48 |
| 3.7    | Floodplains .....                                                         | 3-50 |
| 3.7.1  | Affected Environment.....                                                 | 3-50 |
| 3.7.2  | Environmental Consequences .....                                          | 3-51 |
| 3.8    | Water Quality.....                                                        | 3-51 |
| 3.8.1  | Affected Environment.....                                                 | 3-51 |
| 3.8.2  | Environmental Consequences .....                                          | 3-57 |
| 3.9    | Cultural Resources.....                                                   | 3-59 |
| 3.9.1  | Affected Environment.....                                                 | 3-59 |
| 3.9.2  | Archaeological Resources, Historic Buildings, and Historic Sites.....     | 3-59 |
| 3.9.3  | Traditional Cultural Properties/Sites of Religious Significance.....      | 3-60 |
| 3.9.4  | Environmental Consequences .....                                          | 3-62 |
| 3.10   | Socioeconomics .....                                                      | 3-63 |
| 3.10.1 | Affected Environment.....                                                 | 3-63 |
| 3.10.2 | Environmental Consequences .....                                          | 3-64 |
| 3.11   | Environmental Justice .....                                               | 3-65 |
| 3.11.1 | Affected Environment.....                                                 | 3-66 |
| 3.11.2 | Environmental Consequences .....                                          | 3-66 |
| 3.12   | Aesthetics .....                                                          | 3-66 |
| 3.12.1 | Affected Environment.....                                                 | 3-66 |
| 3.12.2 | Environmental Consequences .....                                          | 3-72 |
| 3.13   | Noise, Radio, and Television Interference .....                           | 3-77 |
| 3.13.1 | Affected Environment.....                                                 | 3-77 |
| 3.13.2 | Environmental Consequences .....                                          | 3-77 |
| 3.14   | Air Quality .....                                                         | 3-79 |
| 3.14.1 | Affected Environment.....                                                 | 3-79 |
| 3.14.2 | Environmental Consequences .....                                          | 3-79 |
| 3.15   | Transportation .....                                                      | 3-80 |
| 3.15.1 | Affected Environment.....                                                 | 3-80 |
| 3.15.2 | Environmental Consequences .....                                          | 3-82 |
| 3.16   | Human Health and Safety.....                                              | 3-82 |
| 3.16.1 | Affected Environment.....                                                 | 3-82 |
| 3.16.2 | Environmental Consequences .....                                          | 3-84 |

|            |                                                                 |            |
|------------|-----------------------------------------------------------------|------------|
| 3.17       | Intentional Destructive Acts .....                              | 3-87       |
| <b>4.0</b> | <b>Cumulative Impacts.....</b>                                  | <b>4-1</b> |
| 4.1        | Introduction.....                                               | 4-1        |
| 4.2        | Past, Present, and Reasonably Foreseeable Future Projects ..... | 4-1        |
| 4.2.1      | Past Projects .....                                             | 4-1        |
| 4.2.2      | Present Projects .....                                          | 4-5        |
| 4.2.3      | Reasonably Foreseeable Future Projects.....                     | 4-5        |
| 4.3        | Analysis of Cumulative and Connected Actions .....              | 4-6        |
| 4.3.1      | Jurisdiction, Land Use, and Agricultural Practices.....         | 4-6        |
| 4.3.2      | Geology, Minerals, Paleontological Resources, and Soils .....   | 4-6        |
| 4.3.3      | Vegetation and Noxious Weeds .....                              | 4-7        |
| 4.3.4      | Fish and Wildlife Resources .....                               | 4-7        |
| 4.3.5      | Threatened and Endangered Species .....                         | 4-7        |
| 4.3.6      | Wetlands.....                                                   | 4-7        |
| 4.3.7      | Floodplains .....                                               | 4-8        |
| 4.3.8      | Water Quality.....                                              | 4-8        |
| 4.3.9      | Cultural Resources .....                                        | 4-8        |
| 4.3.10     | Socioeconomics .....                                            | 4-8        |
| 4.3.11     | Environmental Justice.....                                      | 4-8        |
| 4.3.12     | Aesthetics .....                                                | 4-8        |
| 4.3.13     | Noise, Radio, and Television Interference .....                 | 4-8        |
| 4.3.14     | Air Quality .....                                               | 4-9        |
| 4.3.15     | Transportation .....                                            | 4-9        |
| 4.3.16     | Human Health and Safety.....                                    | 4-9        |
| <b>5.0</b> | <b>References.....</b>                                          | <b>5-1</b> |
| <b>6.0</b> | <b>List of Preparers and Reviewers .....</b>                    | <b>6-1</b> |

## **List of Appendices**

Appendix A - Scoping Report

Appendix B - Alternative Evaluation and Macro-Corridor Study

Appendix C - Routing Study

Appendix D - Environmental Protection Measures

Appendix E - Agency and Tribal Consultation Letters

Appendix F - Representative Relay Tower Viewshed Simulations at the Lower Brule Switchyard

## List of Tables

|            |                                                                                                                                                          |      |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Table 1-1  | Newspaper Notification .....                                                                                                                             | 1-7  |
| Table 1-2  | Scoping Meetings .....                                                                                                                                   | 1-9  |
| Table 2-1  | Project Opportunity and Constraint Criteria.....                                                                                                         | 2-3  |
| Table 2-2  | Transmission Line Characteristics .....                                                                                                                  | 2-13 |
| Table 2-3  | Temporary and Permanent Land Requirements for Proposed Action and<br>Alternative Routes A and B .....                                                    | 2-20 |
| Table 2-4  | Conventional Personnel, Equipment, and Time Requirements for Construction.....                                                                           | 2-22 |
| Table 3-1  | Jurisdictions Within the Study Area .....                                                                                                                | 3-1  |
| Table 3-2  | Temporary and Permanent Disturbance by Jurisdiction .....                                                                                                | 3-3  |
| Table 3-3  | Soil Characteristics within the Study Area.....                                                                                                          | 3-6  |
| Table 3-4  | Soil Characteristics and Estimated Temporary Disturbance .....                                                                                           | 3-12 |
| Table 3-5  | Vegetation Cover Types within the Study Area.....                                                                                                        | 3-15 |
| Table 3-6  | Designated Noxious Weed Species within the Study Area .....                                                                                              | 3-18 |
| Table 3-7  | Summary of Temporary and Permanent Disturbance to Vegetation Cover Types .....                                                                           | 3-19 |
| Table 3-8  | Special Status Species Identified for the Project.....                                                                                                   | 3-30 |
| Table 3-9  | Number of Individual Ferrets Captured or Detected During Spotlight Surveys on<br>the Lower Brule Sioux Indian Reservation from 2007-2012 .....           | 3-33 |
| Table 3-10 | Estimated Fall Ferret Population Size Based on Survey Effort and Suitable Habitat<br>on the Lower Brule Sioux Indian Reservation from 2007 to 2012 ..... | 3-33 |
| Table 3-11 | Summary of Findings for Federally Listed Species Affected by the Project .....                                                                           | 3-40 |
| Table 3-12 | Prairie Dog Colonies Traversed by the Proposed Action .....                                                                                              | 3-42 |
| Table 3-13 | NWI-identified Wetlands within the Study Area.....                                                                                                       | 3-47 |
| Table 3-14 | Number of Stream Crossings by Project Route .....                                                                                                        | 3-54 |
| Table 3-15 | Demographics of Towns Within and Adjacent to the Study Area.....                                                                                         | 3-64 |
| Table 3-16 | Race and Poverty Characteristics of Affected Counties in the Study Area.....                                                                             | 3-67 |
| Table 3-17 | Viewshed Acreages of the Proposed Action and Alternatives.....                                                                                           | 3-72 |
| Table 3-18 | Noise Levels at Various Distances from Typical Construction Equipment .....                                                                              | 3-78 |
| Table 3-19 | Residences Near the Proposed Action or Alternative Routes .....                                                                                          | 3-83 |
| Table 3-20 | Hazardous Materials Typically Used in Transmission Line Construction and<br>Operation .....                                                              | 3-83 |
| Table 4-1  | Past, Present, and Reasonably Foreseeable Future Projects.....                                                                                           | 4-3  |
| Table 6-1  | List of Preparers .....                                                                                                                                  | 6-1  |

## List of Figures

|             |                                                                         |      |
|-------------|-------------------------------------------------------------------------|------|
| Figure 1-1  | Project Location .....                                                  | 1-2  |
| Figure 1-2  | Regional High Voltage Transmission System .....                         | 1-6  |
| Figure 2-1  | Opportunities and Constraints within the Macro-Corridor .....           | 2-5  |
| Figure 2-2  | Alternative Routes .....                                                | 2-9  |
| Figure 2-3  | Applicant-Preferred Route and Alternative Routes .....                  | 2-11 |
| Figure 2-4  | Typical Single-circuit Single-pole Structure .....                      | 2-14 |
| Figure 2-5  | Conceptual Construction Configuration .....                             | 2-18 |
| Figure 2-6  | Typical Self-Supporting Lattice Relay Tower .....                       | 2-24 |
| Figure 2-7  | Guyed Narrow Lattice Relay Tower .....                                  | 2-25 |
| Figure 2-8  | Lower Brule Switchyard .....                                            | 2-28 |
| Figure 2-9  | Witten Substation and Witten Substation Expansion .....                 | 2-29 |
| Figure 2-10 | Typical Single-pole Double-circuit Structure .....                      | 2-30 |
| Figure 3-1  | Land Ownership .....                                                    | 3-2  |
| Figure 3-2  | Water Erodible Soils .....                                              | 3-8  |
| Figure 3-3  | Prime Farmland and Farmland of Statewide Importance .....               | 3-9  |
| Figure 3-4  | Compaction Prone Soils .....                                            | 3-10 |
| Figure 3-5  | Vegetation Cover Types .....                                            | 3-16 |
| Figure 3-6  | Black-tailed Prairie Dog Colonies .....                                 | 3-32 |
| Figure 3-7  | Potential Whooping Crane Habitat and Proposed Line Marking Area .....   | 3-34 |
| Figure 3-8  | Whooping Crane Sightings .....                                          | 3-35 |
| Figure 3-9  | NWI-identified Wetlands .....                                           | 3-49 |
| Figure 3-10 | Probable Areas of Geomorphic Floodplains .....                          | 3-52 |
| Figure 3-11 | Stream Crossings .....                                                  | 3-55 |
| Figure 3-12 | Scenic Riparian Woodland Corridor at White River Crossing .....         | 3-68 |
| Figure 3-13 | Rural Farmstead with Rangeland and Wetland .....                        | 3-69 |
| Figure 3-14 | Recreation Area near Big Bend Dam .....                                 | 3-70 |
| Figure 3-15 | Cultivated Cropland .....                                               | 3-71 |
| Figure 3-16 | Viewshed of the Proposed Action (including Substation/Switchyard) ..... | 3-73 |
| Figure 3-17 | Viewshed of Alternative Route A (including Substation/Switchyard) ..... | 3-74 |
| Figure 3-18 | Viewshed of Alternative Route B (including Substation/Switchyard) ..... | 3-75 |
| Figure 3-19 | Transportation Network .....                                            | 3-81 |
| Figure 4-1  | Cumulative Effects Study Area .....                                     | 4-2  |

## 1.0 Introduction

### 1.1 Project Overview

Basin Electric Power Cooperative (Basin Electric) is proposing to construct, own, and operate a 73.7-mile, 230-kilovolt (kV) transmission line that would connect a new switchyard (named the Lower Brule Switchyard) located on the Lower Brule Sioux Indian Reservation in Lyman County, South Dakota, with the existing Witten Substation located in Tripp County, South Dakota. A switching substation, or switchyard, is a substation without transformers that operates only at a single voltage level. Switchyards are used mainly for connections and interconnections, whereas substations change voltage levels and contain a transformer. As part of the proposed Project, Western Area Power Administration (Western) also proposes to convert an existing single-circuit 230-kV transmission line turning structure, located on the south side of the Big Bend Dam, to a double-circuit structure and construct a 1.6-mile double-circuit 230-kV transmission line to the proposed Lower Brule Switchyard. Collectively, this proposed Project is referred to as the Big Bend to Witten 230-kV Transmission Project (Project). The Project location is shown in **Figure 1-1**.

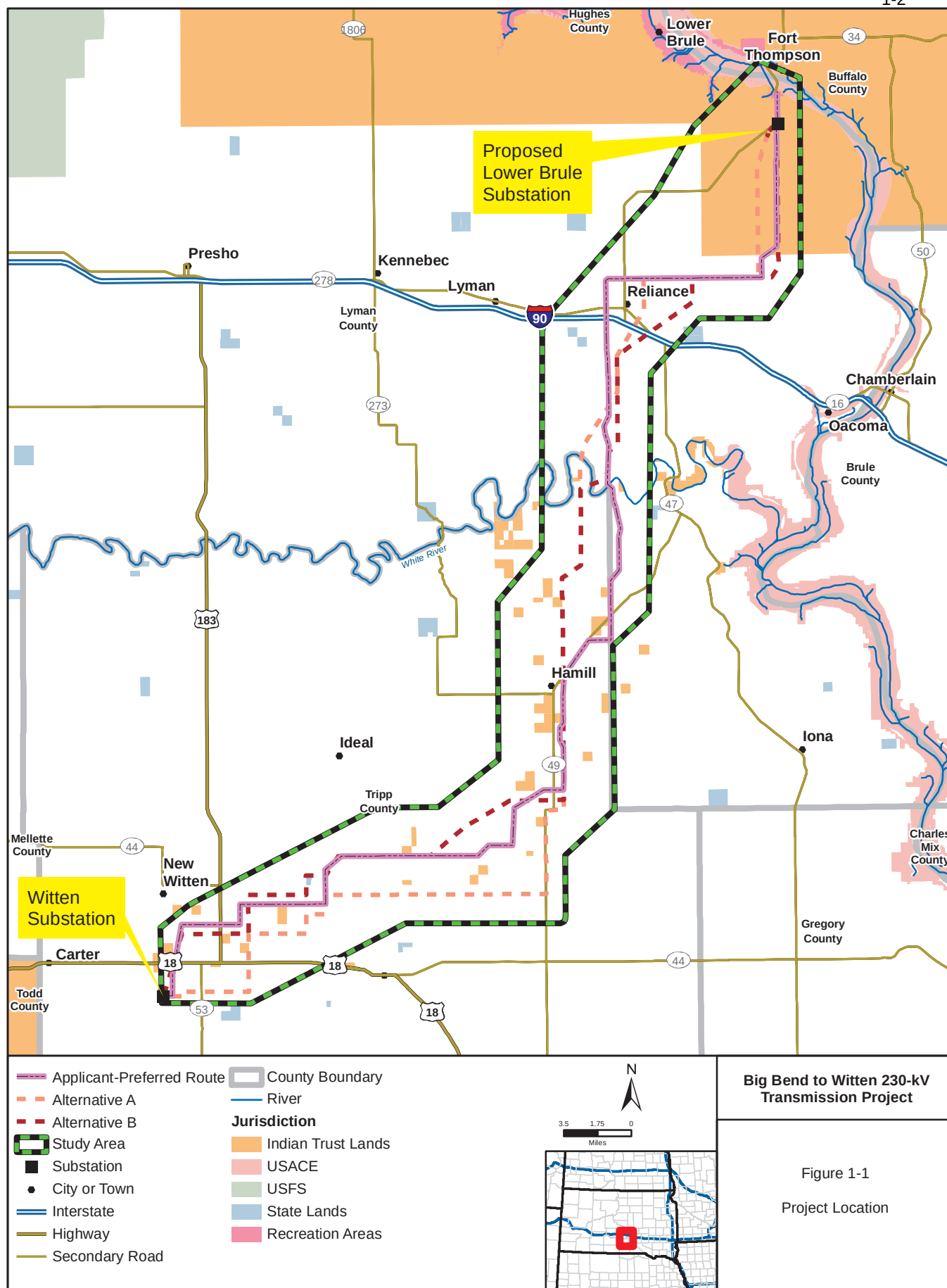
The Project would use predominately steel single-pole self-supporting structures within a 125-foot-wide right-of-way (ROW). The structures would range in height from approximately 70 to 115 feet, depending on span distances between structures and area topography. The span between structures would typically range from 650 feet to 950 feet and average approximately 800 feet, depending on topography. Taller structures would be used for crossing existing distribution and transmission lines or where unusual terrain exists. In special circumstances, steel H-frame structures may be used when span and/or strength requirements preclude the use of single-pole structures.

Structures would be designed to support three conductors in a staggered vertical arrangement and an overhead optical groundwire (OPGW). The OPGW would provide lightning suppression and fiber optic communications between the Lower Brule Switchyard and Witten Substation for systems control. Tangent structures would be free-standing and directly embedded if soil conditions permit. Angle structures (used where the transmission line changes direction) and dead-end structures (used to provide longitudinal stability along the length of the transmission line) would be steel with concrete foundations. Guy wires and anchors would not be used.

### 1.2 Agency Actions and Decisions

Basin Electric is seeking financial assistance from the U.S. Department of Agriculture (USDA) Rural Utilities Service (RUS), as well as an interconnection agreement from Western. These actions require an evaluation of the potential environmental impacts of the Project under the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] 1500–1508), and RUS's and Western's Environmental Policies and Procedures (7 CFR 1794 and 10 CFR 1021, respectively). This environmental assessment (EA) documents the environmental analysis. RUS is the lead agency in the development of this EA in compliance with NEPA, and Western is a cooperating agency. In accordance with 40 CFR 1508.5, a cooperating agency is federal agency other than the lead agency that has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal. As a portion of the proposed route is within Indian trust lands on the Lower Brule Sioux Indian Reservation, the Lower Brule Sioux Tribe (LBST) also has contributed to and been consulted in the development of this EA. The Bureau of Indian Affairs (BIA) would have a realty action for the portion of the Project on Indian Trust lands and, therefore, they also are a cooperating agency.





### **1.2.1 Rural Utilities Service**

RUS's action is to provide financing assistance for the proposed Project, if approved. Under the Rural Electrification Act, as amended, the Secretary of Agriculture is authorized and empowered to make loans for rural electrification to nonprofit cooperatives and others "for the purpose of financing the construction and operation of generating plants, electric transmission and distribution lines or systems for the furnishing and improving of electric service to persons in rural areas" (7 United States Code [USC] 901 et seq.). This EA documents the analysis of potential impacts on the human environment that may result from the Project. Any decision by RUS related to the Project would require compliance with all relevant federal, state, and local environmental laws and regulations and completion of the environmental review requirements as prescribed in RUS's Environmental Policies and Procedures.

### **1.2.2 Western Area Power Administration**

Basin Electric requests to interconnect its Project with Western's Transmission System. Western's action is to approve or deny the interconnection request under the provisions of the Contract for Management and Operation of the Integrated System, Contract No. 98-UGPR-196, dated September 17, 1998. If approved, Western would construct, own, and operate a 1.6-mile-long 230-kV double circuit transmission line from the Big Bend Dam to the new Lower Brule Switchyard. The Lower Brule Switchyard would be built by Western, but the ownership and future operation and maintenance responsibilities for the new Switchyard would be transferred to Basin Electric.

In reviewing interconnection requests, Western must ensure that existing reliability and service is not degraded. Western's Large Generator Interconnection Procedures provides for transmission and system studies to ensure that system reliability and service to existing customers are not adversely affected by new interconnections. These studies also identify system upgrades or additions necessary to accommodate the Project and address whether the upgrades/additions are within the Project scope.

Western must consider interconnection requests to its transmission system in accordance with its Open Access Transmission Service Tariff and the Federal Power Act (FPA). Western satisfies FPA requirements to provide transmission service on a non-discriminatory basis through compliance with its Open Access Transmission Service Tariff. Under the FPA, the Federal Energy Regulatory Commission (FERC) has the authority to order Western to allow an interconnection and to require Western to provide transmission service at rates it charges itself and under terms and conditions comparable to those it provides itself.

### **1.2.3 Lower Brule Sioux Tribe**

The LBST is a federally recognized Indian Tribe located in central South Dakota. The proposed transmission line crosses Indian trust lands of the LBST on the Lower Brule Sioux Indian Reservation. Therefore, activities affecting the environment on the Lower Brule Sioux Indian Reservation require the approval of the LBST Tribal government and the LBST retains a significant interest in the purpose and need for the proposed Project and remains actively involved in the preparation of this EA.

### **1.2.4 Bureau of Indian Affairs**

BIA is responsible for the administration and management of lands and other assets held in trust by the U.S. for American Indians, Indian tribes, and Alaska Natives. Indian trust assets are property (e.g., lands, minerals, and other resources) held in trust by the U.S. for federally recognized Indian tribes or individual Indians. The federal government is obligated to protect trust resources—a duty that is referred to as its trust responsibility and defined through treaties, laws, Executive Orders (EOs), judicial decisions, and agreements. Complying with NEPA is an inherently federal responsibility. However, activities affecting the environment on Indian trust lands often require the approval of both the BIA and the Tribal government. Because of this dual authority, RUS and the BIA are coordinating with the LBST on any decisions through the NEPA process.

### 1.3 Project Purpose and Need

Basin Electric is a not-for-profit, consumer-owned generation and transmission cooperative that supplies reliable power to 137 electric cooperative systems comprising 540,000 square miles (mi<sup>2</sup>) of service territory in nine states, including South Dakota. With over 5,000 megawatts (MW) of electric power capacity in its portfolio, Basin Electric's member distribution cooperatives deliver generated power from the transmission grid to 2.8 million customers. To meet these responsibilities and to address forecasted increasing demand and new development, Basin Electric is proposing to build the 230-kV Big Bend to Witten transmission line to serve the service territories of two distribution cooperatives – Rosebud Electric Cooperative and West Central Electric Cooperative (West Central). Distribution cooperatives, like Rosebud Electric Cooperative and West Central, provide electric service to the end consumer. These cooperatives are non-profit, consumer-owned utilities that provide central station electric service to predominantly rural areas.

Many rural electric cooperatives have low density service areas. For instance, Rosebud Electric Cooperative serves only 2 metered accounts per mile of electric line compared to large power companies that typically serve 40 accounts per mile of line. Despite the low meter density, cooperatives have some of the lowest electric rates in South Dakota and the nation. Cooperatives are owned and controlled by the people they serve.

West Central serves members in Haakon, Jackson, Jones, Lyman, and Stanley counties. The cooperative maintains approximately 3,573 miles of line in an area of more than 7,000 mi<sup>2</sup>, serving approximately 3,660 members. Towns served by West Central include Belvidere, Draper, Hayes, Kadoka, Kennebec, Lower Brule, Midland, Milesville, Murdo, Oacoma, Okaton, Philip, Presho, Reliance, and Vivian.

Rosebud Electric Cooperative is the tenth largest rural electric cooperative among twenty-nine rural electrics in South Dakota. A nine member electric board of directors governs the Cooperative. It employs 22 people to maintain approximately 2,500 miles of line and to serve approximately 5,200 metered accounts in a 3 county area. Rosebud Electric Cooperative serves the towns of Fairfax, Bonesteel, Herrick, Gregory, Dallas, Colome, Witten, and Hamill.

The network transmission system in Central South Dakota is not able to accommodate projected load growth in the next several years. This deficiency and recommendations for long-term system planning were identified as early as the mid-1980s. This transmission line is proposed to strengthen the transmission network, improve transmission system reliability, and to help meet future demand for electricity and economic development in the region. In addition to increasing load serving ability for both Rosebud and West Central Electric Cooperatives, the Project would provide additional access to the regional high voltage transmission system.

Based on regional transmission studies indicating the need to provide additional electric power to the Witten Substation to meet anticipated increased energy demand, Western conducted a joint system engineering study to determine system reliability under the proposed loads at maximum electrical energy consumption. The joint system engineering studies determined that the best way to meet that need and ensure continued system reliability would be to convert the existing Big Bend to Fort Thompson No. 2, 230-kV transmission line turning structure to a double-circuit structure and to construct a new double-circuit 230-kV transmission line from this point to the new Lower Brule Switchyard (Basin 2011). In addition, a new single-circuit 230-kV transmission line would be constructed from the Lower Brule Switchyard to the Witten Substation. With the assistance of the LBST, Basin Electric has identified an Applicant-Preferred Route (which has been carried forward for analysis as the Proposed Action) and two alternative routes to the Witten Substation.

As depicted in **Figure 1-2**, the regional high voltage transmission system in south-central South Dakota is concentrated along the Missouri River, with multiple 230-kV or greater transmission lines connecting hydroelectric generation facilities from Oahe Dam, near Pierre, to Fort Randall Dam, near the South Dakota-Nebraska border. A major node on this high voltage transmission “backbone” is the Fort Thompson substation located near the Big Bend Dam hydroelectric facility. The generators at the dam are connected to the Fort Thompson substation via two 230-kV transmission lines. The proposed Big Bend to Witten transmission line would connect to the 230-kV transmission line on the south side of the Big Bend Dam.

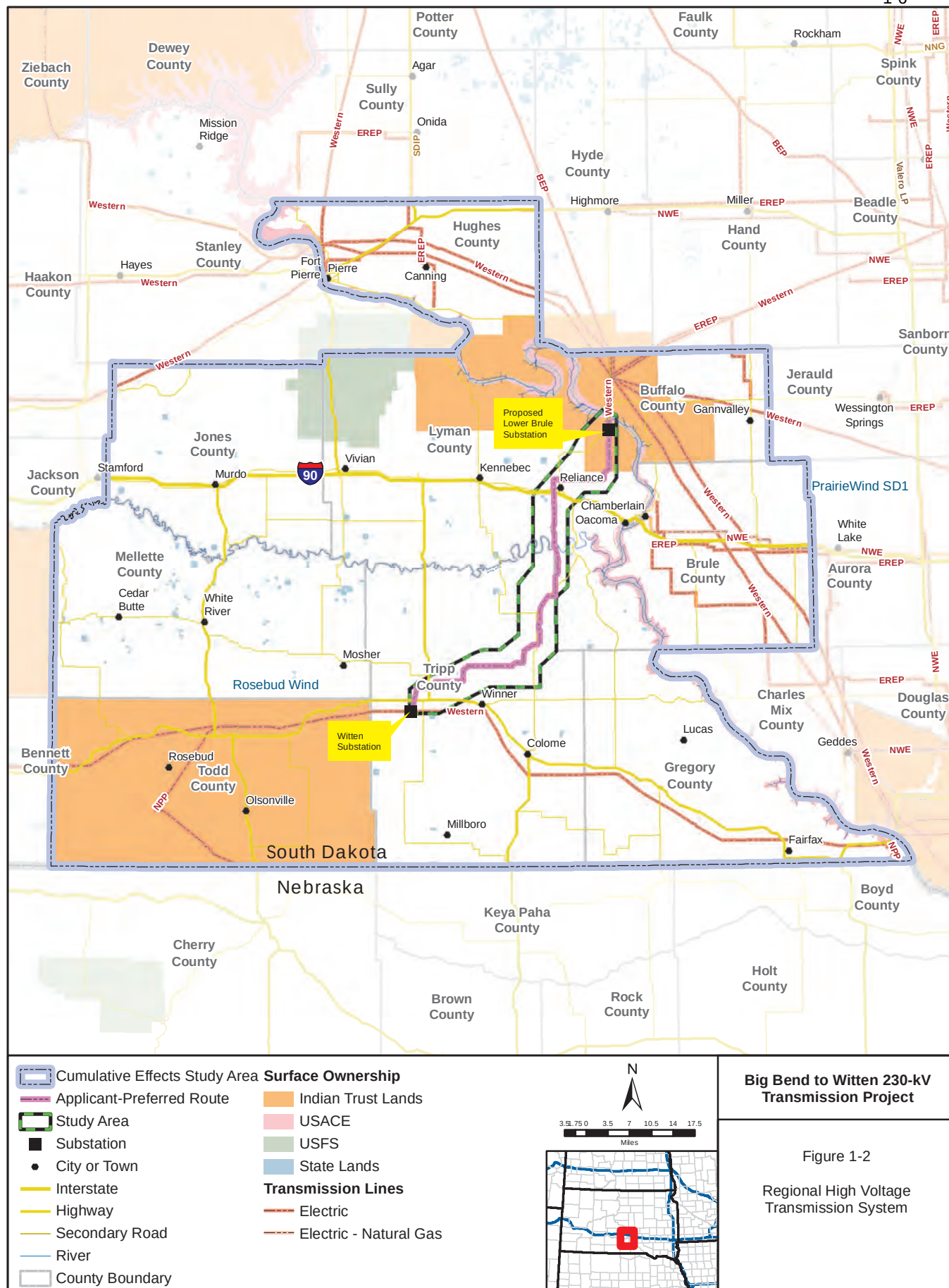
In contrast to the robust transmission system connecting the hydroelectric facilities, the area west of the Missouri river along the South Dakota-Nebraska border is served only by Western’s single east-west (Fort Randall to Martin Substation) 115-kV line. The proposed Big Bend to Witten line would enhance system reliability by providing an additional connection to the “grid” roughly midpoint along this east-west line. If a portion of the Fort Randall to Martin 115-kV line would be damaged by a storm, the Big Bend to Witten line could provide power to the undamaged segments of the line. The proposed line also would provide a tap point for West Central near Reliance, which would enhance the reliability and stability of the West Central system. This new line would tie into a new 230-/69-kV substation proposed near Reliance and provide an alternate source of power to West Central’s 69-kV system. In addition, West Central is in the process of building a second line into the Community of Lower Brule from the Reliance area to allow loop feeding of its Lower Brule distribution substation from current sources. The addition of a new source of power for the West Central 69 kV system would improve overall system reliability to West Central’s new 69-kV line to Lower Brule along with its other members. An example would be the Rosebud Sioux Tribe, who is part of the Rosebud Electric Cooperative, has proposed two wind projects totaling 220 MW, and has conducted related planning and environmental studies. Further progress on the proposals awaits additional information on transmission network connectivity, availability of power purchase agreements, and leasing/permitting issues. Lastly, the Project lends itself to additional build-out in support of Western’s long-range plan for a 230-kV system in southern South Dakota, and it would provide an increase in the load serving capacity such that the delivery needs of the projected network load can be met in a reliable manner. A potential component of this network load would be due to two pumping stations for the proposed Keystone XL (KXL) Pipeline, should that project be permitted and that the line be approved.

## **1.4 Public and Agency Coordination**

### **1.4.1 Early Consultation and Coordination**

#### Lower Brule Sioux Tribe

Consistent with 40 CFR 1501.2(d)(2), several meetings were held with the LBST regarding the proposed Project as well as potential corridors and routes. The first meeting was arranged and held by the LBST on February 25, 2010, at the Tribe’s conference facilities in Lower Brule, South Dakota. Western, Basin Electric, the LBST Chairman, members of the LBST Tribal Council, members of the LBST Elder Advisory Committee, the staff of the LBST Cultural Resource Office, representatives from the Rosebud Sioux Tribe Tribal Historic Preservation Office, and personnel from ENTRIX (at the time the Department of State [DoS] NEPA consultant for the proposed KXL pipeline project) were present at the February 25, 2010, meeting. The purpose of the meeting was to respond to the LBST’s request for a Project description and clarification of the need(s) for the proposed Project. Concerns were raised regarding the purpose of the proposed transmission line and regarding the proposed corridors being too close to cultural sensitive areas and wetland areas in several places. Also discussed and of concern was the environmental review process for the proposed transmission line. The federal agencies agreed to move forward with RUS as the lead federal agency to develop an EA for the proposed transmission line, confirming that this Project has a purpose independent of the KXL project and, therefore, outside the scope of the DoS NEPA review. The Big Bend to Witten transmission line Project would be needed regardless of whether or not the KXL project is constructed.



On March 15, 2010, Basin Electric and Western personnel met with LBST cultural resources office staff and Rosebud Sioux Tribal Historic Preservation Office staff at Lower Brule Tribal Administrative Building to modify the route options in response to Tribal concerns. As a result of these meetings, route options along State Highway (SH) 47 were eliminated and three options that extended south from the proposed Lower Brule Switchyard were added. Basin Electric also shifted the corridor northeast of Winner, to avoid an area with a high potential for cultural resource sites.

On January 10, 2011, Basin Electric personnel met with the LBST at the Lower Brule Tribal Administration Building. The purpose of the meeting was to provide a project update and to discuss the NEPA process, alternative corridor placement, and the process and requirements for Tribal permitting and easements. It was requested that Basin Electric work with the BIA on their role in the permitting and easements on Indian trust lands. The LBST requested close involvement as the Project moved forward, and they have contributed to the development of this EA.

#### County Commissioners' Meetings

Basin Electric environmental, engineering, and ROW representatives met with the Tripp and Lyman County Commissions during their normally scheduled meetings on April 5, 2011. Commissioners were provided PowerPoint® slide handouts about the Project; the slides provided the basis for discussion at each meeting. The handouts provided information about Basin Electric, the Project, permitting requirements, and Project timelines.

Commissioners were asked if they had any questions, comments, or concerns about the Project or if they were aware of any local permits that would be required. Both counties were supportive of the Project and indicated there were no county zoning or permitting requirements. Lyman County raised the issue of a recent ordinance aimed at meteorological towers, with the thought that it also may apply to transmission structures. Upon further review with the Lyman County Commission, it was determined the ordinance did not apply to the Project.

#### **1.4.2 Notification**

The public scoping process for this EA began with notification to the public, other government agencies, and tribes of RUS's intent to prepare an EA with scoping and hold public scoping meetings. Notification included publishing a Notice of Intent (NOI) in the *Federal Register* on April 12, 2011 (76 FR 20311). Additionally, legal notices and display advertisements were published in the local newspapers, twice, at least 10 days prior to the first public scoping meeting (**Table 1-1**).

**Table 1-1 Newspaper Notification**

| <b>Newspaper</b>    | <b>Display Advertisement</b> | <b>Legal Notice</b>         |
|---------------------|------------------------------|-----------------------------|
| Capital Journal     | April 15 and April 22, 2011  | April 15 and April 22, 2011 |
| Lyman County Herald | April 13 and April 20, 2011  | April 13 and April 20, 2011 |
| Winner Advocate     | April 20, 2011               | April 13 and April 20, 2011 |

#### **1.4.3 Consultation and Coordination with Federal, State, and Local Governments**

Specific regulations require RUS to coordinate and consult with federal, state, and local agencies about the potential of the Project and alternatives to affect sensitive resources. The coordination and consultation must occur in a timely manner and are required before any final decisions are made. Issues related to agency consultation may include biological resources, cultural resources, socioeconomics, and land and water management, among others. RUS distributed letters to the following agencies requesting information:

- U.S. Fish and Wildlife Service;
- South Dakota Natural Heritage Program;
- South Dakota Game, Fish, and Parks Department;
- Lower Brule Sioux Tribe; and
- Rosebud Sioux Tribe.

#### **1.4.4 Tribal Government-to-Government Consultation**

RUS distributed letters to the following tribes notifying them about the Project and requesting consultation:

- Lower Brule Sioux Tribe;
- Rosebud Sioux Tribe;
- Standing Rock Sioux Tribe;
- Ponca Tribe of Oklahoma;
- Ponca Tribe of Nebraska;
- Oglala Sioux Tribe of the Pine Ridge Reservation;
- Crow Creek Sioux Tribe;
- Santee Sioux Nation;
- Cheyenne River Sioux Tribe; and
- Fort Peck Assiniboine and Sioux Tribes.

Consultation with the Indian tribes regarding historic properties and traditional cultural resources has continued throughout the Project as stipulated under Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations (36 CFR 800).

#### **1.4.5 Project Scoping**

Scoping is the process of actively soliciting input from the public and other interested federal, state, tribal, and local agencies. Information gained during scoping assists RUS in identifying potential environmental issues, alternatives, and mitigation measures associated with development of the Project. The process provides a mechanism for determining the scope and significant issues (40 CFR 1501.7 and 1508.25) so the EA can focus the analyses on areas of interest and concern. Scoping provides the public, tribes, and agencies opportunities for meaningful involvement in the decision-making process. A summary report of the scoping process for the project is included in **Appendix A**.

The agencies' overriding scoping goal is to engage a diverse group of public, agency and tribal participants to solicit relevant input and provide timely information throughout the review process. Five specific goals were established in the Project's public participation plan, including:

- Increase public awareness and understanding about the NEPA process through meaningful stakeholder participation;
- Identify the public's concerns so they can be addressed in the EA;
- Obtain public, federal, state, and local agency, and tribal comment and input;
- Effectively communicate, cooperate, and consult with the tribes, federal and state agencies, and local elected and appointed officials; and
- Evaluate the success of the communications and public participation activities.

#### 1.4.5.1 Scoping Meetings

Scoping meetings were designed to promote information exchange about the Project and to gather public input on issues of concern that may need to be considered in the EA. RUS hosted two public scoping meetings: one in Reliance, South Dakota, and one in Winner, South Dakota. The dates, locations, and number of public attendees at the scoping meetings are presented in **Table 1-2**.

**Table 1-2 Scoping Meetings**

| Meeting Location                                    | Meeting Date/Time                     | Number of Attendees that Signed In |
|-----------------------------------------------------|---------------------------------------|------------------------------------|
| Reliance, South Dakota American Legion Post 179     | Tuesday, April 26, 2011<br>4-7 p.m.   | 35                                 |
| Winner, South Dakota Holiday Inn Express and Suites | Wednesday, April 27, 2011<br>4-7 p.m. | 48                                 |

The public scoping meetings were conducted in an open house format to allow for an open exchange of information and to enable attendees to ask agency personnel and Basin Electric representatives questions about the Project. Display boards showing the Project location and the NEPA process were presented to facilitate conversation. Large maps were spread on tables so that landowners could identify their property and areas of concern. Informational materials about the Project, NEPA process, transmission line siting, and ROW were available as handouts. Attendees also were provided comment forms to complete and submit at the meeting or mail to RUS at a later date.

#### 1.4.5.2 Summary of Scoping Comments

The 45-day public scoping period ended on May 27, 2011. RUS received a total of 18 comment submittals (e.g., letters, comment forms) containing 43 individual comments during the public scoping period. Most of the comments RUS received were from potentially affected landowners.

Following the close of the public scoping period, comments were compiled and analyzed to identify issues and concerns. A majority of the comments were related to:

- Impacts associated with routing the proposed transmission line across private property;
- Visual impacts to residents;
- Potential effects to agricultural activities; and
- Transmission line routing preferences.

As a result of the landowner comments (i.e., private property, visual impacts, land use compatibility) during the scoping period, transmission line routes that were previously presented in the scoping meetings were revised.



## 2.0 Alternatives Analysis

### 2.1 Development of Alternatives

A Macro-Corridor Study (MCS)/Alternative Evaluation Study (AES) (**Appendix B**) was prepared as required by RUS to thoroughly evaluate potential route alternatives for the Project. In addition, structure designs and alternative transmission line alignments were evaluated to identify those most appropriate for the Project and those that would minimize environmental impacts. The processes and results of these studies are described in detail in the following sections.

### 2.2 Macro-Corridor Study and Alternative Evaluation Study

RUS guidance regarding NEPA implementation (RUS Bulletin 1794A-603) requires that a MCS/AES be prepared and accepted by RUS prior to the start of the official NEPA process. The purpose of the MCS/AES was to evaluate potential alternative transmission line routes within an approximately 6-mile-wide macro-corridor between the Big Bend Dam located on the Lower Brule Sioux Indian Reservation in Lyman County and the existing Witten Substation located in Tripp County, South Dakota. This wide macro-corridor provided flexibility to identify a preferred route and alternative routes for the transmission line while minimizing impacts to important resources identified within the macro-corridor.

For this Project, three distinct phases for identifying and evaluating routes were undertaken as follows:

- Phase 1 – Definition of the Macro-Corridor/Project Study Area;
- Phase 2 – Resource Data Collection and Evaluation; and
- Phase 3 – Opportunities and Constraints Analysis.

#### Definition of the Macro-Corridor/Project Study Area

Basin Electric's System Planning Group and Western determined that a new double-circuit 230-kV transmission line from the Big Bend Dam to the proposed Lower Brule Switchyard, and a single-circuit 230-kV transmission line from the Lower Brule Switchyard to the Witten Substation offered the best way to meet the purpose and need for the Project (**Figure 1-1**).

Two alternative corridors for the proposed transmission line were identified during early stages of Project planning. Initially, a 6-mile-wide corridor was identified by Western and Basin Electric between an existing substation on the transmission grid (Witten Substation) and Big Bend Dam. Several route alternatives were identified within this initial corridor. Later, a second corridor, which also is 6 miles in width, was developed by Western and Basin Electric after consultation and in cooperation with the LBST. This corridor followed a similar path from the existing Witten Substation to Big Bend Dam, but with deviations in the southeast near Winner and the northeast near Reliance. This redesign also allowed for more direct north-south route options on the Lower Brule Reservation. The basis for the extent of a study area for a transmission line project is primarily determined by the project endpoints, the purpose and need, and the electric system requirements and components that best meet the purpose and need. Given the Project endpoints (new double-circuit structure located on the south side of the Big Bend Dam in the north and Witten Substation in the south), West Central's request for interconnection in the Reliance area, and the limited number of reasonable crossing locations of the White River, the study area was defined as an approximately 6-mile-wide macro-corridor generally running north-south through Lyman County and into Tripp County south of the unincorporated town of Hamill. At a point approximately 6 miles south of Hamill, the macro-corridor turns southwest to the Witten Substation. The macro-corridor encompassed approximately 250,350 acres, or 391.2 mi<sup>2</sup>.

Resource data were collected within the study area from resource management agencies, state and local governments, utility companies, and other publicly available sources. These data were used to

prepare Geographic Information System (GIS) resource maps and included the following resource categories:

- Existing linear transportation and utility corridors;
- Land use and jurisdiction;
- Cultural resources;
- Wetlands and water resources;
- Geologic hazards; and
- Biological resources.

All data collected reflect existing data readily available from local, state, and federal agencies.

The resource data were mapped in GIS format and combined with aerial photography to validate the identified preferred and alternative routes for the proposed transmission line within the macro-corridor. As described below, each environmental resource was categorized as an opportunity (suitable area), an avoidance area, or an exclusion area in the GIS opportunity and constraint model. The final phase of the MCS involved conducting an opportunity and constraints analysis. Project opportunity and constraint criteria were developed based on resources and characteristics of the macro-corridor that provided favorable or unfavorable attributes for locating the proposed transmission line. The criteria classifications include opportunity, avoidance, and exclusion areas associated with each selected resource. **Table 2-1** lists the opportunity and constraint criteria that were developed for the Project.

The degree of opportunity and constraint was based on the character of the resource (i.e., linear or site specific, natural or human, native or disturbed, and the proximity of the transmission line to the resource). In some cases, the opportunity and constraint mapping showed route crossing areas of avoidance or exclusion; however, sensitive features or land uses were taken into account during the route refinement process. In some instances, a route may be moved to avoid a sensitive area, or a sensitive feature (e.g., wetland) may be spanned. In either case, potential impacts to a sensitive resource can be avoided.

Avoidance areas included sensitive areas that were likely to incur environmental impacts or result in land use conflicts if directly affected by the Project. It is preferable to avoid these areas if opportunity areas are available elsewhere for locating the proposed transmission line. If a sensitive area cannot be completely avoided, impacts can be minimized through route refinement, careful placement of the transmission structures and access roads, spanning of the sensitive resource, seasonal restrictions on construction activities, and other mitigation measures.

Exclusion areas include locations with the highest level of sensitivity, including those areas with regulatory or legislative designations or extreme physical constraints not compatible with transmission line construction and/or operation. In general, locating a transmission line in these areas is not recommended and could result in increased environmental impacts, significantly higher costs, and/or additional regulatory approvals.

**Figure 2-1** illustrates those areas identified as opportunities and avoidance and exclusion areas based on the opportunities and constraints criteria and resource data gathered. Based on this analysis, all of the identified routes appeared to provide reasonable alternatives for the proposed transmission line which avoided the majority of avoidance and exclusion areas within the macro-corridor. Although some of the routes cross areas that had been identified as avoidance and exclusion areas, routing in these areas appeared feasible from an engineering perspective. Avoidance areas crossed by one or more route segments included buffers associated with potentially sensitive land uses including some residential parcels, wetland areas, areas along the White River associated with moderate landslide potential, and one sharp-tailed grouse lek. Exclusion areas crossed included buffers associated with a

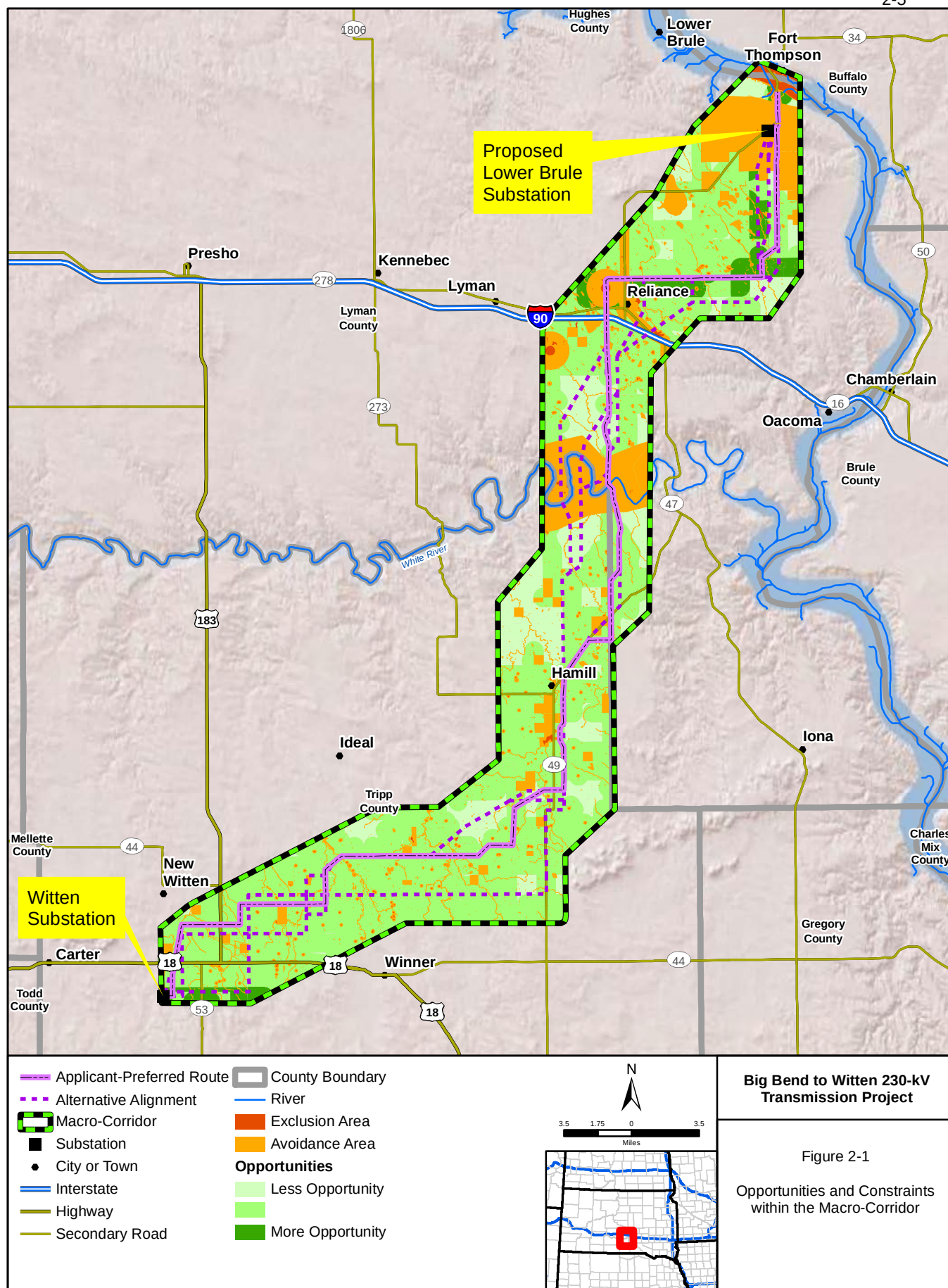
reservoir, a census landmark (Fletcher Landing Field), and one sharp-tailed grouse lek. During the route refinement process, sensitive areas were avoided or spanned to the extent feasible. Greater detail regarding the opportunity and constraint criteria are provided in the MCS/AES in **Appendix B**.

**Table 2-1 Project Opportunity and Constraint Criteria**

| Resource                                                                         | Opportunity Area<br>(optimize use for routing)                                               | Avoidance Area<br>(minimize use for routing)                                                                                                                                                                                                                                                                                                      | Exclusion Area<br>(exclude for routing when possible) |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <b>Existing Linear Transportation and Utility Corridors</b>                      |                                                                                              |                                                                                                                                                                                                                                                                                                                                                   |                                                       |
| Roads (interstate, state, county)                                                | Within 0.5 mile of existing road                                                             | Within 0.25 mile of scenic byway (except when parallel to an existing transmission line)                                                                                                                                                                                                                                                          | —                                                     |
| Railroads                                                                        | Within 0.25 mile of railroad                                                                 | —                                                                                                                                                                                                                                                                                                                                                 | —                                                     |
| Power Lines                                                                      | Within 0.50 mile of existing power lines (69-kV or greater)                                  | —                                                                                                                                                                                                                                                                                                                                                 | —                                                     |
| <b>Land Use and Jurisdiction</b>                                                 |                                                                                              |                                                                                                                                                                                                                                                                                                                                                   |                                                       |
| Land Use/Land Cover                                                              | Cropland and Pasture<br>Herbaceous Rangeland<br>Mixed Rangeland<br>Shrub and Brush Rangeland | <ul style="list-style-type: none"> <li>• Beaches</li> <li>• Commercial and Services</li> <li>• Deciduous Forest Land</li> <li>• Mixed Urban or Built-up</li> <li>• Non-forested Wetland</li> <li>• Other Agricultural Land</li> <li>• Other Urban or Built-up</li> <li>• Residential</li> <li>• Transportation, Communication, Utility</li> </ul> | Reservoirs<br>Strip Mines                             |
| Center-pivot Irrigation                                                          | —                                                                                            | —                                                                                                                                                                                                                                                                                                                                                 | Center-pivot irrigated fields                         |
| Jurisdiction – Municipal or Town Boundaries                                      | —                                                                                            | Within municipal or town boundaries                                                                                                                                                                                                                                                                                                               | —                                                     |
| Jurisdiction – State- or U.S. Army Corps of Engineers (USACE)-administered Lands | —                                                                                            | Within boundary of state- or USACE-lands                                                                                                                                                                                                                                                                                                          | —                                                     |
| Indian Lands                                                                     | —                                                                                            | Within boundary of Indian Lands                                                                                                                                                                                                                                                                                                                   | —                                                     |

**Table 2-1 Project Opportunity and Constraint Criteria**

| <b>Resource</b>                                                                             | <b>Opportunity Area<br/>(optimize use for<br/>routing)</b> | <b>Avoidance Area<br/>(minimize use for<br/>routing)</b>                                                                                                                   | <b>Exclusion Area<br/>(exclude for routing<br/>when possible)</b>                                                     |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Residential Areas                                                                           | —                                                          | Within 500 feet of an occupied residence                                                                                                                                   | Within 150 feet of an occupied residence                                                                              |
| Schools, Parks, Recreation Areas, and other Census Landmarks                                | —                                                          | Within 500 feet of schools; educational facilities; cemeteries; parks; designated recreational areas; and apartments.                                                      | Within 150 feet of schools; educational facilities; cemeteries; parks; designated recreational areas; and apartments. |
| Communication and Radio Towers ( <b>Federal Communications Commission</b> [FCC] Structures) | —                                                          | Within 150 feet of FCC structure                                                                                                                                           | Within 50 feet of FCC structure                                                                                       |
| <b>Cultural Resources</b>                                                                   |                                                            |                                                                                                                                                                            |                                                                                                                       |
| Level I Survey Data                                                                         | —                                                          | Within 0.125 mile of historic property or traditional cultural property (TCP)                                                                                              | Within 100 feet of historic property or TCP                                                                           |
| <b>Wetlands and Water Resources</b>                                                         |                                                            |                                                                                                                                                                            |                                                                                                                       |
| Wetlands                                                                                    | —                                                          | Within wetland boundary                                                                                                                                                    | —                                                                                                                     |
| Surface Water                                                                               | —                                                          | Within 100 feet of lakes and perennial streams                                                                                                                             | —                                                                                                                     |
| <b>Geologic Hazards</b>                                                                     |                                                            |                                                                                                                                                                            |                                                                                                                       |
| Geologic Hazards                                                                            | —                                                          | Within areas classified as moderate or high hazard                                                                                                                         | —                                                                                                                     |
| <b>Biological Resources</b>                                                                 |                                                            |                                                                                                                                                                            |                                                                                                                       |
| Designated Wildlife Areas                                                                   | —                                                          | Federal (U.S. Fish and Wildlife Service [USFWS] Jurisdiction) and state wildlife refuges, state wildlife areas, walk-in hunting areas; game and waterfowl production areas | —                                                                                                                     |
| Sharp-tailed grouse leks                                                                    | —                                                          | Within 1.0 mile of active lek                                                                                                                                              | Within 0.25 mile of active lek                                                                                        |



## 2.3 Route Alternatives

The Routing Study (**Appendix C**) evaluated route alternatives and identified the final three routes that would be carried forward for analysis in the EA. The Routing Report identified Basin Electric's Applicant-Preferred Route (carried forward for analysis as the Proposed Action), as well as two alternative routes (Alternative Route A and Alternative Route B).

### 2.3.1 Alternative Route Screening Analysis

#### 2.3.1.1 Overview of Alternative Route Identification

A series of potential routes (consisting of 63 route segments) between the Big Bend Dam, proposed Lower Brule Switchyard, and existing Witten Substation were evaluated. The potential route segments were presented at the public scoping meetings along with the route preferred by Basin Electric and Western. Some segments were removed from further consideration based on public input.

As part of the routing study, the remaining route segments were combined into 16 potential alternative routes. The 16 potential alternative routes were identified through an iterative process that considered all of the segments presented at the public scoping meetings, as well as constraints within the study area identified during the MCS/AES. The vast majority of segments presented during scoping were used in at least one of the 16 potential alternative routes or the Proposed Action.

During the MCS/AES process and before formal public scoping, Basin Electric identified a preliminary Applicant-Preferred Route that minimized environmental and land use constraints, and minimized Project costs and engineering constraints. After public scoping, the Applicant-Preferred Route was refined in response to input from the public and West Central regarding the interconnection near Reliance.

To identify the routes proposed for NEPA analysis, the 16 alternative routes and the Applicant-Preferred Route were narrowed down to three routes (the Proposed Action and two alternatives) through a screening process that included both quantitative and qualitative metrics.

The quantitative metrics included output from a computerized GIS analysis that tabulated potential constraints within the Project study area and summarized the data in matrix format. The comparative matrix quantified the potential effects for each criterion, ranked each criterion (where lowest generally is best depending on the criterion), and then tallied the rankings to represent an overall total for a relative comparison between alternative routes. To preserve an objective analysis, the criteria were not weighted, since weighting introduces a subjective element regarding the relative importance of various criteria. For this analysis, all criteria were treated equally. The ranks for each criterion were summed to create an overall total score for each route and the overall total scores for each route were ranked to determine the overall rank of each route. In addition to the qualitative metrics described below, the overall rank was used to help identify potential alternative routes for evaluation in the EA. **Table 3-1** in **Appendix C** depicts the summary matrix of quantitative data by route.

In addition to the quantitative metrics depicted in **Table 3-1** in **Appendix C**, the following qualitative metrics were applied during selection of the 3 routes from the field of 17 potential alternative routes:

- One of the three routes would be the Applicant-Preferred Route;
- The alternative routes would use segments that are not duplicative of segments used by the Applicant-Preferred Route to the greatest extent possible;
- The alternative routes would follow direct paths between the Project endpoints and meet the Applicant's purpose and need; and

- To the extent feasible, alternative routes would avoid major constraints including residences, Indian Trust and Allotted lands, cultural and historical resources, and known sensitive biological resources.

### **2.3.1.2 Criteria Used to Evaluate Potential Routes**

The following criteria were used to develop quantitative metrics to evaluate the 16 alternative routes and the Proposed Action in a GIS-based model and output matrix.

- Route length;
- Percent of route adjacent to existing linear features;
- Length crossing Indian lands;
- Length crossing reservoirs and strip mines;
- Communication facilities within 150 feet;
- Residences within 500 feet;
- Number of crossings of perennial streams;
- Length within 100 feet of perennial/intermittent streams;
- Length crossing waterbodies;
- Length crossing National Wetland Inventory (NWI) wetlands;
- Level I cultural resources sites within 500 feet; and
- Known special status species locations.

During the analysis process, some of these criteria were subsequently removed from the comparative ranking matrix if the data were equal for all routes (no discernible difference), or if the criteria no longer applied. Criteria removed are summarized in Section 2.3.1.3. Greater detail regarding these criteria is provided in the Routing Report in **Appendix C**.

### **2.3.1.3 Criteria Considered but Removed from Comparative Analysis**

Several routing criteria were evaluated against the data compiled during the MCS/AES data search, but were ultimately removed from further evaluation in the comparative analysis matrix. The criteria removed either did not apply to the alternative routes or the criteria applied evenly to all routes and, therefore, would not make a discernible difference for purposes of comparing and ranking alternatives. These criteria were removed from the comparative analysis.

- Length within 0.25 mile of a scenic byway;
- Length within 500 feet of census landmarks;
- Length within areas classified as important farmland; and
- Historic properties listed or eligible for inclusion in the National Register of Historic Places (NRHP).

## **2.3.2 Selection of Alternative Routes**

### **2.3.2.1 Big Bend – Lower Brule Switchyard 230-kV Transmission Line**

The northern portion of the Project, the proposed 230-kV transmission line between the Big Bend Dam (new 230-kV double-circuit structure) and the proposed Lower Brule Switchyard consists of a single route. The Project crosses land near the Big Bend Dam that is under the jurisdiction of the USACE before it crosses the Lower Brule Sioux Indian Reservation. Basin Electric and Western

worked with the LBST to determine an appropriate alignment for the new transmission line and location for the proposed Switchyard, and they would continue to collaborate with LBST as needed to facilitate the Project.

### 2.3.2.2 Lower Brule – Witten 230-kV Transmission Line

A total of 16 route alternatives in addition to the Proposed Action, were evaluated in the comparative matrix. **Figure 2-2** depicts the segments that were evaluated in the routing report and includes a table that defines the segment combinations that comprise each of the 17 routes.

### 2.3.2.3 Alternative Routes Removed From Further Consideration

As a result of the comparative analysis, including the quantitative data in **Table 3-1** in **Appendix C**, and consideration of the qualitative metrics described in Section 2.3.1.1, a number of the potential alternative routes were eliminated from further consideration. A summary of the rationale used to eliminate 14 of the alternative routes from further analysis is provided below:

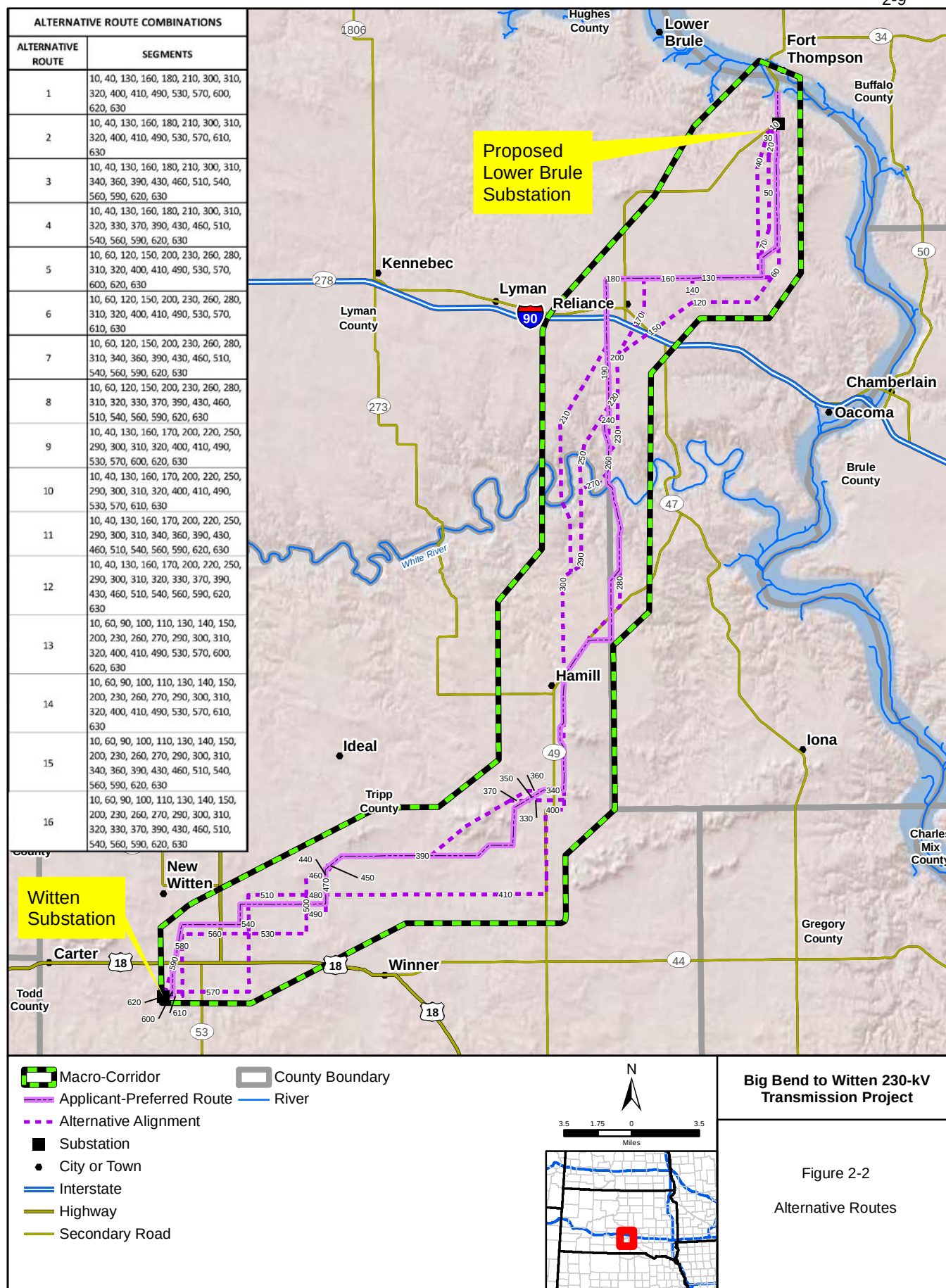
- Routes 1 and 2 were eliminated since they had the greatest length of any alternative and both of these alternative routes scored poorly in the matrix.
- Routes 3 and 4 were very similar to each other and were eliminated based on length within known prairie dog towns and length crossing NWI wetlands.
- Routes 5, 6, 7, and 8 were eliminated since they used segments that crossed Indian trust land.
- Route 9 was eliminated due to length within known prairie dog towns and because it had the highest length within 100 feet of perennial streams. This alternative route had the worst overall score in the matrix.
- Routes 11 and 12 were very similar to each other and were eliminated based on length within known prairie dog towns and length crossing NWI wetlands.
- Routes 13 and 14 also were similar to each other and were the second longest routes at 76 miles each and had the greatest length within 100 feet of perennial streams.
- Route 15 is similar to Route 16, but Route 15 had a longer length within 100 feet of perennial streams.

Alternative Route 16 had minimal constraints, scored well in the matrix (total rank of 3), and shared few segments with the Proposed Action. Therefore, Alternative Route 16 was determined to provide a reasonable alternative to the Proposed Action. Other routes that ranked in second or third place were nearly identical to the Proposed Action or to Alternative Route 16 and therefore, did not represent reasonable additional alternatives. Although Alternative Route 10 does not perform well in the matrix when compared with the other alternative routes (Route 10 received a total score of 34 with a rank of 7 in **Table 3-1** in **Appendix C**), this route was retained for evaluation in the EA since it provides a distinctly different alternative route than either the Proposed Action or Alternative Route 16.

### 2.3.2.4 Identification of Routes for Analysis

As described in Section 2.3.2, both quantitative and qualitative criteria were used to evaluate the 16 alternative routes and the Proposed Action and to identify two alternative routes for NEPA analysis. Basin Electric and Western worked closely with RUS, Native American tribal representatives, USACE, and local landowners to identify potential routes that would best meet the Project objectives and purpose and need, while minimizing adverse environmental effects and conflicts with existing land uses. This process resulted in the identification of the Applicant-Preferred Route, which is being carried forward for analysis as the Proposed Action. Basin Electric evaluated the Proposed Action in detail and “refined” that route to avoid some sensitive areas and other route adjustment requests, listed as follows:





- Near Reliance, the original route was located south and east of Reliance and followed Segments 170, 200, and 230. The Proposed Action was shifted to the north and west of Reliance to accommodate West Central's request for a tap site in this location and landowner concerns regarding the location of the original route.
- South of the White River, the original route followed Segment 280. The Proposed Action was shifted 0.5 mile west to accommodate a landowner request, and the route continued south of SH 49 for approximately 1.25 miles to avoid crossing Indian trust land in Section 13.
- North of Winner, the original route followed Segment 380. The Proposed Action was moved 0.5 mile north along a portion of Segment 390 to accommodate potential future development along 272<sup>nd</sup> Street and to avoid a large wetland area.
- The last 10 miles of the original route into the Witten Substation followed Segments 490, 520, 550, 580, and 610. Routing in this area was shifted to avoid farmland and to follow ½-section lines or parallel to section lines to minimize disturbance to farming activities. In addition, the route along Segment 520 was shifted 0.5 mile north to avoid Indian trust land.

In addition to the Proposed Action, two routes were identified as being reasonable alternatives based on the quantitative and qualitative analysis in the route screening process. The two alternative routes carried forward for detailed environmental analysis along with the Proposed Action are routes 10 (Alternative Route A) and 16 (Alternative Route B).

#### **2.3.2.5 Alternative Route A**

As illustrated in **Figure 2-3** and provided in **Table 3-1** in **Appendix C**, the following features of Alternative Route A are favorable:

- Alternative Route A is slightly shorter than the Applicant-Preferred Route; and
- Alternative Route A has a shorter length across waterbodies when compared with the Applicant-Preferred Route.

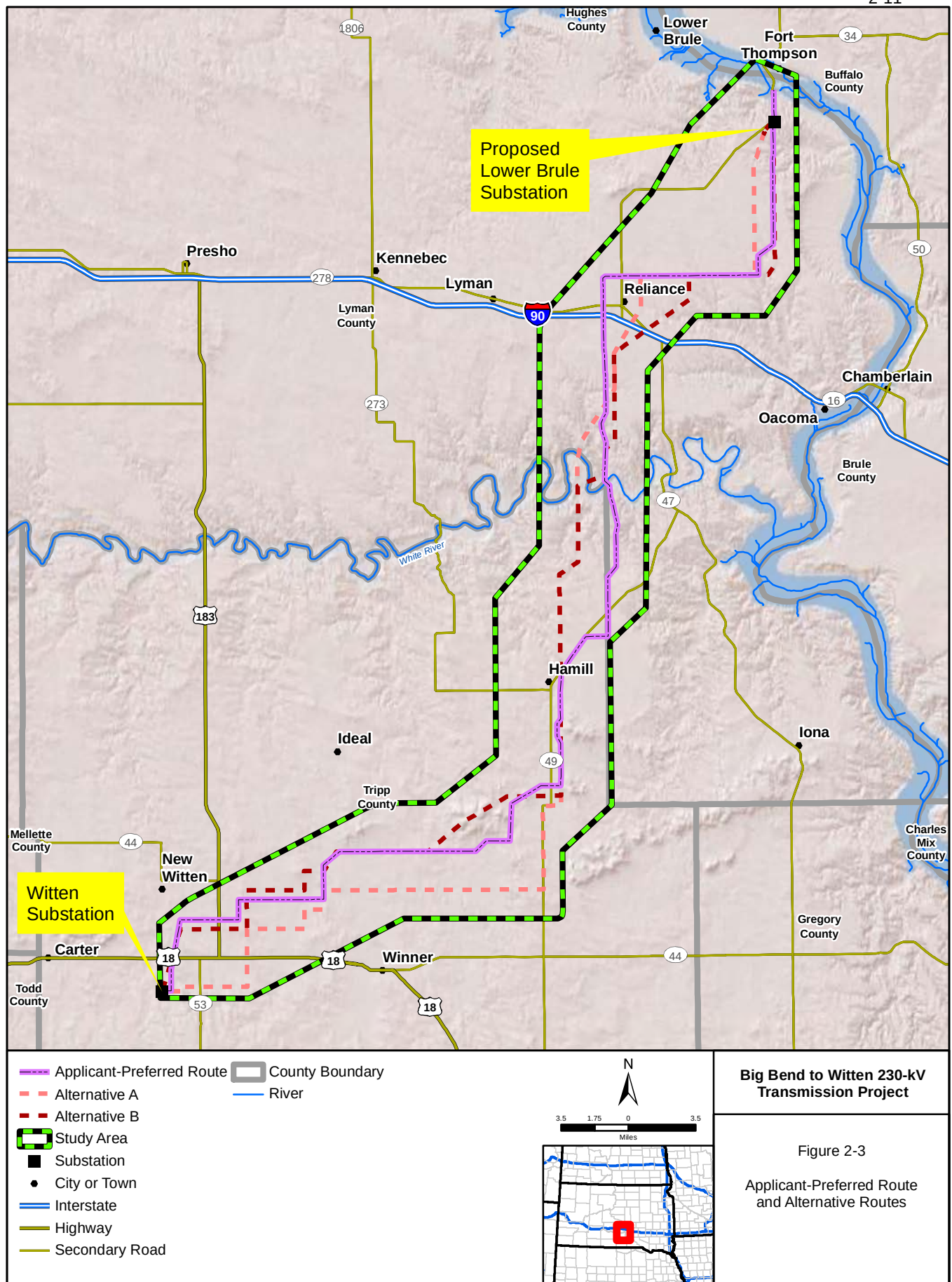
Potentially unfavorable aspects of Alternative Route A include:

- Only 35 percent of the total length of Alternative Route A is adjacent to existing linear features;
- Alternative Route A crosses an existing reservoir;
- Alternative Route A crosses seven perennial streams and has the longest length within 100 feet of perennial and intermittent streams;
- Alternative Route A has the second longest length within known prairie dog towns; and
- Alternative Route A has one residence within 500 feet of the centerline.

#### **2.3.2.6 Alternative Route B**

As illustrated in **Figure 2-3** and provided in **Table 3-1** in **Appendix C**, the following features of Alternative Route B are favorable:

- Route B is approximately 2 miles shorter than Route A and approximately 3 miles shorter than the Applicant-Preferred Route;
- Route B has the shortest length crossing waterbodies and NWI wetlands; and
- Route B has the shortest length within previously documented prairie dog colonies.



Potentially unfavorable aspects of Alternative Route B include:

- Only 37 percent of the total length of Route B is adjacent to existing linear features;
- Route B crosses seven perennial streams;
- Route B has a longer length within 100 feet of perennial and intermittent streams when compared with the Applicant-Preferred Route; and
- Route B has one residence within 500 feet of the centerline.

#### **2.3.2.7 Applicant-Preferred Route**

As illustrated in **Figure 2-3** and provided in **Table 3-1** in **Appendix C**, favorable aspects of the Applicant-Preferred Route, also referred to as the Proposed Action, compared with the two alternative routes include:

- The route has the most favorable crossing of the White River;
- The route has the greatest percentage of alignment paralleling linear features;
- The route is not within 150 feet of any known communications facilities;
- The route has the fewest crossings of perennial streams and the shortest length within 100 feet of perennial and intermittent streams;
- The route is closest to West Central's tap site; and
- There are no occupied residences within 500 feet of the centerline.

Potentially unfavorable aspects of the Applicant-Preferred Route compared with the two alternative routes include:

- The Applicant-Preferred Route is longer than Routes A and B;
- The Applicant-Preferred Route has the greatest length crossing waterbodies and NWI wetlands; and
- The Applicant-Preferred Route is the only one of the three retained routes that traverses a historic sharp-tailed grouse lek.

## **2.4 Structure Alternatives**

Engineering, cost, and environmental analyses were applied to evaluate various transmission line structure designs and materials. Structure design options included single-pole, H-frame, and lattice. Materials considered included steel (galvanized and self-weathering), wood (wood pole), and laminated wood. Factors considered included durability, cost of installation, cost and frequency of periodic maintenance, and potential environmental impacts.

Basin Electric selected single-pole steel structures based on comments from landowners received on previous projects with similar environmental issues. Single-pole steel structures were preferable because they greatly reduce potential conflicts with agricultural machinery operations, allow structure placement near property lines (reducing impacts to any one property owner), and reduce the amount of land needed for any one structure. Although there is a higher initial cost for materials with single-pole steel structures, the higher cost is offset by lower installation and long-term maintenance costs and better acceptance by landowners due to the smaller footprint.

## 2.5 Proposed Action and Alternative Routes

### 2.5.1 Transmission Lines

#### Design Parameters

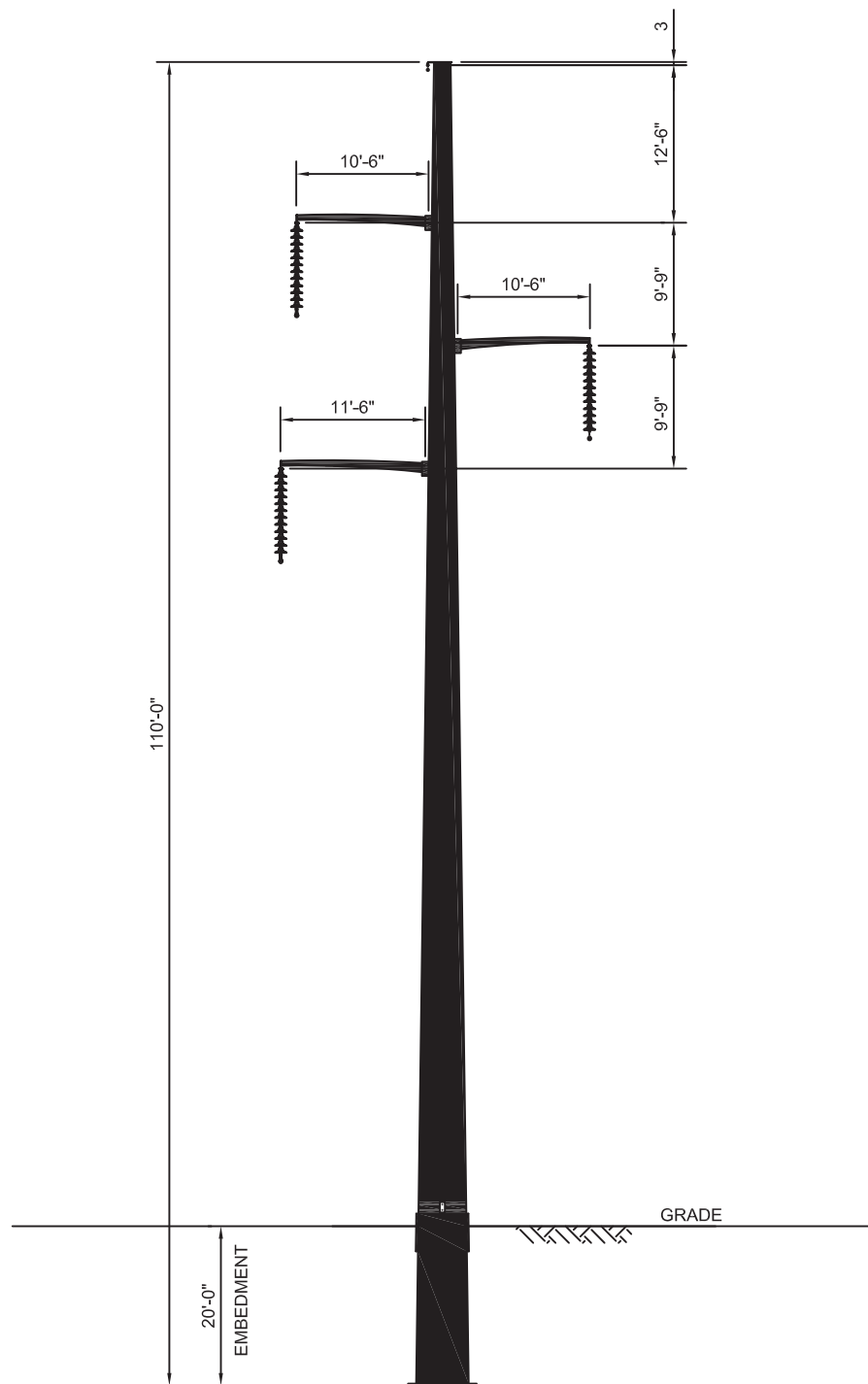
The Proposed Action and alternative routes are illustrated in **Figure 2-3**. **Table 2-2** provides the typical physical design characteristics for the proposed single-circuit 230-kV transmission line. The design specifications for Western's proposed 1.6-mile double-circuit transmission line would be similar to the single-circuit 230-kV transmission line characteristics presented in the table. **Figure 2-4** illustrates the proposed single-circuit 230-kV transmission structures to be used for the Project.

The steel single-pole transmission line structures would range in height from approximately 70 feet to 115 feet and average 95 feet, depending on the required span distances between structures and area topography. The span between structures would typically range from 650 feet to 950 feet and average approximately 800 feet, depending on topography; taller structures could be used for crossing existing distribution and transmission lines or where unusual terrain exists. The single-pole structures would be designed to support three conductors and an overhead OPGW. The OPGW would provide lightning suppression and fiber optic communications between the Lower Brule Switchyard and Witten Substation for systems control. Tangent structures would be freestanding and directly embedded into the soil. Angle structures (used where the transmission line changes direction) and dead-end structures (used to provide longitudinal stability along the length of the line) would be constructed with concrete foundations. Guy wires would not be used.

**Table 2-2 Transmission Line Characteristics**

| Description of Design Component                                                               | Values    |
|-----------------------------------------------------------------------------------------------|-----------|
| Voltage (kV)                                                                                  | 230       |
| Conductor size (inches)                                                                       | 1.345     |
| ROW width (feet)                                                                              | 125       |
| Typical minimum and maximum span distances between structures (feet)                          | 650 – 950 |
| Average span (feet)                                                                           | 800       |
| Minimum and maximum structure height (feet)                                                   | 70 – 115  |
| Average height of structures (feet)                                                           | 95        |
| Average number of structures (per mile)                                                       | 6.6       |
| Temporary disturbance per structure (square feet)<br>(approximately 125-foot x 100-foot area) | 12,500    |
| Permanent disturbance per structure (acre) (approximately 3-foot diameter)                    | <0.0002   |
| Minimum conductor-to-ground clearance to agricultural land at 100 degrees Celsius (feet)      | 26        |
| Minimum conductor-to-ground clearance to rural roads at 100 degrees Celsius (feet)            | 28        |
| Minimum conductor-to-ground clearance to paved highways at 100 degrees Celsius (feet)         | 31        |
| Circuit configuration                                                                         | Delta     |





**Big Bend to Witten 230-kV  
Transmission Project**

Figure 2-4  
Typical Single-circuit  
Single-pole Structure

Project construction and design would meet the requirements of the National Electrical Safety Code (NESC) for the Heavy Loading District, Basin Electric and USDA-RUS design criteria, and other applicable local or national building codes. The Heavy Loading District refers to those areas (including South Dakota) that are subject to severe ice and wind loading. Minimum conductor clearance is measured at the point of greatest conductor sag and closest proximity to the ground. The proposed transmission line would be constructed with clearances that exceed standards set by NESC. Minimum conductor height would be 26 feet over agricultural land, 28 feet over rural roads, and 31 feet over paved highways.

### Construction Activities

Basin Electric would likely commence construction of the transmission line in spring 2016, extending throughout the South Dakota construction season, usually beginning in March or April and ending in November or December of each year. Private contractors would construct the transmission line and haul away construction wastes associated with the Project. The contractors also would be responsible for complying with applicable mitigation measures and agency and tribal requirements.

### Pre-construction Surveying and Geotechnical Analyses

Various studies must be completed and permits acquired before construction could begin, including completion of the EA process, RUS authorization, South Dakota Public Utilities Commission permitting, cultural resources (Section 106 NHPA) review and consultation, Section 7 consultation, transmission line engineering and design, ROW procurement, and final transmission structure siting.

Basin Electric and/or its contractors would perform initial transmission line survey work, consisting of survey control, route centerline location, profile surveys, and access surveys prior to construction. These surveys would likely be conducted concurrently with other pre-construction tasks.

Geotechnical analyses would be conducted at transmission line angle points and other locations to determine engineering requirements for structures. A truck-mounted auger would be transported to each site to drill a small-diameter borehole. Cuttings from each borehole would be evaluated to determine soil characteristics. Geotechnical analyses would be confined to a relatively small area needed for site access and equipment operations. Each geotechnical location would require an area totaling approximately 400 ft<sup>2</sup> for equipment setup and operations in addition to an access trail.

### ROW Access and Construction Preparation

Crews would gain access from public roads and section line trails as well as within the transmission line ROW for constructing and maintaining the line. Access for line construction would be by truck travel within the ROW and structure sites located along section lines would be accessed directly from section line roads and trails, where possible. New graded surface access roads are not anticipated. Existing roads and trails would be left in comparable or better condition than what existed before construction. Gates would be installed where fences cross the ROW and locks would be installed at the landowner's request. Gates not in use would be closed but not locked, unless otherwise requested by the landowner.

Tree and brush removal in the ROW is anticipated to be minimal because the Project area consists largely of cultivated cropland and rangeland, and because woodlands and shelterbelts were avoided during the routing process. The ROW would only be cleared if trees and/or shrubs that are present would interfere with construction activities or the safe, reliable operation of the transmission line. Trees would be cut at ground level to provide access within the ROW and to allow vehicle access. Stumps and roots would remain in the ROW unless the landowner requests otherwise. Disposal of cut trees and brush would be consistent with the landowner's wishes and applicable state waste management rules.

### Transmission Structure Site Preparation

Transmission structure site clearing would be minimal. The Project area and locations along the proposed transmission line route are relatively flat and the need for structure site leveling is expected to

be minimal. It is anticipated that at some structure locations, blading of small areas (up to 40 feet by 40 feet for crane and manlift landings) may be required to level the ground surface to allow the safe operation of the equipment. Blading would be confined to the ROW and would be accomplished using bulldozers or front-end loaders. Soil removed during leveling would be stockpiled and replaced following construction; special emphasis would be placed on salvaging topsoil to be used for reclamation. The ground would be re-graded to the approximate original contour and revegetated (rangeland) or tilled (cropland) when the work is completed. Temporary disturbance to soils would be mitigated by returning the sites to grazing and farming.

### Pole Augering

Crews would use a truck-mounted auger or tracked vehicle equipped with a power auger to drill holes for the structures at appropriate locations along the ROW. Total disturbance at each structure location would vary depending on terrain and equipment; however, all disturbances would be confined to the ROW.

Augering for poles would have an average diameter of 5 feet and an average depth of 20 feet. The single-pole structure would be lowered by crane into augered holes and the ring around the structure would be backfilled with crushed gravel and rock or augered material if suitable. Surplus material (expected to total approximately 15 cubic yards (yd<sup>3</sup>) at each tangent structure site) would be left on-site or hauled to an off-site location (i.e., area landfills) for disposal, in accordance with landowner wishes.

Approximately 20 structures would require reinforced concrete foundations consisting of up to a 6-foot-diameter excavation to an average depth of 20 feet. Approximately 21 yd<sup>3</sup> of surplus material would be either spread in the vicinity of the structure or disposed of in accordance with landowner wishes. Large volumes of excess soil would be disposed of at local landfills. Landfills typically need additional fill as cover for waste material. Disposal of waste material, including concrete spoil, would be in compliance with applicable regulations and would not include placement in wetlands or aquatic sites. Site-specific hole diameters, depth, and the use of reinforced concrete foundations would be determined during geotechnical and engineering evaluations.

### Structure Assembly and Erection

Structure components (i.e., structure segments, davit arms, hardware, insulators, and related materials) would be trucked to structure work site locations and assembled. Davit arms, insulators, and other appurtenances would be attached to the poles while on the ground at each structure location, within the 125-foot-wide ROW. Erection crews would place the structure in the hole (directly imbedded) or on reinforced foundations (i.e., self-supporting angle point and dead-end structures) using cranes or large boom trucks. The structures would then be plumbed and the hole backfilled, as previously described.

### Conductor Stringing and Tensioning

Following structure construction, crews would install the conductors and OPGW using conductor stringing sheave blocks and line pulling and tensioning equipment. The conductor and OPGW would be kept under tension during the stringing process to keep the conductor clear of the ground and obstacles that could damage the conductor and/or OPGW surfaces.

Pulling and tensioning sites are typically located at 10,000-foot intervals and at angle point structures. Sites along tangent structures are maintained within the ROW, those at angle points typically are partially outside of the normal 125-foot-wide ROW. Each site typically requires two 37,500-square-foot (ft<sup>2</sup> [0.9-acre]) temporary use areas. Stringing equipment generally consists of wire pullers, tensioners, conductor reels, OPGW wire reels, and sheave blocks. About 10,000 feet of conductor and OPGW would be installed for each pull. After the conductor/ground wire is pulled for a section of line, it is tightened or sagged to the required design tension in compliance with the NESC. The process would be repeated until all of the conductor and OPGW are pulled through all sheaves. Conductor stringing also would require access to each structure for securing the conductor to the insulators or OPGW to each



structure, once final line sag is established. A typical pulling and tensioning site and splicing site are shown schematically in **Figure 2-5**.

For public safety and property protection, temporary wooden guard structures would be used to provide support when stringing conductor and OPGW across existing power lines, roads, highways, railroads, and other linear obstacles. The structures would be removed when stringing is complete; the pole borings would be backfilled and the temporary support structure sites would be reclaimed. All temporary wooden guard structures would be installed within the transmission line ROW.

#### Structure Site Access and Traffic

Access would involve the use of existing roads where available, and temporary overland access trails where necessary. No new access roads would be constructed for the Project. The use of temporary overland access trails between structure sites would not require new construction, but would result in temporary disturbance. Occasional access from section line trails could result in temporary disturbance along the ROW; however, such disturbance would be limited to a 12-foot-wide track (approximately) and only long enough to provide vehicle access directly to structure locations. Some additional access disturbance could occur if truck or vehicle turnarounds are needed; however, the use of structure work sites would be encouraged.

Existing access roads (typically paved or maintained with a gravel or aggregate base) would be used in their original condition to the extent possible, or with minor road blading or other improvements as agreed upon by the county or township. Basin Electric would be responsible for repairing any damage caused by construction equipment movement and would return existing roads to original or better condition following construction. Basin Electric would not be responsible for maintaining roads following construction. Basin Electric would not be responsible for maintaining fences and gates following construction and restoration; however, access gates that would be installed during construction would be left in place following construction.

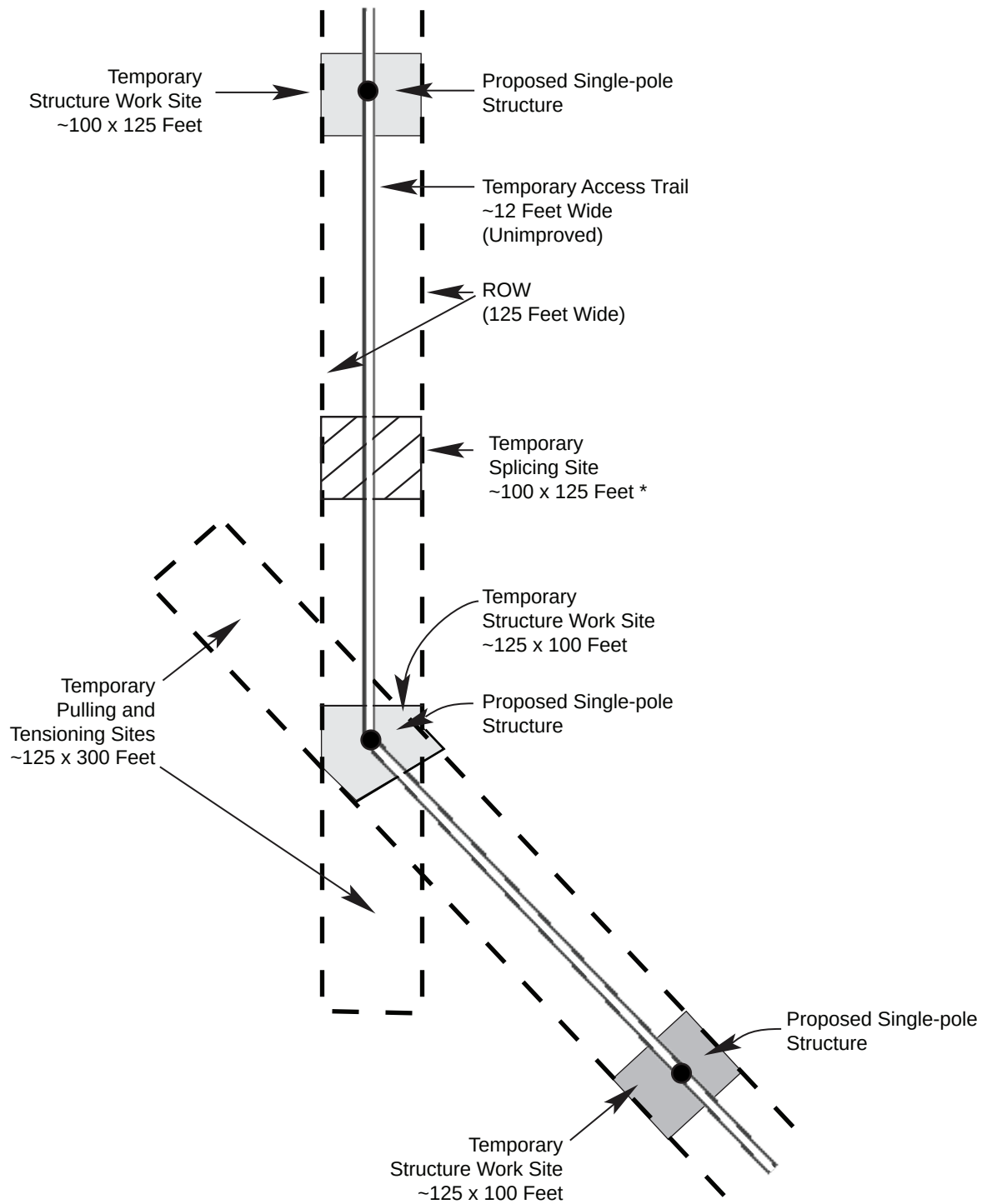
Line segments that are parallel to section lines that do not have established roadways would use the 66-foot-wide public ROW to the extent practicable. Specific access locations and areas of temporary disturbance cannot be determined without detailed engineering showing locations where such access locations might be appropriate and distances that would be crossed. A 33-foot-long, 12-foot-wide temporary access point would temporarily disturb 0.009 acre. If blading or other minor improvements are needed to ensure the safe movement of heavy equipment, such improvements would remain in place following construction.

Basin Electric would restore disturbed areas to pre-construction conditions, to the extent practicable, and would not be responsible for the long-term maintenance of such section line trails. Any fences, gates, or similar features that would be removed during construction would be replaced or rebuilt. Gates and fences that would be installed during construction would be left in place for future use.

#### Temporary Overland Access and Land Requirements

Temporary overland access would be used in areas without existing roads. Access through cultivated fields would be, to the extent practicable, during the non-growing season. Landowners would be compensated for loss of crops caused by construction activities. Gates may be installed to facilitate access to some structures and the ROW. The gates would be left in place following construction activities. Permanent access roads to the ROW or structures would not be maintained.

Temporary access routes would result in a 12-foot-wide temporary disturbance and compaction of vegetation and soils. Natural vegetation along these temporary access routes would recover quickly, primarily because grading would not be required. Temporary overland access routes would be subject to the same cultural resource and vegetation surveys as the other ROWs. Landowners would be compensated for access routes where public access does not exist.

**LEGEND**

\* ~10,000 Feet Intervals

**Big Bend to Witten 230-kV  
Transmission Project**

Figure 2-5  
Conceptual Construction  
Configuration

A 100-foot x 125-foot (12,500 ft<sup>2</sup>) temporary work site would be located at each structure location and within the ROW. The area would be graded, if required, to ensure safe movement and operation of heavy equipment. The Proposed Action and Alternative Routes A and B require approximately 144, 142, and 138 acres, respectively, for structure installation, as shown in **Table 2-3**.

Pulling and tensioning sites and splicing sites would result in temporary disturbance to lands within and outside of the ROW. Pulling and tensioning areas would temporarily disturb a total of 75,000 ft<sup>2</sup> (1.7 acres) at each angle structure location. Approximately 15 to 22 pulling and tensioning sites would be needed at angle structure locations, totaling approximately 26 to 38 acres. The pulling and tensioning sites at the angle structures would extend beyond the designated ROW. Additional areas would be needed along long straight-line expanses of tangent structures. Approximately 20 to 25 pulling and tensioning sites would be required along tangent structures. Each pulling and tensioning site would occupy approximately 37,500 ft<sup>2</sup> within the ROW. Pulling and tensioning along tangent structures would result in temporary impacts from approximately 17 to 22 acres within the designated ROW.

Splicing sites, measuring approximately 12,500 ft<sup>2</sup> (0.3 acre), also would be required at approximately 10,000-foot increments within the transmission line ROW. Approximately 39 to 41 splicing sites would be required for construction, resulting in temporary impacts to 11 to 12 ROW acres. The conceptual configuration of temporary work sites, 12-foot-wide access trail, structure locations, pulling and tensioning sites, and splicing sites is shown in **Figure 2-5**.

Three temporary laydown areas would be needed; each site would total approximately 10 to 15 acres.

Approximately 50 borings are required for geotechnical analyses. Each boring site would temporarily affect as much as 400 ft<sup>2</sup> within the proposed ROW and at designated structure sites. The geotechnical surveys would be conducted during low precipitation conditions, which would minimize impacts to the soils and crops.

Estimated temporary and permanent land requirements identified in **Table 2-3** were used as the basis for calculating temporary and permanent acreage impacts to land uses, prime and unique farmland and farmland of statewide importance, vegetation types, and wetlands. Linear distance data developed through routing were converted to estimate acreage impacts. As noted in **Table 2-3**, temporary impacts associated with the Proposed Action would affect approximately 356 acres. Temporary impacts associated with Alternative Routes A and B would affect approximately 349 and 348 acres, respectively. Permanent impacts would be similar among the three alternatives, essentially limited to areas occupied by the single-pole structure bases.

#### Permanent Land Requirements

Permanent land disturbance has been estimated for self-supporting tangent structures, self-supporting dead-end structures, and self-supporting turning structures. Each tangent structure would require directly imbedding one 3-foot-diameter pole at each structure location, thus occupying a total of 7.1 ft<sup>2</sup> per structure. Turning structures and dead-end structures would be larger, with a 5-foot-diameter, thus each occupying approximately 19.6 ft<sup>2</sup>. Approximately 35 turning and dead-end structures would be required for the transmission line. Tangent, dead-end, and angle structures would be self-supporting, thus guy wires would not be required.

**Table 2-3 Temporary and Permanent Land Requirements for Proposed Action and Alternative Routes A and B**

|                                                                            | Transmission Line Alternative                        |                      |                      |
|----------------------------------------------------------------------------|------------------------------------------------------|----------------------|----------------------|
|                                                                            | Proposed Action                                      | Alternative Route A  | Alternative Route B  |
| Total length (miles)                                                       | 75.8                                                 | 75.1                 | 72.5                 |
| Total number of single-pole structures <sup>1</sup>                        | 501                                                  | 496                  | 479                  |
| <b>Temporary Land Requirements</b>                                         |                                                      |                      |                      |
| Structure pads (acres) <sup>2</sup>                                        | 143.8                                                | 142.3                | 137.5                |
| Access road within ROW (acres) <sup>3</sup>                                | 103.5                                                | 102.5                | 99.0                 |
| Pulling and tensioning sites at angle structures (number) <sup>4</sup>     | 20                                                   | 15                   | 22                   |
| Pulling and tensioning sites at angle structures (acres) <sup>5</sup>      | 34.4                                                 | 25.8                 | 37.9                 |
| Pulling and tensioning sites along tangent locations (number) <sup>6</sup> | 20                                                   | 25                   | 20                   |
| Pulling and tensioning sites along tangent locations (acres) <sup>7</sup>  | 17.2                                                 | 21.5                 | 17.2                 |
| Splicing site locations (number) <sup>8</sup>                              | 41                                                   | 40                   | 39                   |
| Splicing sites (acres) <sup>9</sup>                                        | 11.8                                                 | 11.5                 | 11.2                 |
| Three laydown areas (acres) <sup>10</sup>                                  | 30 – 45                                              | 30 – 45              | 30 – 45              |
| 50 geotechnical boring sites (within ROW)                                  | approximately 400 ft <sup>2</sup> each <sup>11</sup> |                      |                      |
| <b>Total Temporary Disturbed Area (acres)</b>                              | <b>340.7 – 355.7</b>                                 | <b>333.6 – 348.6</b> | <b>332.8 – 347.8</b> |
| <b>Permanent Land Requirements</b>                                         |                                                      |                      |                      |
| Permanent land requirements for structures (acres) <sup>12</sup>           | 0.1                                                  | 0.1                  | 0.1                  |
| Lower Brule Switchyard and access road                                     | 7.1                                                  | 7.1                  | 7.1                  |
| Witten Substation expansion and access road                                | 7.0                                                  | 7.0                  | 7.0                  |
| <b>Total Permanently Disturbed Area (acres)</b>                            | <b>14.2</b>                                          | <b>14.2</b>          | <b>14.2</b>          |
| <b>Potential Additional Permanently Disturbed Area (acres)</b>             |                                                      |                      |                      |
| Reliance Tap Site <sup>13</sup>                                            | 10.0                                                 | 10.0                 | 10.0                 |

<sup>1</sup> Approximate number, based on average 800-foot spacing.<sup>2</sup> Number of structures x 100 x 125 feet (12,500 ft<sup>2</sup>).<sup>3</sup> 800 linear feet between structure sites, number of structures, 12-foot-wide access trail.<sup>4</sup> Estimated number, based on number of angle structures.<sup>5</sup> Angle point locations x 125 feet x 300 feet (37,500 ft<sup>2</sup>) x two directions.<sup>6</sup> Estimated number along areas with tangent structures.<sup>7</sup> Tangent structure locations x 125 feet x 300 feet (37,500 ft<sup>2</sup>).<sup>8</sup> 10,000-foot spacing between splicing sites.<sup>9</sup> Splicing site locations x 125 feet x 100 feet (12,500 ft<sup>2</sup>).<sup>10</sup> Approximately 10 to 15 acres of surface disturbance per area.<sup>11</sup> Temporary disturbance areas previously accounted for in temporary disturbance for angle structures.<sup>12</sup> Estimated total permanent disturbance for all structures (approximately 7.1 ft<sup>2</sup> per structure x the estimated number of structures).<sup>13</sup> A 10-acre electrical tap site may be constructed in the Reliance, South Dakota area for West Central Cooperative at a later date.

### Easements

Landowners were contacted several times throughout the routing process. Survey permissions are requested from each landowner along the route in order to allow Basin Electric access for engineering and environmental surveys. Once a route is finalized, Basin Electric would follow several steps to acquire the ROW for the Project. Title searches going back 30+years are completed to identify current ownership and all encumbrances that need to be addressed. A market analysis is conducted by a third-party appraiser to identify the current land values, which are in turn used to establish monetary offers for the easements. Negotiations with landowners occur in an effort to acquire easements; these negotiations may take place over several visits.

Similar steps as described above also are used for state lands, USACE (federal lands), and Indian tribal lands. Appropriate federal, state, and tribal representatives would be contacted. This may result in the ROW rights being granted in other forms such as permits or leases.

### Construction Waste Management

Typical waste materials generated from construction activities include miscellaneous lumber and shipping materials used to protect equipment during transportation, paper products, soda cans, food-related materials, and sanitary waste. Waste from construction materials and rubbish from all construction areas would be collected, hauled away, and disposed in a state-approved landfill. Sanitary waste would be disposed through arrangements with local municipal sanitary waste treatment facilities.

Material staging areas and vehicle maintenance and refueling areas would not be located near waterways. If any of the material staging areas include vehicle and equipment refueling, or storage of petroleum products in excess of 1,320 gallons, a Spill Prevention, Control, and Countermeasures (SPCC) Plan would be developed. The SPCC Plan would address: 1) operating procedures to prevent spills; 2) control measures to prevent a spill from reaching navigable waters; and 3) countermeasures to contain, clean up, and mitigate the effects of a spill that reaches navigable waters. Additionally, spill containment and clean up materials (e.g., absorbent material, shovels) would be available at every work site. The materials would be used to contain and clean up oil and hydraulic spills that may result from equipment leaks. Workers would be trained in procedures to follow to contain and clean up released hazardous materials.

### Construction Schedule, Work Force, and Equipment

Transmission line construction would generally follow a sequential set of activities performed by crews proceeding along the length of the line. **Table 2-4** lists the construction activities. Basin Electric would likely commence construction of the transmission line in spring 2016, extending throughout the South Dakota construction season, usually beginning in March or April and ending in November or December of each year. The sequential nature of construction would minimize activities at any given work site.

### Worker Safety and Health Protocol

All construction and maintenance activities would be carried out in compliance with applicable federal and state worker safety regulations, as defined under the Occupation Safety and Health Administration (OSHA) Act of 1979. Worker safety and health is administered by Basin Electric's Transmission Systems Maintenance Division, which is a member of the National Safety Council.

### Environmental Protection Measures

Project-specific mitigation measures have been developed to avoid or reduce the severity of environmental impacts (**Appendix D**). The measures are applicable to Project construction and operation.

**Table 2-4 Conventional Personnel, Equipment, and Time Requirements for Construction**

| <b>Task</b>                                       | <b>Number of Personnel</b> | <b>Equipment</b>                                                                                                    | <b>Length of Time</b> |
|---------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------|
| Structure site clearing and vegetation management | 4–6                        | Pickups, all-terrain vehicles                                                                                       | 1 month               |
| Gate installation                                 | 3                          | Flatbed and pickup trucks                                                                                           | 1 month               |
| Structure assembly                                | 6–8                        | Pickups, cranes, material trucks, rubber-tired crane, 4x4 pickups                                                   | 4 months              |
| Augering                                          | 2–3                        | Rotary drilling rigs, backhoes, pickups, rubber-tired digging equipment, all-terrain vehicles, portable compressors | 4 months              |
| Structure erection                                | 6–8                        | Rubber-tired cranes, boom trucks, 4x4 pickups                                                                       | 5 months              |
| Ground wire and conductor stringing               | 16–20                      | Pickups, manlifts/boom trucks, hydraulic tensioning machines, reel trailers                                         | 3 months              |
| Cleanup                                           | 4                          | Pickups, dump trucks, flatbed trucks                                                                                | Duration of Project   |
| Concrete foundations                              | 10                         | Excavators, concrete trucks, skid steer                                                                             | 1–2 months            |
| Equipment installation                            | 10                         | Cranes and trucks                                                                                                   | 3–4 months            |

### Reclamation

Following construction, disturbed areas would be graded and/or re-sloped to their approximate original contours to minimize erosion and visual alteration. In grassland or pasture areas, disturbed areas would be reseeded with native species. Cultivated land would be tilled and returned to production. Fences and gates damaged as a result of the Project would be repaired.

Rangeland from which vegetation has been removed, destroyed, or damaged would be reclaimed and revegetated. Reclamation activities, weather permitting, would be ongoing throughout construction and would take place as soon as construction activities are completed in a particular area. Drainage structures and similar improvements would be removed from areas to be reclaimed, where appropriate, and the area would be revegetated using a native seed mixture, as recommended by the County Agricultural Extension Service or the Natural Resources Conservation Service (NRCS).

Ruts and scars from overland travel would be leveled to break up compacted soils and aid in returning areas to approximate original contours. Cultivated areas disturbed by overland travel would be leveled and tilled to break up compacted soils (if necessary) and returned to production.

The optimal timing for revegetation success would be spring or fall to coincide with seasonal rains. Mulching or netting may be required to protect seeded areas from erosion. Other erosion control devices, such as water bars, or terracing, or water diversion structures would be constructed where needed. Follow-up inspections would be carried out during the next growing season. Areas that did not become revegetated would be reseeded again, as necessary.

The reclamation procedures described above would be applied to disturbed areas including temporary access, staging areas, the transmission line ROW, and other areas disturbed by Project activities.

### Operation and Maintenance

The following operation and maintenance activities would be performed throughout the life of the Project.

- Basin Electric's preventive maintenance program for the transmission line includes aerial and ground inspections. Aerial inspections would be conducted at least two times each year. Ground patrols would be conducted annually for the first 3 or 4 years, and less frequently thereafter. Climbing inspections of structures would be conducted on a 5-year cycle with every fifth structure inspected each year. Inspections and patrols would involve the use of vehicles in areas where there is suitable vehicle access.
- Maintenance activities would include repairing damaged conductors, inspecting and repairing structures, replacing damaged and broken insulators, and tightening hardware.
- Basin Electric would maintain any gates it installs or uses for access.
- Basin Electric would trim or remove trees that pose a clearance or safety problem to the operation of the transmission line. Specific requirements of the National Electric Reliability Council would be followed. This activity would be completed in accordance with the landowner easement.

Treatment of vegetation within the ROW would include the selective removal or tree trimming to prevent contact with the transmission line conductors. Some trees would have to be removed if they are classified as "danger trees" (trees that are 20 feet in height or taller which, upon falling, would come within 10 feet of the structure or conductors). Disposal of cut trees and brush would be in a manner acceptable to the landowner and in accordance with applicable state waste management rules. The need for tree removal is expected to be minimal as areas with trees were intentionally avoided during detailed routing.

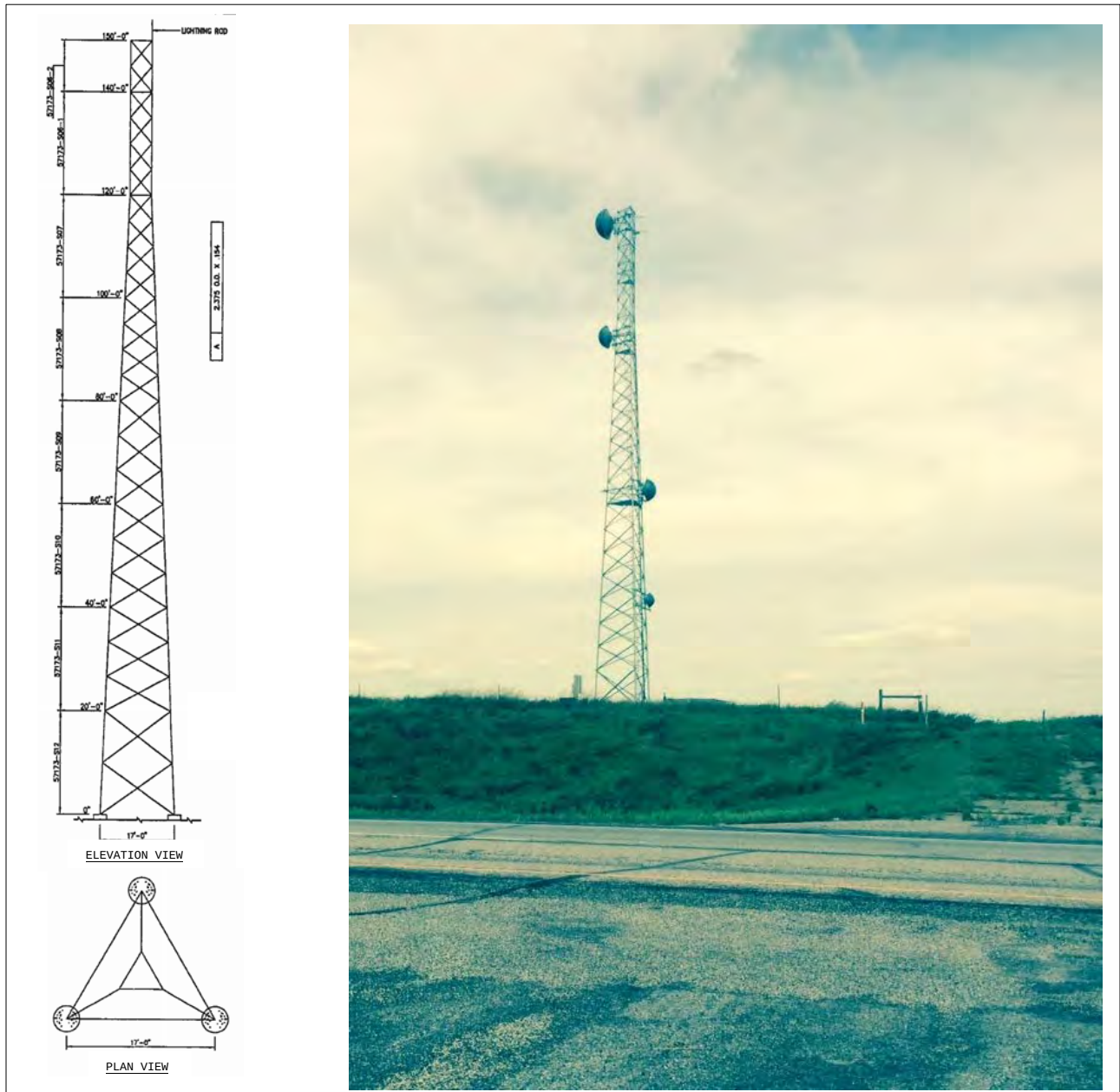
### Decommissioning

If the transmission line were to be abandoned or rebuilt, decommissioning and removal of structures, conductor, and ancillary equipment would be in accordance with applicable regulations in place at the time.

## **2.5.2 Lower Brule Switchyard and Witten Substation Expansion**

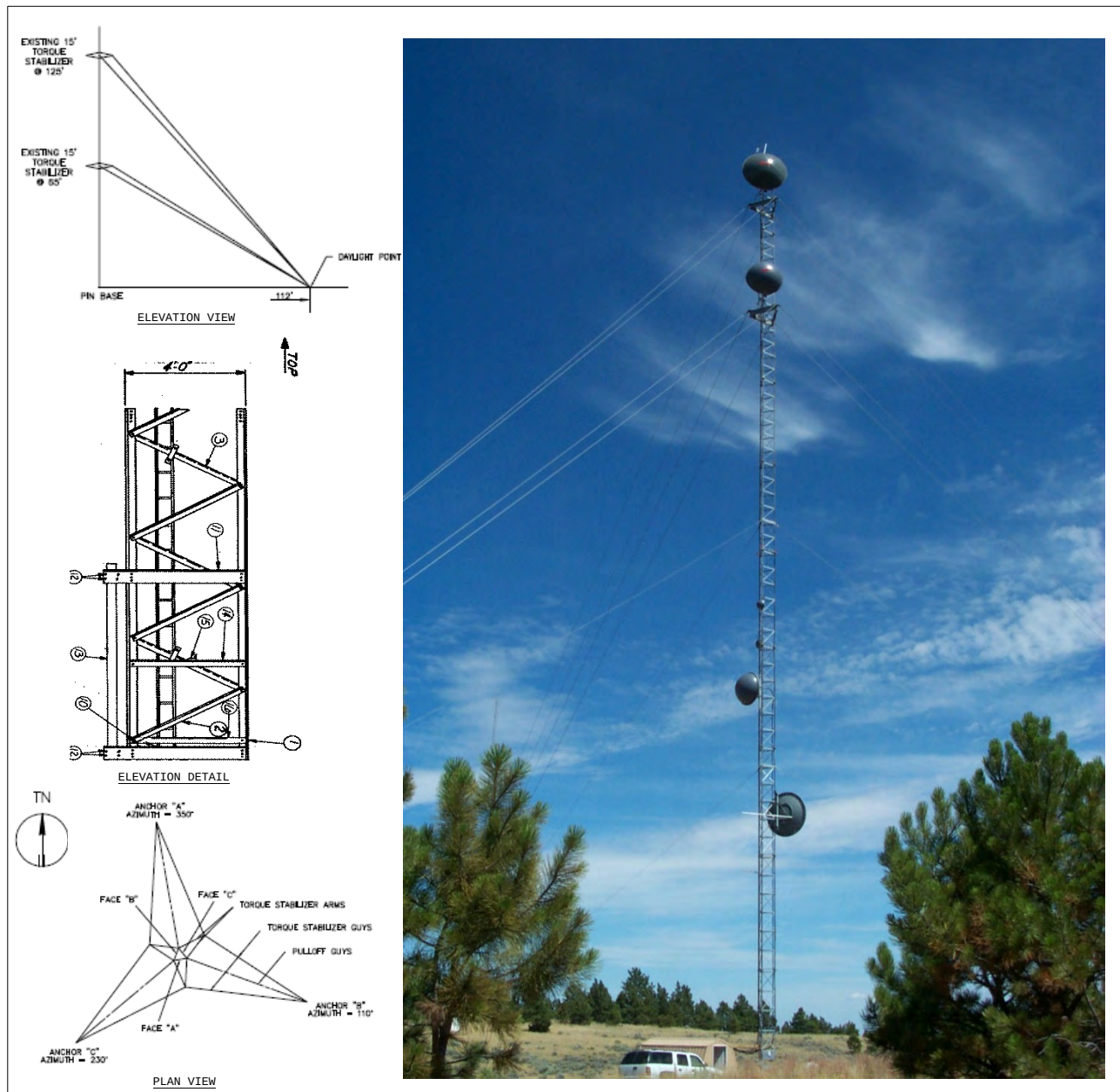
### **2.5.2.1 Design and Land Requirements**

Both the Lower Brule Switchyard and the Witten Substation Expansion include infrastructure to support the operation of the proposed 230-kV transmission line. A Supervisory Control and Data Acquisition system would interconnect the Lower Brule Switchyard and Witten Substation expansion. Hard-wire system communications would use fiber optics within the OPGW between the two sites and microwave communications equipment would be installed for Supervisory Control and Data Acquisition redundancy and to facilitate voice and data communications by field personnel. A microwave tower and dish would be constructed at the Witten Substation expansion and Lower Brule Switchyard. Each microwave relay tower would be a maximum of 150 feet in height, and have 2 to 4 dishes (each dish is 6 feet to 8 feet in diameter) affixed to it. Basin communications engineers have determined that due to the weight of the dishes creating potential wind loading issues, a monopole tower design is not feasible. Alternatively, two lattice designs were considered – a 'traditional,' self-supporting design with a wide triangular base (15 feet each side at the base) that tapers to a narrow tip, and a straight, narrower lattice (3 feet on each side); the former does not require guy lines, while the latter design does (see **Figures 2-6 and 2-7**).



**Figure 2-6** Typical Self-Supporting Lattice Relay Tower





**Figure 2-7** Guyed Narrow Lattice Relay Tower

Similar to other structural components, the two designs were evaluated according to durability, cost of installation, cost and frequency of periodic maintenance, land requirements and potential environmental impacts. While durability of each design is the same, construction cost for the self-supporting design is somewhat, but not substantially, higher; operations and maintenance costs also would be the same. The self-supporting design would have a footprint of 400 to 500 ft<sup>2</sup>, while the guyed design, based on three guy anchors 100 to 150 feet from the tower, would require a much larger area (maximum of 70,685 ft<sup>2</sup>). Additional space required for a shelter, propane, fencing, and associated components are comparable for each tower type. In terms of loading (i.e., amount of equipment that can be attached), the self-supporting design can handle higher loads.

Comparative environmental impacts are addressed in more detail in Sections 3.4, Fish and Wildlife Resources; 3.5, Special Status Species; and 3.12, Aesthetics. Briefly, potential impacts to avian species would be slightly lower with the self-supporting structure, while impacts to terrestrial species would be minor with either design. The towers would pose some additional risk to certain special status species, but not to the extent that they would be adversely affected. Consideration of aesthetics would favor the guyed design due to the narrower profile. The lower land requirement would favor the self-supporting design, but consideration of engineering and environmental factors did not weigh in favor of either design. Final design selection will be based on land (easement) requirements and any additional preference expressed by the LBST. Representative simulations from two observation points within the viewshed of the relay tower at the Lower Brule Switchyard are provided in **Appendix F**.

The Lower Brule Switchyard would be developed on a 7.1-acre site and the Witten Substation expansion would occur immediately adjacent to the existing Witten Substation on a 7-acre site (**Figures 2-8 and 2-9**).

#### **2.5.2.2 Construction Activities**

The sites for the Switchyard and Substation Expansion would be cleared and leveled in a manner similar to that proposed for the transmission structures. Topsoil would be segregated from underlying soils and redistributed on disturbed areas. Excess soil would be spread around the sites and/or used for fill, where needed. Soil erosion would be controlled during construction using best management practices. Components would be trucked to the site on local highways and roads and off-loaded using cranes and similar equipment. Concrete and aggregate would be trucked in from local sources. Access roads would be constructed to provide vehicle and equipment access from public roads and would consist of a compacted aggregate surface.

#### **2.5.2.3 Operation**

Basin Electric would operate both the Switchyard and Substation throughout the Project life. After construction, the ownership of the Lower Brule Switchyard would be transferred to Basin Electric, which would then own and operate it.

### **2.5.3 Big Bend Double-Circuit Structure and Transmission Line**

#### **2.5.3.1 Design and Land Requirements**

Western proposes to convert the existing Big Bend-Fort Thompson No. 2, 230-kV transmission line turning lattice structure, located on the south side of the dam, to a double-circuit structure. Western would construct approximately 1.6 miles of new double-circuit transmission line south to a new Switchyard, the Lower Brule Switchyard, which also would be constructed by Western. The new 1.6-mile-long double-circuit 230-kV transmission line would be owned, constructed, and operated by Western. **Figure 2-10** illustrates a typical 230-kV double-circuit structure.

#### **2.5.3.2 Construction Activities**

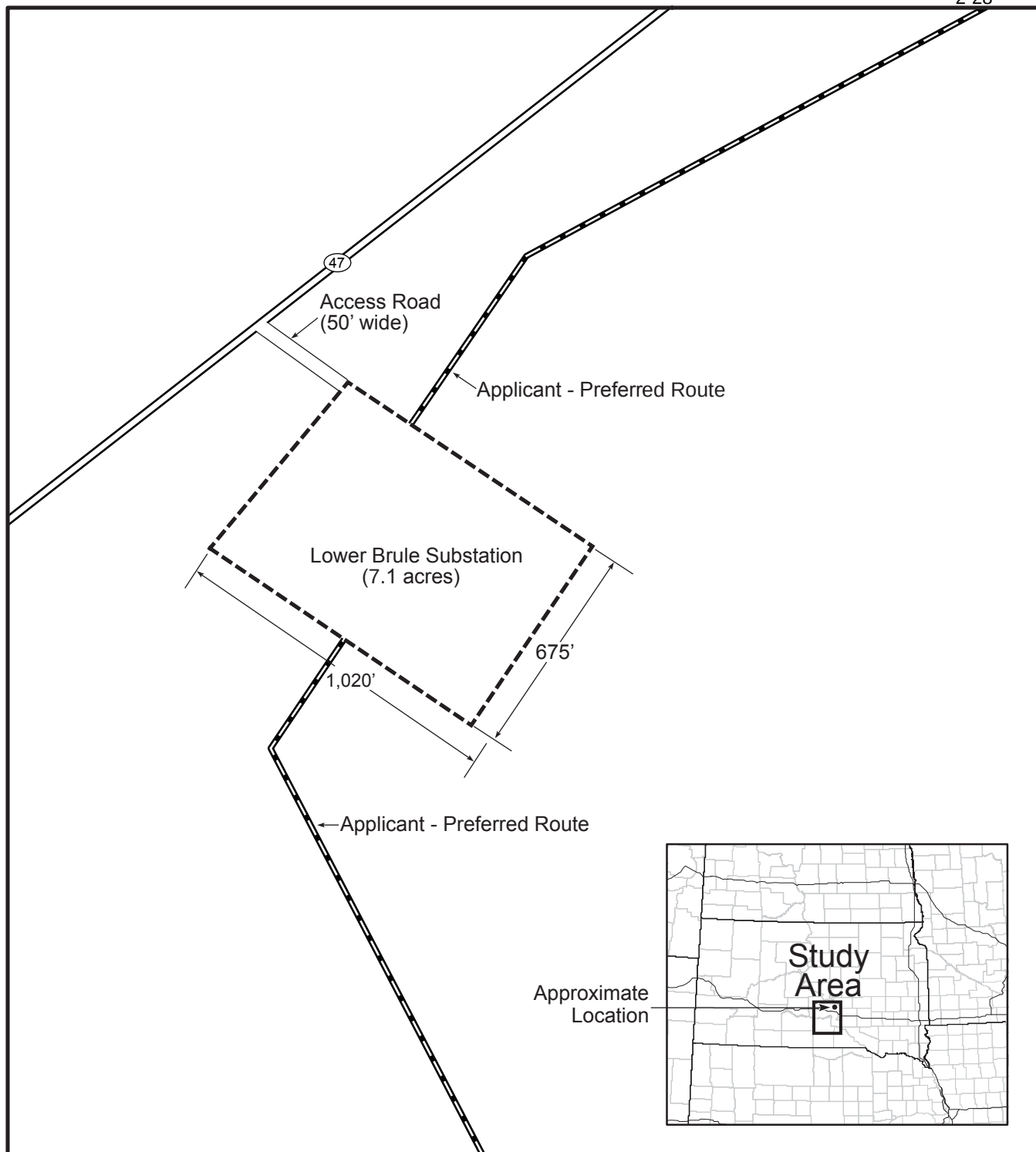
General construction activities would be the same as those described in Section 2.5.1.

### **2.5.3.3 Operation**

General operational activities would be the same as those described in Section 2.5.1.

## **2.6 No Action Alternative**

CEQ NEPA regulations (40 CFR 1502.14) require evaluation of the No Action Alternative as part of the analysis. The No Action Alternative differs from baseline analyses, which describes the affected environment, because this alternative addresses conditions that would exist without the Project. Under the No Action Alternative, beneficial and adverse impacts associated with construction and/or operation of the proposed transmission line, switchyard, and substation expansion would not be realized and existing conditions would continue during the foreseeable future. If the No Action Alternative were selected, none of the action alternatives would be funded or implemented by RUS or Western.



### Legend

-  Substation
-  Applicant - Preferred Route
-  State Highway

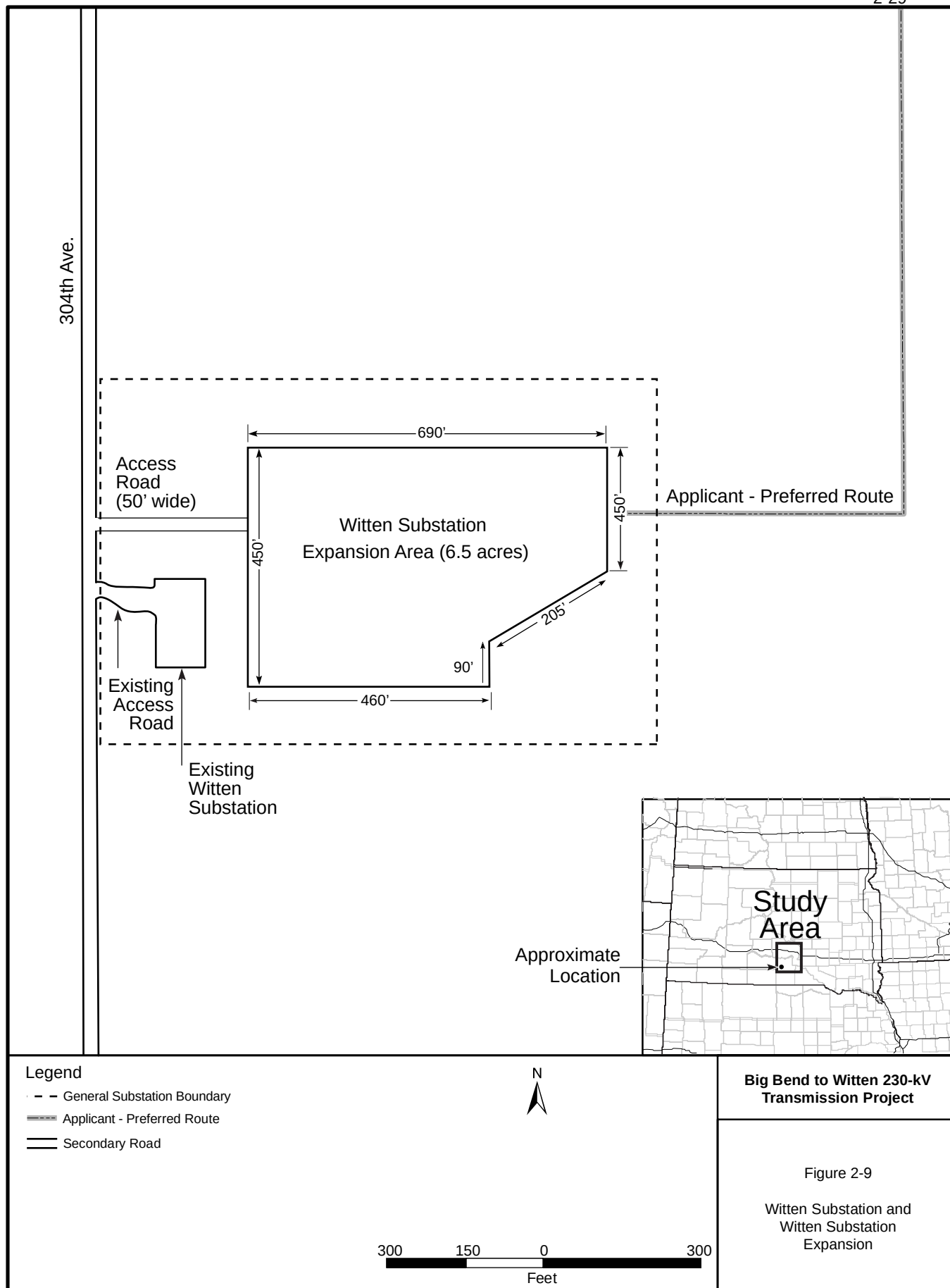


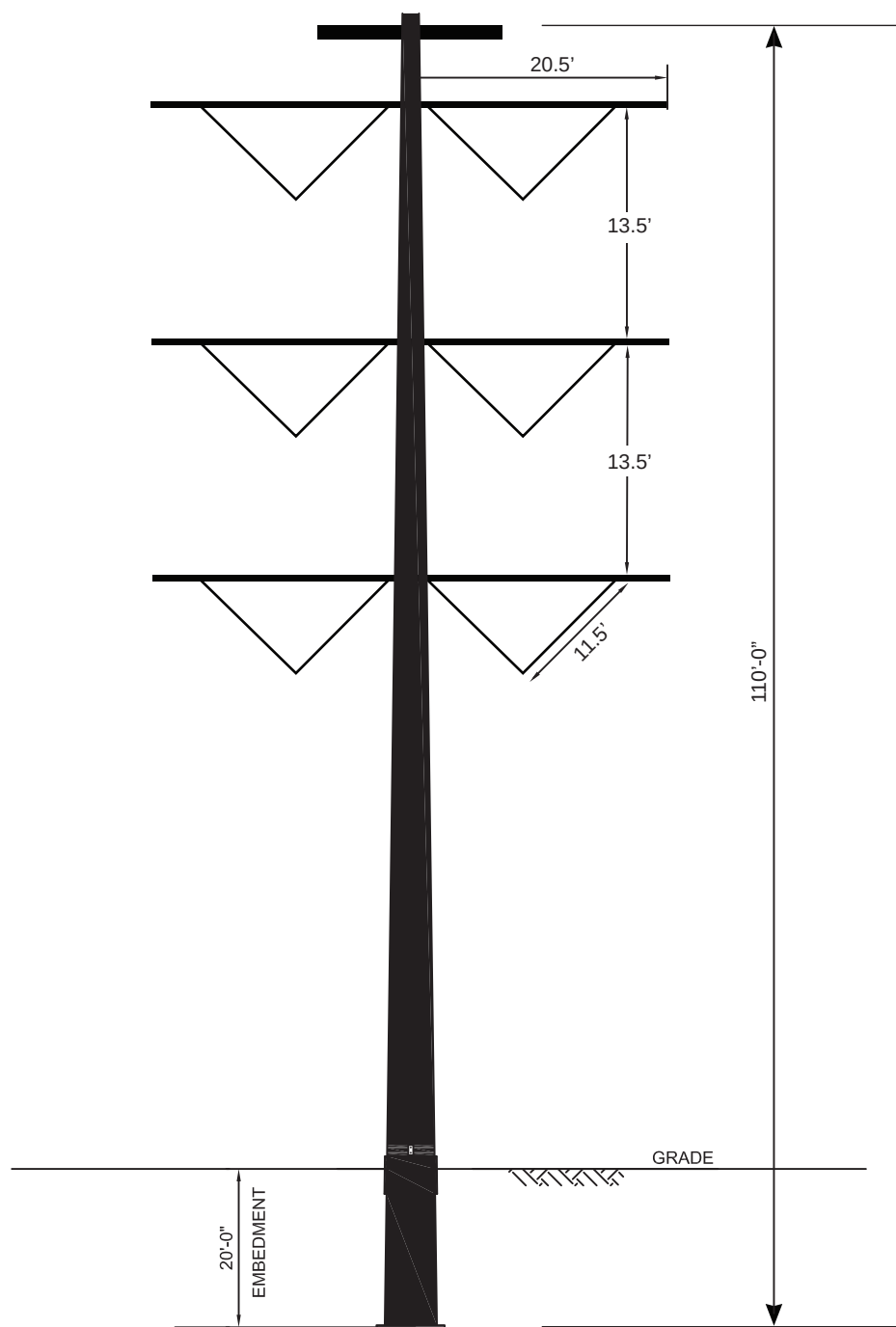
**Big Bend to Witten 230-kV  
Transmission Project**

Figure 2-8

Lower Brule Substation

Note: The substation location and layout are preliminary and would be refined based on discussions/ negotiations with the Lower Brule Sioux Tribe.





**Big Bend to Witten 230-kV  
Transmission Project**

Figure 2-10  
Typical Double-circuit  
Single-pole  
Structure

## 3.0 Affected Environment and Environmental Consequences

This chapter describes the environment that would be affected by the development of the Project analyzed in this EA. The baseline information summarized in this chapter was obtained from published and unpublished materials; interviews with local, state, tribal, and federal agencies; and from field studies conducted in the study area. The affected environment for individual resources was delineated based on the area of potential direct and indirect environmental impacts for the Project. For resources such as soils and vegetation, the affected area was determined to be the physical location and immediate vicinity of the areas that may be impacted by the Project. For other topics such as water quality, air quality, wildlife and fishery resources, and socioeconomics, the affected environment was more extensive (e.g., airshed, local communities, etc.).

This chapter also describes the anticipated direct and indirect environmental impacts of the Proposed Action and the alternatives, including the No Action Alternative. The analysis of potential impacts assumed the implementation of the environmental protection measures developed for the Project (see **Appendix D**, Environmental Protection Measures). Mitigation measures developed in response to anticipated impacts are recommended for individual resources, and are discussed at the end of each resource section.

### 3.1 Jurisdictions, Land Use, and Agricultural Practices

#### 3.1.1 Affected Environment

As detailed in **Table 3-1** and illustrated in **Figure 3-1**, the majority of the land within the study area is private land, comprising 88 percent. The Lower Brule Sioux Indian Reservation comprises 11 percent of the study area. The remainder of the study area, approximately 1 percent, is owned by the USACE and the State of South Dakota.

**Table 3-1 Jurisdictions Within the Study Area**

| Ownership             | Acreage Within the Study Area | Percent of Study Area |
|-----------------------|-------------------------------|-----------------------|
| Private               | 220,086                       | 88                    |
| BIA/LBST              | 27,989                        | 11                    |
| USACE                 | 1,708                         | <1                    |
| State of South Dakota | 567                           | <1                    |
| Total                 | 250,350                       | 100                   |

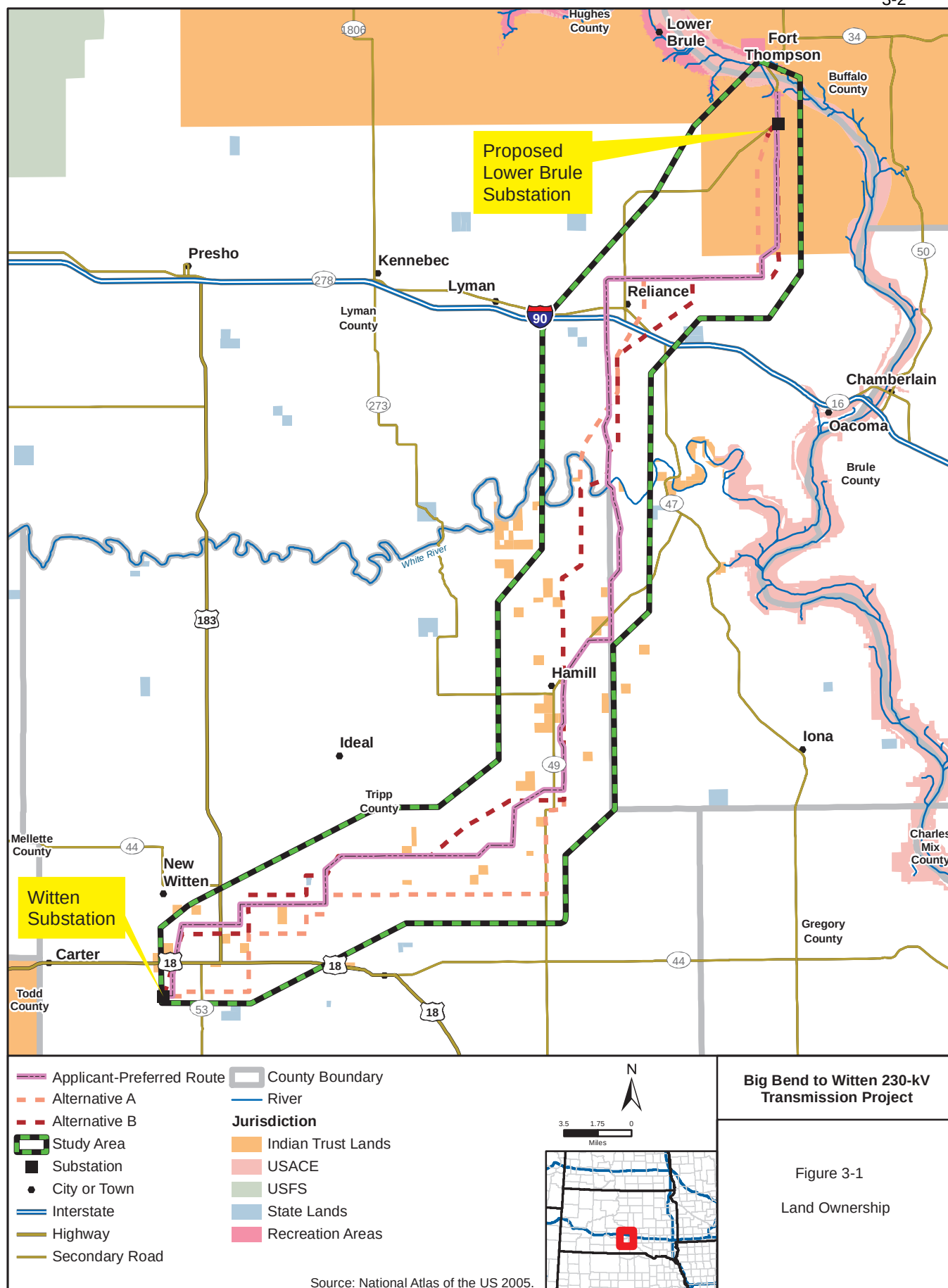




Table 3-5 in Section 3.3, Vegetation and Noxious Weeds, lists the various vegetation cover types within the study area, which correspond to several land use types. Based on the vegetation cover types, the primary land use within the study area is farmland, comprising approximately 59 percent of the study area. The most common crops produced are barley, wheat, oats, and corn. Hayland also is used for livestock grazing or production of seed and hay. Ranching is the second most common land use with the study area. Rangelands comprise approximately 40 percent of the study area and consist of grassland, badland, and shrubland. Less than 1 percent of the study area is developed. These areas include the cities of Hamill and Reliance, as well as utility lines and associated facilities, roads, and highways. Recreational activities also are another land use within the study area, comprising less than 1 percent of the study area.

### 3.1.2 Environmental Consequences

#### 3.1.2.1 Proposed Action

Construction of the proposed transmission line would result in temporary impacts to lands during and immediately following construction. Tangent structures and angle structures would be single-pole self-supporting and would not require guy wires. Although self-supporting angle structures would require reinforced concrete and steel foundations, no additional lands for guy wires would be needed. Since guy wires are not needed, cultivation and ranching can occur adjacent to the base of each structure. Therefore, the amount of land that would be taken out of farmland production would be limited to the footprint of each structure base, resulting in a negligible to minor long-term impact on farmland use.

Temporary and permanent impacts according to land ownership have been tabulated (**Table 3-2**) using disturbance acreages presented in **Table 2-3**. As shown in **Table 3-2**, construction of the Proposed Action would result in temporary impacts to 356 acres from structure pads, access roads, pulling and tensioning sites for conductor stringing, conductor splicing sites, and other Project activities.

**Table 3-2 Temporary and Permanent Disturbance by Jurisdiction**

| Ownership             | Proposed Action               |                               | Alternative Route A           |                               | Alternative Route B           |                               |
|-----------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|                       | Temporary Disturbance (acres) | Permanent Disturbance (acres) | Temporary Disturbance (acres) | Permanent Disturbance (acres) | Temporary Disturbance (acres) | Permanent Disturbance (acres) |
| Private               | 218                           | 7.1                           | 210.9                         | 7.1                           | 208.2                         | 7.1                           |
| BIA/LBST              | 132.2                         | 7.1                           | 132.2                         | 7.1                           | 132.2                         | 7.1                           |
| USACE                 | 5.5                           | <1                            | 5.5                           | <1                            | 5.5                           | <1                            |
| State of South Dakota | 0                             | 0                             | 0                             | 0                             | 1.9                           | 0                             |
| <b>Total</b>          | <b>355.7</b>                  | <b>14.2</b>                   | <b>348.6</b>                  | <b>14.2</b>                   | <b>347.8</b>                  | <b>14.2</b>                   |

The majority (218 acres) of the temporary disturbance would occur on private land. Permanent disturbance would primarily occur on 7.1 acres of private land and 7.1 acres of Indian trust land with construction and operation of the Witten Substation and Lower Brule Switchyard, respectively.

Approximately 246 acres of cropland and pasture and 98 acres of herbaceous rangeland would be temporarily disturbed during construction. Basin Electric would consult directly with affected landowners to minimize disruption to agricultural activities. Impacts to cropland would be limited to soil compaction, which would be minimized by the land being returned to cultivation use after construction. Construction within rangeland also could result in soil compaction, which is expected to recover over time.

Permanent impacts would occur with the construction and operation of the Lower Brule Switchyard and Witten Substation expansion, access roads, and transmission line structures. Land within these areas would be permanently removed from production. Overall temporary and permanent impacts to land use would be minimized by Basin Electric's decision to use single-pole, self-supporting structures, rather than steel lattice, guyed, or H-frame structures and implementation of environmental protection measures.

#### **3.1.2.2 Alternative Route A**

Under Alternative Route A, direct and indirect impacts to jurisdictions, land use, and agricultural practices would be similar to those described under the Proposed Action. Approximately 7 fewer acres of land would be temporarily disturbed by this alternative. Approximately 242 acres of cropland and pasture and 101 acres of herbaceous rangeland would be temporarily disturbed during construction. **Table 3-2** summarizes estimated acreage of temporary and permanent Project-related disturbance for Alternative Route A.

#### **3.1.2.3 Alternative Route B**

Under Alternative Route B, direct and indirect impacts to land use would be similar to those described under the Proposed Action. Approximately 8 fewer acres of land would be temporarily disturbed by this alternative. Approximately 204 acres of cropland and pasture and 121 acres of herbaceous rangeland would be temporarily disturbed during construction. **Table 3-2** summarizes estimated acreage of temporary and permanent Project-related disturbance by Project activity for Alternative Route B.

#### **3.1.2.4 No Action Alternative**

Under the No Action Alternative, there would be no changes in land use within the study area.

### **3.2 Geology, Minerals, Paleontological Resources, and Soils**

#### **3.2.1 Affected Environment**

##### **3.2.1.1 Geology**

##### Physiography and Geology

The Project is located in the Unglaciaded Missouri Plateau section of the Great Plains physiographic province (Fenneman 1928). The study area crosses two physiographic sub-sections of the Unglaciaded Missouri Plateau. A short portion of the north end of the study area is located in the Missouri Trench, the deeply incised valley of the Missouri River (Hogan and Foubert 1998). Elevation of Missouri Trench ranges about 1,400 feet above mean sea level (amsl) at the Missouri River to about 1,700 feet amsl at the edge of the trench. Most of the study area is in the Pierre Hills section, which is located in the center of South Dakota and west of the Missouri River. The Pierre Hills is characterized by rounded hills and buttes, and elevations within the study area range from under 1,500 amsl to over 2,200 feet amsl.

The bedrock in the study area is the Upper Cretaceous Pierre Shale, which is composed of dark gray marine organic to calcareous shale. The Pierre Shale may be several hundred feet thick in the study area and contains layers of sandstone and conglomerate, but also persistent bentonite beds (Martin et al. 2004). Surficial deposits consist of recent alluvium, older terrace deposits, and eolian (i.e., wind-blown) deposits. No faults have been documented in the study area, but a north-south trending anticlinal fold is present in eastern Lyman County. Many faults in the Pierre Shale in west-central South Dakota are too small to present on smaller map scales, but have been described during detailed field studies (Crandell 1958).

## *Geological Hazards*

### Landslides

The Pierre Shale is susceptible to landslides in the form of slumps or flows or combinations of slumps and flows (Crandell 1958). The study area is located in an area of high susceptibility to landslides, with generally low incidence, where incidence is defined as less than 1.5 percent of the area involved in landslides (National Atlas 2011; Radbruch-Hall et al. 1982). High landslide incidence is defined as greater than 15 percent of the area involved. An area of high incidence in the study area occurs on the slopes of the Missouri Trench and where the White River joins the Missouri River, which would need to be considered during final engineering and locating transmission poles. Incidence of landslides appears to be related to periods of anomalously high precipitation and occur more frequently when moisture causes movement along the planes of small faults or fractures in the shale (Crandell 1958).

### Seismicity

Central South Dakota does not experience very many earthquakes and the ones that have been recorded are of relatively low magnitude. Within a 60-mile radius of a circle centered near Hamill, South Dakota, there have been nine earthquakes greater than 2.0 magnitude from 1973 to October 2011 (National Earthquake Information Center 2011). The strongest quake was measured at a 4.6 magnitude and was about 10 miles north of Fort Thompson. Expected ground motions from a strong earthquake event are expected to be low (Petersen et al. 2008). No active or Quaternary faults have been identified in South Dakota (U.S. Geological Survey [USGS] 2006).

### Subsidence

There are no potential karst areas in the study area (Weary et al. 2008).

#### **3.2.1.2 Minerals**

The only potential commercial mineral resources in the study area are sand and gravel (South Dakota Geological Survey and USGS 2008). The most likely sources of gravel may be terrace deposits along the valley of the White River (Caddes 1947). Manganese has been found in nodules and beds in the Pierre Shale and although occasional concentrations are high, no commercial production has occurred (Cox and Beach 1980; Gries 1942). There are no other potential mineral resources in the study area (Hogan and Fouberg 1998).

#### **3.2.1.3 Paleontological Resources**

As indicated in Section 3.2.1.2, the study area is almost entirely underlain by the Pierre Shale. The members of the Pierre shale in the area may contain fossils, commonly fish scales, and other fish parts and invertebrates (Curtiss and Wadell 1951; Petsch 1952; Petsch and Curtiss 1950). Some zones in the Pierre Shale contain ammonite fossils commonly found in concretions (Gries 1942). High value reptilian fossils are occasionally found in the Pierre Shale and include turtles and marine lizards (Parris et al. 2007).

Many important fossil localities in the Pierre Shale are found along the wall of the Missouri Trench where Pierre outcrops and fossils have a greater chance of discovery. The discovery of important fossils is less probable in the vegetated and topsoil-covered area within the study area.

#### **3.2.1.4 Soils**

Information regarding soil characteristics was obtained from NRCS literature or databases, including the Land Resource Regions and Major Land Resource Areas (MLRAs) of the U.S., the Caribbean, and the Pacific Basin, USDA Handbook 296 (USDA-NRCS 2006) and the Soil Survey Geographic Database (SSURGO). SSURGO is the most detailed level of soil mapping completed by the USDA-NRCS. The

SSURGO databases for Lyman and Tripp counties, South Dakota (NRCS 2011) are the source for the soils data in this section. **Table 3-3** provides a summary of the soil characteristics within the study area generated from the SSURGO data. The various soil map units within the study area were combined into generalized groups of soils to evaluate potential impacts and to determine effective erosion control measures, reclamation, and revegetation potential in the area.

**Table 3-3 Soil Characteristics within the Study Area**

| Soil Characteristics             | Acres Within Study Area |
|----------------------------------|-------------------------|
| Droughty                         | 2,323                   |
| Prime Farmland                   | 77,385                  |
| Farmland of Statewide Importance | 60,623                  |
| Hydric                           | 222,960                 |
| Wind Erodible                    | 661                     |
| Water Erodible                   | 62,476                  |
| Shallow Depth to Bedrock         | 293                     |
| Compaction Prone                 | 237,830                 |
| Low Revegetation Potential       | 3,747                   |

Note: Acreages are not additive as areas with soil characteristics noted in the table may overlap.

### Regional Overview

The study area is located within MLRA 63B, Southern Rolling Pierre Shale Plain Major of soil resources (USDA-NRCS 2006). This MLRA is an area of old plateaus and terraces that have been deeply eroded. It is nearly level to rolling and has long, smooth slopes and a well-defined dendritic drainage system. Rivers and creek valleys have smooth floors and steep walls. Some of the higher areas have deposits of glacial drift. The topography is typified by nearly level and broad intervalley remnants of smooth fluvial plains. Elevation ranges from 1,310 to 1,640 feet amsl on the bottom land along the Missouri River and from 1,310 to 1,970 feet amsl on the shale plain uplands. Cretaceous Pierre Shale underlies most of this area. This is a marine sediment having layers of volcanic ash that have been altered to smectitic clays. These clays shrink as they dry and swell as they become wet, causing significant problems for road and structural foundations. These soils also are prone to slumping and larger landslides when situated on sloping areas. The dominant soil orders in this MLRA are Entisols, Inceptisols, Mollisols, and Vertisols. Mollisols are fertile soils with high organic matter and a nutrient-enriched, thick surface. In contrast, Entisols are considered recent soils that lack soil development because erosion or deposition rates occur faster than the rate of soil development. Inceptisols are weakly developed soils that formed in humid and subhumid regions. Inceptisols have altered horizons that have lost bases or iron and aluminum but retain some weatherable minerals. Vertisols have a high content of expansive clay known as montmorillonite that forms deep cracks in drier seasons or years. Vertisols shrink when drying and swell when they become wetter. The soils are shallow to very deep, generally well drained, and loamy or clayey.

### Study Area Soil Characteristics

Soil characteristics such as susceptibility to erosion and the potential for revegetation are important to consider when planning for construction activities and stabilization of disturbed areas. These hazards or limitations for use are a function of many physical and chemical characteristics of each soil, in combination with the climate and vegetation. **Table 3-3** summarizes important soil characteristics to be

considered when evaluating the effects of surface-disturbing activities, with explanations of the meanings of each column described in this section.

Water erosion is the detachment and movement of soil by water. Natural erosion rates depend on inherent soil properties, slope, soil cover, and climate. Approximately 25 percent of the soils within the study area are highly erodible to water. Water erodible soils are illustrated in **Figure 3-2**. Wind erosion is the physical wearing of the earth's surface by wind. Wind erosion removes and redistributes soil. Small blowout areas may be associated with adjacent areas of deposition at the base of plants or behind obstacles, such as rocks, shrubs, fence rows, and roadbanks (Soil Quality Institute 2001). Wind erodible soils comprise less than 1 percent of the soils within the study area. Highly erodible soils typically require aggressive erosion control measures to minimize soil loss and offsite deposition if they are disturbed.

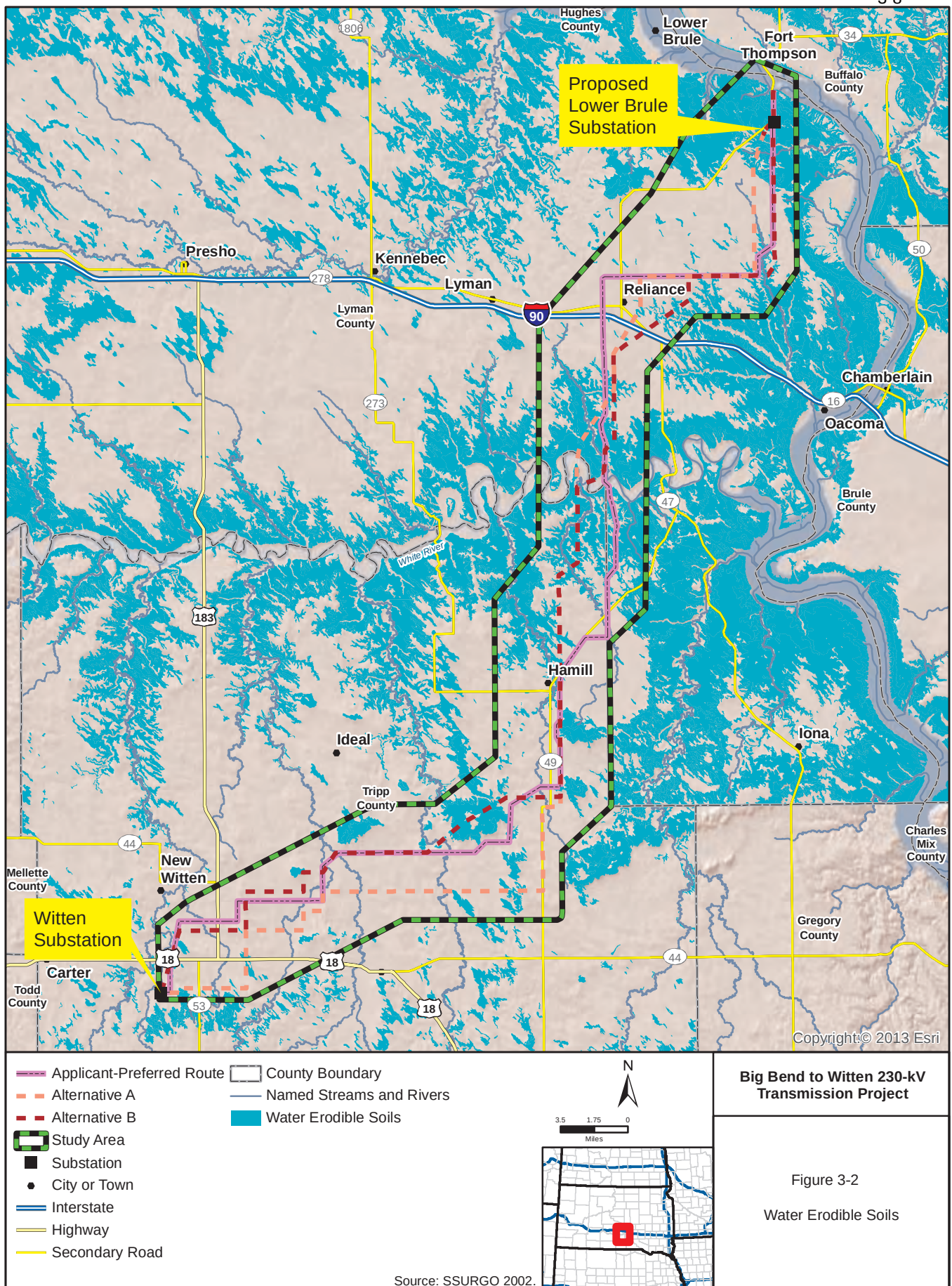
Prime farmland is land that has the best combination of physical and chemical characteristics for producing crops and is available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods. These soils have the capability to be prime farmland, even if they have not yet been developed for agricultural uses. Farmland of statewide importance is land other than prime farmland which has a good combination of physical and chemical characteristics for the production of crops. It must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use (USDA 1993). The Farmland Protection Policy Act (FPPA) states that federal programs that contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses will be minimized and shall be administered in a manner that, as practicable, are compatible with state and local government and private programs and policies to protect farmland. Approximately 31 percent of soils within the study area are prime farmland and 24 percent are farmland of statewide importance. The occurrence of prime farmland and farmland of statewide importance are illustrated in **Figure 3-3**.

Soil compaction occurs when soil particles are pressed together and the pore spaces between them are reduced and bulk density is increased. Moist fine textured soils are most susceptible to severe compaction. Compaction prone soils are often high in clay which can be a limiting factor to vegetation growth. Approximately 95 percent of the soils within the study area are compaction prone. The occurrence of compaction prone soils is illustrated in **Figure 3-4**.

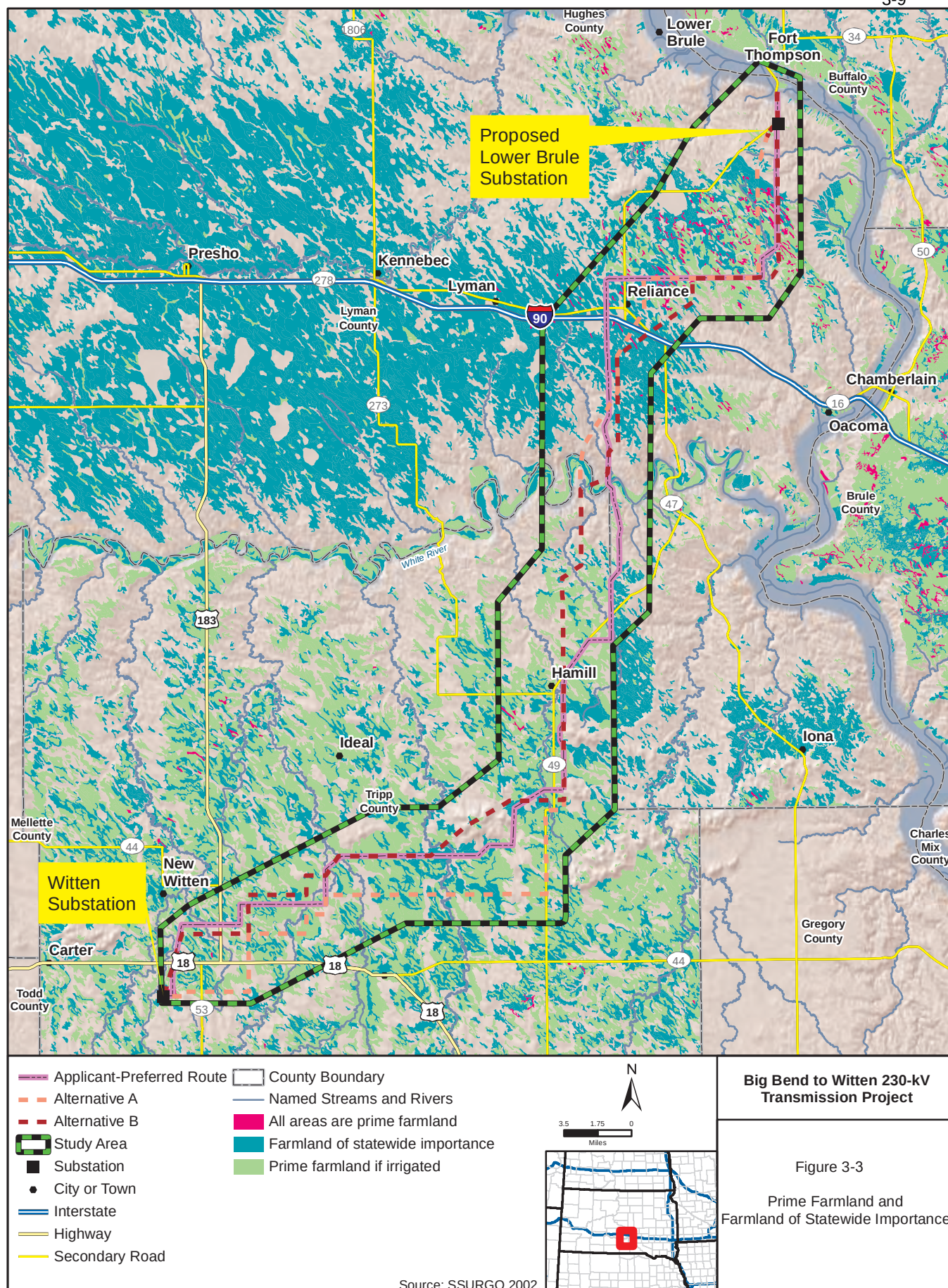
Soils that are droughty have physical characteristics that may limit plant growth due to low water holding capacity. In addition, the success of stabilization and restoration efforts in these areas may be limited unless additional treatments and practices are employed to offset the adverse physical characteristics of the soils. Approximately 1 percent of the soils within the study area are considered droughty.

Hydric soils are soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. These soils are commonly associated with floodplains, lake plains, basin plains, riparian areas, wetlands, springs, and seeps. Approximately 89 percent of the soils within the study area have at least one component of the map unit that is hydric. Smaller areas of hydric soils may exist but may not be captured due to the scale of mapping. Alteration of hydric soils should be avoided.

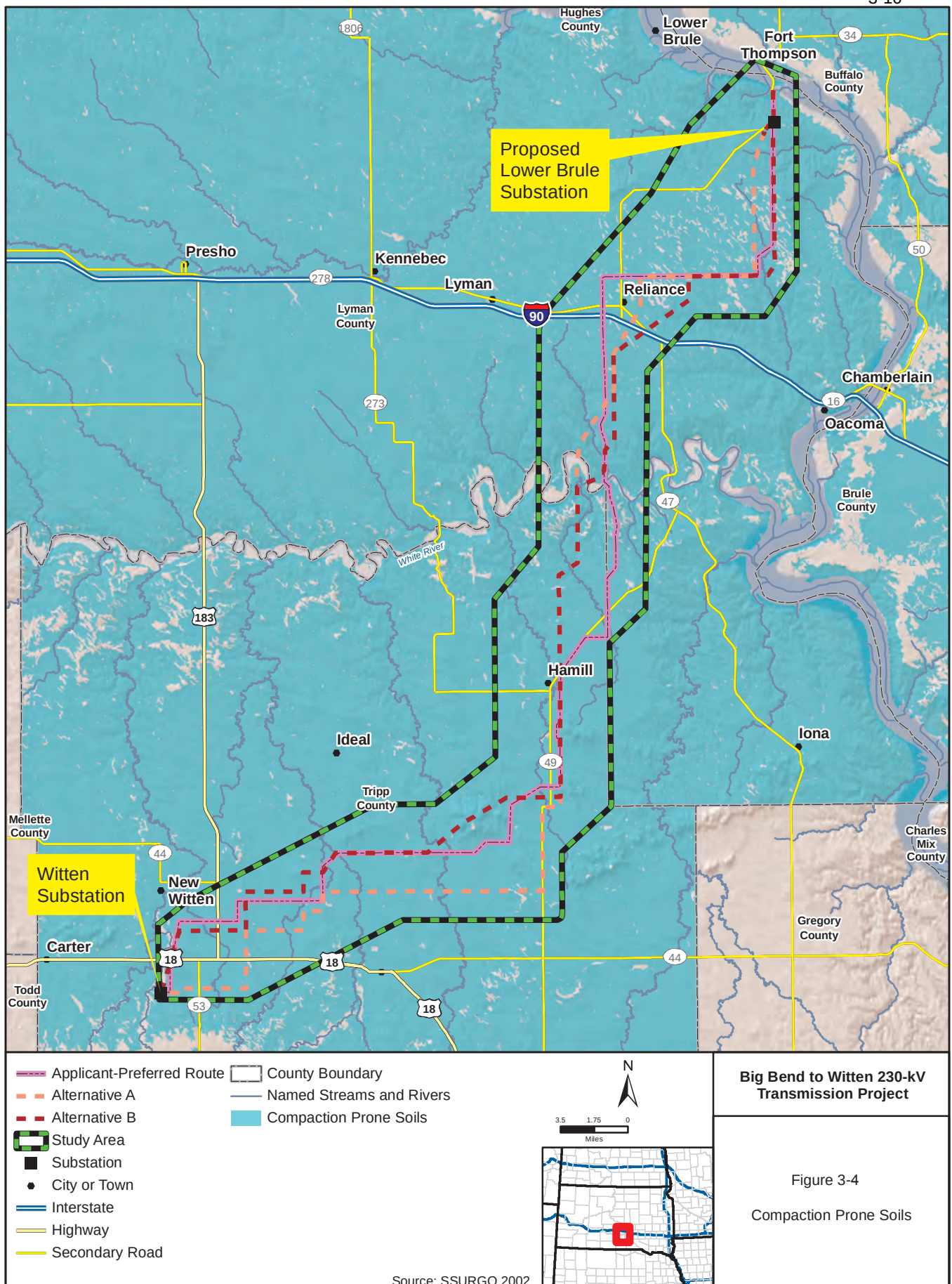
Soils with a shallow depth to bedrock include soils that have lithic (hard) bedrock less than 60 inches from the soil surface. This can be an important consideration for excavating holes for transmission line poles. Less than 1 percent of the soils within the study area have a shallow depth to bedrock.













Soils with low revegetation potential have chemical characteristics such as high salts, sodium, or pH that may limit plant growth. Saline soils affect plant uptake of water and sodic soils often have drainage limitations. In addition, the success of stabilization and restoration efforts in these areas may be limited unless additional treatments and practices are employed to offset the adverse physical and chemical characteristics of the soils. Approximately 2 percent of the soils within the study area have low revegetation potentials. Soils derived from the Pierre Shale generally have low revegetation potentials due to the high salts and calcareous nature of the parent materials from which they are derived.

### 3.2.2 Environmental Consequences

#### 3.2.2.1 Proposed Action

##### Geology

The major issues for geology involve potential impacts to unique geological resources and potential impacts of geological hazards to the Project. The Project has been designed to avoid unique geological resources. Geological hazards related to seismicity and/or sinking and settling are not expected to adversely impact the Project. There are potential landslide and slope instability concerns with regard to the Pierre Shale. These risks would be higher in areas of steep slopes during periods of anomalously high precipitation. Potential areas of concern were identified in Section 3.2.1.1 as areas along the slopes of the Missouri Trench and where the White River joins the Missouri River. The environmental protection measures, as listed in **Appendix D**, would minimize hazards of construction in these areas.

##### Minerals

A major concern that linear projects present for mineral resources development is access to the mineral resource sites. Because of the lack of documentable mineral resources in the study area, the Project is not expected to prevent access to mineral resource sites or preclude development of those resources.

##### Paleontological Resources

Potential impacts to paleontological resources would involve the loss and destruction of scientifically valuable fossil resources. In the study area, areas of concern for paleontological resources are bedrock exposures of Pierre Shale along the Missouri Trench and the White River. Fossil recovery and protection would not occur on private lands unless through prior agreement with landowners. Due to the minimal amount of subsurface disturbance associated with the Project, effects to paleontological resources are likely to be negligible or minor.

##### Soils

Potential impacts to soil resources and potential impacts to the Project were evaluated based on soil types, their extent within the Project area, and their physical and chemical characteristics in relation to the Project activities. **Table 3-3** presents the soil characteristics in the study area and their relative extent. This information was based on SSURGO database reviews and analyses (NRCS 2011).

**Table 3-4** lists the estimated temporary disturbance acreages according to soil characteristics.

In general, the impacts associated with construction of the transmission line would be temporary. Temporary disturbances would occur within the ROW due to construction traffic along the ROW, laydown areas, pulling and tensioning sites, and splicing sites. These temporary activities would affect approximately 356 acres of soils within the designated ROW, some of which may have been previously disturbed by agricultural activities. Based on structure spacing at a nominal 800 feet, construction of the transmission line would result in small areas of localized permanent disturbance associated with approximately 501 single pole structures with a diameter of 5-6 feet. Localized permanent impacts to soils would result from loss of surface lands due to installation of structures.

**Table 3-4 Soil Characteristics and Estimated Temporary Disturbance**

| <b>Soil Characteristics</b>        | <b>Proposed Action (acres)</b> | <b>Alternative Route A (acres)</b> | <b>Alternative Route B (acres)</b> |
|------------------------------------|--------------------------------|------------------------------------|------------------------------------|
| Compaction Prone <sup>1</sup>      | 336.0                          | 333.5                              | 316.9                              |
| Prime Farmland <sup>2</sup>        | 124.3                          | 134.6                              | 109.7                              |
| Farmland of Statewide Importance   | 84.4                           | 68.4                               | 69.4                               |
| Hydric <sup>3</sup>                | 319.1                          | 309.5                              | 293.1                              |
| Low Revegetation Potential         | 3.7                            | 6.3                                | 3.9                                |
| Wind Erodible                      | 0.1                            | 0.2                                | 0                                  |
| Water Erodible                     | 75.9                           | 86.7                               | 95.2                               |
| Corrosion to Concrete <sup>4</sup> | 13.9                           | 18.1                               | 25.6                               |
| Corrosion to Steel <sup>4</sup>    | 340.4                          | 340.2                              | 323.2                              |

<sup>1</sup> Includes soils with greater than 28 percent clay in the top 20 inches.

<sup>2</sup> Includes areas of prime farmland if irrigated.

<sup>3</sup> Soils characterized as partially hydric (at least one component of the map unit is hydric). Hydric soils are a small percentage of the total area.

<sup>4</sup> Soils characterized as having a high hazard of corrosion to concrete or steel.

Note: Acreages are not additive as areas with soil characteristics noted in the table may overlap.

Source: NRCS 2011.

A 5-foot-diameter augering for a single-pole, tangent structure to an average depth of 20 feet would displace approximately 15 yd<sup>3</sup> of soil. Installation of angle structures (those that alter the direction of the line) would require a 6-foot-diameter, 20-foot-deep borehole for foundation construction. Soil displacement for each angle structure would total approximately 21 yd<sup>3</sup>. Excess soils would be either left on-site or disposed of off-site at an approved landfill, depending on the landowner's wishes. The area would be graded, if required, to ensure safe movement and operation of heavy equipment. Pulling and tensioning areas would temporarily disturb approximately 17 to 22 acres of soil acres within the designated ROW, some of which may have been previously disturbed by agricultural activities.

Disturbance by construction practices resulting in the loss of the protective vegetative soil cover could result in accelerated wind and water erosion. Compaction would occur where construction vehicles travel along the ROW. This would reduce infiltration and increase runoff, which would increase erosion by water. The Proposed Action would temporarily affect approximately 76 acres of water erosion prone soils. Although few soils are prone to wind erosion along the proposed transmission line, wind erosion may result on all soils due to disturbance along the ROW when high winds are present. Wind erosion also may result when soils are excavated or leveled and loose on the surface. Project environmental protection measures and best management practices would be applied to reduce water erosion and sedimentation to nearby waterways.

Carbonates, salts, and sodium often accumulate in the lower subsoils. The mixing of soil horizons by rutting or spreading subsoil on the soil surface would lower soil productivity of agricultural and rangeland by diluting the physical, biological, and chemical properties of the nutrient rich topsoil. In addition, contamination of surface soils with subsoils that have chemical constraints would limit the revegetation potential of disturbed sites. This is especially a concern in areas of prime farmland. Soil productivity also would be negatively altered if woody materials are chipped and left on-site at depths deeper than

3 inches. Approximately 124 acres along the proposed ROW are considered prime farmland and 84 acres are considered farmland of statewide importance that could be temporarily disturbed. Direct impacts to prime farmland would result where Project footprints (structures, facilities) result in the permanent removal of soil resources. Surplus soil would be spread around the base of the structure or hauled to an off-site location (i.e., area landfills) for disposal, in accordance with landowner wishes.

Soil compaction and rutting result from the movement of construction vehicles along the construction ROW, on access roads, and from overland access. The degree of compaction would depend on the moisture content and texture of the soil at the time of construction. Approximately 336 acres of compaction prone soils occur along the proposed route that could be temporarily disturbed. Compaction would be most severe where there is repeated traffic and where heavy equipment operates on moist to wet soils with high clay contents. In many cases, wet areas such as wetlands and streams can be spanned by the line to minimize impacts during construction.

Rutting affects the surface hydrology of a site as well as the rooting environment. The process of rutting physically severs roots and reduces the aeration and infiltration of the soil, thereby degrading the rooting environment. Rutting also disrupts natural surface water hydrology by diverting and concentrating water flows creating accelerated erosion. Rutting is most likely to occur on moist or wet fine-textured soils but also may occur on dry sandy soils due to low soil strength. If soils are moist or wet, topsoil also may adhere to tires and/or tracked vehicles and be carried away. Maintenance of the line would be scheduled during periods of minimum precipitation to minimize impacts such as rutting and compaction.

Corrosion potential pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. For uncoated steel, the risk of corrosion is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract. For concrete, the risk of corrosion is based on soil texture, acidity, and amount of sulfates in the saturation extract (NRCS 2011).

Approximately 14 acres of soils along the Proposed Action with a severe concrete corrosion hazard could be temporarily disturbed. In general, the risk of corrosion to concrete is relatively low. Approximately 340 acres of soils that have a severe steel corrosion hazard along the Proposed Action could be temporarily disturbed. The risk of corrosion to uncoated steel by soils along the Proposed Action is high. The effects of corrosion on steel transmission line structures would be offset by the use of protective coating.

Construction of the new substation/switchyard and access roads would result in the permanent disturbance of approximately 14 acres of soil resources at each location. Where substation/switchyard structures are located the soils would be taken out of production and the area around the substation/switchyard would be graveled. A permanent loss in soil productivity and quality would be expected in these locations. Construction-related impacts to soil resources would be the similar to what is described above for transmission lines.

#### **3.2.2.2 Alternative Route A**

##### Geology, Minerals, and Paleontological Resources

Under Alternative Route A, direct impacts to geological, mineral, and paleontological resources would be similar to those described under the Proposed Action.

### Soils

Under Alternative Route A, direct impacts to soil resources would be similar to those described under the Proposed Action. Approximately 7 fewer acres of soils would be temporarily disturbed by this alternative. Compared to the Proposed Action, Alternative Route A would temporarily disturb fewer acres of compaction prone soils (3 acres less), farmland of statewide importance (16 acres less), hydric soils (10 acres less), and soils with corrosion to steel (0.2 acre less). Compared to the Proposed Action, Alternative Route A would temporarily disturb more acres of prime farmland (10 acres more), soils with low revegetation potential (3 acres more), water erodible soils (11 acres more), and soils with corrosion to concrete (4 acres more). **Table 3-4** presents the soil characteristics in the analysis area ROW for Alternative Route A.

#### **3.2.2.3 Alternative Route B**

##### Geology, Minerals, and Paleontological Resources

Under Alternative Route B, direct impacts to geological, mineral, and paleontological resources would be similar to those described under the Proposed Action.

### Soils

Under Alternative Route B, direct and indirect impacts to soil resources would be to those described under the Proposed Action. Approximately 8 fewer acres of soils would be temporarily disturbed by this alternative. Compared to the Proposed Action, Alternative Route B would temporarily disturb fewer acres of compaction prone soils (19 acres less), prime farmland (15 acres less), farmland of statewide importance (15 acres less), hydric soils (26 acres less), and soils with corrosion to steel (17 acres less). Compared to the Proposed Action, Alternative Route B would temporarily disturb more acres of soils with low revegetation potential (0.2 acre more), water erodible soils (19 acres more), and soils with corrosion to concrete (12 acres more). **Table 3-4** presents the soil characteristics in the analysis area ROW for Alternative Route B.

#### **3.2.2.4 No Action Alternative**

##### Geology, Minerals, and Paleontological Resources

Under the No Action Alternative, the Project would not occur and there would be no impacts from geological hazards or to mineral resources. Potential loss of paleontological resources would continue to occur as the result of natural erosion processes or the unauthorized collection of fossils.

### Soils

Under the No Action Alternative, the Project would not be constructed and the associated impacts to soils would not occur. Under this alternative, there would be no temporary or permanent impacts to soils for the transmission lines. Soil resources that are highly erodible, compaction prone, or with substantial natural drainage limitations would not be affected. Natural and anthropogenic actions such as erosion, agriculture, fire, recreation, and development would continue to impact soil resources.

### **3.3 Vegetation and Noxious Weeds**

#### **3.3.1 Affected Environment**

##### **3.3.1.1 Vegetation**

The study area is located within the Northwestern Glaciated Plains and the Northwestern Great Plains ecoregions of south-central South Dakota. The landscape is characterized as a semi-arid rolling plain of shale, siltstone, and sandstone with isolated sandstone buttes, badland formations, and semi-permanent and seasonal wetlands, referred to as 'prairie potholes'. Vegetation cover types and characterizations were compiled using the National Land Cover Gap Analysis Project (GAP) database (USGS 2010) and SDGFP Comprehensive Wildlife Conservation Strategy (SDGFP 2006). Seven vegetation cover types

are considered to occur within the study area: agriculture, grassland, shrubland, woodland, wetland/waterbody, badlands, and developed lands. Distribution and composition of each vegetation cover type varies based on landscape position, soil type, climatic conditions, moisture, elevation, aspect, and grazing and land management practices. Descriptions of the plant communities within each vegetation cover type are provided in the following text. Species nomenclature is consistent with the NRCS Plants Database (USDA-NRCS 2011). **Table 3-5** summarizes the vegetation cover types within the study area. **Figure 3-5** illustrates the vegetation cover types within the study area.

**Table 3-5 Vegetation Cover Types within the Study Area**

| Vegetation Cover Type          | Acreage within Study Area | Percent of Study Area |
|--------------------------------|---------------------------|-----------------------|
| Agriculture                    | 146,593                   | 59                    |
| Grassland                      | 97,987                    | 39                    |
| Badland                        | 2,891                     | 1                     |
| Wetland/Waterbody <sup>1</sup> | 2,345                     | 1                     |
| Woodland/Upland Forest         | 326                       | <1                    |
| Developed                      | 152                       | <1                    |
| Shrubland                      | 56                        | <1                    |
| <b>Total</b>                   | <b>250,350</b>            | <b>100</b>            |

<sup>1</sup> Wetland acreages presented in **Tables 3-5** and **3-13** differ significantly based on the dataset used within each section.

**Table 3-5** presents acreage using the GAP database (USGS 2010); **Table 3-13** presents wetland acreage using the NWI database (USFWS 2011). The spatial extent of wetland and WUS features in specific locations will be delineated prior to construction.

Source: USGS 2010.

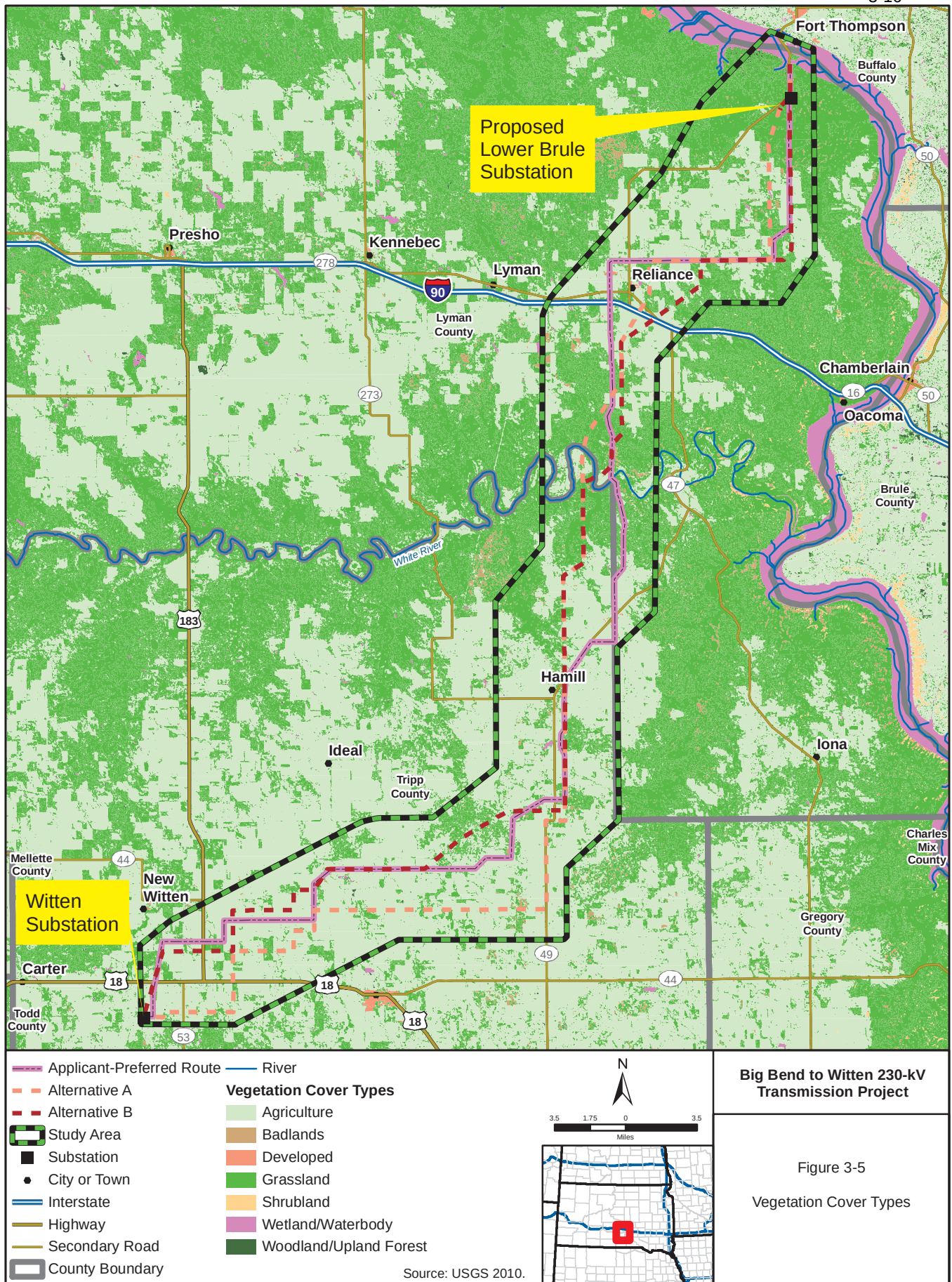
### Agriculture

Agriculture, the most prominent cover type within the study area (146,593 acres, 59 percent), is composed of cultivated cropland used primarily for the production of annual crops such as barley, wheat, oats, and corn. In addition, this vegetation cover type also consists of pasture and hayland including areas of grass, legumes, or grass-legume mixtures (i.e., planted herbaceous perennials) planted for livestock grazing or the production of seed or hay.

### Grassland

Grassland, the second most prominent vegetation cover type within the study area (97,987 acres, 39 percent), is composed of tall-grass prairie (i.e., grassland community dominated by tall grasses 3 to 6 feet tall), mixed-grass prairie, and sandhills dune prairie. Sandhill dune prairie grasslands typically occupy wind-formed sand dunes of sand or gravel soils, dominated by sand-adapted species including sand bluestem (*Andropogon halli*), hairy grama (*Bouteloua hirsuta*), prairie sandreed (*Calamovilfa longifolia*), and little bluestem (*Schizachyrium scoparium*). Mixed-grass prairie grasslands typically are composed of a mixture of tall, short, and intermediate grass species (approximately 1 to 2 feet tall) such as blue grama (*Bouteloua gracilis*), green needlegrass (*Nassella viridula*), thickspike wheatgrass (*Elymus lanceolatus*), and western wheatgrass (*Pascopyrum smithii*). Tall-grass prairie grasslands typically are dominated by tall grasses between 3 to 6 feet tall, such as big bluestem (*Andropogon gerardii*), little bluestem, and Indian grass (*Sorghastrum nutans*). Common forb species include pasque





flower (*Pulsatilla* spp.), western wallflower (*Erysimum asperum*), prairie smoke (*Geum triflorum*), Missouri milkvetch (*Astragalus missouriensis*), lead plant (*Amorpha canescens*), Indian breadroot (*Pediomelum* spp.), purple prairie clover (*Dalea purpurea*), gaura (*Gaura* spp.), harebell (*Asyneuma* spp.), fringed sage (*Artemesia frigida*), purple coneflower (*Echinacea* spp.), yarrow (*Achillea* spp.), and several species of goldenrods (*Solidago* spp.). Grassland vegetation is primarily used for livestock grazing.

#### Badland

The badland vegetation cover type, occupying approximately 2,891 acres (1 percent) of the study area, is characterized by steep, primarily south- and west-facing slopes with less than 20 percent vegetation cover on flats or eroded buttes formed from mudstone, claystone, siltstone, and scoria. Although sparsely vegetated, species associated with this vegetation cover type may include xeric shrub species such as spiny saltbush (*Atriplex* spp.) sagebrush (*Artemesia* spp.), rabbitbrush (*Chrysothamnus* spp.), and greasewood (*Sarcobatus* spp.). Sub-shrub and forb species may include prickly pear (*Opuntia* spp.), silver sage (*Artemesia cana*), prairie sandreed, yucca (*Yucca* spp.), winterfat (*Krascheninnikovia lanata*), butte primrose (*Oenothera caespitosa*), standing milkvetch (*Astragalus laxmannii*), and penstemon (*Penstemon* spp.).

#### Wetland/Waterbody

The wetland/waterbody cover type, occupying approximately 2,345 acres (1 percent) of the study area, includes a mosaic of palustrine emergent (PEM) wetlands, palustrine scrub-shrub (PSS), palustrine forested (PFO) wetlands, and open water systems. In PEM wetlands, fowl bluegrass (*Poa palustris*) and foxtail barley (*Hordeum jubatum*) dominate areas that typically contain water for several weeks after spring snowmelt. Shallow-marsh vegetation, such as spikerush (*Eleocharis palustris*) and wheat sedge (*Carex atherodes*), dominate areas where water typically persists for a few months each spring, and deep-marsh vegetation like cattails (*Typha latifolia*) and hardstem bulrush (*Scirpus acutus*) occupies areas where water persists throughout the year. PSS wetlands are dominated by woody vegetation less than 5 meters in height. The species present include shrubs, young trees, or trees that are stunted due to environmental conditions. Common PSS species may include greasewood, winterfat, fourwing saltbush (*Atriplex canescens*), and shadscale saltbush (*Atriplex confertifolia*). PFO wetlands are dominated by woody vegetation greater than or equal to 5 meters in height. Common PFO species include: boxelder (*Acer negundo*), eastern cottonwood (*Populus deltoides*), peachleaf willow (*Salix amygdaloides*), gray alder (*Alnus incana*), water birch (*Betula occidentalis*), redosier dogwood (*Cornus sericea*), chokecherry (*Prunus virginiana*), skunkbush sumac (*Rhus trilobata*), Drummond's willow (*Salix drummondiana*), narrowleaf willow (*Salix exigua*), shining willow (*Salix lucida*), silver buffaloberry (*Shepherdia argentea*), and snowberry species (*Symphoricarpos* spp.). Exotic species of tamarisk species (*Tamarix* spp.) and Russian olive (*Elaeagnus angustifolia*) are common within these stands.

#### Woodland/Upland Forest

The woodland/upland forest vegetation cover type, occupying approximately 326 acres (<1 percent) of the study area, is composed of natural or semi-natural woody vegetation, generally greater than 6 meters tall where tree canopy accounts for 25 to 100 percent of the cover. Most of the upland forests are found along streams and rivers, in rugged topography, or where rolling hills are dissected by drainages. Forest communities are either deciduous or mixed forest (forests composed of a deciduous and evergreen species). Common deciduous tree species include green ash (*Fraxinus pennsylvanica*), burr oak (*Quercus macrocarpa*), hickory (*Carya* spp.), and quaking aspen (*Populus tremuloides*); common evergreen species include juniper (*Juniperus* sp.) and pine (*Pinus* spp.).

#### Developed

The developed land cover type, occupying approximately 152 acres (<1 percent) of the study area, typically is characterized as high and low intensity residential development and urban development.

### Shrubland

The shrubland vegetation cover type, occupying approximately 56 acres (<1 percent) of the study area, is composed of mesic, xeric, and creeping juniper dwarf shrubland communities. Common shrub species may include western snowberry (*Symphoricarpos occidentalis*), silver buffaloberry, chokecherry, serviceberry (*Amelanchier alnifolia*), and creeping juniper (*Juniperus horizontalis*). Evergreen shrublands dominated by silver sagebrush and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) may be present in small, sparse stands throughout the study area. Common grassland species, such as those described above, may occupy the understory associated with this vegetation cover type.

#### 3.3.1.2 Noxious Weeds

An increasing concern on both public and private lands is the introduction, spread, and proliferation of noxious weed species. Pursuant to the South Dakota Administrative Rules 12:62:02:01, a 'noxious weed' is defined as "a weed which the commission has designated as sufficiently detrimental to the state to warrant enforcement of control measures". The South Dakota Department of Agriculture (SDDA) currently declares seven plant species as state-designated noxious weeds. In addition to the South Dakota state-designated species, management is required for additional county-specific species within Lyman and Tripp counties. State and county-designated noxious weed species are presented in **Table 3-6**.

**Table 3-6 Designated Noxious Weed Species within the Study Area**

| Common Name           | Scientific Name                                                                                                          | State of South Dakota Designated Species | County Designated Species (TR-Tripp; LY-Lyman) |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------------------------------------------|
| Russian knapweed      | <i>Acroptilon repens</i>                                                                                                 | X                                        | --                                             |
| Hoary cress           | <i>Cardaria draba</i>                                                                                                    | X                                        | --                                             |
| Plumeless thistle     | <i>Carduus acanthoides</i>                                                                                               | --                                       | TR, LY                                         |
| Musk thistle          | <i>Carduus nutans</i>                                                                                                    | --                                       | TR, LY                                         |
| Diffuse knapweed      | <i>Centaurea diffusa</i>                                                                                                 | --                                       | TR                                             |
| Spotted knapweed      | <i>Centaurea stoebe</i>                                                                                                  | --                                       | TR                                             |
| Canada thistle        | <i>Cirsium arvense</i>                                                                                                   | X                                        | --                                             |
| Bull thistle          | <i>Cirsium vulgare</i>                                                                                                   | --                                       | TR                                             |
| Field bindweed        | <i>Convolvulus arvensis</i>                                                                                              | --                                       | LY                                             |
| Leafy spurge          | <i>Euphorbia esula</i>                                                                                                   | X                                        | --                                             |
| Purple loosestrife    | <i>Lythrum salicaria</i>                                                                                                 | X                                        | --                                             |
| Perennial sow thistle | <i>Sonchus arvensis</i>                                                                                                  | X                                        | --                                             |
| Saltcedar             | <i>Tamarix aphylla</i> ,<br><i>T. chinensis</i> , <i>T. gallica</i> ,<br><i>T. parviflora</i> ,<br><i>T. ramosissima</i> | X                                        | --                                             |
| Common mullein        | <i>Verbascum thapsus</i>                                                                                                 | --                                       | TR                                             |

Sources: SDDA 2009; USDA-NRCS 2011.



### 3.3.2 Environmental Consequences

The impact analysis area for vegetation and noxious weeds encompasses the Proposed Action and alternative routes. Construction impacts were calculated based on the inclusion of temporary use areas associated with single-pole structures and pad placement; access roads within the 125-foot-wide construction ROW; pulling and tensioning sites; splicing sites; laydown areas; and geotechnical boring sites. Operation impacts were calculated based on permanent disturbance associated with transmission structures, the Lower Brule Switchyard, Witten Substation expansion, and associated access roads. The primary issues associated with vegetation include direct and/or indirect impacts to native vegetation communities, riparian/wetland habitats, and impacts associated with the potential introduction and/or spread of noxious weed species.

#### 3.3.2.1 Proposed Action

**Table 3-7** summarizes estimated acreage of Project-related disturbance by vegetation cover type for the Proposed Action based on the temporary and permanent land requirements listed in **Table 2-3**.

**Table 3-7 Summary of Temporary and Permanent Disturbance to Vegetation Cover Types**

| Vegetation Cover Type          | Proposed Action                        |                           | Alternative Route A                    |                           | Alternative Route B                    |                           |
|--------------------------------|----------------------------------------|---------------------------|----------------------------------------|---------------------------|----------------------------------------|---------------------------|
|                                | Temporary Impacts (acres) <sup>1</sup> | Permanent Impacts (acres) | Temporary Impacts (acres) <sup>1</sup> | Permanent Impacts (acres) | Temporary Impacts (acres) <sup>1</sup> | Permanent Impacts (acres) |
| Agriculture                    | 204.3                                  | 7.1                       | 210.7                                  | 7.1                       | 194.2                                  | 7.1                       |
| Grassland                      | 147.3                                  | 7.1                       | 135.1                                  | 7.1                       | 151.3                                  | 7.1                       |
| Badland                        | 3.3                                    | 0.0                       | 1.3                                    | 0.0                       | 1.8                                    | 0.0                       |
| Wetland/Waterbody <sup>2</sup> | 0.3                                    | 0.0                       | 1.5                                    | 0.0                       | 0.4                                    | 0.0                       |
| Woodland/Upland Forest         | <0.1                                   | 0.0                       | 0.0                                    | 0.0                       | 0.0                                    | 0.0                       |
| Developed                      | 0.4                                    | 0.0                       | 0.0                                    | 0.0                       | 0.0                                    | 0.0                       |
| Shrubland                      | 0.0                                    | 0.0                       | 0.0                                    | 0.0                       | 0.1                                    | 0.0                       |
| <b>Total</b>                   | <b>355.7</b>                           | <b>14.2</b>               | <b>348.6</b>                           | <b>14.2</b>               | <b>347.8</b>                           | <b>14.2</b>               |

<sup>1</sup> Acreage estimations calculated using a programmatic approach based on the estimated total impacts in relation to the total amount of each vegetation cover type within the 125-foot-wide ROW.

<sup>2</sup> Although data indicates that approximately 0.3 to 1.5 acres of wetland and waterbodies would be temporarily impacted, all wetland and waterbodies would be either avoided or spanned.

Direct impacts from Project-related activities would include the temporary loss of vegetation as a result of trampling, clearing/blading of surface cover, and direct removal of aboveground and below ground vegetation as a result of construction implementation. Tree and brush removal within the ROW is anticipated to be minimal as the Project area largely consists of agriculture and grassland, and woodlands and shelterbelts were avoided to the maximum extent possible during the routing process. The ROW would only be cleared if trees and/or shrubs that are present would interfere with construction activities or the safe, reliable operation of the transmission line. Permanent impacts as a result of operation and maintenance activities would be limited to vegetation communities located within the permanent aboveground structure and ancillary footprints. The 125-foot-wide construction ROW would be allowed to re-establish to its previous herbaceous state; however, “danger trees” (trees that are 20 feet in height or taller, which upon falling, would come within 10 feet of the structure or conductors)

would be trimmed, resulting in a long-term loss of “danger trees” within the woodland/upland forest vegetation cover type.

Indirect impacts resulting from implementation may include the potential establishment of noxious weed species in areas of vegetation removal or soil disturbance, in areas where reclamation is unsuccessful or prolonged, or in areas of higher soil erosion or lower vegetation cover. Noxious weed species can be introduced to the Project area via weed-contaminated vehicles, equipment, and erosion control devices (e.g., straw bales) and, if not controlled, can displace native plant species, rendering infested areas unproductive. In addition, increased fugitive dust emissions associated with vehicle and equipment travel along access roads for construction, operation, and maintenance activities may result in a potential decrease in species and habitat productivity.

To minimize environmental impacts and ensure site stabilization and revegetation, Basin Electric would follow the construction procedures detailed within Chapter 2.0, Alternatives Analysis. Included therein, construction within agricultural fields would be avoided during extremely wet conditions to avoid excessive rutting and compaction. In addition, Basin Electric has committed to avoiding wetlands, waterbodies, and other sensitive features via route around or spanning. Upon completion of construction, all temporary disturbed areas would be reseeded using native vegetation in compliance with the environmental protection measures (**Appendix D**). Timely stabilization of areas disturbed by construction and reseeding with an appropriate seed mixture would minimize the magnitude and duration of vegetation disturbance. Given the site-specific soil and moisture conditions, and extent of disturbance, it is anticipated that herbaceous-dominated communities would be successfully revegetated within 5 to 10 years; however, badland communities may take significantly longer to stabilize and revegetate. Shrub-dominated communities could take as long as 20 to 30 years to return to a pre-disturbance composition. Basin Electric would only remove “danger trees” that may interfere with safe operation of the proposed transmission line. Clearing of woodland areas is not anticipated.

Substantial increases in weed prevalence are not anticipated; however, despite efforts to prevent the proliferation of noxious weed species, it is possible that construction, operation, and maintenance activities would result in the spread or introduction of noxious weed species along the ROW or that weed species would be transported into areas that were relatively weed-free. Implementation of the environmental protection measures would minimize the potential introduction and spread of noxious weed species.

#### **3.3.2.2 Alternative Route A**

Under Alternative Route A, direct and indirect impacts to vegetation, and impact minimization measures would be similar to those described under the Proposed Action. Approximately 7 fewer acres of vegetation would be temporarily disturbed by this alternative. **Table 3-7** summarizes estimated acreage of Project-related disturbance by vegetation cover type for Alternative Route A based on the Project specifications listed in **Table 2-3**.

#### **3.3.2.3 Alternative Route B**

Under Alternative Route B, direct and indirect impacts to vegetation resources, and impact minimization measures would be similar to those described under the Proposed Action. Approximately 8 fewer acres of vegetation would be temporarily disturbed by this alternative. **Table 3-7** summarizes estimated acreage of Project-related disturbance by vegetation cover type for Alternative Route B based on the Project specifications listed in **Table 2-3**.

#### **3.3.2.4 No Action Alternative**

Under the No Action Alternative, the Project would not be developed; therefore, impacts to vegetation would not occur as a result of this Project.

### **3.4 Fish and Wildlife Resources**

#### **3.4.1 Affected Environment**

As discussed in Section 3.3, Vegetation and Noxious Weeds, the dominant habitat types in the study area include agricultural (59 percent) and grassland (39 percent). Other limited habitat types that occur in the study area include badland, wetland/waterbody, woodland/upland forest and shrubland. Developed or heavily disturbed lands are not considered typical wildlife habitat and are not included in this analysis. The study area is characterized as a semi-arid rolling plain with isolated sandstone buttes, badland formations, and semi-permanent and seasonal wetlands, referred to as “prairie potholes.” Baseline descriptions of both resident and migratory wildlife include species that have either been documented within, or that could occur in the study area based on habitat associations. Wildlife species that could occur along the majority of the study area are typical of the grassland, agricultural land, badland, and wetland/waterbody communities of south-central South Dakota.

The Project would cross a number of named streams and rivers, as well as smaller tributaries and intermittent streams. In Lyman County, the Project would cross Short, North Fork American Crow, and Red Butte creeks, and their tributaries. In Tripp County, the Project would cross Black Dog, No Moccasin, Thunder, Dog Ear, Hollow, and East Cottonwood creeks, and a number of smaller tributaries. The White River forms the border between Lyman and Tripp counties and also would be crossed by the Project. Aquatic species inhabit surface waters including wetlands, perennial and intermittent drainages, and ponds and marshes. Aquatic habitat occurs in the study area.

##### **3.4.1.1 Big Game Species**

Big game species that occur in the study area include white-tailed deer, mule deer, and pronghorn. No important seasonal ranges have been identified within the study area (SDGFP 2011a).

##### White-tailed Deer

White-tailed deer are abundant throughout the state, inhabiting woodlands, riparian areas, and agricultural lands (SDGFP 2011a). White-tailed deer feed on cultivated crops, such as corn and wheat, native forbs and grasses, as well as mushrooms, fruits, and nuts. During winter, white-tailed deer congregate in woodland habitat. The 2010 population estimate for white-tailed deer in all areas of South Dakota except the Black Hills is 140,000 animals. This number has been slowly declining since 2004 (SDGFP 2011a).

##### Mule Deer

Mule deer occur throughout the west and central regions of the state, inhabiting virtually all habitat types (SDGFP 2011a). Mule deer feed on a wide variety of plants including forbs, grasses, sedges, shrubs, and trees. During winter, mule deer occur in areas of relatively high sagebrush densities and overall low snow accumulation, on south- and east-facing slopes. The 2010 population estimate for mule deer in all areas of South Dakota, except the Black Hills, is 60,000 animals. This number has been fairly stable since 2002. The 2010 estimate has decreased slightly from 2009 (SDGFP 2011a).

##### Pronghorn

South Dakota hosts one of the highest pronghorn populations in the nation, ranging throughout the west and central regions of the state (SDGFP 2011a). Pronghorn inhabit grasslands and shrublands on flat to rolling topography, and browse on shrubs, especially sagebrush, throughout the year. During the winter, pronghorn generally utilize areas of relatively high sagebrush densities and overall low snow accumulations, on south- and east-facing slopes. The 2010 population estimate for pronghorn in all areas of South Dakota is 51,000 animals. This number is down significantly from the 2008 estimate of 80,000 animals (SDGFP 2011a).

### 3.4.1.2 Small Game Species

Small game species that occur within the study area include upland game birds, waterfowl, furbearers, and other small mammals.

#### Upland Game Birds

Upland game birds that occur in the study area include sharp-tailed grouse, greater prairie chicken, gray (Hungarian) partridge, wild turkey, ring-necked pheasant, and mourning dove. Sharp-tailed grouse occur in a wide variety of habitats, including grasslands, agricultural areas, and shrublands (Stokes and Stokes 1996). Fifteen active sharp-tailed grouse leks are located in the northern portion of the study area on tribal land, and more leks could potentially exist (LBST2012a). Additional leks have been documented west of the study area in both Lyman and Tripp counties. No active sharp-tailed grouse leks would be crossed by the Project; however, historic leks could be affected. Greater prairie chickens occur in diverse grassland habitat (SDGFP 2006). Gray (Hungarian) partridge, wild turkey, and ring-necked pheasant all occur in a wide variety of habitats, including grasslands, shrublands, and agricultural areas (Stokes and Stokes 1996). These species are known to occur in Lyman and Tripp counties (SDGFP 2011b). Mourning doves occur in habitats ranging from deciduous forests to shrubland and grassland communities, often nesting in trees or shrubs near riparian areas or water sources (Stokes and Stokes 1996). This species is considered widespread and is common in South Dakota (SDGFP 2011b).

#### Waterfowl

Numerous waterfowl species are known to breed and migrate through south-central South Dakota, inhabiting the wetlands and waterbodies that would be crossed by the Project. Common waterfowl species that occur in the study area include Canada goose, mallard, green-winged teal, northern pintail, gadwall, and American wigeon. Other common summer residents include blue-winged teal, cinnamon teal, northern shoveler, redhead, and ring-necked duck (Stokes and Stokes 1996). Waterfowl production in South Dakota has been increasing dramatically. The estimate for breeding duck populations in 2008 was 3.4 million; in 2009 breeding duck populations were estimated at 4.8 million; and in 2010, the estimate was 5.8 million birds. Annual precipitation is the main reason for increasing waterfowl populations (SDGFP 2011c, 2010).

#### Furbearers

Furbearers that occur in the study area include muskrat, beaver, raccoon, striped skunk, muskrat, mink, long-tailed weasel, badger, bobcat, coyote, jackrabbit, and gray fox and red fox. These species have wide distributions in South Dakota and are found within all habitat types present in the study area (SDGFP 2011b). Due to increased structural diversity and available food sources, a higher diversity of furbearers is likely present in riparian areas. Fur dealer records for 2009-2010 (SDGFP 2010) indicate approximately 60,574 animals of 13 species were trapped, for a cash value of approximately \$432,245. Muskrat, raccoon, coyote, and jackrabbit make up the majority of trapped species.

#### Small Game Mammals

Small game mammals that occur in the study area include fox squirrel and eastern cottontail (SDGFP 2011b). Fox squirrels occur in open deciduous forests in riparian and woodland habitats. Eastern cottontails occur in a variety of habitat types, but are most common in brushy areas such as shelterbelts and old farmsteads (Fitzgerald et al. 1994).

### 3.4.1.3 Non-game Species

A diversity of non-game species (e.g., small mammals, raptors, passerines, amphibians, and reptiles) occupies a variety of habitat types found within the study area (i.e., agricultural land, grassland, badland, woodland/upland forest, shrubland, and wetland/waterbody). Special status species are discussed in Section 3.5, Threatened and Endangered Species.

### Small Mammals

Common small mammals that occur in the study area include bats, voles, gophers, prairie dogs, woodrats, and mice. These species provide a substantial prey base for predators, including larger mammals (coyote, badger, bobcat), raptors (eagles, hawks, falcons, owls), and reptiles (snakes). Bat species that occur within the study area include the hoary bat, little brown myotis, and big brown bat (South Dakota Bat Working Group [SDBWG] 2004). Bat species are described in more detail below.

#### *Hoary Bat*

The hoary bat is a solitary tree roosting bat, which utilizes trees with adequate foliage cover above, and minimal foliage cover below. Roost sites typically occur in live trees that are 10 to 16.5 feet tall, on forest edges. In eastern South Dakota, hoary bats inhabit trees in cottonwood floodplain forests along the Missouri River. Foraging occurs over water, or at the top of the tree canopy. This species migrates south in winter (SDBWG 2004).

#### *Little Brown Myotis*

The little brown myotis is opportunistic with regard to foraging and roosting habitat. Typical habitat consists of cottonwood forests, deciduous forests, and urban areas. The species is common near human-made structures (SDBWG 2004). Day roost sites are located in buildings, trees, under rocks or wood, or occasionally in caves. Night roosts are located in similar sites, or even the same sites, but usually in more confined spaces. Nursery roosts are usually in buildings, but also in other locations with suitable temperatures. Foraging usually occurs over water at the margins of lakes, streams, and ponds, as well as along forest edges. The little brown myotis hibernates from September-November and March-May, (depending on latitude and altitude), in sites with high humidity and temperature, such as caves or mines (Harris 2005).

#### *Big Brown Bat*

The big brown bat is common throughout South Dakota. Primary habitat for this species is forested areas. The species commonly roosts in human-made structures. In winter, big brown bats migrate from eastern South Dakota to western South Dakota to hibernate in caves, mines, and buildings. Foraging occurs over meadows, canopy vegetation, and open water (SDBWG 2004).

### Reptiles

Common reptiles that occur in the study area include the painted turtle, common snapping turtle, racer, gophersnake (bullsnake), plains garter snake, common garter snake, prairie rattlesnake, and western hognose snake (Kiesow 2006). These species serve as both predators and prey in the prairie ecosystem.

#### **3.4.1.4 Migratory Birds**

Migratory birds are integral to natural communities and act as environmental indicators based on their sensitivity to environmental changes caused by human activities. Migratory birds are protected by the Migratory Bird Treaty Act (MBTA) (16 USC 703-711) and EO 13186 (66 FR 3853). These laws make it illegal to take, kill, or possess migratory birds or any part, nest or egg of a migratory bird except under permits issued pursuant to Federal regulations. EO 13186 was enacted in part to ensure that environmental analyses of federal actions evaluate impacts on migratory birds.

A variety of avian species occur in the study area throughout the year; however, they are most abundant during the spring/fall migration, as well as during the breeding season. A total of 110 breeding bird species were identified during the three USGS Breeding Bird Survey routes located closest to the study area (USGS 2011).

### Passerines

Representative passerine species include killdeer, common nighthawk, eastern kingbird, western kingbird, eastern bluebird, common yellowthroat, clay-colored sparrow, vesper sparrow, lark sparrow, western meadowlark, Say's phoebe, horned lark, barn swallow, black-billed magpie, common raven, and lark bunting (Stokes and Stokes 1996).

### Raptors

Raptor species that occur in the study area are those that inhabit grassland, shrubland, woodland/upland forest, wetland/waterbody, badland, and agricultural land habitats. Species that could occur as residents or migrants in the study area include eagles (bald and golden eagles), hawks (e.g., red-tailed hawk, Swainson's hawk, ferruginous hawk), falcons (e.g., prairie falcon, American kestrel), accipiters (e.g., Cooper's hawk, sharp-shinned hawk), owls (e.g., great-horned owl, burrowing owl, long-eared owl, short-eared owl), and northern harrier (Stokes and Stokes 1996). In addition to being protected by the MBTA, bald eagles and golden eagles are protected under the Bald and Golden Eagle Protection Act. The bald eagle (discussed in Section 3.5, Threatened and Endangered Species) also is state listed as endangered.

#### **3.4.1.5 Aquatic Species**

Aquatic species are fish, amphibians, and invertebrates that inhabit surface waters such as perennial streams and pond/lake environments. The description of aquatic communities focuses on important fisheries, which are defined as species with recreational or commercial value. The study area for aquatic resources includes the perennial streams, rivers, and ponds/lakes that would be crossed by the Project. This section describes recreationally or commercially important fisheries which occur at, or immediately downstream of the proposed crossings.

Invertebrate communities in waterbodies within the study area include worms, immature and adult insect groups, shellfish, and other forms of aquatic life. The composition can vary depending on flowing or standing water and other physical characteristics of the waterbody. They represent important food sources for fish and also are used as indicators of water quality conditions. For the purpose of describing aquatic resources, it is assumed that invertebrates are present in all waterbodies crossed by the Project.

### Fish

Coolwater and warmwater fish species are found in perennial waterbodies in the study area. Spawning seasons for warmwater species are variable and species-specific, but spawning generally occurs between April and August and peaks in June and July. Spawning periods for various coolwater species occur from February through November, peak in April or October, and are species-specific.

Game fish include a variety of warm water and coolwater species such as walleye, perch, bass, crappie, catfish, bluegill, sauger, northern pike, and trout. Native non-game species include flathead chub, minnow, sunfish, and emerald shiner (Hoagstrom et al. 2011).

### Amphibians

Potential habitat for amphibians includes perennial and intermittent stream reaches, wetlands, and ephemeral ponds. Common species found in the study area include the eastern plains spadefoot, Canadian toad, Great Plains Toad, Woodhouse's toad, northern leopard frog, western chorus frog, wood frog, and tiger salamander (Kiesow 2006).

#### **3.4.1.6 Habitat Management Areas**

Four Habitat Management Areas (HMAs) are present within the study area on tribal land, but are not crossed by any of the proposed routes. These areas are lands that the Lower Brule Sioux Tribal Wildlife Department intensively manages specifically for various types of wildlife. Management activities include

prairie restoration, native tree and shrub planting, wetland restoration, and crop management. These lands are controlled to limit housing or other development that would be contrary to wildlife management objectives. HMAs are extensively used by hunters (LBST 2012b).

### **3.4.2 Environmental Consequences**

#### **3.4.2.1 Proposed Action**

RUS, Basin Electric, and their consultant consulted the USFWS, SDGFP, and the LBST to identify potential impacts to fish and wildlife. Potential impacts to fish and wildlife could be direct or indirect. Direct impacts include species mortalities as a result of vehicle collisions or crushing of nests/burrows during construction or stream sedimentation. Indirect impacts include species displaced due to increased levels of noise, vibration, and human presence.

Potential impacts also could be either temporary or permanent. Construction impacts tend to be temporary, such as removing vegetation that could otherwise provide habitat that is later reclaimed and re-established (approximately 3 to 5 years). As presented in Section 3.3, Vegetation and Noxious Weeds, a total of six vegetation types that could serve as wildlife habitat would be temporarily disturbed by Project construction: agricultural land (204.3 acres), grassland (147.3 acres), badland (3.3 acres), wetland/waterbody (0.3 acre), and woodland/upland forest (less than 0.1 acre). The temporary disturbance to these vegetation types from the Project are discussed in the following sections. Operations impacts tend to be permanent, such as maintaining a substation/switchyard in an area that once could provide habitat. The extent of both temporary and permanent impacts would depend on factors such as the sensitivity of the species, seasonal use patterns, type and timing of the construction activities, and physical parameters (e.g., topography, cover, forage). Approximately 14 acres of potential habitat consisting of grassland and agricultural land would be permanently lost, primarily associated with the substation and switchyard.

Potential impacts by types of fish and wildlife are discussed in the following sections.

#### Big Game Species

No big game critical ranges would be affected by the Project. Project construction would disturb areas that could potentially provide habitat for big game, such as agricultural lands, grasslands, and badlands. However, the disturbance associated with the Project would represent approximately 1 percent of the overall available habitat within the study area available for big game species. Disturbed areas would be reclaimed, and in most instances, suitable habitat adjacent to disturbed areas would be available for big game species until grasses and woody vegetation are re-established within the disturbance areas.

Based on the amount of available habitat within the study area, impacts to big game species would be minimal, limited primarily to temporary displacement from areas of human activity associated with construction. To prevent direct mortality to individuals during construction, Basin Electric has committed to fence or cover boreholes to reduce the potential for livestock and wildlife entering the boreholes and for public safety.

#### Small Game Species

Direct and indirect impacts to small game include displacement and possible mortalities related to Project construction including temporary increased levels of noise and human presence. Project construction would disturb areas that could potentially provide habitat for small game species, such as agricultural lands, grasslands, badlands, wetlands/waterbodies, and woodland/upland forests. However, in most instances, suitable habitat adjacent to disturbed areas would be available for small game species until grasses and woody vegetation become re-established within the disturbance areas.

In areas with minimal trees or perching sites, such as the open agricultural and grasslands areas affected by the Project, power poles and lines can provide nesting, perching, roosting, or hunting sites for



raptors, ravens, and crows, which can increase predation on ground birds and small mammals. However, the actual impact of raptors hunting from utility poles has not been adequately studied, quantified, or verified and such predation can occur regardless of the power line (Avian Power Line Interaction Committee [APLIC] 2006). Basin Electric has committed to working with applicable state and federal agencies and the LBST to determine if measures are needed (**Appendix D**). However, perch deterrents tend to control the location of perching rather than prevent perching from occurring (APLIC 2006).

#### Upland Game Birds and Waterfowl

Direct and indirect impacts to upland game birds and waterfowl include displacement and possible mortalities related to Project construction including temporary increased levels of noise and human presence. Vegetation removed during Project construction also could remove areas used by upland game birds and waterfowl. However, in most instances, suitable habitat adjacent to disturbed areas would be available until grasses and woody vegetation become re-established within the disturbance areas.

Although the Project would not affect active leks, the Proposed Action would traverse one historic sharp-tailed grouse lek and be located within 3 miles of another historic lek. The Proposed Action would render this historic lek site unusable and prevent the possibility of any future use from occurring at that lek. However, given that the location hasn't been active, it is possible that the lek has already been deemed unusable by sharp-tailed grouse. The possibility remains that the historic lekking grounds could still be used by sharp-tailed grouse and the proximity of the Proposed Action to the habitat could result in displacement to other areas. These species are particularly sensitive to disturbance while they congregate on lekking grounds each morning and evening from March to June. Construction activities and associated noise occurring during early morning and late evening in the vicinity of lekking grounds could disrupt and displace individuals that have gathered for breeding activities. Once breeding activities have concluded, hens create their nests on the ground beneath vegetation in proximity to the lekking grounds. Project construction could affect nesting sharp-tailed grouse by destroying nests, causing nest abandonment, or causing injury or direct mortality to the young. Basin Electric has developed measures to reduce the potential for construction impacts to game birds and waterfowl, which are described below.

If construction occurs during the breeding season, active game bird and waterfowl nests would be identified and avoided. In addition, sharp-tailed grouse and greater prairie chicken leks would be identified and avoided during the breeding season. Basin Electric has committed to conducting surveys prior to surface disturbance activities during the typical breeding season (April 15 through July 15). A qualified biologist would survey within suitable habitat for evidence of nesting (e.g., mated pairs, territorial defense, birds carrying nest material, transporting food). If active nests or leks are located, or other evidence of nesting is observed, appropriate protection measures, including establishment of spatial buffer areas and timing constraint periods, would be implemented until the young have fledged and dispersed from the nest area. These measures would be implemented on a site-specific and species-specific basis, in coordination with RUS. As a result, direct impacts to upland game birds and waterfowl from construction activities are expected to be low.

Waterfowl are found in wetlands scattered throughout the study area, with a large concentration north of Interstate-90 (I-90). Areas within mapped wetland boundaries and areas within 100 feet of surface waters are designated as avoidance areas by the Project. All of the surface waters within the study area, including the White River, would be spanned by the transmission line, thereby reducing habitat-related impacts to waterfowl.

In areas with minimal trees or perching sites, such as the open agricultural and grasslands areas affected by the Project, power poles and lines can provide nesting, perching, roosting, or hunting sites for raptors, ravens, and crows, which can increase predation on ground birds and small mammals. In addition, young birds are at greater risk to predation during the nestling period and immediately

post-fledging when their motor skills and foraging behaviors are becoming developed. However, the actual impact of raptors hunting from utility poles has not been adequately studied, quantified, or verified and such predation can occur regardless of the power line (APLIC 2006). Basin Electric has committed to working with applicable state and federal agencies and the LBST to determine if measures are needed (**Appendix D**). However, perch deterrents tend to control the location of perching rather than prevent perching from occurring (APLIC 2006).

The operation of the transmission line would increase the collision potential for upland game birds and waterfowl (APLIC 2012). Collision potential depends on transmission line design, the location of the transmission line relative to high-use habitat areas (e.g., nesting, foraging, and resting), and bird flight patterns and migration corridors. Species of birds reported to be susceptible to collisions generally have a large body size, long wing span, heavy body, and poor maneuverability. Examples include species of loons, storks, grebes, waterfowl, and some species of hawks and eagles. Individual losses from collision mortality are unlikely to affect large and robust populations; therefore, collision risk of rare or endangered species is of greater concern (APLIC 2012). Basin Electric has committed to implement standard measures to minimize avian collision risk with overhead transmission lines, as outlined in *Reducing Avian Collisions with Power Lines* (APLIC 2012). Basin Electric also has proposed marking portions of the line to reduce potential collision risk for Whooping crane (see Section 3.5); such measures also could reduce collision risk for other species including upland game birds and waterfowl. An additional collision risk would be posed by the communications towers that would be constructed at the switchyard and substation sites. However, the self-supporting design would provide somewhat greater visibility, and would not require guy lines, which pose a greater collision risk. Should the guyed design be chosen, the guy wires would be marked with devices similar to those used on transmission lines. Lighting also would not be required. In consideration of these factors, collision risk due to the communications towers is expected to be low.

#### Non-game Species

Direct and indirect impacts to non-game species include displacement and possible mortalities related to Project construction including temporary increased levels of noise and human presence. Non-game species are more susceptible to mortalities during construction activities because species are less mobile and burrowing non-game species (e.g., small mammals and reptiles) could be crushed by construction vehicles and equipment. Transmission and communications towers would present a collision risk to bats, but this is expected to be minimal.

Vegetation removed during Project construction also could remove areas used by non-game species. However, in most instances, suitable habitat adjacent to disturbed areas would be available until grasses and woody vegetation become re-established within the disturbance areas.

#### Migratory Birds Including Raptors

Non-game avian species that could be affected by construction activities include nesting migratory birds and raptors which use the various vegetation types present in the study area. Direct and indirect impacts to avian species include displacement, destruction of nests, and possible mortalities related to Project construction including temporary increased levels of noise and human presence. Vegetation removed during Project construction also could remove areas used by non-game avian species and raptors. However, in most instances, suitable habitat adjacent to disturbed areas would be available until grasses and woody vegetation become re-established within the disturbance areas. Basin Electric has committed to conducting pre-construction surveys in order to identify the presence of migratory bird species and active nests would be avoided during construction, which would minimize the potential for these effects.

Three Historic eagle nests are present within 0.5 to 1 mile of the Proposed Action. Basin Electric has committed to conduct pre-construction surveys if construction is scheduled to occur during the breeding season for raptors (February 1 through August 15). Aerial and/or pedestrian breeding raptor surveys would be conducted by a qualified biologist through areas of suitable nesting habitat in order to identify

any active nest sites within 0.5 mile (1.0 mile for bald eagles) from the Project area. Appropriate protection measures, including seasonal constraints and establishing distance buffer areas would be implemented at active nest sites until the young have fledged and have dispersed from the nest area. These measures would be implemented on a site-specific and species-specific basis, in coordination with RUS. By implementing these environmental protection measures, construction- and operation-related impacts to raptor species would be low.

Line-strike is a major source of injury and mortality to raptors and other large birds (USFWS 2011) and is a potential source of injury and mortality to migratory birds. In particular, transmission lines located adjacent to wetlands or stream crossings could increase this potential impact. Individual losses from collision mortality are unlikely to affect large and robust populations; therefore, collision risk of rare or endangered species is of greater concern (APLIC 2012). Standard measures to minimize avian collision risk with overhead transmission lines, as outlined in *Reducing Avian Collisions with Power Lines* (APLIC 2012) would be examined and implemented as appropriate. Basin Electric also has proposed marking portions of the line to reduce potential collision risk for Whooping crane (see Section 3.5); such measures also could reduce collision risk for other migratory bird species and raptors. As noted previously, an additional though likely minor collision risk would be posed by the communications towers that would be constructed at the switchyard and substation sites. Since the towers would be less than 200 feet in height, registration with both the Federal Aviation Administration and FCC would not be required, nor would any lighting or marking. Marking of guy wires (if that design is selected), and higher visibility of the self-supporting designs should limit collision risk to birds, especially neotropical migrants. The proposed height of the towers (approximately 150 feet) and the absence of lights and guy wires (or marking) align with the lower risk characterization of the USFWS's *Interim Guidelines For Recommendations On Communications Tower Siting, Construction, Operation, and Decommissioning* (USFWS 2000). The breeding raptor surveys would likewise identify any active nests in proximity to the towers, and determine if additional avoidance or siting measures would be necessary.

Electrical transmission line configurations of 60-kV or greater typically do not present an electrocution hazard to migratory birds, including raptors, based on conductor placement and distances between conductors and ground wires (APLIC 2006). As a result, no electrocution hazard to migratory birds, including raptors, would be anticipated from the Project.

### Reptiles

Impacts to reptiles could include mortalities or displacement related to Project construction and operation. Construction activities could result in direct mortalities as a result of crushing of burrows from vehicles and equipment. Vegetation removed during Project construction also could remove areas used by reptiles. Due to the presence of suitable habitat adjacent to the disturbed areas, and the temporary nature of Project construction, impacts to these species is expected to be minimal, limited primarily to disturbed areas within the construction ROW.

### Aquatic Species

Direct impacts to aquatic communities and habitat in the White River, Short, North Fork American Crow, Red Butte, Black Dog, No Moccasin, Thunder, Dog Ear, Hollow, and East Cottonwood creeks and a number of smaller tributaries and intermittent streams would be avoided, because the transmission line would span wetlands and waterbodies. Measures designed to reduce impacts to wetland/waterbody habitat at Project crossing locations are addressed in Section 3.6, Wetlands, and Section 3.8, Water Quality. Basin Electric has committed not to construct aboveground facilities and staging areas within mapped wetlands, riparian areas, or other waters of the U.S. (WUS), and Basin Electric would minimize the potential for indirect impacts to surface waters by controlling soil disturbance to avoid sedimentation of these water bodies through storm water runoff. Limited fisheries are present in the Project ROW, and those that are present would be spanned by the transmission line, reducing the potential for any impacts to these resources. Therefore, no new disturbance or impacts would be anticipated for aquatic resources.

### Habitat Management Areas

Impacts to HMAs are not anticipated as a result of construction and operation of the Project because they are outside the ROW that would be disturbed.

### Summary

Impacts to fish and game and non-game wildlife associated with the Project are anticipated to be minimal because: 1) only a small portion of potentially suitable habitat would be affected by Project construction activities; 2) established topsoil handling techniques and subsequent reseeding of disturbed areas would aid in the re-establishment of habitats; 3) the committed environmental protection measures would minimize potential impacts to species during the breeding season and minimize the impacts to their breeding territories; 4) the potential for injury or mortality by line-strike collision or electrocution or tower collision would be minimized by implementation of committed measures; and 5) the temporary nature of Project construction would minimize the length of time that wildlife would potentially avoid habitats along the Project ROW.

#### **3.4.2.2 Alternative Route A**

Potential impacts to fish and wildlife resources would be the same as discussed for the Proposed Action. However, this alternative would result in approximately 7 fewer acres of temporary impacts to potential wildlife habitat as a result of surface disturbing activities. Permanent impacts would be the same as discussed for the Proposed Action. In addition, this alternative would be located farther from the two sharp-tailed grouse leks (lek 1 – 2.9 miles; lek 2 – 0.5 mile) as discussed in Section 3.4.1.2. This alternative would be further from one eagle nest (approximately 3 miles), but would still be within 0.5 mile of two eagle nests.

#### **3.4.2.3 Alternative Route B**

Potential impacts to fish and wildlife resources would be the same as discussed for the Proposed Action. However, this alternative would result in approximately 8 fewer acres of temporary impacts to potential wildlife habitat as a result of surface disturbing activities. Permanent impacts would be the same as discussed for the Proposed Action. In addition, this alternative would be located farther from the two sharp-tailed grouse leks (lek 1 – 4.5 miles; lek 2 – 3.4 miles) as discussed in Section 3.4.1.2. This alternative would be further from one eagle nest (approximately 2 miles), but would still be within 0.5 mile of two eagle nests.

#### **3.4.2.4 No Action Alternative**

The temporary disturbance of approximately 355.3 acres and the permanent disturbance of approximately 14.2 acres of potential wildlife habitat would not occur if the No Action Alternative were to be implemented. Impacts to fish and wildlife resources would not occur as a result of this Project.

### **3.5 Special Status Wildlife Species, Including Federally Listed Species**

Special status species are those species protected under state, federal, or tribal law, regulation, or policy. Included in this category are federally listed species that are protected under the Endangered Species Act (ESA) and South Dakota state-listed species. In accordance with Section 7 of the ESA, as amended, the lead Federal agency (RUS) in coordination with the USFWS must ensure that any action that they authorize, fund, or carry out would not adversely affect a federally listed threatened or endangered species.

#### **3.5.1 Affected Environment**

**Table 3-8** presents the 13 special status species that were identified as potentially occurring in the study area (SDGFP 2014; USFWS 2014, 2011a). The potential for occurrence in the study area was based on range, known distribution, and the presence of potentially suitable habitat within the study area. Based

on consultation with the USFWS, SDGFP, and SDNHP, no federal or state-listed special status plant species were identified for the Project; therefore, no baseline studies or assessments were completed (SDGFP 2014; USFWS 2014, 2011a).

**Table 3-8 Special Status Species Identified for the Project**

| Common Name             | Scientific Name                     | Status                                                                                                    |
|-------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Black-footed ferret     | <i>Mustela nigripes</i>             | Federal endangered in Lyman County and on Lower Brule tribal land<br>NEP/federal/proposed in Tripp County |
| Whooping crane          | <i>Grus americana</i>               | Federal endangered                                                                                        |
| Interior least tern     | <i>Sterna antillarum athalassos</i> | Federal endangered                                                                                        |
| Pallid sturgeon         | <i>Scaphirhynchus albus</i>         | Federal endangered                                                                                        |
| American burying beetle | <i>Nicrophorus americanus</i>       | Federal endangered                                                                                        |
| Piping plover           | <i>Charadrius melodus</i>           | Federal threatened                                                                                        |
| Sprague's pipit         | <i>Anthus spragueii</i>             | Federal candidate                                                                                         |
| Bald eagle              | <i>Haliaeetus leucocephalus</i>     | State threatened                                                                                          |
| River otter             | <i>Lontra canadensis</i>            | State threatened                                                                                          |
| False map turtle        | <i>Graptemys pseudogeographica</i>  | State threatened                                                                                          |
| Northern redbelly dace  | <i>Phoxinus eos</i>                 | State threatened                                                                                          |
| Pearl dace              | <i>Margariscus margarita</i>        | State threatened                                                                                          |
| Sturgeon chub           | <i>Macrhybopsis gelida</i>          | State threatened                                                                                          |

### 3.5.2 Federally Listed Threatened and Endangered Species

#### Black-footed Ferret

The black-footed ferret is federally listed as endangered (FR67-2721). No designated critical habitat exists for this species (USFWS 2011a). Historically, the range of the black-footed ferret coincided closely with that of the prairie dog throughout the Great Plains and Rocky Mountain states of the U.S. and Canada (Fitzgerald et al. 1994). The species was considered extinct by the middle of the 20th century until it was documented in Mellette County, South Dakota, in 1964 and again in 1981 near Meeteetse, Wyoming. However, the South Dakota population subsequently disappeared and the Wyoming population declined to only a few remaining individuals, which were captured and provided the basis for the ongoing captive breeding program (Ashton and Dowd 2008).

Black-footed ferrets that were produced by this captive breeding program are often reintroduced as a Non-essential, Experimental Population (NEP), or as fully endangered. A NEP (including offspring) of a listed species is designated by rule published in the *Federal Register* as wholly separate geographically from other populations of the same species. For consultation purposes, a NEP of an endangered species is treated as a threatened species in National Parks (administered by the National Park Service) and in National Wildlife Refuges (administered by the USFWS); and as a species proposed for listing on other federally administered land, private land, and Indian trust land (USFWS

1998). In South Dakota, the black-footed ferret is treated as endangered in Lyman County and as NEP/proposed in Tripp County.

Black-footed ferrets are primarily nocturnal, solitary carnivores that are obligate associates of prairie dogs. Over 90 percent of the black-footed ferret diet is composed of prairie dogs, and ferrets use prairie dog burrows as their sole source of shelter. Black-footed ferrets require colonies with high densities of active prairie dogs burrows (Fitzgerald et al. 1994). They typically breed from March to May (USFWS 1988). The gestation period ranges from 41 to 45 days, with as many as 5 young born in late May and early June. The kits remain underground until late June or early July. Upon emerging, they may accompany the female during nocturnal foraging. Male ferrets are not active in rearing the young and live a solitary life except during the breeding season. Ferrets are most commonly observed in late summer or early fall (Ashton and Dowd 2008).

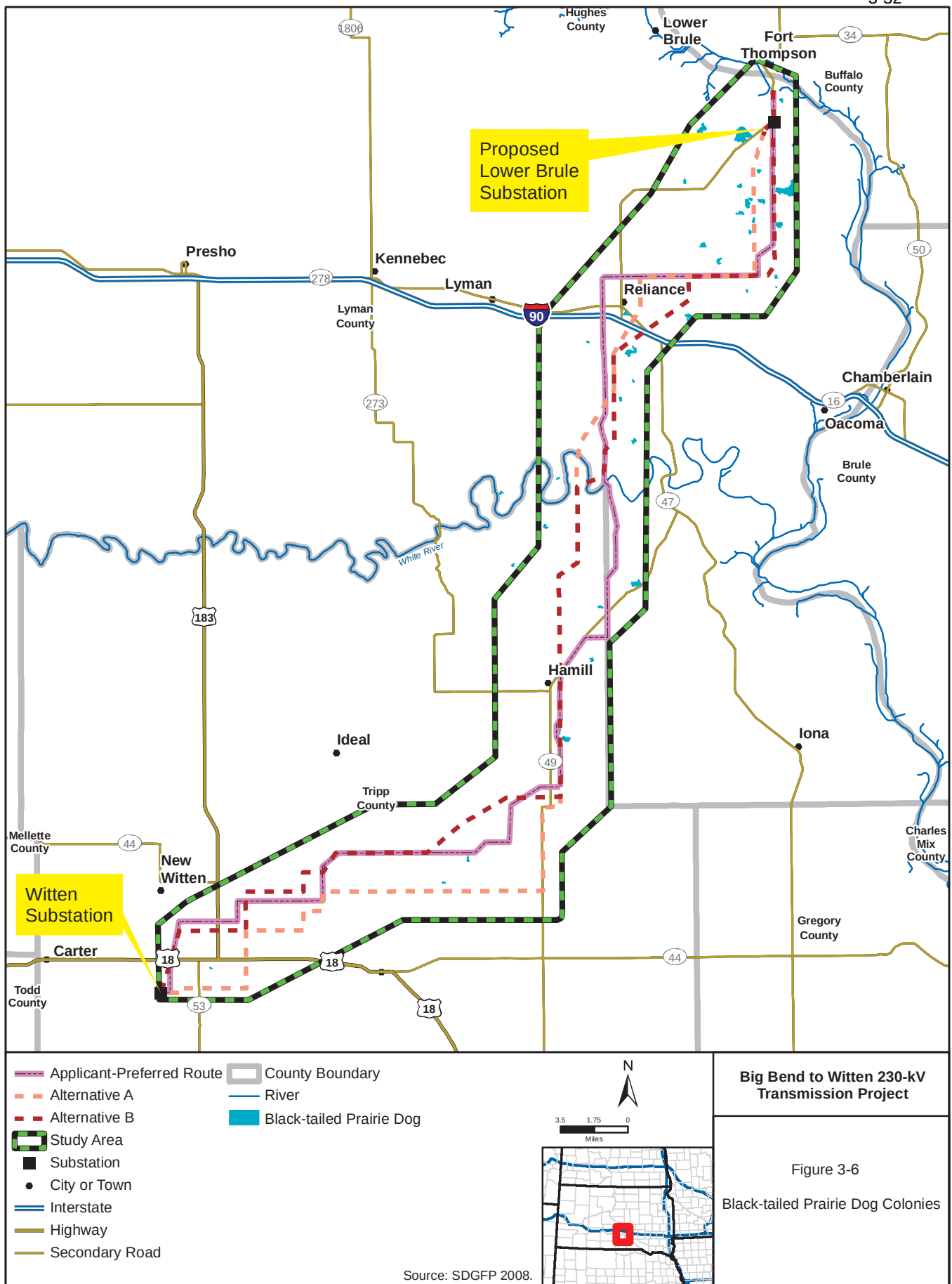
Suitable habitat for black-footed ferrets is determined by the size of active prairie dog colonies and the density of prairie dogs. In the Project area, an average of 25 acres of occupied prairie dog colonies is needed to support an individual ferret for at least one year (LBST [unpublished data]). A prairie dog colony or complex (10,000 acres or greater) with towns no further than 3 miles apart is necessary to sustain a viable population of 120 ferrets (Hagen et al. 2005). In the Project area, a prairie dog complex of 1,500 acres with colonies no further than 1 mile apart is likely to support 30 breeding adults. A total of 47 black-tailed prairie dog colonies are present within the study area, ranging in size from approximately 0.1 acre to approximately 286 acres (**Figure 3-6**). Two colonies would be crossed by the Project route, for distances of approximately 0.12 mile and 0.11 mile, respectively.

Although the black-footed ferret is presumed extirpated in South Dakota, the species has been reintroduced in six different locations in the state: Badlands National Park in 1994, Conata Basin in 1996, Cheyenne River Indian Reservation in 2000, Rosebud Indian Reservation in 2003, Lower Brule Sioux Indian Reservation in 2006, and Wind Cave National Park in 2007 (USFWS 2008). The Rosebud Indian Reservation and the Lower Brule Sioux Indian Reservation are the closest reintroduction sites to the study area. The Rosebud Sioux Reservation reintroduction area overlays all of Gregory, Mellette, Todd, and Tripp counties in South Dakota. Initial reintroduction efforts on the Lower Brule Sioux Indian Reservation focused on lands near the Big Bend Dam (**Figure 3-6**). The Project route would cross approximately 6 miles of the Lower Brule Sioux Indian Reservation and the Lower Brule Switchyard would be constructed on the reservation.

Approximately 1,087 acres of prairie dog colonies are within the study area on tribal land. Black-footed ferrets and their progeny have previously occupied approximately 2,679 acres of prairie dog colonies on tribal land within and near the study area (LBST 2012a). Data for black-footed ferret-occupied colonies was collected during the fall of 2010 and 2011. Although some small colonies near the Proposed Action have not supported ferrets every year, they are recognized as important dispersal corridors for juveniles. Many of these small colonies could increase in size and become more suitable for year-round occupation by ferrets, as suitable habitat for prairie dogs exists throughout the study area.

Surveys for black-footed ferrets might be necessary. The species is highly mobile and ferrets have been documented to disperse to a distance of up to 15 miles. An individual ferret was reported within the study area in October 2012 by a local rancher. Existing colonies of prairie dogs in the study area are likely to increase in size, and in the future, additional colonies could become established within the study area, which would create additional habitat for black-footed ferrets (LBST 2012a).

**Table 3-9** summarizes the number of individual ferrets captured or detected during spotlight surveys on the Lower Brule Sioux Indian Reservation from 2007 to 2012. **Table 3-10** summarizes the estimated fall ferret population size based on survey effort and suitable habitat on the Lower Brule Sioux Indian Reservation from 2007 to 2012. Factors contributing to black-footed ferret population declines include poisoning of prairie dogs, habitat destruction, and disease (e.g., sylvatic plague and canine distemper) (USFWS 2008). Predation also is a concern.



**Table 3-9 Number of Individual Ferrets Captured or Detected During Spotlight Surveys on the Lower Brule Sioux Indian Reservation from 2007-2012**

| 2007 | 2008 | 2009 | 2010 | 2011 |
|------|------|------|------|------|
| 9    | 21   | 29   | 31   | 8    |

Source: LBST 2012b.

**Table 3-10 Estimated Fall Ferret Population Size Based on Survey Effort and Suitable Habitat on the Lower Brule Sioux Indian Reservation from 2007 to 2012**

| 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|
| 18   | 42   | 58   | 62   | 10   | 30   |

Source: LBST 2012b.

### Whooping Crane

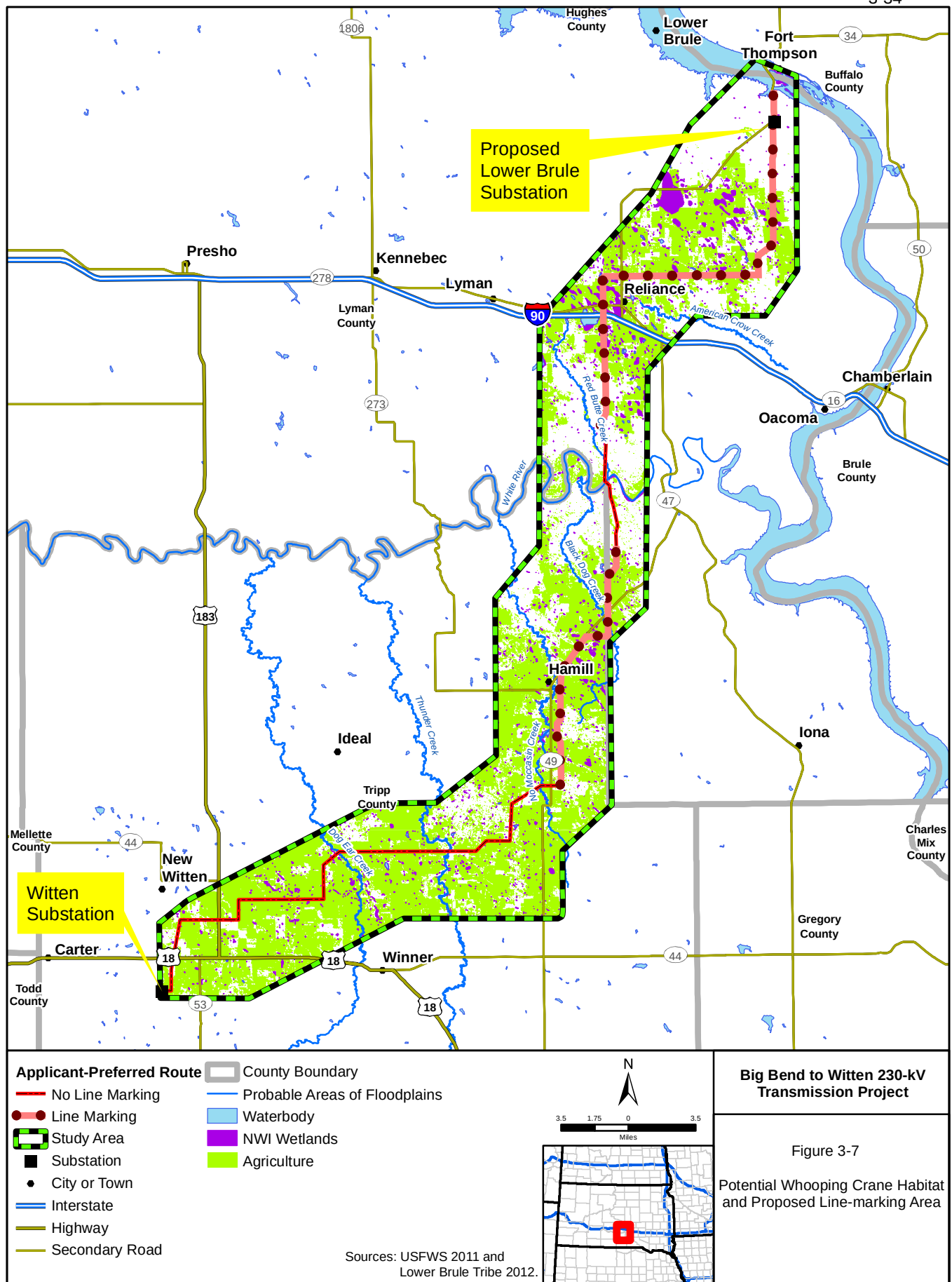
The whooping crane was listed as endangered on March 11, 1967 (32 FR 4001). Critical habitat for this species is not present in South Dakota (USFWS 2011a). The overall decline of the whooping crane has been attributed to habitat loss, human disturbance, hunting, predation, disease, and collisions with manmade features (Canadian Wildlife Service [CWS] and USFWS 2005). As of August 2011, the total population of wild whooping cranes was estimated to be 437 (International Crane Foundation 2011).

Whooping cranes that migrate through the study area nest in, and adjacent to, the Wood Buffalo National Park in Canada, and winter primarily in coastal marshes in Texas at the Aransas National Wildlife Refuge (Aransas-Wood Buffalo Population [AWBP]) (USFWS 2011d). During spring and fall migration, the AWBP transits the central Great Plains, including portions of North Dakota, South Dakota, Nebraska, Kansas, and Oklahoma. Birds from the AWBP population depart from their wintering grounds in Texas from late March through the first of May. Fall migration typically begins in mid-September with most birds arriving on wintering grounds between late October and mid-November (CWS and USFWS 2005).

Whooping cranes use a variety of habitats during migration, including freshwater marshes, wet prairies, shallow portions of rivers, reservoirs, lakes, lagoons, and grain and stubble fields. They feed on insects, berries, grains, fish, crustaceans, reptiles, and amphibians. Cranes roost on submerged or barren sandbars and are easily disturbed when roosting or feeding (Ashton and Dowd 2008).

The study area is outside the breeding range for the whooping crane; therefore, the Project would not affect nesting habitat or composite nesting areas. However, the study area is within the 75 percent sighting corridor of the AWBP migration route (USFWS 2008b). Whooping cranes migrate through South Dakota in the spring (April to mid-May) and in the fall (mid-September to October). Suitable stop-over habitat for migrating whooping cranes is present throughout the study area. Approximately 59 percent of the study area consists of farmland. Wetlands and waterbodies are present throughout the study area, especially north of Interstate 90 (**Figure 3-7**). Whooping crane sightings have been documented in the study area (**Figure 3-8**). Therefore, it is likely that the species would be present in the study area during their biannual migrations.







### Interior Least Tern

The interior least tern was listed as endangered on May 28, 1985 (50 FR 21784). Historically, the breeding range of this subspecies extended from Texas to Montana and from eastern Colorado and New Mexico to southern Indiana. It included the Rio Grande, Red, Missouri, Arkansas, Mississippi, and Ohio River systems. The species winters along the Gulf Coast, Caribbean island coasts, the eastern coast of Central America, and northern South America. No critical habitat has been designated for this subspecies, but essential breeding habitat has been identified within its historic range (USFWS 2011a, 1990). The interior least tern continues to breed in most of the historic river systems, although its distribution generally is restricted to less altered river segments (USFWS 1990).

Interior least terns spend 4 to 5 months at their breeding sites. In South Dakota, the breeding season typically lasts from May 1 to August 15 (USFWS 2011e). Riverine nesting habitat for the interior least tern consists of sparsely vegetated sand and gravel bars within a wide, unobstructed river channel (Nelson 1998; USFWS 1990). The size of nesting habitat depends on water levels and the extent of associated sandbars. Interior least terns are considered to be colonial nesters, with colonies that generally consist of up to 20 nests. They nest on the ground in a simple unlined scrape, typically on sites that are sandy and relatively free of vegetation. Usually two to three eggs are laid by late May. Both the male and female terns share incubation duty, which generally lasts between 20 and 25 days. Fledging occurs approximately 3 weeks after hatching (Ehrlich et al. 1988). Departure from colonies varies, but is usually complete by early September (USFWS 1990).

Interior least terns feed in the shallow areas of rivers, streams, and lakes. In addition to small fish, they also consume crustaceans, insects, mollusks, and worms (Nelson 1998; USFWS 1990). Interior least terns usually feed within a few hundred yards of the nesting colony; however, terns which nest at sand and gravel pits, or other artificial habitats, may travel up to 2 miles to forage (Ashton and Dowd 2008; USFWS 1990). Interior least terns spend 6 to 7 months at wintering sites along the Gulf Coast, Caribbean island coasts, the eastern coast of Central America, and northern South America.

In South Dakota, interior least terns are known to occur along the Missouri and Cheyenne rivers, mainly below the Gavins Point Dam (Ashton and Dowd 2008). Suitable nesting habitat is not present within the study area, although migration habitat is known to occur along the Missouri River, near the study area (USFWS 2011g). The transmission line would terminate at a transmission structure near the Big Bend Dam, immediately south of the Missouri River. The closest structure would be 100 feet or more from the riverbank. It is possible for the species to occur in the study area while foraging and during migration (USFWS 2011g).

### Pallid Sturgeon

The pallid sturgeon was federally listed as endangered on September 6, 1990 (55 FR 36641) and also is state listed as endangered. No critical habitat has been designated for this species (USFWS 2011b). The pallid sturgeon is native to the Missouri and Mississippi River systems and is adapted to habitat conditions in these large rivers prior to modifications. Preferred habitat for this species is large, free-flowing rivers with warm, turbid water (USFWS 1993). The pallid sturgeon inhabits rivers with strong current (40 to 90 cubic feet per second [cfs]) with a firm sandy substrate (Ashton and Dowd 2008; USFWS 1993). Adults and sub-adults feed primarily on fish, while smaller juveniles feed primarily on the larvae of aquatic insects (Wilson 2004). Suitable habitat occurs in the Missouri River near the northern terminus of the Project. The transmission line would terminate at a transmission structure near the Big Bend Dam, immediately south of the Missouri River. The minimum setback for Project structures would be 100 feet from the bank of the river. Therefore, the potential for this species to occur near the study area would be low.

### American Burying Beetle

The American burying beetle was listed as endangered on July 13, 1989 (54 FR 29652). No critical habitat has been designated for this species (USFWS 2011a). Historically, the American burying beetle was widely distributed throughout eastern North America and three Canadian provinces. In South Dakota, the American burying beetle primarily inhabits grassland and native prairie. This nocturnal species feeds on carrion, often by flying long distances to find a suitable carcass. When a pair of American burying beetles finds a suitable carcass, they will move it forward and excavate the soil from under it to a depth of about 4 inches. The carrion is cleaned of fur or feathers, fly larvae, and other organisms, and covered with a secretion that slows decomposition. It is then shaped into a ball and buried. The female will lay 10 to 30 eggs in a tunnel adjacent to the preserved carcass. When the eggs hatch, the larvae crawl to the carrion ball where one or both parents regurgitate food to the larvae. Adults and larvae feed on the carcass until the young pupate in the soil and emerge as adults about 1 month later. Adults could be present from July through August. They die soon after the young have pupated (Ashton and Dowd 2008).

A population of American burying beetles exists in south-central South Dakota, ranging from southwestern Gregory County through southern Tripp County. This area encompasses an estimated 500 mi<sup>2</sup> of core habitat and 800 mi<sup>2</sup> of potential habitat (Ashton and Dowd 2008). In 2005, a mark-recapture study was conducted on the population in this area and it met the definition of a self-sustaining population, as described in the recovery plan. South Dakota's American burying beetle population is an extension of a larger population found in the sandhills of Nebraska (Ashton and Dowd 2008). The portion of the study area that is south of U.S. 18 crosses the extreme northern extent of known American burying beetle range in Tripp county, encompassing approximately 37.5 acres of suitable habitat. Approximately 2 miles of transmission structures and the Witten Substation expansion would be located south of U.S. 18. Potential for the American burying beetle to occur within the study area would be low because the Project is located at the extreme northern limit of its geographic range in South Dakota (USFWS 2011j).

### Piping Plover

The piping plover was listed as endangered on December 11, 1985 (50 FR 50726), but populations of piping plover that occur within the study area are considered to be threatened. Designated critical habitat for the piping plover exists along the Missouri River in southeastern South Dakota, both upstream and downstream of the study area (USFWS 2002). This critical habitat exists approximately 85 miles north (upstream) of the study area and continues into North Dakota. Critical habitat also exists approximately 107 miles south (downstream) of the study area and continues into Nebraska.

In North America, piping plovers breed only in three geographic regions: the Atlantic Coast, the northern Great Plains, and the Great Lakes. Wintering areas are along south Atlantic, Gulf Coast, and Caribbean beaches and barrier islands (USFWS 2011h). Piping plover begin arriving on breeding grounds in the Great Plains in mid-April. In South Dakota, the breeding season typically lasts from May 1 to August 15 (USFWS 2011e). Populations that nest along the Missouri River utilize beaches, and dry barren sandbars in wide, open channel beds. Nesting habitat of inland populations consists of sparsely vegetated shorelines around small alkali lakes, large reservoir beaches, river islands and adjacent sandpits, and shorelines associated with industrial ponds (Haig and Plissner 1993). Vegetative cover in nesting habitat is usually 25 percent or less (SDGFP 2006). The piping plover feeds by probing the sand and mud for insects, small crustaceans, and other invertebrates in or near shallow water.

Nests consist of shallow scrapes in the sand, with the nest cup often lined with small pebbles or shell fragments. The nest is typically far from vegetative cover. Nesting piping plovers have been found in least tern nesting colonies at a number of sites on Great Plains river sandbars and sand pits. Incubation is shared by the male and female and averages 26 days. Incubation begins only after the last egg is laid and eggs typically hatch on the same day. Brooding duties also are shared by the male and female. Broods remain in nesting territories until they mature unless they are disturbed. Fledging takes

approximately 21 to 35 days (USFWS 2005). If a nest fails or is destroyed, adults could re-nest up to two times (SDGFP 2005). Breeding adults begin leaving nesting grounds as early as mid-July, with the majority gone by the end of August.

In South Dakota, piping plovers are known to occur along the Missouri River (Ashton and Dowd 2008). Suitable nesting habitat is not present within the study area, although migration habitat is present along the Missouri River near the study area (USFWS 2011g). The transmission line would terminate at a transmission structure near the Big Bend Dam, approximately 100 feet or more south of the Missouri River. It is possible for the species to occur in the study area while foraging and during migration (USFWS 2011g).

#### Sprague's Pipit

The Sprague's pipit was listed as a federal candidate species on September 15, 2010 (75 FR 56028). This species inhabits large (at least 225 acres) tracts of native grasslands, including lightly to moderately grazed lands. Habitat loss and degradation are primary causes of conservation concern for the Sprague's pipit. In addition, this species is affected by reduced productivity due to brown-headed cowbird parasitism in fragmented native prairie (SDGFP 2006). The Sprague's pipit feeds primarily on insects, spiders, and some seeds (Hagen et al. 2005; USFWS 2011i). The species is considered a possible migrant in Lyman County. No confirmed nest sites are present in South Dakota (USFWS 2011c). Approximately 39 percent of the study area consists of grassland. However, potential for this species to occur in the study area would be low since the study area occurs outside the geographic breeding range for this species.

### **3.5.3 State-Listed Species**

#### Bald Eagle

The bald eagle is state-listed as threatened, and is protected under the Bald and Golden Eagle Protection Act. The species occurs throughout South Dakota year-round and new nests are constructed each year (USFWS 2011g). The bald eagle typically occurs near large waterbodies with suitable roosting and foraging habitat. They are mainly scavengers feeding primarily on fish, but also will eat waterfowl, rabbits, rodents, and other carrion. Nest sites usually are located in mature trees close to open water, but also could occur on cliffs. Winter habitat includes areas of open water, adequate food sources, and sufficient diurnal and nocturnal roosts. Bald eagles are present in the study area year-round (Ashton and Dowd 2008). In South Dakota, bald eagles typically begin nest building activities in late November and begin laying eggs in late January or early February. The young fledge from June to August (USFWS 2008). Six historic bald eagle nests are located within or near the study area, between I-90 and the north bank of the Missouri River. One historic nest is located approximately 2 miles east of the study area on the White River (SDNHP 2011). Four historic nests are located near the study area along the Missouri River. As a result, the potential for this species to occur in the study area would be high.

#### River Otter

The river otter is state-listed as threatened. The species inhabits waterbodies in wooded areas. Key habitat components include riparian vegetation, cavities for dens, and an adequate prey base. Otters feed primarily on fish, but also will take frogs, crayfish, and turtles. Breeding occurs in early spring. The pups remain with the mother until just prior to the birth of the mother's next litter (Ashton and Dowd 2008). Although otters generally are highly mobile during the denning season (March to September), they are tied to a particular den site (DoS 2008). The river otter has been documented in the White River as recently as 2008 (SDNHP 2011). According to the SDGFP, there are no known locations of river otter dens in the study area (SDGFP 2011b); therefore, the potential for this species to occur in the study area would be low.

### False Map Turtle

The false map turtle is state-listed as threatened. The species inhabits waterbodies containing abundant aquatic vegetation and basking sites. The false map turtle is active from April through October and spends the winter in a muskrat den, under rocks or logs, or in the mud of the slough or lake bottom. It feeds on insects, worms, crayfish, mussels, snails, dead fish, and aquatic vegetation (Ashton and Dowd 2008). The species has been documented at the Missouri River near the northern terminus of the Project as recently as 2010 (SDNHP 2011). The transmission line would terminate at a transmission structure near the Big Bend Dam, immediately south of the Missouri River. The minimum setback for Project structures would be 100 feet from the bank of the river, therefore, potential for this species to occur in the study area would be low.

### Northern Redbelly Dace

The northern redbelly dace is state-listed as threatened. The species inhabits spring-fed streams in the Big Sioux, Minnesota, Niobrara, and Crow creek drainages in South Dakota. Beds of aquatic vegetation are the preferred habitat for this species. The northern redbelly dace feeds on algae, zooplankton, and aquatic insect larvae (Ashton and Dowd 2008). The study area is outside of the known geographic range of the northern redbelly dace (SDGFP 2006). Ashton and Dowd (2008) reported the distribution and documented locations for this species as well south and west of the study area. The SDNHP has one record for this species near the study area from 1933. In addition, the transmission line would span all waterbodies along the Project routes. The minimum setback for Project structures would be 100 feet from the banks of streams. Therefore, potential for this species to be affected in the study area would be low.

### Pearl Dace

The pearl dace is state-listed as threatened. The species inhabits cool bogs, ponds, lakes, creeks, and clear streams with a weak to moderate current and sand or gravel substrate. The pearl dace feeds on algae and invertebrates. The species is known to occur in cool spring sites in extreme south-central South Dakota (Ashton and Dowd 2008). The study area is outside of the known geographic range of the pearl dace (SDGFP 2006). In addition, the transmission line would span all waterbodies along the Project routes. The minimum setback for Project structures would be 100 feet from the banks of streams; therefore, potential for this species to be affected in the study area would be low.

### Sturgeon Chub

The sturgeon chub is state-listed as threatened. The species inhabits swift current areas in channels of large, turbid rivers, usually with a gravel substrate. The sturgeon chub feeds on benthic invertebrates. The species is known to occur in the White River (Ashton and Dowd 2008). The transmission line would span the White River with a minimum setback of 100 feet from the banks. Therefore, potential for this species to occur in the study area would be moderate.

## **3.5.4 Environmental Consequences**

### **3.5.4.1 Proposed Action**

Potential impacts to special status species could be direct or indirect. Direct impacts include species mortalities as a result of vehicle collisions or crushing of nests/burrows during construction or stream sedimentation. Indirect impacts include species displaced due to increased levels of noise, vibration, and human presence. Intensity of these impacts would depend upon proximity to special status species or their habitat, timing and type of construction, sensitivity of the affected species, and seasonal use patterns.

Potential impacts also could be either temporary or permanent. Construction impacts tend to be temporary, such as removing vegetation that could otherwise provide habitat that is later reclaimed and re-established (approximately 3 to 5 years). Operations impacts tend to be permanent, such as

maintaining a substation/switchyard in an area that once could provide habitat. The extent of both temporary and permanent impacts would depend on factors such as the sensitivity of the species, seasonal use patterns, type and timing of the construction activities, and physical parameters (e.g., topography, cover, forage).

Potential impacts specific to each special status species are discussed in the following sections.

#### Federally Listed Threatened and Endangered Species

A biological assessment for the Project was prepared and submitted to the USFWS with an overall finding of “may affect, not likely to adversely affect” federally listed species for the Project. Based on the biological assessment and proposed mitigation measures as part of informal consultation, the USFWS concurred with these findings for all federally listed species (Larson 2013; **Appendix E**). **Table 3-11** contains the species considered in the biological assessment, as well as the effects determination for each species.

**Table 3-11 Summary of Findings for Federally Listed Species Affected by the Project**

| Species                                                         | Status | Habitat                                                                                                                                      | Potential for Occurrence in Project Area | Determination                              | Rationale                                                                                                                              |
|-----------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Black-footed ferret ( <i>Mustela nigripes</i> )                 | E      | The species inhabits prairie dog colonies.                                                                                                   | Potential to occur                       | May affect, not likely to adversely affect | Endangered/ Non-essential Experimental Population (EXPN)                                                                               |
| Whooping crane ( <i>Grus Americana</i> )                        | E      | During migration, freshwater marshes, wet prairies, shallow portions of waterbodies, and grain and stubble fields are utilized for foraging. | Potential to occur                       | May affect, not likely to adversely affect | Appropriate conservation measures will be implemented to minimize potential impacts.                                                   |
| Interior least tern ( <i>Sterna altilarum ssp. athalassos</i> ) | E      | During migration, shallow waters of rivers, streams, and lakes are utilized for foraging.                                                    | Potential to occur                       | May affect, not likely to adversely affect | The species may be present at the Missouri River. Appropriate conservation measures will be implemented to minimize potential impacts. |
| Piping plover ( <i>Charadrius melodus</i> )                     | T      | During migration, shallow waters of rivers, streams, and lakes are used for foraging.                                                        | Potential to occur                       | May affect, not likely to adversely affect | The species may be present at the Missouri River. Appropriate conservation measures will be implemented to minimize potential impacts. |

**Table 3-11 Summary of Findings for Federally Listed Species Affected by the Project**

| Species                                                      | Status | Habitat                                            | Potential for Occurrence in Project Area | Determination                              | Rationale                                                                                                                                    |
|--------------------------------------------------------------|--------|----------------------------------------------------|------------------------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| American burying beetle<br>( <i>Nicrophorus americanus</i> ) | E      | The species inhabits grassland and native prairie. | Potential to occur                       | May affect, not likely to adversely affect | The Project would disturb a small amount of potential habitat in the extreme northern extent of the known geographic range for this species. |

Key = E –Endangered, T –Threatened.

A summary of proposed conservation measures, which will continue to be refined in coordination with applicable state and federal agencies and the LBST as needed, includes:

- Standard measures to minimize avian collision risk with overhead transmission lines or guy wires, as outlined in *Reducing Avian Collisions with Power Lines* (APLIC 2012), would be examined and appropriate measures developed as needed.
- Adequate raptor proofing designs, as described in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006), would be implemented on transmission structures.
- Siting of Project components would be avoided within active prairie dog colonies, to the extent practicable.
- Anti-perch devices would be placed on transmission structures that occur in active prairie dog colonies as determined through further coordination.
- Although the USFWS has not recommended surveys for the black-footed ferret, surveys would be completed if requested by the LBST as additional information on habitat quality and ferret population status becomes available.
- Line marking according to APLIC guidelines in areas of suitable crane stopover habitat to mitigate collision risk for migrating whooping cranes as discussed with the USFWS South Dakota Ecological Services Office and the LBST. This measure also serves to mitigate collision risk for migrating and foraging interior least terns and piping plovers.
- Project staff would be trained to recognize whooping cranes, any sightings would be immediately reported to the USFWS, South Dakota Field Office, and, if whooping cranes were to be sighted during construction, activities would cease until the birds move away from the Project ROW.
- Existing native vegetation within the construction ROW would be preserved whenever feasible.
- Surface disturbance areas would be reclaimed using native species, as approved by the county extension agency or landowners, and will be planted at the appropriate times in order to re-establish native vegetative cover and minimize the potential for invasion by non-native species.
- Wetland and riparian communities would be spanned by the proposed transmission line, thereby avoiding impacts to these ecosystems.



- Erosion and sedimentation controls would be implemented to minimize indirect impacts to wetlands and riparian areas.
- If herbicides are used to remove woody species that become established in the ROW and pose a hazard to the transmission line, they would be used in an appropriate manner.
- Mulch and seeds used for re-vegetation, erosion, and sediment control would be certified as weed-free.

No additional measures resulted from the Section 7 consultation between RUS and the USFWS (Larson 2013; **Appendix E**).

#### *Black-footed Ferret*

The black-footed ferret requires active prairie dog colonies of suitable size and density to maintain viable population levels. A total of two prairie dog colonies would be crossed by the Proposed Action. These colonies are listed in **Table 3-12**. However, the potential for this species to occur in the study area is low, due to the small and highly fragmented prairie dog colonies that are present. Although the USFWS has not recommended surveys for the black-footed ferret, Basin Electric has committed to completing surveys by the LBST as additional information on habitat quality and ferret population status becomes available. Any black-footed ferrets which could be present within the study area would be considered endangered or part of an NEP (USFWS 2011c), and the Proposed Action would not be considered to adversely affect this species.

**Table 3-12 Prairie Dog Colonies Traversed by the Proposed Action**

| <b>Black-tailed Prairie Dog Colony</b> | <b>Location</b> | <b>Size (acres)</b> | <b>Length Crossed (miles)</b> |
|----------------------------------------|-----------------|---------------------|-------------------------------|
| 1                                      | T101N R74W S10  | 0.25                | 0.02                          |
| 1                                      | T101N R74W S15  | 1.50                | 0.09                          |
| 2                                      | T106N R72W S27  | 1.96                | 0.12                          |
| <b>Total</b>                           |                 | <b>3.71</b>         | <b>0.23</b>                   |

If black-footed ferrets are present within the study area, both direct and indirect impacts could occur as a result of surface disturbing activities associated with the Project. Direct impacts to black-footed ferrets and their habitat would include the temporary disturbance of 3.7 acres of black-tailed prairie dog colonies, animal displacement, and possible mortality associated with ground disturbing construction activities. Indirect impacts would include temporary increased noise and human presence associated with both surface disturbing activities during Project construction and maintenance activities during Project operation.

Construction of the proposed transmission line would increase the potential for predation of black-footed ferrets by great-horned owls. Basin has committed to avoid siting Project components within active prairie dog colonies, to the extent practicable. However, if transmission structures are located within or near prairie dog colonies, anti-perch devices would be placed on transmission structures that occur in active prairie dog colonies as determined through further coordination. Based on consultation with the USFWS (USFWS 2011k), surveys are not recommended for this species.

#### *Whooping Crane*

No direct impacts to the whooping crane are anticipated during Project construction. Whooping cranes do not nest in South Dakota. Although potentially suitable roosting and foraging habitat may occur in the

study area, historic records for this species are sporadic, and established communal roost sites have not been documented within the study area (USFWS 2011c). Occurrence within or near the study area would be limited to migrating individuals or groups, or possibly in mixed flocks with sandhill cranes.

Indirect impacts to migrating whooping cranes may result from migrating individuals being flushed from the ROW during construction-related activities. Disturbance during roosting and foraging activities can stress the birds during critical times of the year (USFWS 2011g). Since whooping cranes are highly mobile, it is anticipated that individuals would move to other suitable resting and foraging habitats within the Project region. Based on the rarity of the species in the study area, potential impacts from encountering and flushing a migrating whooping crane during Project construction would be unlikely.

Direct impacts to whooping cranes could occur as a result of collision with the transmission line or microwave towers. Whooping cranes are large birds with low maneuverability. Line strike mortality is the greatest known human-caused threat to whooping cranes (USFWS 2011g). Collision risk depends on the location of the transmission line and towers relative to high-use habitat areas (e.g., nesting, foraging, and roosting), line orientation to flight patterns, and movement corridors, visibility, and transmission line/tower design. Collision risk increases when transmission lines are constructed between suitable wetland roosting and foraging habitat. Cranes tend to fly at low altitudes between these habitats, increasing collision potential. Basin has committed to the following measures to minimize potential impacts to Whooping crane:

- Line marking according to APLIC guidelines in areas of suitable crane stopover habitat to mitigate collision risk for migrating whooping cranes as discussed with the USFWS South Dakota Ecological Services Office and the LBST (**Figure 3-7**).
- Project staff would be trained to recognize whooping cranes, any sightings would be immediately reported to the USFWS, South Dakota Field Office, and, if whooping cranes were to be sighted during construction, activities would cease until the birds move away from the Project ROW.

Implementation of these measures would minimize any potential impacts and, therefore, the species would not be adversely affected by the Project.

#### *Interior Least Tern and Piping Plover*

Nesting habitat for these species is not present near the study area at the Missouri River (USFWS 2011k). Based on consultation with the USFWS (USFWS 2011k), pre-construction nesting surveys are not recommended.

The interior least tern and piping plover may forage near the study area at the Missouri River. No direct impacts to foraging habitat would be anticipated at this location, since the transmission line would terminate at a transmission structure near the Big Bend Dam, immediately south of the Missouri River. The minimum setback for Project structures would be 100 feet from the bank of the river. Direct and indirect impacts to interior least terns and piping plovers include displacement related to Project construction and operation and increased levels of noise, activity, and human presence. Indirect impacts would result from increased noise and human presence, if interior least terns or piping plovers are present within 0.25 mile of the Project ROW.

Similar impacts could occur during any maintenance activities if interior least terns or piping plovers are present within 0.25 mile of the ROW. The construction of a new electrical transmission line and microwave tower near the Missouri River would increase the collision potential for interior least terns and piping plovers (USFWS 2011g). Standard measures to minimize avian collision risk with overhead transmission lines, as outlined in *Reducing Avian Collisions with Power Lines* (APLIC 2012) would be examined and implemented as appropriate; marking also would apply to the microwave tower guy wires should that design be selected. Basin Electric also has proposed marking portions of the line to reduce

potential collision risk for Whooping crane (see Section 3.5); such measures also could reduce collision risk for these species. As a result of these environmental protection measures, impacts to the interior least tern and piping plover would not be anticipated to adversely affect these species.

#### *Sprague's Pipit*

Direct and indirect impacts to Sprague's pipit include mortalities or displacement related to Project construction and operation as well as increased noise levels and human presence. Project construction would disturb areas that could be used for foraging. However, in most instances suitable foraging habitat adjacent to disturbed areas would be available to the Sprague's pipit. The species is a migrant in Lyman and Tripp counties and there are no known nest sites in South Dakota (USFWS 2011c). Therefore, impacts to the Sprague's pipit would be low.

#### *American Burying Beetle*

It is highly unlikely individual American burying beetles would be present in the study area, or that this species would be affected by Project construction (USFWS 2011j). The majority of the American burying beetle's life cycle is spent underground or in the litter layer of soil. Two miles of transmission line and the Witten Substation expansion would be constructed south of U.S. 18, resulting in a total of 7.1 acres of permanent surface disturbance. The study area is located at the extreme northern extent of American burying beetle geographic range in South Dakota. Potential impacts to the American burying beetle from Project operations would be negligible. The likelihood of maintenance personnel encountering an American burying beetle is low due to the fact that the species is nocturnal and fossorial. Based on consultation with USFWS, no surveys would be conducted for this species and impacts are not anticipated.

Construction activities involving over 1 acre of soil disturbance, which would occur south of U.S. 18 in Tripp County, would be reported to the USFWS Ecological Services Office. Based on consultation with the USFWS, surveys for this species are not recommended.

#### *Pallid Sturgeon*

Potential impacts to the Pallid sturgeon are primarily related to potential alteration or degradation of native habitats, increased sedimentation, potential toxicity related to fuel spills, and issues associated with water management. The Applicant has committed to not constructing aboveground facilities and construction laydown areas within mapped wetlands, riparian areas, or other WUS. The transmission line would span wetlands and waterbodies, including the White River. Direct impacts to aquatic special status species from construction activities would be unlikely. Therefore, impacts to the Pallid sturgeon would not be anticipated.

#### State-Listed Species

##### *Bald Eagle*

Direct impacts to bald eagles can result from the loss or alteration of habitat, and increased human disturbance. Line-strike and electrocution also are major sources of injury and mortality to bald eagles. Indirect impacts to bald eagles include disturbance or displacement related to Project construction and operation as well as increased levels of noise and human presence. During the breeding season, bald eagles are sensitive to a variety of human activities. Some eagle pairs tolerate proximity to human activity; others will abandon the nest site. This variability could be related to a number of factors, including visibility, duration, noise levels, extent of the area affected by the activity, prior experiences with humans, and tolerance of the individual nesting pair. Relative sensitivity of bald eagles during various stages of the breeding season also varies. If agitated by human activities, eagles could inadequately construct or repair their nest, could expend energy defending the nest rather than tending to their young, or could abandon the nest altogether. Activities that cause prolonged absences of adults from their nests can jeopardize eggs or young in various ways. Older nestlings could be startled by loud or intrusive

human activities and prematurely jump from the nest. Disruption, destruction, or obstruction of roosting and foraging areas also can affect bald eagles. Interference with feeding can result in reduced productivity. Human activities near or within communal roost sites could prevent eagles from feeding or taking shelter.

The operation of the Project would increase the collision potential for bald eagles. However, collision potential typically is dependent on variables such as the line and microwave tower location in relation to high use areas (e.g., nesting, foraging, and roosting), line orientation to flight patterns and movement corridors, visibility, and transmission line/tower design. Basin Electric has committed to implementing standardized protection measures, as outlined in *Reducing Avian Collisions with Power Lines* (APLIC 2012), to prevent or minimize collision risk associated with the Project, in coordination with state and federal agencies and the LBST, as needed.

Transmission line configurations 60-kV or greater typically do not present an electrocution hazard to bald eagles, based on conductor placement and distances between conductors and ground wires (APLIC 2006). As a result, no electrocution hazard to bald eagles would be anticipated from the Project.

Three historic eagle nests occur within 0.5 to 1 mile of the Proposed Action. If construction is scheduled to occur during the breeding season for bald eagles (February 1 through August 15), pre-construction aerial and/or pedestrian breeding raptor surveys would be conducted by a qualified biologist in areas of suitable nesting habitat in order to identify any active nest sites within 1.0 mile from the Project area. Appropriate protection measures, including seasonal constraints and establishment of distance buffer areas would be implemented at active nest sites until the young have fledged and have dispersed from the nest area. These measures would be implemented on a site-specific basis, in coordination with the USFWS; the USFWS also would be consulted as to any permit requirements under the Bald and Golden Eagle Protection Act. Also, areas within 100 feet of surface waters are designated as avoidance areas by the Project, and the transmission line would span waterbodies. By implementing these environmental protection measures, impacts to the bald eagle would be low.

#### *River Otter*

Direct impacts to the river otter include displacement related to Project construction; habitat alteration, and increased noise levels and human presence, primarily at the White River crossing. Temporary construction-related disturbance near den sites could lead to abandonment of young, lost productivity, and displacement from preferred habitats, if present. However, according to SDGFP (2011b) there are no known locations of river otter dens within the study area. Consequently, no direct impacts to breeding river otters would be expected as a result of Project construction. The transmission line would span the White River with a minimum setback of 100 feet from the banks; therefore, impacts from Project operation are not anticipated.

#### *False Map Turtle, Northern Redbelly Dace, Pearl Dace, and Sturgeon Chub*

Potential impacts to aquatic special status species, including the false map turtle, northern redbelly dace, pearl dace, and sturgeon chub are primarily related to potential alteration or degradation of native habitats, increased sedimentation, potential toxicity related to fuel spills, and issues associated with water management. The Applicant has committed to not constructing aboveground facilities and construction laydown areas within mapped wetlands, riparian areas, or other WUS. The transmission line would span wetlands and waterbodies, including the White River. Direct impacts to aquatic special status species from construction activities would be unlikely. Therefore, impacts to aquatic special status species would not be anticipated.

### **3.5.4.2 Alternative Route A**

#### Special Status Species

Potential impacts to special status species would be the same as discussed for the Proposed Action. This alternative would impact two prairie dog colonies; Colony 1, which also is crossed by the Proposed Action, and Colony 3, which is located at T106N, R72W, S33. A total of approximately 4.28 acres of prairie dog colonies would be affected by Alternative Route A. This alternative would be further from one eagle nest (approximately 3 miles), but would still be within 0.5 mile of two eagle nests.

### **3.5.4.3 Alternative Route B**

#### Special Status Species

Potential impacts to special status species would be the same as discussed for the Proposed Action. This alternative route would impact one prairie dog colony; Colony 1, which also is crossed by the Proposed Action. A total of approximately 0.05 acres of a prairie dog colony would be affected by Alternative Route B. This alternative would be further from one eagle nest (approximately 2 miles), but would still be within 0.5 mile of two eagle nests.

### **3.5.4.4 No Action Alternative**

#### Special Status Species

The temporary disturbance, permanent structures, and associated activity would not occur under the No Action Alternative. Impacts to special status species would not occur from this Project.

## **3.6 Wetlands**

### **3.6.1 Affected Environment**

#### **3.6.1.1 Waters of the U.S.**

WUS are defined in 33 CFR 328 and include all waters that currently are, or were used in the past, or may be susceptible to use in interstate or foreign commerce; all interstate waters including wetlands; all other waters such as interstate lakes, rivers, streams (including intermittent streams), mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate commerce; and all impoundments of waters otherwise defined as WUS under this definition. In addition, tributaries of the above listed waters, including arroyos and other intermittent drainages, and wetlands adjacent to the above waters also are considered to be WUS.

Criteria used by the USACE to determine whether a drainage constitutes a WUS include presence of a defined bed (i.e., a linear bed in a topographic depression which would transport surface water from a watershed), presence of defined banks (i.e., near vertical or steep-sided banks formed by erosion from flowing water), and evidence of an ordinary high water mark (e.g., scoured bed, shelving, an absence of terrestrial vegetation and recent alluvial or litter deposition) that the drainage is subject to surface water flows on an average annual basis.

WUS within the study area may include, but are not limited to the following: White River and Thunder, Hollow, No Moccasin, Dog Ear, Black Dog, American Crow, Red Butte, Sand, Short, Owl, and North Fork American Crow creeks. A detailed surface waters discussion including a tabular summary of the surface water features within the study area are presented in Section 3.8.1, Water Quality, and **Table 3-13**, respectively.

**Table 3-13 NWI-identified Wetlands within the Study Area**

| <b>Wetland Type</b>    | <b>Acres</b> | <b>Percent of Total Acreage (%)</b> |
|------------------------|--------------|-------------------------------------|
| PEM <sup>1</sup>       | 5,690        | 61                                  |
| PSS <sup>1</sup>       | 77           | <1                                  |
| PFO <sup>1</sup>       | 12           | <1                                  |
| Palustrine Aquatic Bed | 1,220        | 13                                  |
| Lacustrine             | 1,673        | 18                                  |
| Riverine               | 610          | 7                                   |
| Manmade Pond           | 7            | <1                                  |
| <b>Total</b>           | <b>9,289</b> | <b>100</b>                          |

<sup>1</sup> PEM = palustrine emergent; PSS = palustrine scrub-shrub; PFO = palustrine forested.

Source: USFWS 2011.

### 3.6.1.2 Wetlands

As described above, wetlands adjacent to WUS also are considered to be WUS. In addition, and as used in this section, the term “wetlands” has a regulatory definition as defined in 33 CFR 328.3(b). The term “wetlands” is defined as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.” The frequency and duration of saturation may vary by geographical region, and is largely dependent upon local climatic conditions.

Under the USACE’s 1987 Wetland Delineation Manual, a “three-parameter” approach is required for delineating USACE-defined wetlands (USACE 1987). Based on this approach, areas are identified as wetlands if they exhibit the following characteristics:

- The prevalence of vegetation consisting of hydrophytic species or plants that have the ability to grow in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content and depleted soil oxygen levels.
- The presence of soils that are classified as hydric or possessing characteristics that are associated with reducing soil conditions. Hydric soils are poorly drained and have a seasonal high water table within 6 inches of the surface.
- An area which is inundated either permanently or periodically at mean water depths less than or equal to 6.6 feet or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation (usually 12.5 percent of the growing season) (USACE 1987; Wetland Training Institute, Inc. 1995). Within the study area, an area would need to be saturated for a period of approximately 19 days to support vegetation adapted to saturated soils based on the average number of days above 32 degrees Fahrenheit (i.e., average 152 days\*0.125) (NRCS 2002, 2000).

The USACE Wetland Delineation Manual (USACE 1987), in conjunction with the Regional Supplement to the Manual: Great Plains Region (USACE 2008) requires that, under normal circumstances, all three of these conditions be met for an area to be considered a wetland under the USACE’s definition. Federal mandates governing regulatory enforcement in wetlands and other WUS include Section 10 of the Rivers and Harbors Act of 1899 (Section 10), Sections 401 and 404 of the Clean Water Act (CWA), as

amended (33 USC 1251 et seq.), and EO 11990, Protection of Wetlands (42 FR 26961). Any loss, dredging, or filling of WUS would be regulated by the USACE under CWA Section 404. Final regulatory authority and delineation boundaries for wetlands and WUS within these areas lie with the USACE. If wetland and riparian features potentially impacted are identified as being jurisdictional, consultation with the Omaha District of the USACE would be conducted, a subsequent jurisdictional determination would be obtained, and permit requirements would be determined at that time.

A desktop review of the NWI database was completed to identify the spatial extent of hydrological features within the study area. Based on this review, approximately 9,289 acres of palustrine, lacustrine (including manmade ponds), and riverine systems were identified. **Table 3-13** summarizes the NWI wetland data and associated acreage of each system within the study area. **Figure 3-9** illustrates the NWI-identified wetlands within the study area.

### 3.6.2 Environmental Consequences

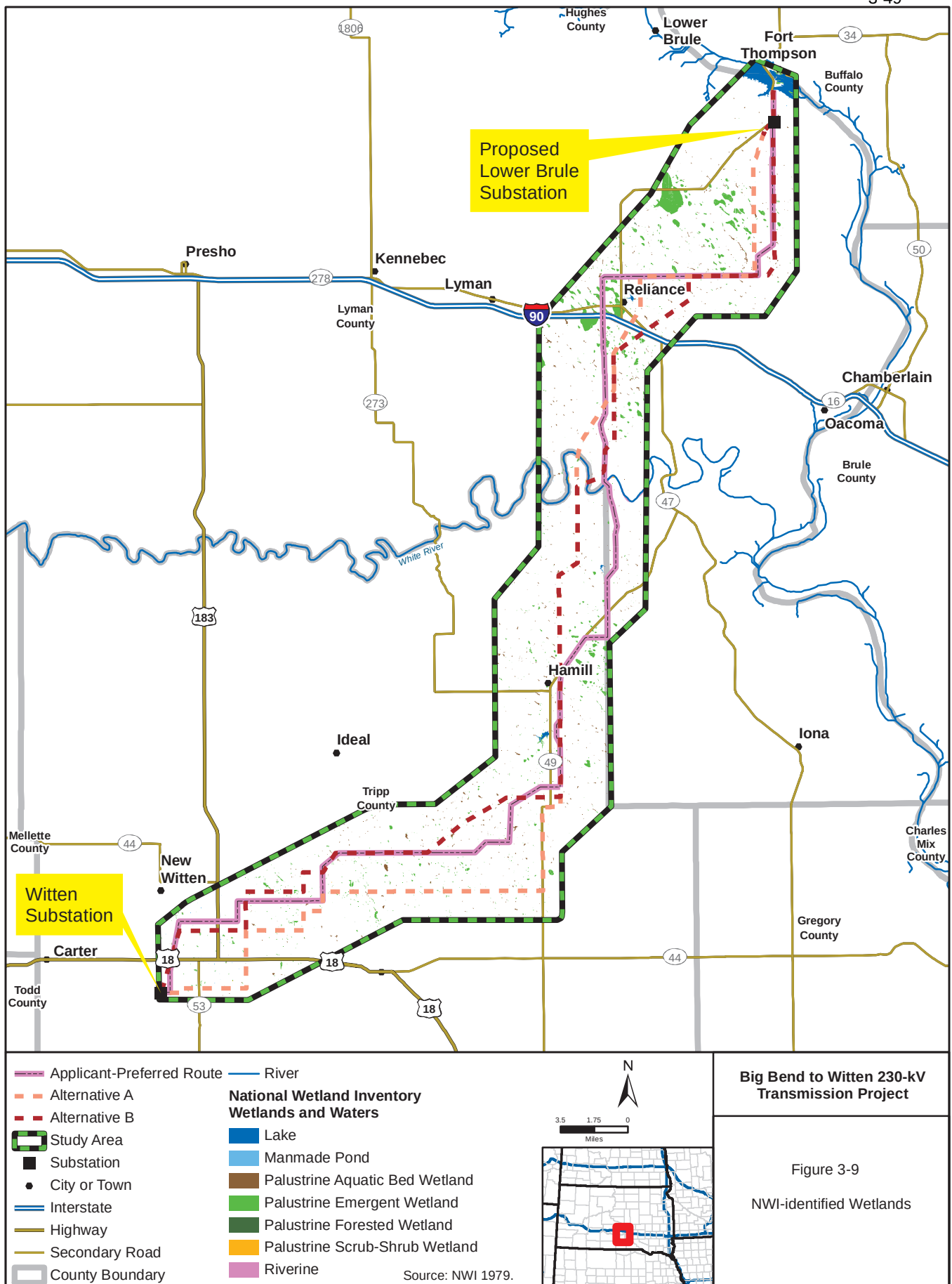
The impact analysis area for wetlands and WUS encompasses the Proposed Action and alternative routes. Temporary impacts were calculated based on the inclusion of temporary use areas associated with single-pole structures and pad placement; access roads within the 125-foot-wide construction ROW; pulling, tensioning, and splicing sites; laydown areas; and geotechnical boring sites. Permanent impacts were calculated based on the inclusion of long-term use areas associated with structure placement, and the Lower Brule Switchyard, and Witten Substation expansion areas and their associated access roads. The primary issues associated with wetlands and WUS include direct and/or indirect impacts to riparian/wetland habitats, and impacts associated with the introduction and/or spread of noxious weeds and invasive species within these communities.

#### 3.6.2.1 Proposed Action

As described in **Appendix D**, Environmental Protection Measures, a pre-construction wetland and waterbody survey would be conducted in localized areas for appropriate structure placement in accordance with USACE wetland delineation protocol prior to construction. All features would be mapped using a Global Positioning System device to enable feature avoidance and site-specific structure placement.

Wetland and riparian communities would be spanned by the proposed transmission line; and construction, operation, and maintenance vehicle and equipment travel through wetlands would be prohibited, thereby avoiding direct impacts to these ecosystems. In addition, a 100-foot buffer would be established adjacent to wetlands and creeks, where practicable, to prevent or minimize impacts to these ecosystems. The Lower Brule Switchyard and Witten Substation expansion areas and associated access roads would not impact wetlands since these areas consist of cultivated cropland and rangeland. Indirect impacts as a result of Project implementation may include increased sedimentation and erosion, introduction of noxious weeds and invasive species, and accidental spills within wetland and riparian communities.

To minimize indirect impacts to wetlands and riparian areas, environmental protection measures would be implemented to include at minimum the following: 1) placement of erosion and sedimentation control devices; 2) prohibit the placement of staging areas and refueling areas near surface waterbodies; 3) conduct timely stabilization and revegetation with an approved native seed mixture to minimize soil erosion and sediment runoff; 4) implement pre-construction weed control, equipment washing, and post-construction noxious weed monitoring; 5) develop and execute measures in the Stormwater Pollution Prevention Plan (SWPPP); and 6) designate off-site and staging area refueling locations.





Impacts to wetlands would generally be avoided as a result of the pre-construction surveys, avoidance of areas identified, and Environmental Protection Measures in **Appendix D**; therefore, impacts are anticipated to be minimal.

#### **3.6.2.2 Alternative Route A**

Under Alternative Route A, direct and indirect impacts to wetlands and WUS and impact minimization measures would be similar to those described under the Proposed Action.

#### **3.6.2.3 Alternative Route B**

Under Alternative Route B, direct and indirect impacts to wetlands and WUS and impact minimization measures would be similar to those described under the Proposed Action.

#### **3.6.2.4 No Action Alternative**

Under the No Action Alternative, the Project would not be developed; therefore, impacts to wetland resources would not occur.

### **3.7 Floodplains**

#### **3.7.1 Affected Environment**

The basis for examining the occurrence of floodplains and the potential Project effects on them is found in EO 11988, Floodplain Management, dating from May 1977. This EO states that actions by federal agencies shall avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains wherever there is a practicable alternative. Each agency has a responsibility to evaluate the potential effects of any actions it may take in a floodplain; to ensure that its planning programs reflect consideration of flood hazards and floodplain management; and to prescribe procedures to implement the policies and requirements of the Order. If an agency has proposed to conduct, support, or allow an action to be located in a floodplain, the agency is to consider alternatives to avoid adverse effects and incompatible development in the floodplains.

From a geomorphic perspective, floodplains are relatively low, flat areas of land that surround water bodies and hold overflows during flood events. Floodplains are often associated with rivers and streams, where they consist of streamlain sediments forming levels (or “terraces”) deposited in different geologic times along the watercourse. Low terraces within a few feet above the elevation of an ordinary high water mark are usually considered the modern floodplain. From a policy perspective, much of the basic inventory, regulation, and mitigation effort for floodplains and flood mitigation (including the National Flood Insurance Program [NFIP]) have been led by the Federal Emergency Management Agency (FEMA). FEMA defines a floodplain as being any land area susceptible to inundation by waters from any source (FEMA 2011a). For purposes of the NFIP, regulatory floodplains are defined as the areas that would be inundated from a 100-year flood event (an event having a 1 percent chance of occurring in any year). FEMA Flood Insurance Rate Maps (FIRM) delineate floodplains on that basis, with Zone A and its subcategories delineating regulated floodplains.

There are no published FEMA floodplain maps, either historical or current, for the study area (FEMA 2011b). The South Dakota Office of Emergency Management (OEM), in Pierre, administers the National Flood Insurance Program for South Dakota under a cooperative agreement with FEMA.

Geomorphically, the floodplain along the White River is the most extensive within the study area. It occurs as a broad, relatively flat valley feature ranging from approximately 0.5 mile to 1 mile wide across the study area. Floodplain elevations along the White River in the study area range from approximately 1,475 feet upstream to 1,400 feet downstream. Narrower geomorphic floodplains exist at other stream crossings. These primarily occur in Tripp County and include streams such as Black Dog, No Moccasin, Thunder, and Dog Ear creeks (**Figure 3-10**). These floodplains range from about 75 to 150 feet wide.

Similar narrow floodplains occur within the study area in Lyman County along American Crow Creek and on lower Red Butte Creek. Other stream crossings within the study area consist of narrower, more entrenched channel features with little or no associated floodplains.

### **3.7.2 Environmental Consequences**

#### **3.7.2.1 Proposed Action**

The proposed construction would avoid disturbance in floodplains by selecting site-specific alignments to avoid streams or, where crossings would be necessary, span them with overhead lines. As described in Chapter 2.0, the span between transmission structures would typically range from 650 feet to 950 feet, and would average approximately 800 feet, depending on topography. Taller structures allowing wider spans could be used if necessary for crossing broader floodplain features.

In general, this approach would avoid impacts to hydrologic and hydraulic conditions on floodplains, since little or no disturbance on floodplains would result from spanning them. There are no officially designated FEMA floodplains along the Proposed Action, and most of the crossings would involve relatively narrow features such as No Moccasin Creek or Dog Ear Creek (**Figure 3-10**). In some cases, transmission structures may be required on low-lying geomorphic floodplains along streams. If this occurs, however, the footprint would be small and is not anticipated to create an encroachment on out-of-bank flow conveyance. Since existing access routes would be used, no stream constrictions would result from the Project.

Neither the Lower Brule Switchyard nor the Witten Substation expansion would be located on geomorphic or FEMA-designated floodplains. No impacts to floodplains would occur from construction of these facilities. These facilities would not be affected by floodplains.

No operations and maintenance impacts to floodplain hydrology or flood conveyance are anticipated from the Project.

#### **3.7.2.2 Alternative Route A**

Impacts from this alternative would be the same as those described for the Proposed Action.

#### **3.7.2.3 Alternative Route B**

Impacts from this alternative would be the same as those described for the Proposed Action.

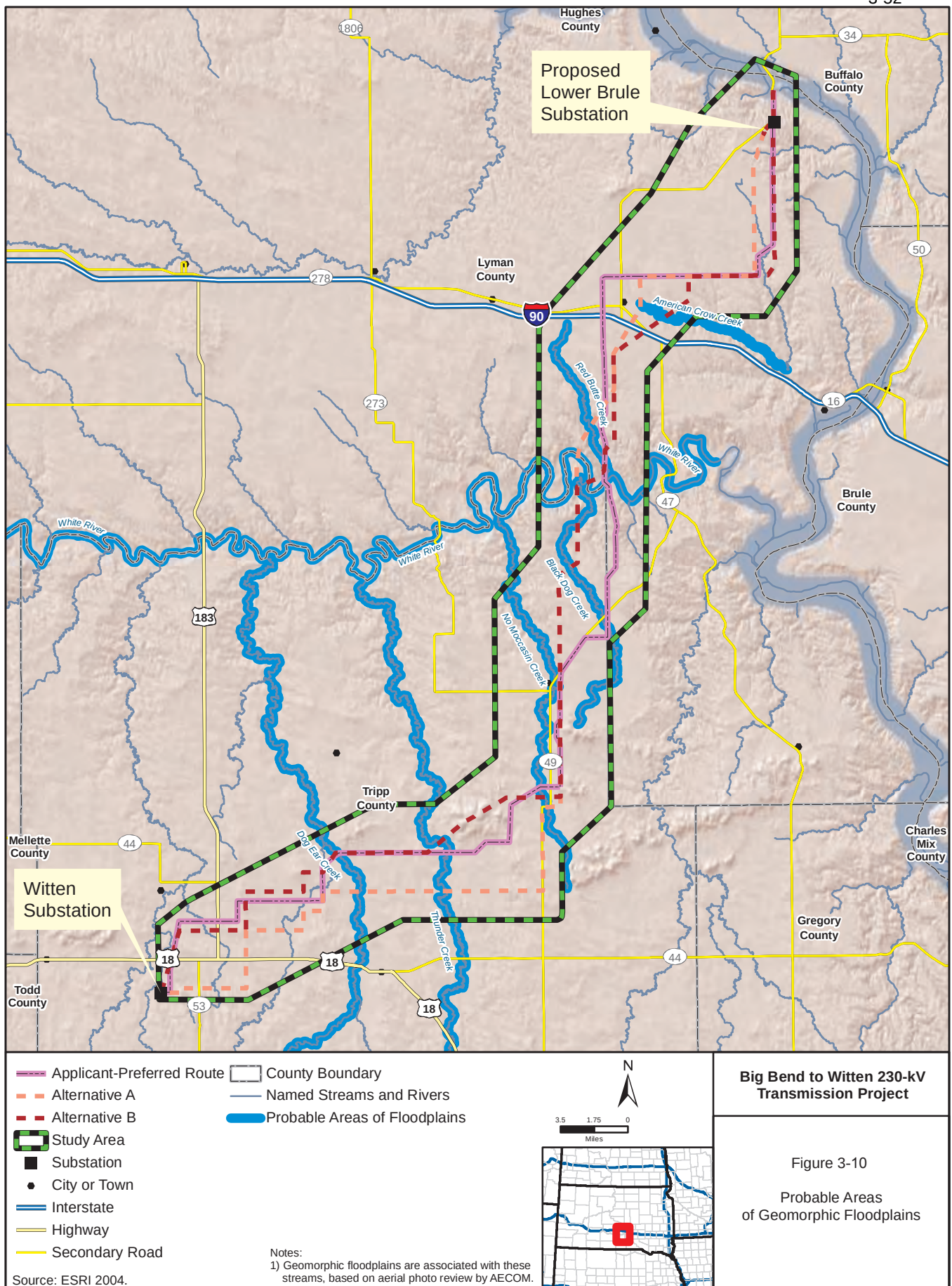
#### **3.7.2.4 No Action Alternative**

Under the No Action Alternative, no impacts to floodplain hydrology or hydraulics would occur. Existing conditions on geomorphic floodplains in the area would continue undisturbed by Project activities.

### **3.8 Water Quality**

#### **3.8.1 Affected Environment**

WUS are regulated by the CWA. The purpose of the CWA is to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” The CWA is the primary authority under which the U.S. Environmental Protection Agency (USEPA), the South Dakota Department of Environment and Natural Resources (DENR), and USACE regulate effects to surface waters within the boundaries of South Dakota.



Designated beneficial uses for the various waterbodies (i.e., rivers and streams, lakes, groundwater) form the basis for assigning and administering water quality standards. The uses and the standards, in turn, designate the quality at which the waters are to be maintained and protected. Water quality standards for South Dakota define the physical and chemical characteristics of surface water and groundwater that allow them to meet these uses, as designated by the state. South Dakota assigns numbers to the designated beneficial-use categories (DENR 2011a):

- 1) Domestic water supply waters;
- 2) Coldwater permanent fish life propagation waters;
- 3) Coldwater marginal fish life propagation waters;
- 4) Warmwater permanent fish life propagation waters;
- 5) Warmwater semi-permanent fish life propagation waters;
- 6) Warmwater marginal fish life propagation waters;
- 7) Immersion recreation waters;
- 8) Limited-contact recreation waters;
- 9) Fish and wildlife propagation, recreation, and stock watering waters;
- 10) Irrigation waters; and
- 11) Commerce and industry waters.

All streams in South Dakota are assigned the beneficial uses of irrigation (Use 10), fish and wildlife propagation, recreation, and stock watering (Use 9) (DENR 2011a).

Water quality is assessed under state and federal monitoring programs, and regulated through permit reviews and provisions for various water uses or other activities. In addition, the CWA requires states to publish, every 2 years, an updated list of water-quality “impaired” streams and lakes that do not meet designated uses because water quality does not meet established standards.

Storm water runoff is generated when precipitation from rain and snowmelt events flows over land or impervious surfaces and does not percolate into the ground. As the runoff flows over the land or impervious surfaces (paved streets, parking lots, and building rooftops), it accumulates debris, chemicals, sediment or other pollutants that could adversely affect water quality if the runoff is discharged untreated. The primary method to control storm water discharges is the use of best management practices. Storm water discharges from construction activities (such as clearing, grading, excavating, and stockpiling) that disturb one or more acres of land are regulated under the National Pollutant Discharge Elimination System (NPDES) storm water program. To prevent storm water discharge of pollutants, construction operators must obtain coverage under an NPDES permit, which often requires a storm water pollution prevention plan (SWPPP) to define what best management practices the operator would comply with the NPDES (e.g., silt fencing, erosion control). The NPDES is a nationwide federal program of the USEPA. In South Dakota, DENR has the delegated authority from USEPA to issue permits and regulate storm water discharges under the NPDES for activities within the state.

#### **3.8.1.1 Existing Surface Water Quality**

**Table 3-14** indicates the total number of stream crossings along each of the Project routes within the study area (**Figure 3-11**). These crossings occur within two major watersheds, Medicine or Medicine Creek (Hydrologic Unit Code [HUC] 10140104) and the Lower White River (HUC 10140204) (USEPA 2011). No areas of probable concern for sediment contamination occur along or adjacent to the Project routes (USEPA 2004). Water quality has been sampled by the DENR and the USGS in Medicine

Creek near the town of Kennebec, and in the lower White River at Oacoma (USEPA 2011; USGS 2011). Although part of the larger Medicine Creek watershed area would be crossed, Medicine Creek itself would not be crossed by any of the Project routes under consideration; its data probably reflect general water quality characteristics and influences in the area. Currently, there are no water quality impairments listed for Medicine Creek (USEPA 2011). In past assessments, Medicine Creek was impaired on the basis of elevated specific conductivity (SpC, a general measure of salinity), as well as Total Dissolved Solids (TDS) and Total Suspended Solids (TSS) concentrations. If Medicine Creek is representative of smaller drainages and land use influences in the study area, these water quality constituents may be elevated in other streams along the Project routes.

**Table 3-14 Number of Stream Crossings by Project Route**

| Total Number of Stream Crossings |    |
|----------------------------------|----|
| Proposed Action                  | 85 |
| Alternative Route A              | 93 |
| Alternative Route B              | 85 |

As a flow example, annual peak discharges in Medicine Creek at Kennebec averaged 2,356 cfs for the period 1960 through 2010, with a maximum of 16,600 cfs and a minimum of less than 1 cfs (USGS 2011). The median peak flow is 725 cfs. These data reflect a contributing watershed area of approximately 446 mi<sup>2</sup>. Peak flows occurred in any month from March through August, but were most common from late March to mid-June. Similarly, peak flows at other stream crossings also are expected to vary widely in their rates and timing. From existing water quality data, SpC ranged between 284 to 6,530 microSiemens per centimeter (µS/cm) in Medicine Creek (USEPA 2011; USGS 2011). More recent data for selected peak-flow and late summer/early fall low-flow months indicate generally higher SpC values, averaging approximately 3,600 µS/cm (USEPA 2011). SpC values were consistently higher in the low-flow months, as were TDS concentrations. For data available for years 2000 to 2005, TDS ranged between approximately 570 milligrams per liter (mg/L) to 5,520 mg/L in peak-flow months, and from approximately 2,530 to 7,280 mg/L in selected low-flow months. TSS ranged widely, between 22 and 1,140 mg/L, and did not show a general seasonal pattern. Dissolved oxygen concentrations ranged from 11.2 to 18.2 mg/L. The pH values ranged between 8.13 to 9.01, with values of 8.4 to 8.7 being more typical. There was generally a slight increase in pH later in the year.

On the White River at Oacoma, annual peak flows averaged 15,563 cfs for the period 1960 through 2010, with a maximum of 42,400 cfs and a minimum of 1,750 cfs (USGS 2011). River data are gathered at the SH 47 bridge a few miles downstream of the study area. They reflect a contributing watershed area of approximately 9,859 mi<sup>2</sup>. Recorded peak flows occurred in any month from mid-February through late September, but appeared to be most common from early March to late June.

The White River basin receives the majority of the runoff and drainage from the badlands in the western part of the state. These exposed sedimentary rock formations form a major natural source of both suspended and dissolved solids to the river. Severe erosion and leaching of soils occurs in the Badlands and downstream throughout the basin (DENR 2010). The river is currently impaired on the basis of Sodium Adsorption Ratio (SAR) and pathogens (the presence of *E. coli* and excessive fecal coliform counts) (DENR 2010; USEPA 2011). In past assessments, the river also was impaired due to elevated TSS concentrations and turbidity. The applicable water quality standard for TSS has been modified to be less than or equal to 21,550 mg/L, as a site-specific daily maximum for semi-permanent fish life propagation. The current water quality in the river attains that standard (DENR 2011a; USEPA 2011).





Water quality data from the White River have been collected by both the USGS and DENR. Over the period 1969 to 2011, USGS data for SpC indicate that this parameter ranged from approximately 300 to 2,670  $\mu\text{S}/\text{cm}$ , with an average of 690  $\mu\text{S}/\text{cm}$  (USGS 2011). Recent data from DENR fall within the same range. In the last 10 years, SpC data from the river samples have been consistently below about 1,200  $\mu\text{S}/\text{cm}$ . Suspended sediment concentrations, which include USGS data from 1972 to 2011, average approximately 10,000 mg/L, with a median value of 4,525 mg/L. They range widely (14 to 82,000 mg/L). Since the year 2000, suspended sediment concentrations have somewhat declined in the river, with an average of approximately 7,800 mg/L, a median value of 3,040 mg/L, and a range of 14 to 58,100 mg/L. Recent (2000 through 2005) TSS data for peak-flow and selected low-flow months ranged from approximately 60 to 11,400 mg/L (USEPA 2011). There was no apparent seasonal correlation. TDS concentrations from the same data set ranged from approximately 210 to 5,600 mg/L, and were generally lower in the late summer/early fall. Based on this brief comparison, the river data appear to differ from Medicine Creek data in that respect. This may be due to more early season runoff in the river from the badlands upstream. Dissolved oxygen concentrations ranged from approximately 8.7 to 12.8 mg/L, and pH ranged from approximately 8.0 to 8.7 standard units (USEPA 2011).

### 3.8.1.2 Existing Groundwater Quality

Groundwater resources occur in several major aquifers in the study area and surrounding region. These consist of unconsolidated alluvial deposits along streams, nearby Pleistocene terrace materials, the coarse, weakly consolidated sands in the Valentine Formation of the Ogallala Group on higher plateaus, the deeper Dakota Formation sandstones, and still deeper water-bearing zones of the Inyan Kara and Minnelusa Formations (Barari 1976a,b; Howells 1974; Ogle 1995; Schulz 1994). Alluvial water-bearing zones occur within broad streamlain deposits along the White River valley, and in narrower bands along other floodplains as shown in **Figure 3-11**.

Most wells that reliably produce water in the study area are constructed in Dakota (Newcastle) Formation sandstones at depths approximately 1,000 feet below ground surface, or in deeper zones (DENR 2011b). These wells are isolated from the surface by the overlying thickness of clayey materials in the Pierre Shale, and by chalky shales and siltstones of the Niobrara Formation, Carlisle Shale, Greenhorn Limestone, and Graneros Shale. These rocks form relatively impermeable zones hundreds of feet thick above water-bearing zones in the Dakota Formation and the deeper Inyan Kara Group, Sundance, and Minnelusa formations (Ogle 1995). These aquifers are under confined conditions, and wells completed in them are likely to flow when drilled in topographically low areas, such as near streams (Carter 1998). Water levels in the Dakota aquifer have been declining steadily due to the extensive pumping from this aquifer statewide (Ogle 1995).

Groundwater that has an ambient TDS concentration of 10,000 mg/L or less is classified as having the beneficial use of drinking water supplies, suitable for human consumption (South Dakota Administrative Rule 74:54:01:03). If groundwater quality fails to meet other state standards due to natural causes or conditions, no degradation of the groundwater beyond the ambient concentration is allowed.

Groundwater quality in the shallow, unconsolidated alluvial and terrace aquifers varies widely according to the source of these transported materials and the nature of the near-surface bedrock underlying the deposit. Data from shallow wells in the region indicate that SpC ranged from approximately 820 to 4,900  $\mu\text{S}/\text{cm}$ ; TDS concentrations ranged from about 520 to 4,500 mg/L; and pH ranged from 7.5 to 8.0 standard units (Howells 1974; Ogle 1995; USGS 2011).

In the general area, groundwater from the Dakota Formation contains TDS concentrations ranging from approximately 1,500 to 3,000 mg/L. SpC ranges from about 2,000 to 5,000  $\mu\text{S}/\text{cm}$ , and pH generally ranges from 7.0 to 8.0 standard units (Howells 1974; USGS 2011). Salinity, particularly as related to sodium concentrations, and TDS are occasionally elevated in water from wells supplied by the Dakota Formation (Barari 1976b; Howells 1974).

### 3.8.2 Environmental Consequences

Construction of the Proposed Action or alternative routes would result in land disturbance of approximately 348 to 356 acres, depending on route selection as described in Chapter 2.0. Because of this, a NDPEs permit for construction activities would be required from the State of South Dakota. As authorized by Section 402 of the CWA, the NPDES permit program regulates sources that may discharge pollutants into WUS. The Project would comply with permit application requirements, and with provisions of the NPDES permit issued after review and approval by DENR. As described in Chapter 2.0, if any of the material staging areas include vehicle and equipment refueling, or involve storage of petroleum products in excess of 1,320 gallons, a SPCC Plan would be developed and implemented.

Additional state and federal programs regulate the discharge of dredged or fill material into WUS, including wetlands, under Section 404 of the CWA. No dredge or fill activities are anticipated as part of the Project; it is assumed that most traffic around streams would use existing bridges or crossing structures. However, temporary disturbance may be needed to allow equipment and vehicles to cross the smaller streams. Environmental protection measures for wetlands, floodplains, and water quality would be implemented to protect or minimize impacts to water quality (**Appendix D**). The potential for Project impacts to wetlands is discussed further in Section 3.6. Local and state programs address floodplain management, as further discussed in Section 3.7. No permanent structures are proposed to be located in floodplains.

A number of environmental protection measures are proposed for the Project as described in **Appendix D**. Several measures related to Agricultural Practices, Soils, Wetlands, Floodplains, and Water Quality as listed in **Appendix D** would address potential impacts to water resources and water quality. In particular, these would include:

- Spanning waterbodies with overhead transmission lines to avoid disturbance impacts;
- Eliminating deep ruts that could channel runoff and sediment;
- Additional erosion and sediment controls, including revegetation and other practices;
- Development and implementation of an approved SWPPP, Spill Prevention and Response Plan, and SPCC Plan if needed and any other provisions that may be specified during the approval processes for the permits;
- Scheduling maintenance operations during periods of minimum precipitation whenever possible;
- Spanning streams and drainages, and avoiding waterbodies and wetlands during construction and maintenance;
- Setbacks from wetlands and waterbodies for staging areas and refueling; and
- Use of existing access roads and trails with minimal grading.

#### 3.8.2.1 Proposed Action

Potential impacts to water quality from construction of the Proposed Action and substation/switchyard could include sedimentation of streams and ponds from augering and grading, and increased turbidity and salinity from traffic on access roads, trails, and temporary access routes. At a number of structures, 15 to 20 yd<sup>3</sup> of surplus soil material would be either spread in the vicinity of the structure or disposed of in accordance with landowner wishes (see Chapter 2.0). Runoff from these materials could add to the potential sedimentation, turbidity, and salinity in surface waters. In addition, water quality impacts could result from spills of fuels, lubricants, drilling fluids, cuttings, or other material used to operate equipment and erect the structures.

Along this route, three perennial streams and numerous intermittent streams would be spanned. A total of approximately 1,600 feet of waterbody crossings would be spanned by the transmission line.



Approximately 25,600 feet of the route would be located within 100 feet of a perennial or intermittent stream.

Impacts to these features and water quality within them would be avoided, or their effects reduced by implementation of the environmental protection measures. In addition, the implementation of an approved SWPPP, Spill Prevention and Response Plan, and SPCC Plan if needed and any other provisions that may be specified during the approval processes for the permits previously described also would avoid or reduce potential impacts to water features and water quality. As described in Chapter 2.0, waste and rubbish from construction areas would be collected and disposed of in an approved landfill. Sanitary waste would be removed through arrangements with local municipal sanitary waste treatment facilities. Hazardous waste would not be stored or located near the ROW or in proximity to waterways or drainages at any time before, during, or after construction. Material staging areas and vehicle maintenance and refueling areas would not be located near waterways.

As previously described, the majority of groundwater in the study area is isolated from surface activities by hundreds of feet of relatively impermeable, clayey material. Shallower groundwater in alluvial and terrace deposits would be protected by compliance with NPDES permit provisions and implementation of the Spill Prevention and Response Plan. Negligible use of water supplies would occur during Project construction, and potential impacts to surface water or groundwater quantities would not occur. No impacts to water quality or quantity would be anticipated.

Potential impacts to water quality from operation and maintenance of the transmission line and substation/switchyard could primarily include increased sedimentation, turbidity, and salinity in streams and ponds from traffic on access roads, trails, and temporary access routes. These potential water quality impacts would be avoided or mitigated through implementation of environmental protection measures, and ongoing compliance with operating plans and permit provisions. With implementation of environmental protection measures, impacts to water quality are expected to be negligible to minor and would not result in measurable changes to watershed impairment determinations.

#### **3.8.2.2 Alternative Route A**

Potential impacts to water quality under this Alternative would be similar to those described for the Proposed Action. Under this alternative, seven perennial streams and numerous intermittent streams would be crossed. A total of approximately 1,500 feet of waterbody crossings would be involved. Approximately 32,000 feet of the route would be located within 100 feet of a perennial or intermittent stream.

Impacts to these features and water quality within them would be avoided, or their effects reduced and mitigated, by implementation of the environmental protection measures, a SWPPP, SPCC, and Spill Prevention and Response Plan in the same manner as discussed for the Proposed Action. Potential water quality impacts and related considerations from operations and maintenance under Alternative Route A would be the same as those discussed for the Proposed Action.

#### **3.8.2.3 Alternative Route B**

For this alternative, seven perennial streams and numerous intermittent streams would be crossed. A total of approximately 1,200 feet of waterbody crossings would be involved. Approximately 29,000 feet of the route would be located within 100 feet of a perennial or intermittent stream. Alternative Route B would be located in steeper terrain northeast of Winner and along the tributaries to American Crow Creek east of Reliance. As a result, the potential for surface water quality impacts from increases in sedimentation, turbidity, and salinity during construction and maintenance would be higher along this alternative than along the Proposed Action or Alternative Route A.

Impacts to these features and water quality within them would be avoided, or their effects reduced and mitigated, by implementation of the environmental protection measures, a SWPPP, SPCC, and Spill

Prevention and Response Plan in the same manner as discussed for the Proposed Action. The environmental protection measures and the SWPPP would need somewhat more rigorous implementation to successfully control runoff, sedimentation, and surface water quality impacts along Alternative Route B, due to steeper terrain along parts of the route.

Potential water quality impacts and related considerations from operations and maintenance under Alternative Route B would be the same as those discussed for the Proposed Action.

#### **3.8.2.4 No Action Alternative**

Under the No Action Alternative, no surface disturbance, excavation, waterbody crossings, equipment operations, traffic, or storage of fuels or other materials would occur as a result of the Project, and therefore this alternative would have no additional impacts to water quality.

### **3.9 Cultural Resources**

#### **3.9.1 Affected Environment**

The regulations implementing Section 106 of the NHPA (36 CFR 800) require that federal agencies and applicants for federal financial assistance consider the potential effects of their actions on “historic properties” listed in or eligible for listing in the NRHP. The NRHP contains a wide range of historic property types including historic buildings and structures, archaeological sites, individual objects, landscape features, and combinations of property types that form districts (e.g., archaeological districts or historic districts).

The potential to affect historic properties must be evaluated for the entire “area of potential effects” (APEs). The APE is defined as the entire Project footprint of all Project activities and the viewshed surrounding the Project footprint. The APE for historic properties is defined in 36 CFR 800.16(d) as “the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.” The APE includes areas of direct impact and indirect impacts. Direct impacts include all locations potentially subject to ground disturbance resulting from construction activities. Indirect impacts include visual effects. That is, all locations for which elements of the Project (e.g., aboveground electric transmission structures and lines) might create a visual impact (e.g., block the view of an important historic property or interrupt the viewshed between associated historic properties).

The Project APE for direct impacts includes the 125-foot-wide construction ROW as well as temporary construction equipment and materials storage yards and temporary or permanent access roads created or upgraded for transmission line construction and maintenance. Where applicable, the APE for visual impacts includes Project components with vertical profiles of sufficient mass and scale that they would block the view of an eligible building, structure, or landscape feature or introduce incompatible elements to a historic property for which setting contributes to its NRHP eligibility.

#### **3.9.2 Archaeological Resources, Historic Buildings, and Historic Sites**

Under the National Register Criteria for Evaluation (36 CFR 60), buildings, structures, and archaeological sites that are more than 50 years old may be eligible for inclusion in the National Register. Buildings, structures, and sites less than 50 years old must meet special criteria to be considered National Register eligible. Archaeological resources are the tangible remains of human occupations that are no longer in use. Buildings are designed to house human activity (e.g., homes, community centers, etc.) and structures are constructed for purposes other than to house human activity (e.g., bridges, canals, etc.). Finally, certain areas which are associated with the cultural practices or beliefs of a living community or cultural group may qualify for consideration as Traditional Cultural Properties (TCPs) (Parker and King 1998). The LBST Cultural Resources Office, under the direction of a qualified archeologist, conducted cultural resources investigations in the APE. A description of those investigations follows.

### 3.9.2.1 Cultural Resources Investigations

In July 2012, the LBST Cultural Resources Office (CRO) conducted a Level III archaeological survey and TCP survey for the proposed transmission line route and substation/switchyard locations (Molyneaux and Blue Thunder 2013). The survey corridor was 84 miles long by 125 feet wide and also included a 1,000-foot-long reroute and three proposed substation locations. For visual concerns, the survey included an area measuring 0.25-mile either side of the transmission line centerline. The TCP survey included lands within sight of the transmission line corridor. Prior to the Level III and TCP surveys, a background literature and site records search of the survey corridor and substation locations was conducted through the State Archaeological Research Center's site records database and from archives and files at the LBST CRO. In addition, the CRO reviewed the General Land Office maps, township plat maps, county and local histories, and historic aerial photography. An analysis of these databases indicated that several previous surveys had been conducted within a small portion (3.4 percent) of the survey corridor. As a result of the literature and files search, one historic property (historic railroad) was identified within the survey corridor.

A total of 20 cultural resources were identified during the Level III archaeological survey. Of the 20 cultural resources, 9 were located within or adjacent to the survey corridor (direct APE) and 11 were identified within 0.25 mile of the survey corridor (visual APE). The nine sites in the direct APE include two prehistoric lithic scatters, one historic dump, two historic railroads, one historic depression, and three historic farmsteads. Of the 11 sites within the visual APE, four are farmsteads, three are historic dumps, two are buttes/quarries, one is a wagon road, and one is an historic station (Big White River Government Issue Station). Of the nine sites within the direct APE, two are sections of two railroads previously recommended as eligible for nomination to the NRHP: the former Chicago, Milwaukee, St. Paul, and Pacific Railway; and the former Chicago and North Western Railway. The remaining seven sites were recommended as not eligible. Of the 11 sites within the visual APE, 1 site (Big White River Government Issue Station) has the potential (if ever fully investigated and recorded) to be eligible for the NRHP. The remaining 10 sites were recommended as not eligible for the NRHP. There are two NRHP-eligible historic structures located outside of the visual APE (approximately 0.5 to 0.9 mile away), but the viewshed between the structures and the proposed transmission line has been disturbed by existing utility poles, trees, farmsteads, and a highway. As a result of the TCP survey, many localities with significance within the history and traditions of the Sicangu people of the Lakota Nation were identified by tribal members who were part of the survey. Due to the confidential nature of these localities, they are not identified in this document.

The Level III survey and TCP survey identified two NRHP-eligible historic properties within the direct APE, two NRHP-eligible historic structures outside of the visual APE, and several localities of significance to the tribes. Basin worked cooperatively with the LBST to alter the corridor in certain areas to mitigate impacts to sites of significance found during the Level III and TCP investigations. Based on the evidence of the two surveys, the CRO recommended a finding of "No Historic Properties Affected." The results of the two surveys were included in a report that was submitted to the South Dakota State Historic Society on March 12, 2013. In a letter dated July 24, 2013, the South Dakota State Historic Preservation Officer (SHPO) agreed with the findings of the Level III survey and TCP survey (Rubingh 2013; **Appendix E**). In the letter, the South Dakota SHPO states that "we would recommend a determination of 'No Historic Properties Affected' provided the following the stipulations: 1) all eligible and unevaluated sites are avoided by all construction activities, and 2) activities occurring in areas not identified in your correspondence are submitted to SHPO for further review and comment."

### 3.9.3 Traditional Cultural Properties/Sites of Religious Significance

National Register Bulletin 38, "Guidelines for Evaluating and Documenting Traditional Cultural properties," provides guidance for determining National Register eligibility for a historic property based on "traditional cultural significance," which may be defined as "those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice." The general category of TCPs encompasses a wide range of historic property types,

including but not limited to, locations associated with important beliefs, plant and mineral gathering areas, places that mark cultural origins, prehistoric archaeological sites, features (e.g., stone circles/cairns), artifacts, sacred areas, burial sites, rock art, traditional use areas, and sources for materials used in the production of sacred objects and traditional tools. Many TCPs are Native American religious sites; therefore tribal input is essential to determining if TCPs are located in the APE, and if the Project could impact TCPs.

On February 25, 2010, the LBST arranged and held a meeting at the LBST conference facilities in Lower Brule, South Dakota. Western and Basin Electric met with LBST representatives, the Lower Brule Sioux Tribal Chairman, members of the Tribal Council, members of the Cultural Resources Elder Advisory Committee, Lower Brule community members, staff of the LBST Cultural Resources Office and the Department of Wildlife, Fish and Recreation, and representatives from the Rosebud Sioux Tribal Historic Preservation Office. The tribes raised concerns regarding the proposed corridors being too close to culturally sensitive areas including Medicine Butte. There also were tribal concerns that the proposed routes could impact wetland areas in several places and also impact tribal program areas. The LBST offered information about where the proposed route could be modified to avoid culturally sensitive areas. Western, RUS, and Basin responded to tribal concerns by selecting a route that avoided these areas, and the LBST has had continuing input on the development of Project alternatives. Basin contracted with the Cultural Resources Office of the LBST to conduct a TCP survey, as noted above. Because eligible historic properties would be avoided, RUS, as lead federal agency for Section 106 review, has made a determination of “no historic properties affected,” in consultation with the tribes and the SHPO. Western, RUS, and Basin will continue to work with the LBST Cultural Resources Office and tribal leadership throughout Project implementation to ensure protection of cultural resources important to the tribes.

### 3.9.3.1 Tribal Consultation

The NHPA as well as the implementing regulations for Section 106 of the NHPA (36 CFR 800) require federal agencies responsible for specific undertakings to consult with any federally recognized Indian tribe that attaches religious and cultural significance to historic properties that may be affected by an undertaking. Consultation is defined in 36 CFR 800.16(f) as “the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process.”

As the lead federal agency for Section 106 review, RUS initiated consultation by sending letters on April 22, 2011, to all federally recognized American Indian tribes, either residing in or with cultural ties to the study area (see example letters and distribution list in **Appendix E**). The letter informed these tribes of the specifics of the Project and solicited their input regarding historical and traditional ties to the area, and about the presence of sites of cultural and religious importance to the tribe. A total of nine Native American groups were contacted:

- Lower Brule Sioux Tribe;
- Rosebud Sioux Tribe;
- Standing Rock Sioux Tribe;
- Ponca Tribe of Oklahoma;
- Ponca Tribe of Nebraska;
- Oglala Sioux Tribe of the Pine Ridge Reservation;
- Crow Creek Sioux Tribe;
- Santee Sioux Nation; and
- Cheyenne River Sioux Tribe.

No responses to these requests for consultation were received. While they are the two tribes most directly affected by the proposal, the LBST has remained actively involved in Project planning and coordination, and the Rosebud Sioux Tribe to a lesser extent. In addition to ongoing coordination and consultation via regular conference calls and other communications, RUS met three times with representatives of the LBST tribe and once with the Rosebud Sioux Tribe. The first meeting was an initial meeting with LBST and the Rosebud Sioux Tribe in February 2010 to clarify the purpose of the proposed transmission line. The second meeting was held at the LBST conference center on June 10, 2011. Both meetings included participation by tribal members and elders, the Rosebud Sioux Tribal Historic Preservation Office, Western, RUS, and Basin. The purpose of the meeting was to provide a detailed Project description and timeline, summarize the April 2011 NEPA scoping meetings, describe the agency's approach to Section 106, identify and discuss resources important to the tribes, and discuss potential cultural resource survey requirements.

The third meeting was held on March 15, 2012, at the LBST council chambers. Participants included LBST Council members, the Tribal Chairman, tribal members and elders, Western, RUS, Basin, and West Central. The main purpose of the meeting was to specifically address the Tribal Council about the proposal, explain the roles of each agency and Basin, answer questions, and seek their feedback. Council members expressed their concerns about the need for better consultation with and involvement of the tribe, resolution of the proposed line route (between the Proposed Action and a tribe-preferred alternative), and the need to more directly involve the BIA.

### **3.9.4 Environmental Consequences**

#### **3.9.4.1 Proposed Action**

As a result of the Level III archeological survey and TCP survey, two NRHP-eligible historic railroads were identified within the 125-foot transmission line ROW, one potentially eligible historic property was identified within the visual APE; and two NRHP-eligible historic structures were identified outside of the visual APE (Molyneaux and Blue Thunder 2013). Several localities of significance to the tribes were identified within sight of the Project. No direct impacts to the historic railroads would occur since they would be spanned by the transmission line, and no transmission structures would be constructed within the railroad ROWs.

As a result of the TCP survey, many areas with significance within the history and traditions of the Sicangu people of the Lakota Nation were identified by tribal members who were part of the survey (Molyneaux and Blue Thunder 2013). Due to the confidential nature of these localities, they are not identified in this document, in accordance with Section 304 of the NHPA. In a letter dated July 24, 2013, the South Dakota SHPO concurred with the findings in the Level III and TCP surveys report of "no historic properties affected." However, Project construction activities could potentially adversely affect subsurface cultural resources. If previously unknown cultural resources are encountered during Project construction, all work within 200 feet of the discovery would cease and RUS in coordination with the tribal monitor would notify the SHPO and appropriate tribes within 48 hours of the discovery. A qualified archaeologist and, if necessary, a tribal representative would evaluate the find to make recommendations on NRHP-eligibility. If RUS determines the discovery to be NRHP-eligible, further consultation would be conducted with the appropriate parties, including the Advisory Council on Historic Preservation, to determine any mitigation efforts necessary to avoid or mitigate adverse effects in accordance with 36 CFR 800.13, "Post-Review Discoveries." The contractor constructing the Project would be responsible for securing the site from any potential disturbance by looting or other activities until all appropriate parties have been notified and had an opportunity to consult and provide information for RUS to determine the level of effort needed to protect any historic properties. Construction would not resume at the location of the discovery until authorized by the RUS.

If construction or other Project personnel or tribal monitor encounter what they believe may be human remains, all work would immediately cease at that location and RUS would be notified. RUS would then notify the appropriate law enforcement agency within 48 hours (South Dakota Codified Law § 34-27-25),

as well as the SHPO, LBST CRO, and Rosebud Sioux Tribal Historic Preservation Office. No further construction would occur within 200 feet any direction of the discovery and the site would be secured until RUS, the SHPO, and/or a qualified archaeologist and tribal representatives had examined and evaluated the discovery. Construction would not resume until authorized by RUS.

Impacts would not be anticipated to adversely affect cultural resources because: 1) although the Project ROW crosses two previously recorded NRHP-eligible historic railroads, no direct impacts to the historic railroads would occur since they would be spanned by the transmission line; 2) if any additional historic properties are located in the APE, they would be avoided or mitigated in compliance with Section 106; and 3) unanticipated discoveries of cultural resources during construction would be handled as described in Section 3.9.4.1.

#### **3.9.4.2 Alternative Route A**

Under Alternative Route A, impacts to previously recorded cultural resources would be the same as those described for the Proposed Action.

#### **3.9.4.3 Alternative Route B**

Under Alternative Route B, impacts to previously recorded cultural resources would be the same as those described for the Proposed Action and Alternative Route A.

#### **3.9.4.4 No Action Alternative**

Under the No Action Alternative, the Project would not be developed; therefore, no impacts to cultural resources would occur as a result of the Project.

### **3.10 Socioeconomics**

#### **3.10.1 Affected Environment**

##### **3.10.1.1 Population and Demography**

The study area is located in Lyman and Tripp counties in rural, south-central South Dakota. The northern portion of the study area is located in Lyman County. Lyman County includes an area of approximately 1,640 mi<sup>2</sup> and a 2010 population of 3,755 residents (U.S. Census Bureau 2010). The southern portion of the study area is located in Tripp County, which includes an area of 1,614 mi<sup>2</sup>. Based on data from the U.S. Census Bureau, Tripp County had a 2010 county population of 5,644 residents.

Racial composition of residents within the two counties is predominantly white: 58.3 percent in Lyman County and 83.1 percent in Tripp County. **Table 3-15** provides demographic information for the towns located in proximity to the study area.

##### **3.10.1.2 Economy and Employment**

Agriculture is the primary industry within the study area, with the most acreage devoted to growing crops such as corn, soybeans, hay, wheat, and alfalfa (SDDA 2010). Livestock production is the second largest industry, primarily producing beef, pork, and dairy. Service industries and retail trade support residents in the area towns.

**Table 3-15 Demographics of Towns Within and Adjacent to the Study Area**

| Town        | County | Population <sup>1</sup> | Median Household Income <sup>2</sup> | Percent (%) Below Poverty Level <sup>2</sup> |             |
|-------------|--------|-------------------------|--------------------------------------|----------------------------------------------|-------------|
|             |        |                         |                                      | Families                                     | Individuals |
| Lower Brule | Lyman  | 613                     | \$22,885                             | 39                                           | 42          |
| Reliance    | Lyman  | 191                     | \$42,750                             | 12                                           | 19          |
| Hamill      | Tripp  | 11                      | No Data                              | No data                                      | No data     |
| New Witten  | Tripp  | 79                      | \$31,000                             | 0                                            | 0           |
| Winner      | Tripp  | 2,897                   | \$38,618                             | 10                                           | 17          |

<sup>1</sup> U.S. Census Bureau, Census 2010.<sup>2</sup> U.S. Census Bureau, Census 2005-2009 estimate.

There are a variety of recreation opportunities in the study area that provide employment and revenue to the community. During the fall hunting season, the hunting industry provides recreational activities and increased revenues in the study area. Recreation in the study area includes big and small game hunting on private lands and South Dakota School and Public Lands. Also, the Walk-In-Area Program, a collaborative effort between the state and private landowners, opens designated private lands to hunting as well as fishing. Big game opportunities include whitetail deer, mule deer, and pronghorn; small game opportunities include pheasant, dove, sharp-tailed grouse, turkey, and waterfowl. The White River is a popular destination for catfish fishing, while Lake Sharpe, located immediately north of the study area, provides opportunities for walleye and largemouth bass fishing, in addition to camping, boating, picnicking, and hunting. Fishing opportunities are year round. Biking and golfing may be enjoyed near the town of Winner. Two recreation areas within the study area, Good Soldier Creek Recreation Area and Right Tailrace Recreation Area, are located on the Lower Brule Sioux Indian Reservation adjacent to Lake Sharpe and the Big Bend Dam. Both recreation areas are managed by the USACE. Main uses of these recreational areas are water-related activities (boating, fishing), but also include picnicking, camping, and hiking.

### 3.10.2 Environmental Consequences

#### 3.10.2.1 Proposed Action

Construction of the Project would directly affect approximately 105 landowners, regardless of alternative selected. A portion of the landowner's land would be used as an easement, for which they would be compensated by the Applicant. The Proposed Action does not have any residences within 500 feet of the centerline. Areas used for crop and livestock production may be taken out of commission, either temporarily or permanently, as a result of the Project. However, line routing has been situated along field edges or section lines to reduce the overall amount of interference with agricultural operations and any potential impacts to productive areas would be minimized through negotiations with landowners. There are abundant areas for crop and livestock production in the study area, and any potential impacts would be negligible to the local economy.

Construction of the proposed transmission line would be completed by construction contractors. A total of approximately 70 workers would be needed during the 8-month construction period. Workers traveling from outside of the area would require lodging and meals, benefiting the communities of Lower Brule, Reliance, and Winner with a minimal, temporary positive economic impact during construction as a result of increased income and tax revenue. Some materials and services would be purchased locally, such as concrete, seed, aggregate, and machinery repair. Lyman and Tripp counties also would see an increase

in property tax receipts from the Project. As a result of the small construction workforce and the temporary nature of construction activities, negative impacts to housing, population, or community facilities and services are not expected due to the Project. Ultimately, the increased reliability in electric service would be a beneficial effect on the local population.

Visitors to the area for recreation opportunities may be temporarily displaced during the 8-month construction period, particularly if construction coincides with key recreation seasons. Impacts to game species discussed in Section 3.4.2 also could temporarily affect hunting opportunities in the area; however, these impacts are anticipated to be minor and short-term as abundant habitat exists nearby. Once the Project is installed, direct impacts to recreational opportunities should be minimal; however, long-term visual effects are discussed in Section 3.12, Aesthetics.

#### **3.10.2.2 Alternative Route A**

Under Alternative Route A, direct and indirect impacts to socioeconomic resources would be similar to those described for the Proposed Action.

#### **3.10.2.3 Alternative Route B**

Under Alternative Route B, direct and indirect impacts to socioeconomic resources would be similar to those described for the Proposed Action.

#### **3.10.2.4 No Action Alternative**

If the No Action Alternative were selected, local communities would not realize the beneficial economic impacts associated with Project construction and operation.

### **3.11 Environmental Justice**

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was signed on February 11, 1994. EO 12898 directs federal agencies to review proposals and identify, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations to the greatest extent practicable and permitted by law. The EO also directs, through the development of agency-specific environmental justice strategies, greater public participation and access to information. According to the USDA 2012-2014 Environmental Justice Strategic Plan, the (EO) "... was born out of the need to address concerns that the high and adverse environmental impacts of private or governmental actions were falling disproportionately on populations protected by laws such as Title VI (of the 1964 Civil Rights Act) (also sometimes referred to as "environmental justice" concerns)." The Strategic Plan also states that "Executive Order 12898 amplifies Title VI by providing that each federal agency shall make achieving environmental justice part of its mission ..."

CEQ guidelines for evaluating potential adverse environmental justice effects indicate minority populations should be identified when either: 1) a minority population exceeds 50 percent of the population of the affected area; or 2) a minority population represents a "meaningfully greater increment" of the affected area population than the population of some appropriate larger geographic unit, as a whole. As such, the Project must be evaluated in terms of an adverse effect that:

- a) Is predominately borne by a minority population and/or low-income population; or
- b) Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low income population.



### 3.11.1 Affected Environment

Demographic composition by race and ethnicity of residents in Lyman and Tripp counties is detailed in **Table 3-16**. The residents are predominantly White. The second largest race/ethnicity in the study area is American Indian. Both counties are home to an American Indian Reservation whose population that is higher than the state average. This population can be attributed to the Lower Brule Sioux Indian Reservation located in the northern portion of the study area and the Rosebud Sioux Indian Reservation located west of the study area. Reliance and Hamill are the only towns located within the study area. The populations of Reliance and Hamill are 80 percent White and 100 percent White, respectively. Lyman and Tripp counties recorded 2009 poverty levels that were above the state average and median household income levels that were below the state average. Since the proposed project crosses the LBST Indian Reservation, the proportion of affected American Indian populations potentially affected by the project is higher than county figures depict.

### 3.11.2 Environmental Consequences

#### 3.11.2.1 Proposed Action

The Project was evaluated for any disproportionately high and adverse human health or environmental effects on minority communities and low-income communities. As detailed in **Table 3-16**, both Lyman and Tripp counties contain American Indian populations that are meaningfully greater (at least 1.5 times as a percentage) than the American Indian population of the state. Lyman County and the community of Lower Brule also have poverty rates that are meaningfully greater than the state average. There is no evidence the Project would have a disproportionately high adverse human health or environmental effect on minority and low-income populations, because effects from the construction and operation of the Project would be the same for all populations. Possible economic development and employment opportunities created by the proposed project may offset some potential effects of the project crossing the Lower Brule Sioux Indian Reservation.

#### 3.11.2.2 Alternative Route A

Under Alternative Route A, direct and indirect impacts to environmental justice would be the same as those described for the Proposed Action.

#### 3.11.2.3 Alternative Route B

Under Alternative Route B, direct and indirect impacts to environmental justice would be the same as those described for the Proposed Action.

#### 3.11.2.4 No Action Alternative

Under the No Action Alternative, construction of the Project would not take place and minority and low-income populations would remain unchanged.

### 3.12 Aesthetics

#### 3.12.1 Affected Environment

The landscape of the study area is characterized by a variety of landforms, including the plains and topographically varied landscapes of the Missouri Plateau Region (unglaciated section) of the Great Plains physiographic province (Fenneman 1931). The Project crosses through a mix of rangeland and agricultural fields. Cottonwood-dominated riparian vegetation characterizes the crossing of the White River. Rangeland vegetation is dominated by mixed shrub grasslands. **Figure 3-12** through **Figure 3-15** illustrate four characteristic views of the study area landscape. Human modifications to the natural landscape character are sparsely scattered, most commonly consisting of roads with occasional clusters of farm buildings and fences. There are few populated settlements.

**Table 3-16 Race and Poverty Characteristics of Affected Counties in the Study Area**

| State/County                   | Race <sup>2</sup> as a Percent (%) of Total Population (estimated) <sup>1,2</sup> – 2010 |                           |                                    |            |                   | Population at or Below Poverty Level (%) (2009) <sup>1</sup> | Median Household Income (\$) (2009) <sup>1</sup> |
|--------------------------------|------------------------------------------------------------------------------------------|---------------------------|------------------------------------|------------|-------------------|--------------------------------------------------------------|--------------------------------------------------|
|                                | White                                                                                    | Black or African American | American Indian and Alaskan Native | Asian      | Two or More Races |                                                              |                                                  |
| Lyman County                   | 58.3                                                                                     | 0.1                       | 38.2                               | 0.3        | 2.9               | 23.8                                                         | 34,318                                           |
| Tripp County                   | 83.1                                                                                     | 0.1                       | 14.0                               | 0.2        | 2.4               | 20.4                                                         | 38,887                                           |
| <b>South Dakota Percentage</b> | <b>85.9</b>                                                                              | <b>1.3</b>                | <b>8.8</b>                         | <b>0.9</b> | <b>2.1</b>        | <b>14.2</b>                                                  | <b>45,048</b>                                    |

<sup>1</sup> U.S. Census Bureau 2010.

<sup>2</sup> People who identify their origin as Hispanic or Latino may be of any race. Thus, the percent Hispanic or Latino should not be added to the race as a percentage of population categories. 1.1 percent of the population in both Lyman and Tripp counties identify themselves as Hispanic or Latino. Hispanic/Latino ethnicity accounts for 2.7 percent of the state population.



Figure 3-12 **Scenic Riparian Woodland Corridor at White River Crossing**





Figure 3-13 **Rural Famstead with Rangeland and Wetland**





Figure 3-14 Recreation area Near Big Bend Dam





Figure 3-15 **Cultivated Cropland**

Visually sensitive areas in the study area include towns, roads, recreation areas, and traditional cultural worship areas. The study area includes the Lewis and Clark National Historic Trail Auto Route, the Native American Scenic Byway, Medicine Butte, and the towns of Hamill and Reliance, South Dakota. Interstate, U.S., and state highways that occur in the study area include I-90, U.S. 16, U.S. 18, U.S. 183, SH 47, SH 49, SH 273, and SH 278. The Project also would be visible from less traveled roads and homes within its viewshed. In addition, the Project would be visible from the Missouri River and White River, which provide public recreational activities in the study area.

### 3.12.2 Environmental Consequences

#### 3.12.2.1 Proposed Action

The visible features of the Project would include the expansion of one substation and one switchyard, including a microwave tower at each of these sites (approximately 150 feet in height), and self-supporting steel poles for the transmission line, ranging in height from approximately 70 to 115 feet, depending on span distances between structures and centerline topography. Three steel conductors would span between structures. The spans would typically range from 650 feet to 950 feet, depending on topography. Taller structures would be used for crossing existing distribution and transmission lines or where unusual terrain exists. Vegetation would be removed at structure locations and in substation/switchyard areas in a small portion of the Project area where vegetation is of such a height that it could interfere with safe operation of the transmission line. This may include removing trees for Project construction or transmission line operation, although there are few trees present in the study area. The aesthetic impact of the Project would be stronger if visible in the immediate foreground (0.25 mile) in areas of high scenic beauty combined with one or more of the following: scenic highways, integral vistas, parks, and recreational rivers.

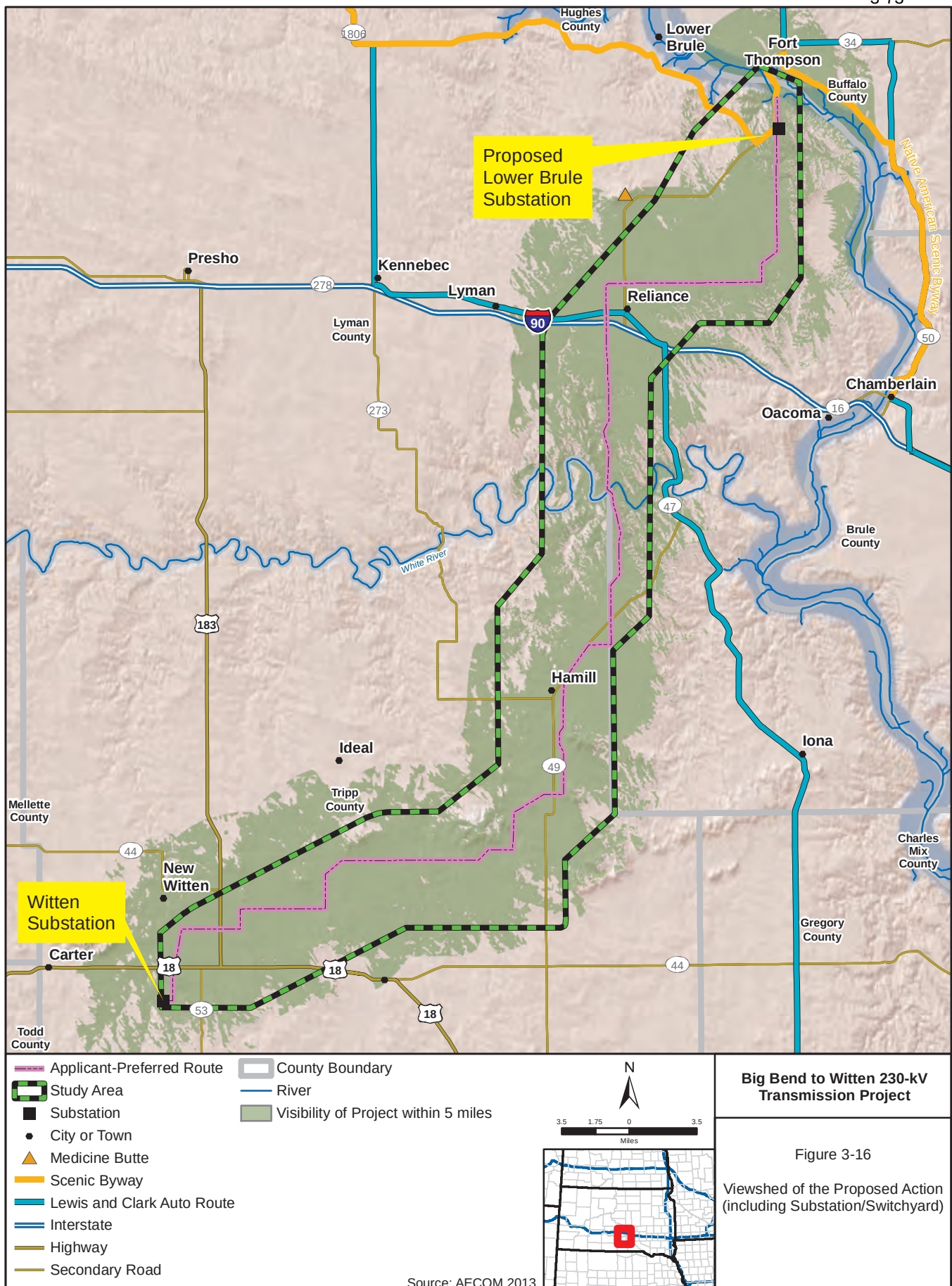
**Figure 3-16** through **Figure 3-18** illustrate the viewsheds of the Proposed Action and Alternative Routes A and B, respectively. **Table 3-17** lists viewshed acreages for the Proposed Action and Alternative Routes A and B.

**Table 3-17 Viewshed Acreages of the Proposed Action and Alternatives**

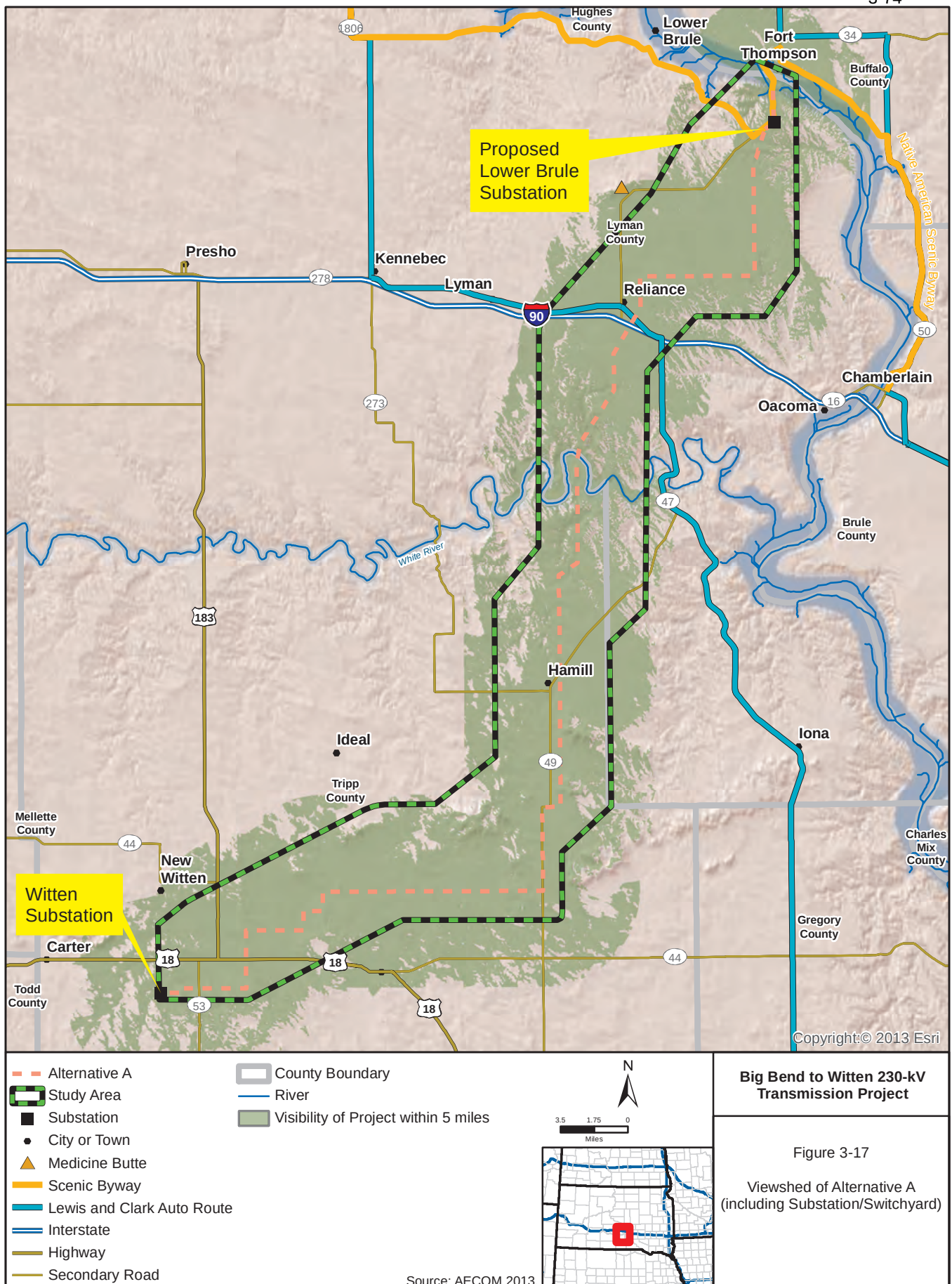
| Action                               | Visibility within 0.5 mile | Visibility 0.5 mile to 5 miles |
|--------------------------------------|----------------------------|--------------------------------|
| Proposed Action – 501 structures     | 48,248 acres               | 306,503 acres                  |
| Alternative Route A – 496 structures | 47,719 acres               | 316,632 acres                  |
| Alternative Route B – 479 structures | 46,076 acres               | 312,702 acres                  |

The aesthetic impacts resulting from the construction and operation of the Project are based on the impacts to people and scenery, and compliance with laws, ordinances, regulations, and standards of the applicable jurisdictions.

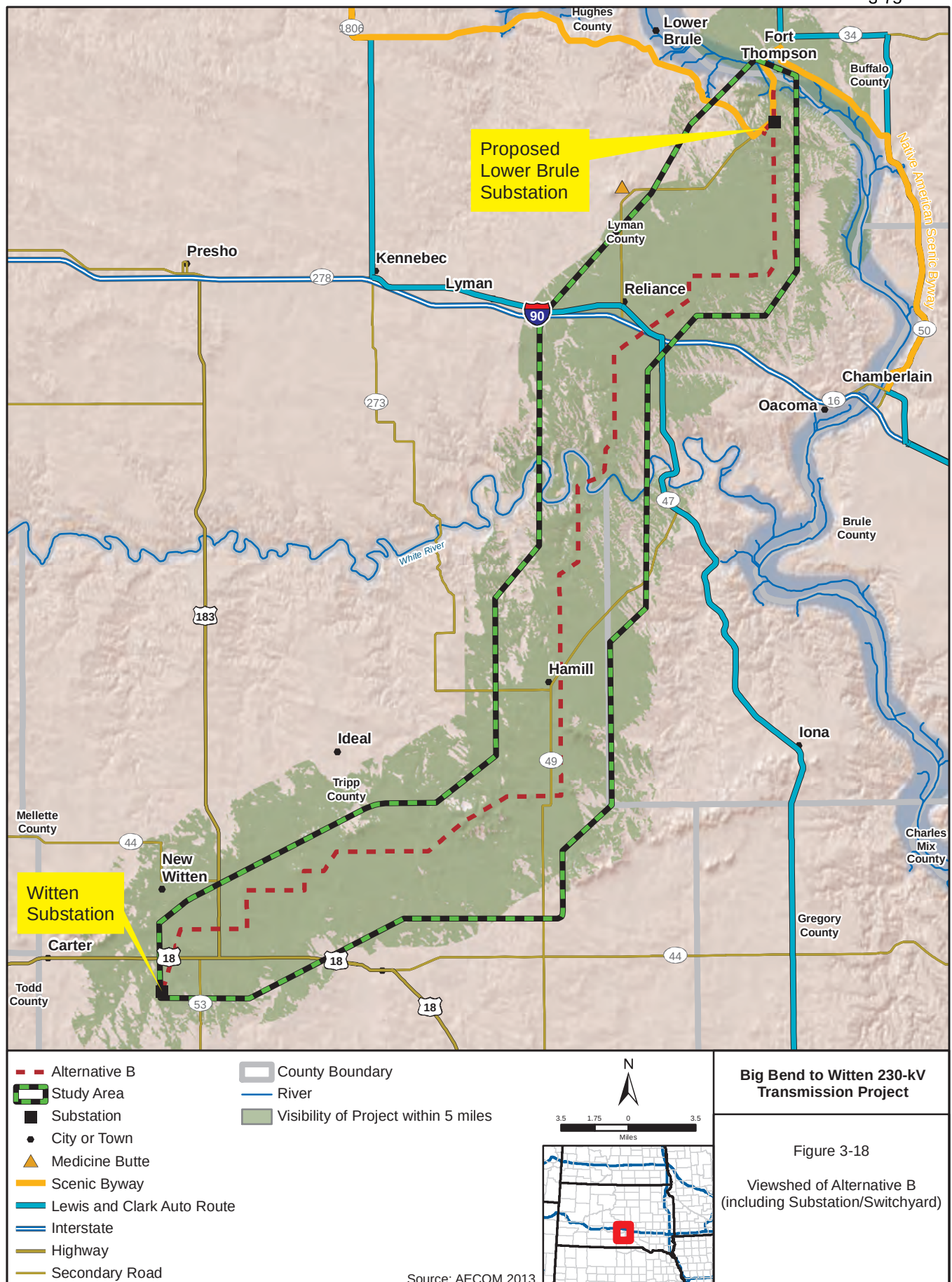












The Proposed Action would cross the Lewis and Clark National Historic Trail Auto Route and the federally designated Native American Scenic Byway. Therefore, the Proposed Action would be visible in the immediate foreground (0.25 mile). The Auto Route is not a part of the congressionally designated trail, but is an existing highway approximately parallel to the historic river trail. The Auto Route is a series of developed highways and roadways that do not possess unique qualities related to the understanding of the National Historic Trail. The portion of SH 47 within the study area also has been designated as the Native American Scenic Byway. The transmission line would cross the viewshed of this driving route at a discrete location and, therefore, would not have a substantial impact on the overall driving experience for travelers driving this route. In most places, the transmission line would be at least one mile from the driving route. Therefore, the impacts to the visual character of this driving route would be minor.

The Proposed Action would cross the White River and, therefore, would be visible in the immediate foreground (0.25 mile). The scenic beauty of the White River landscape in that area is high as compared to the characteristic landscapes of the physiographic province. The transmission line would cross the river at a relatively discrete area and would not be located in an area of higher than normal recreational use of the river. The scenic beauty of the river would be impacted in the area where the transmission line crosses the river, but this is a small portion of the overall watershed and its associated scenic qualities.

Therefore, the Project would have a moderate to high impact on the river's aesthetics in the immediate vicinity of the transmission line crossing area, but on the whole, the impact to the overall scenic qualities of the White River watershed would be minor.

One of the Project's two substations, the Lower Brule Switchyard, would be visible from the Native American Scenic Byway at a distance of less than 1 mile. The microwave tower at this site, at a proposed height of 150 feet, would be visible at potentially longer distances depending on the viewpoint. This would include the Lewis and Clark National Historic Trail, which at this location essentially follows the center line of the Missouri River. According to a simple viewshed analysis conducted by the National Park Service, at a height of 150 feet the tower is likely to be visible from the river at some locations both up and downstream of the dam and from a portion of the Trail auto route on the east side of the river. The tower also would be visible to at least a portion of the Lower Brule Sioux Reservation; initial discussions with both the LBST and the NPS indicate a preference for the guyed tower design due to its narrower overall profile. Representative simulations from two observation points within the viewshed of the relay tower at the Lower Brule Switchyard are provided in **Appendix F**. Mitigation measures have been developed to reduce the impacts of the switchyard on the scenic qualities of the Native American Scenic Byway. With the implementation of these mitigation measures, the Project would have minor to moderate impacts on the aesthetics of this scenic byway at the local level.

Initial mitigation and re-routing of the transmission line reduced the direct impact to the Medicine Butte viewshed. All other impacts from public viewing locations, including the towns of Hamill and Reliance, the Missouri River, and crossings of the several highways, other less-traveled roads, and residences, would result in minor to moderate impacts at discrete locations along these viewsheds.

#### **3.12.2.2 Alternative Route A**

The aesthetic impacts resulting from construction and operation of Alternative Route A would be similar to those of the Proposed Action.

#### **3.12.2.3 Alternative Route B**

The aesthetic impacts resulting from construction and operation of Alternative Route B would be similar to those of the Proposed Action.

#### 3.12.2.4 No Action Alternative

The No Action Alternative would result in no aesthetic impacts to the landscape within the Project area resulting from this Project.

### 3.13 Noise, Radio, and Television Interference

Project-related noise would result primarily from construction of the Project. Potential interference of radio and television transmission by the Project, as well as noise effects, is detailed in this section.

#### 3.13.1 Affected Environment

The study area is characterized by rural background noise typically consisting of natural noise sources, such as wind and wildlife, as well as manmade noise sources characteristically associated with ranching and farming, such as noise from cattle, farm machinery, and ranch vehicles. Rural ambient noise typically ranges from 20 A-weighted decibel (dBA) to 40 dBA (British Wind Energy Association 2000). Forty dBA is the equivalent of a quiet office or library. Existing noise sources also include traffic along transportation corridors such as I-90, U.S. Highways 18 and 183, and SHs 47, 49, and 53.

No noise studies have been conducted within the study area. There is one elementary school, two recreational areas, and numerous residences in the towns of Hamill and Reliance within the study area. The school, recreation areas, and towns are more than 500 feet from the centerline of the Proposed Action and alternative routes.

#### 3.13.2 Environmental Consequences

##### 3.13.2.1 Proposed Action

Temporary noise impacts would result from construction activities. Temporary construction noise would be limited to no more than a few days at any particular location and could be mitigated by scheduling work to daytime hours, particularly near sensitive receptors (e.g., rural residences). The use of single-pole structures, rather than H-frame structures, would reduce construction time needed for boring structure legs by approximately 50 percent. Reduced augering time would reduce the duration of associated equipment noise. The Project would not result in long-term noise impacts to area residents.

Average noise levels for typical construction equipment range from 74 dBA for a roller to 88 dBA for a crane (Harris, Miller, Miller, and Hanson, Inc. 2006). In general, the dominant noise source from most construction equipment is the diesel engine, particularly if the engine is poorly muffled. Other sources of continuous noise include field compressors, bulldozers, and backhoes. **Table 3-18** portrays the noise levels of various types of construction equipment expected at different distances.

For a general assessment of construction impacts, assuming a geometric spreading only (i.e., a decrease of about 6 dBA per doubling of distance from a point source) on the basis of the noise levels presented in **Table 3-18**, it is estimated that the noisiest piece of equipment operating at peak load would produce noise levels that would exceed the USEPA guideline for residential noise (55 dBA) at a distance of about 1,600 feet (USEPA 1974). Rural background noise in rural areas is typically near 40 dBA (USEPA 1978). The effects of noise generated by construction would be alleviated, to some extent, by air absorption, terrain, and vegetation. If there are complaints by those affected in the study area, Basin would work with those parties to determine the best approach to minimize any possible impacts.

**Table 3-18 Noise Levels at Various Distances from Typical Construction Equipment**

| Construction Equipment | Noise Level <sup>1</sup> at Distances (dBA) |          |          |          |          |            |
|------------------------|---------------------------------------------|----------|----------|----------|----------|------------|
|                        | 50 feet                                     | 100 feet | 200 feet | 400 feet | 800 feet | 1,600 feet |
| Bulldozer              | 85                                          | 79       | 73       | 67       | 61       | 55         |
| Concrete Mixer         | 85                                          | 79       | 73       | 67       | 61       | 55         |
| Concrete Pump          | 82                                          | 76       | 70       | 64       | 58       | 52         |
| Crane, Derrick         | 88                                          | 82       | 76       | 70       | 64       | 58         |
| Crane, Mobile          | 83                                          | 77       | 71       | 65       | 59       | 53         |
| Front-end Loader       | 85                                          | 79       | 73       | 67       | 61       | 55         |
| Generator              | 81                                          | 75       | 69       | 63       | 57       | 51         |
| Grader                 | 85                                          | 79       | 73       | 67       | 61       | 55         |
| Shovel                 | 82                                          | 76       | 70       | 64       | 58       | 52         |
| Truck                  | 88                                          | 82       | 76       | 70       | 64       | 58         |

<sup>1</sup> The equivalent steady-state sound level that contains the same varying sound level during a 1-hour period.

Source: Harris, Miller, Miller, and Hanson, Inc. 2006.

Corona on the surface of high voltage conductors, caused by current arcing across two or more points along a conductor, can create signals that may interfere with radio and television reception. Modern transmission line design has reduced corona to a minimum and such design is proposed for the Project. Occasionally, more sensitive radio and television sets pick up on “corona noise.” During a rainfall event, noise from corona discharge emanating from a power line would be at 39 dBA, at approximately 50 feet from the center of the tower, which would equal the noise being generated in a library (Bonneville Power Administration 1996). In general, because of the climate in the analysis area and existing ambient noise, such as wind and wildlife, the impact of corona discharge is expected to be negligible. Noise from traffic during the operations phase would range from light- to medium-duty vehicles, and is expected to be negligible. Overall, the noise levels of operations would be lower than the noise levels associated with short-term construction activities, and in conjunction with the existing ambient noise, would result in a negligible impact to noise sensitive receptors in the analysis area. The Proposed Action does not have any telecommunications facilities within 150 feet of the alignment, nor are any residences within 500 feet of the alignment. At a distance of 500 feet, corona noise would be less than the USEPA guideline for residential noise of 55 dBA (USEPA 1974). Although corona discharge can cause television and radio reception interference, it does not represent a threat to human health or safety.

The nearest residences to the Lower Brule Switchyard and Witten Substation are greater than 0.5 mile from either of the sites. At this distance, construction noise and noise related to increased truck traffic would not impact local residents.

### 3.13.2.2 Alternative Route A

Under Alternative Route A, direct and indirect impacts to noise, radio, and television would be similar to those described under the Proposed Action, with the exception that only one residence would be within 250 feet of the alignment and one telecommunications facility would be within 150 feet of the alignment.

### 3.13.2.3 Alternative Route B

Under Alternative Route B, direct and indirect impacts to noise, radio, and television would be similar to those described under the Proposed Action, with the exception that one residence would be within

500 feet of the alignment and one residence would be within 250 feet of the alignment. Additionally, one telecommunications facility would be within 150 feet of the alignment.

#### **3.13.2.4 No Action Alternative**

Human-induced noise levels would remain at their current levels within the study area if the transmission line or substation/switchyard were not constructed.

### **3.14 Air Quality**

#### **3.14.1 Affected Environment**

The Clean Air Act (42 USC 7401 *et seq.* as amended in 1977 and 1990) is the principal federal statute governing air pollution. The Clean Air Act empowered the USEPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. These pollutants are called “criteria” air pollutants and include carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide, lead, particulate matter equal to or less than 10 microns in diameter, and fine particulate matter equal to or less than 2.5 microns in diameter. The NAAQS include primary standards designed to protect human health and secondary standards to protect public welfare, including visibility and damage to crops and vegetation.

Regions of the country that do not meet the NAAQS are designated as “nonattainment” areas. Certain rural parts of the country do not have extensive air quality monitoring networks; these areas are considered “unclassifiable” and are presumed to be in attainment with the NAAQS. The study area includes portions of Lyman and Tripp counties. Air quality in each of these counties falls into the categories of either “better than national standards” or “unclassifiable/attainment” for all criteria air pollutants in accordance with 40 CFR 81.342 (USEPA 2014).

Air quality within the state of South Dakota is regulated by the DENR Air Quality Program. There are no prescribed state-wide requirements for controlling fugitive dust emissions such as those that may be released during construction of the Project.

Lyman and Tripp counties are primarily rural agricultural counties, and based on a review of the DENR Title V permitting website, there are no known large emission sources in those counties, or within the study area. Emission sources within and near the study area include vehicular travel on paved and unpaved roads, residences (e.g., space heating, water heating, and fireplaces), open burning, and agricultural operations. Based on the lack of nearby large emission sources and the air quality attainment status of the counties, the existing air quality within the study area is expected to be good.

#### **3.14.2 Environmental Consequences**

Because the Project area is in an attainment area and none of the actions proposed would involve introduction of a new facility that would be a major point source of air pollution, the Project would not have measurable effects on local or regional air quality. During construction, Project activities would have a minor to moderate temporary effect on air quality from fugitive dust and vehicle emissions at the site-specific level.

##### **3.14.2.1 Proposed Action**

During construction, air quality impacts would be temporary and would primarily occur in the immediate vicinity and downwind of construction activities. Temporary air quality impacts would include both fugitive dust emissions and exhaust emissions; however, fugitive dust would be the primary pollutant of concern. Fugitive dust emissions would result from mechanical clearing of vegetation and movement of soil, augering for direct embedded transmission structures, and vehicular travel on unpaved roads and within the construction ROW. Emissions of fugitive dust from vehicle travel are a function of several factors, including soil moisture, wind speed, and vehicular speed on unpaved roads.

Air quality mitigation measures to minimize fugitive dust from overland travel within the ROW and from other ground disturbance activities would be implemented as necessary to reduce fugitive dust. Fugitive dust emissions generated as a result of surface disturbance activities and vehicle use of access roads would be controlled by the periodic application of water, if necessary.

Given the current attainment status of the counties and the relatively short duration of construction activities, construction of the Project would not be expected to result in a degradation of local or regional air quality, or result in any exceedences of the NAAQS. Overall, construction impacts on air quality are projected to be negligible.

Operation of the proposed transmission line would have no measurable impact on air quality within the study area or in Lyman or Tripp counties. Periodic maintenance activities would have the potential to generate minor amounts of fugitive dust and exhaust emissions from maintenance vehicles; however, the air quality impacts would be negligible.

#### **3.14.2.2 Alternative Route A**

Under Alternative Route A, direct and indirect impacts would be similar to those described for the Proposed Action.

#### **3.14.2.3 Alternative Route B**

Under Alternative Route B, direct and indirect impacts would be similar to those described for the Proposed Action.

#### **3.14.2.4 No Action Alternative**

Under the No Action Alternative, the proposed transmission line would not be constructed and air quality impacts would not occur.

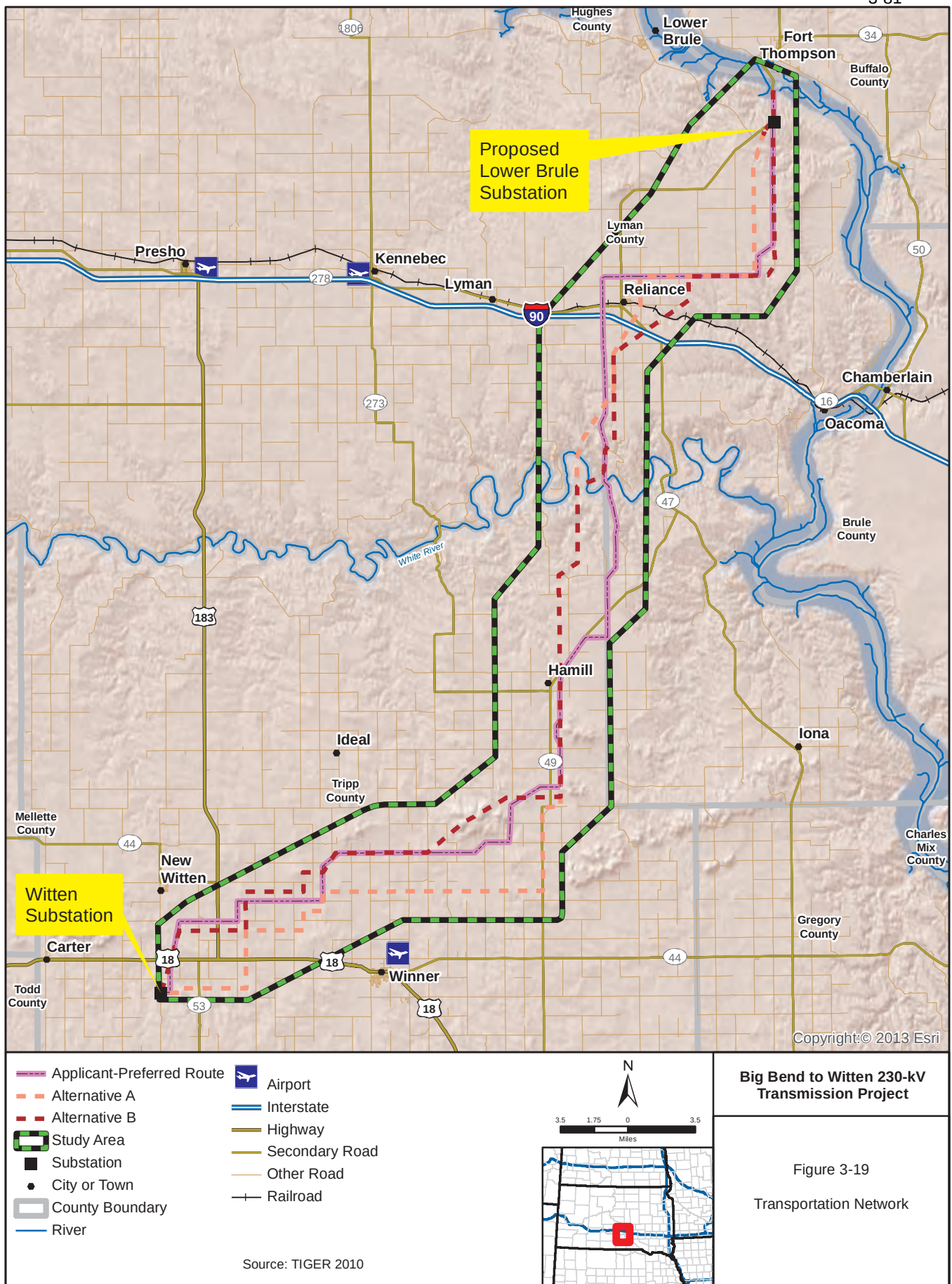
### **3.15 Transportation**

Regional transportation facilities, largely consisting of highways and rural roads, would be used to transport construction and maintenance workers, equipment, and materials to transmission line and substation/switchyard sites.

#### **3.15.1 Affected Environment**

Construction of the Project would require crossing numerous roads and highways. **Figure 3-19** illustrates the transportation network in and near the study area. Major highways in the study area include I-90; U.S. Highways 18 and 183; SH 44, 47, 49, and 53; and BIA Highway 5. I-90 extends east-west through Reliance, and U.S. Highways 18 and 183 transect the southern portion of the study area east-west and north-south, respectively. SH 49 runs north-south through Hamill in the central portion of the study area. SH 47 and 53 transect north-south through the northern and southern portions of the study area, respectively. SH 44 transects east-west through the southern portion of the study area. A portion of SH 47 within the study area has been designated as the Native American Scenic Byway. The byway traverses the Lower Brule Sioux Indian Reservation from west to east and enters the study area on BIA Highway 5. Additionally, the Lewis and Clark National Historic Trail Auto Tour Route enters the study area on SH 47 north of Reliance. Other roads and highways in the study area are oriented in a north-south, east-west grid along section lines. In addition, the Dakota Southern Railroad intersects the northern portion of the study area in an east-west orientation through the town of Reliance. The Winner Regional Airport provides general aviation services. The main runway is 4,500 feet long and 75 feet wide (AirNav 2011). The Fletcher Landing Field is the only known airstrip within the study area. It has not been used in several years and does not appear to be active.





### **3.15.2 Environmental Consequences**

#### **3.15.2.1 Proposed Action**

Disruption to local traffic is expected to be minimal and temporary and related to the movement of heavy equipment. Single-pole transmission line structures, conductor, ground wire, OPGW, and hardware would be trucked to staging areas and/or to structure site locations. Flat-bed trucks would be used to transport structure sections (typically two sections per structure), insulators, hardware, conductor, and OPGW, totaling approximately 161 to 164 truckloads. Equipment would be required for site clearing, structure assembly, augering, conductor and OPGW stringing, and foundation construction, as identified in **Table 2-5**.

Temporary wooden H-frame structures would be installed at roadway crossings within the proposed transmission line ROW to facilitate conductor stringing. The wooden H-frame structures would be installed by augering structure leg holes near the roadway and installing structure poles and cross-members to support conductor, and OPGW during pulling and tensioning. Actual disruption to local traffic patterns would be minimal, consisting of temporary delays. Road closures would not be required. Transmission line installation at railroad crossings would be similar to those of road crossings, but would not impact rail movement. Soils displaced while augering holes for the H-frame legs would be used to back-fill around the legs and used as fill when the structure is removed. Personal vehicles would transport approximately 70 construction workers to scattered work sites over an 8-month period. Areas where worker activity is most intense are likely to experience localized temporary traffic increases that could be an annoyance to rural residents. Overall traffic increases also could lead to a small increase in risk of traffic accidents.

The movement of heavy equipment would comply with applicable South Dakota Department of Transportation regulations. Local roads and highways that are damaged by construction equipment would be repaired in a timely manner and to county specifications.

The Proposed Action is approximately 5 miles northwest of Winner Regional Airport. Due to the distance of the Project from the airport, as well as the relatively low average structure height of 110 feet, impacts to airport operations are not anticipated.

#### **3.15.2.2 Alternative Route A**

Under Alternative Route A, direct and indirect impacts to transportation resources would be the same as those described for the Proposed Action.

#### **3.15.2.3 Alternative Route B**

Under Alternative Route B, direct and indirect impacts to transportation resources would be the same as those described for the Proposed Action.

#### **3.15.2.4 No Action Alternative**

Potential impacts to local traffic patterns would not occur if the Project were not developed.

### **3.16 Human Health and Safety**

This section includes information regarding potential human health and safety issues related to Project construction and operation.

#### **3.16.1 Affected Environment**

Construction and operation of the Project could result in temporary impacts to public health and safety and ongoing potential for impacts to workers servicing the transmission lines and equipment. Potential health and safety concerns related to construction include highway and roadway safety associated with

the transport of structures, structure hardware, conductor, and personnel and solid waste management. Concerns connected to operations include electric shock, electric and magnetic fields, corona, stray voltage, and induced voltage. Worker safety issues are associated with Project construction, operation, and maintenance activities. Potential health and safety issues are similar among the three Project routes. Neither schools nor residential developments are located within 500 feet of the Proposed Action or alternative routes, although there are scattered residences near the Proposed Action or alternative routes (**Table 3-19**).

**Table 3-19 Residences Near the Proposed Action or Alternative Routes**

| Residential Distance from Alternatives | Proposed Action (count) | Alternative Route A (count) | Alternative Route B (count) |
|----------------------------------------|-------------------------|-----------------------------|-----------------------------|
| Residences Within 500 feet             | 0                       | 0                           | 1                           |
| Residences Within 250 feet             | 0                       | 1                           | 1                           |

### 3.16.1.1 Hazardous Materials and Solid Waste

#### Regulatory Framework

“Hazardous materials,” which are defined in various ways under a number of regulatory programs, can represent potential risks to both human health and the environment when not properly managed. The term hazardous materials include the following materials that may be utilized or disposed of in construction and operation:

- Substances covered under OSHA Hazard Communication Standards (29 CFR 1910.1200 and 30 CFR 42): The types of materials that may be used in electrical transmission line construction and operational activities and that would be subject to these regulations would include almost all of the materials listed in **Table 3-20**.
- “Hazardous substances” as defined by Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by Superfund Amendments and Reauthorization Act and listed in 40 CFR Table 302.4.
- “Hazardous wastes” as defined in the Resource Conservation and Recovery Act (RCRA) procedures in 40 CFR 262 are used to determine whether a waste is a hazardous waste. Hazardous wastes are regulated under Subtitle C of RCRA.

#### Hazardous Materials Use

A number of hazardous materials or substances are used in the construction, operation, and maintenance of electrical transmission lines. **Table 3-20** lists common types of hazardous materials that could be used, but it is not a comprehensive list.

**Table 3-20 Hazardous Materials Typically Used in Transmission Line Construction and Operation**

|                                                                 |
|-----------------------------------------------------------------|
| Canned spray paint                                              |
| Compressed gases (flammable and nonflammable)                   |
| Diesel deicer                                                   |
| Fire extinguishers                                              |
| Gasoline treatment                                              |
| Glycols (ethylene glycol, propylene glycol, triethylene glycol) |

**Table 3-20 Hazardous Materials Typically Used in Transmission Line Construction and Operation**

|                                                                                              |
|----------------------------------------------------------------------------------------------|
| Herbicides                                                                                   |
| Lead acid batteries                                                                          |
| Methanol                                                                                     |
| Penetrating oil                                                                              |
| Pesticides                                                                                   |
| Petroleum-based lubricants and fluids (motor oil, grease, hydraulic fluid, transmission oil) |
| Petroleum fuels (gasoline, diesel)                                                           |
| Pipe coating resin                                                                           |
| Solvents/solvent containing products                                                         |
| Starter fluid                                                                                |

Source: Modified from Molberg et al. (2007) and San Diego Gas and Electric (2006).

### 3.16.1.2 Non- Hazardous Solid Waste

#### Regulatory Definition of Solid Waste

Through RCRA Subtitle D, the USEPA delegates authority to state and local governments to be the primary planning, regulating, and implementing entities for the management of nonhazardous solid waste, such as household garbage and nonhazardous industrial solid waste.

#### Solid Waste Generation

Solid waste generated from transmission line construction and operation is minimal when compared to other types of industrial and commercial projects. Solid waste generated from construction and operation of the proposed transmission line and associated facilities generally would consist of construction rubble (e.g., excess or off-spec concrete, soil, and rock), paper, cardboard, and packing material, brush, other vegetation, scrap metal, discarded food, trash, garbage, general refuse, equipment maintenance waste (filters, used oil) and regulation-defined empty containers (Molberg et al. 2007). All solid waste generated by the Project would be disposed at an appropriately permitted facility in accordance with state regulations.

#### Contaminated Sites

In spite of the generally rural areas crossed by the study area, there is always the potential that contaminated sites are present, given that transmission line routes often parallel or are within existing utility and transportation corridors. Contaminated sites can result from industrial activities (mineral extraction, mineral processing, and manufacturing) or from commercial activities (fuel storage for retail outlets, vehicle maintenance). Active or closed landfills or unauthorized dumps also may present potential contamination concerns.

### 3.16.2 Environmental Consequences

#### 3.16.2.1 Proposed Action

##### Construction and Operation

Constructing the Project could have minor effects on public and employee health and safety that would likely be temporary and minor. Transport of heavy equipment and materials would create traffic congestion in some areas, which could affect highway safety. Potential long-term health and safety

concerns include electric shock, electric and magnetic fields (EMF), corona, stray voltage, and induced voltage, which would not likely affect the public, because the proposed distances from residences is sufficient to mitigate these effects.

The Project would be constructed in compliance with worker health and safety regulations as prescribed by the U.S. Department of Labor, OSHA, and the NESC. Construction of the proposed transmission line would require the transport of heavy equipment and materials along the length of the Project. Impacts from vehicle movement would be temporary and concentrated within specific areas at structure sites. Construction would occur over an 8-month period. Materials delivery would be carried out during the 8-month construction period. Approximately 88 truckloads would be required for structures and 25 truckloads would be required for insulator and hardware delivery. Large pieces of equipment, such as structure segments, would be delivered directly to work sites along the proposed transmission line corridor. Conductor, groundwire, and OPGW transport would require at least 51 truckloads. Additional truck traffic would be needed to transport materials from staging sites to work sites. Roads that are damaged due to heavy equipment movement would be repaired by Basin Electric.

Electric shock is not expected to represent a health and safety hazard to the public as conductor heights would be sufficient to allow movement of construction and farm equipment and personnel below the proposed transmission line.

Cause and effect relationships between EMF exposure and adverse health effects have not been determined. Some studies have indicated possible connections between exposure and health effects, while other studies have not. Those indicating some sort of linkage have often, if not always, shown no correlation when replicated. EMF levels typically diminish substantially with increased distance from the conductors, typically reaching background levels within 300 feet of the nearest conductor. Furthermore, occasional exposure to such fields would be temporary and infrequent. Exposures would be far less than those experienced in the home or workplace. There are no residences within 500 feet of the Proposed Action.

Corona is caused by electric current arcing across two or more points along transmission line conductor. Corona does not represent a threat to human health and safety. Stray voltage is typically associated with rural end-users, such as farm and ranch complexes where equipment is exposed to dust and other contaminants. Induced current occurs along linear features, such as fences that parallel conductors. Neither stray voltage nor induced current are health risks to area residents and both can be mitigated by proper grounding.

Potential adverse health effects associated with lightning strikes are minimized by the presence of the overhead ground wire and OPGW which shield the conductors. The current from a lightning strike is diverted to the ground at the adjacent structure. When the current is discharged from the structure base to the surrounding ground, a step potential voltage can momentarily exist on the ground near the structure, presenting an electrocution hazard. Therefore, people should avoid structures during a lightning storm.

Electrocution hazard would be present inside the fence of the substation/switchyard facilities. High voltage equipment always poses a threat to any human who enters the facility. The facility would be fenced and access points secured with padlocks and marked with signs prohibiting the entry of unauthorized personnel. The design of the facility would be such that energized equipment would comply with Rule 110.A. of the NESC that requires a 14.9-foot safety clearance zone within the fence for 230-kV equipment. Exposed parts must be outside of the safety zone. Only trained personnel would be allowed to maintain the substation equipment, and they would comply with applicable Basin Electric worker safety programs, procedures, and regulations.

### Hazardous Materials

Issues related to the presence of hazardous materials are the potential impacts to the environment from an accidental release of hazardous materials during transportation and use during construction and operation of the Project.

Improper handling or storage of hazardous materials can result in contamination of soil and water resources as well as pose a threat to worker and public health and safety. The environmental effects of a release would depend on the material released, the quantity released, and the location of the release. Potential releases could include a small amount of fuel spilled during transfer operations at the ROW to the loss of several thousand gallons of fuel into a riparian drainage. The release of a hazardous material or solid waste into a sensitive area (such as stream, wetland, or populated area) will be avoided.

Contamination of soil and water may occur due to spills during transportation, storage, and handling of hazardous materials and solid waste. Also, unknown subsurface contaminated soil could be encountered during augering.

Soil and water contamination along the ROW may result from spills during construction and augering. Impacts from spills would typically be minor because of the low frequency of spill occurrence, relatively low volume of materials being handled, and small volume of spills. Fixed facilities (construction laydown areas) would have a SPCC Plan to address procedures to ensure the proper handling and storage of these materials and procedures for the containment and cleanup of spills at fixed facilities. Spill prevention and containment and cleanup procedures for construction along the ROW that would not be covered under SPCC Plans would be provided in the Spill Prevention and Response Plan. For example, spill prevention procedures would include specification of distance from water bodies at which equipment refueling would take place.

**Table 3-20** lists various hazardous materials that would be used in the operation of the transmission line and associated facilities. The procedures for safe handling of these materials would be covered under the SPCC Plan and also is covered by a number of regulatory programs as described in Section 3.17.1.2. Contamination from spills or leaks of fuels, lubricants, coolants, and solvents during construction could occur, but the impacts typically would be minor due to the low frequency and volumes of these occurrences. Hazardous materials used in operation of the Project would be handled and used according to applicable rules and regulations and present a low risk to the environment and public health.

### Solid Waste

Construction waste would be disposed in accordance with applicable rules. Construction debris would not be placed in or adjacent to waterways and construction trash would be removed from the ROW. Basin Electric would comply with applicable state and local waste disposal, sanitary sewer, or septic system regulations.

It is possible that contaminated soil could be encountered during augering operations. If contaminated soil is encountered, Basin Electric's contractor would suspend work in the area of the suspected contamination until the type and extent of the contamination was determined. The type and extent of contamination, the responsible party, and local, state, and federal regulations would determine the appropriate cleanup method for contaminated soil.

There are currently no known contaminated sites crossed by the proposed transmission line route or affected by aboveground facilities. If unanticipated contaminated soil or groundwater is encountered during construction, Basin Electric would implement appropriate measures and procedures.

As described in Section 3.17.1.2, the waste generated during operation would be similar to waste generated during construction and would have to be disposed in accordance with applicable rules and regulations.

#### **3.16.2.2 Alternative Route A**

Under Alternative Route A, direct and indirect impacts to human health would be similar to those described under the Proposed Action, with the exception that one residence would be within 250 feet of the alignment. Direct and indirect impacts from storage and use of hazardous materials and the generation of solid waste would be the same as the Proposed Action.

#### **3.16.2.3 Alternative Route B**

Under Alternative Route B, direct and indirect impacts to human health would be similar to those described under the Proposed Action, with the exception that one residence would be within 500 feet of the alignment and one residence would be within 250 feet of the alignment. Direct and indirect impacts from storage and use of hazardous materials and the generation of solid waste would be the same as the Proposed Action.

#### **3.16.2.4 No Action Alternative**

Impacts to human health would not occur if the Project were not to be constructed or operated. Additionally, under the No Action Alternative, impacts from hazardous materials and solid waste would not occur.

### **3.17 Intentional Destructive Acts**

Transmission line projects may be the subject of intentional destructive acts ranging from random vandalism and theft to sabotage and acts of terrorism intended to disable the facility. Acts of vandalism and theft are more likely to occur than acts of sabotage and terrorism and most likely to occur in remote areas and at substation/switchyard. Theft frequently involves equipment and salvageable metal at substations and switchyards. Vandalism often includes shooting out insulators. Sabotage and terrorism would most likely include destruction of key transmission line components with the intent of interrupting the electrical grid.

Intentional destructive acts can result in financial, human health and safety, and environmental impacts and impact to consumers and businesses that rely on power. Financial impacts are ultimately passed on to rate payers. Health and environmental impacts related to intentional destructive acts could range from electrocution of perpetrators, line crews, or the public; wildfire ignition from downed lines; and oil contamination from damaged equipment. Impacts to consumers and business would range from minor annoyance to economic hardship.

Vandalism and theft within substations/switchyards would be minimized as equipment would be protected by fencing. Few if any preventive measures are available to protect the transmission line from vandalism or sabotage. However, separation of lines would reduce the potential for affecting two or more lines as a result of a single act of sabotage.



## 4.0 Cumulative Impacts

### 4.1 Introduction

Cumulative impacts are those impacts on the environment that result from the incremental impact of the Proposed Action when added to the impacts of past, present, and reasonably foreseeable future actions (RFFAs), regardless of what agency (federal or non-federal) or private entity undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time (40 CFR 1508.7). Impacts first must be identified for the proposed Project before cumulative impacts with past, present and RFFAs can occur.

Connected actions are those that 1) automatically trigger other actions which may require environmental impact statements, 2) cannot or will not proceed unless other actions are taken previously or simultaneously, 3) are interdependent parts of a larger action and depend on the larger action for their justification (40 CFR 1508.25). If a single action does not necessarily trigger another and has an independent utility apart from another action, then the two actions are not considered to be connected. For the purposes of this analysis, both cumulative and potential connected actions have been included.

The cumulative effects study area (CESA) includes a 9-county area (approximately 6,516,935 acres) in south-central South Dakota as illustrated in **Figure 4-1**. Past and present actions and RFFAs with the potential to cause cumulative impacts in combination with the Project also are illustrated in **Figure 4-1**. These actions were identified primarily by geographic location and their similarity to the Project, as well as the type of resource potentially affected. A brief description of these actions is provided in this section. The area of concern for cumulative impacts would vary by resource. Impacts to certain resources would be restricted to the actual area of disturbance. Other resources, such as vegetation and wildlife, may be affected over a wide area, and cumulative impacts could involve more than surface disturbance.

### 4.2 Past, Present, and Reasonably Foreseeable Future Projects

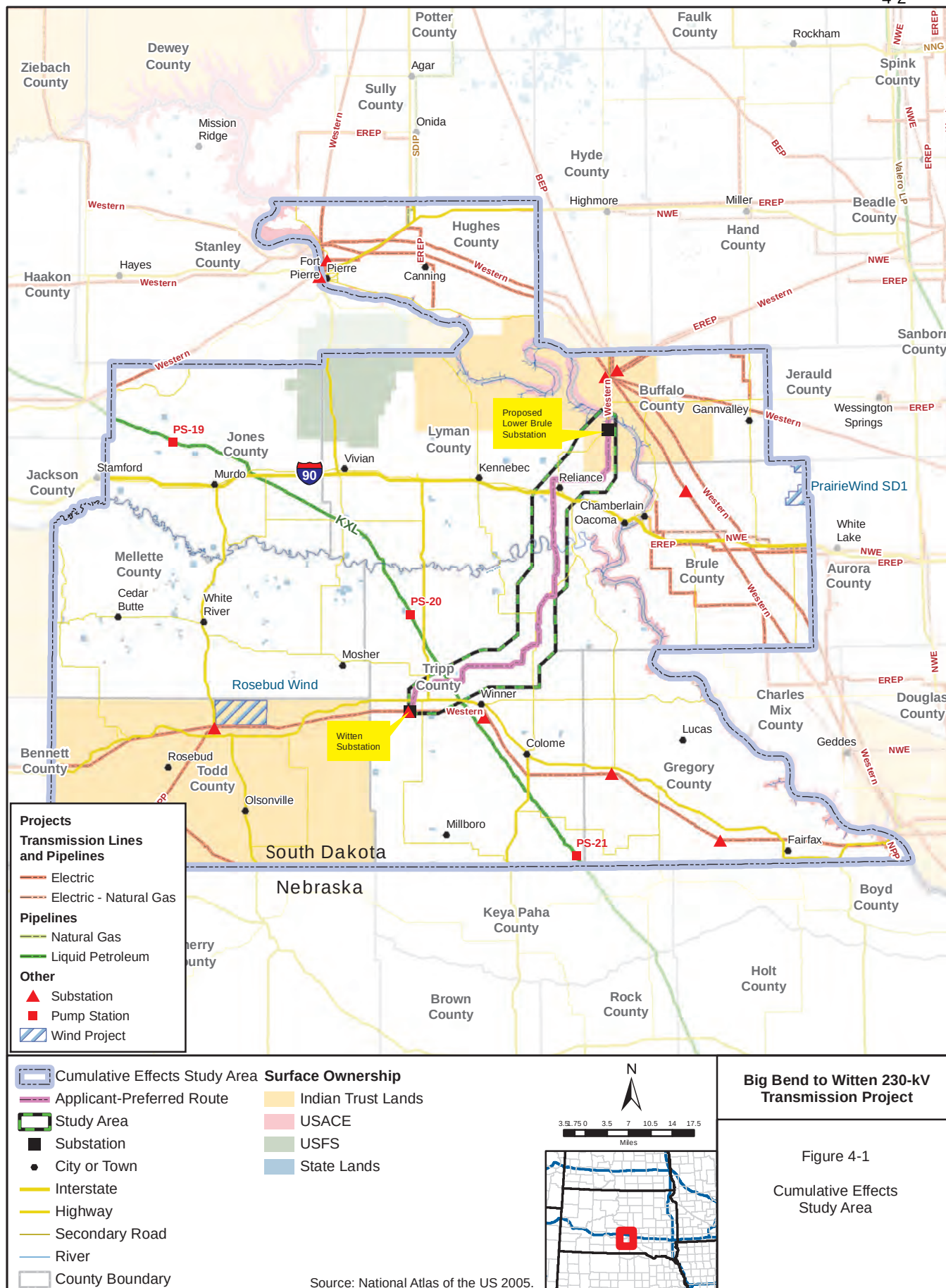
**Table 4-1** briefly describes past and reasonably foreseeable future projects within the CESA that were considered in the cumulative impacts analysis. The CESA includes various types of projects including electric transmission line, pipeline (i.e., natural gas, crude oil, and other liquids), and wind energy projects. The majority of the projects in the CESA are composed of linear projects such as electric transmission lines and pipelines. Many of these electric transmission lines and pipelines occur within the same utility corridors and are illustrated as multiple-utility corridors (e.g., electric-natural gas) in **Figure 4-1**.

#### 4.2.1 Past Projects

Past projects within the CESA include eight electric transmission lines, two natural gas pipelines, and one wind energy facility.

##### Electric Transmission Lines

The eight electric transmission lines traverse approximately 868 miles within the CESA. Seven of the eight electric (115-, 230-, and 345-kV) transmission lines are owned and operated by Western and extend approximately 835 miles within the CESA. The Nebraska Public Power electric transmission line crosses approximately 33 miles within the CESA. The majority of the surface disturbance associated with the construction of these transmission lines was temporary since areas were reclaimed or vegetation recovered shortly after construction was completed. Permanent surface disturbance associated with these transmission lines was limited to the structure locations, consisting of approximately 1.1 acres. In addition to the transmission lines, 10 electric substations are associated with these transmission lines with an average permanent surface disturbance of 15 acres.



**Table 4-1 Past, Present, and Reasonably Foreseeable Future Projects**

| Project Name                                                   | Map ID  | Project Description                                                                 | Distance Within CESA (miles) | Estimated Temporary Surface Disturbance (acres) | Estimated Permanent Surface Disturbance (acres) |
|----------------------------------------------------------------|---------|-------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------|-------------------------------------------------|
| <b>Past Projects</b>                                           |         |                                                                                     |                              |                                                 |                                                 |
| Western – Multiple Electric Transmission Lines                 | Western | A network of 115-, 230-, and 345-kV electric transmission lines.                    | 835                          | 1,215 <sup>1</sup>                              | 1.0 <sup>2</sup>                                |
| Western – Substations for Multiple Electric Transmission Lines | Western | Ten substations associated with 115-, 230-, and 345-kV electric transmission lines. | NA                           | 150 <sup>3</sup>                                | 150 <sup>3</sup>                                |
| Nebraska Public Power (NPP) 115-kV Electric Transmission Line  | NPP     | Segment of an 115-kV electric transmission line on the Rosebud Indian Reservation.  | 33                           | 48 <sup>1</sup>                                 | <0.1 <sup>2</sup>                               |
| SDIP Natural Gas Pipeline                                      | SDIP    | Natural gas pipeline in central Hughes County.                                      | 19                           | 115 <sup>4</sup>                                | <0.1 <sup>5</sup>                               |
| NWE Natural Gas Pipeline                                       | NWE     | Natural gas pipeline in central Brule County.                                       | 31.5                         | 191 <sup>4</sup>                                | <0.1 <sup>5</sup>                               |
| Basin Electric – PrairieWinds SD1 Wind Energy Project          | Basin   | A portion of this wind energy project occurs in northeastern Brule County.          | NA                           | 300                                             | 35                                              |
| <b>Subtotal</b>                                                |         |                                                                                     |                              | 2,019                                           | 186.3                                           |

**Table 4-1 Past, Present, and Reasonably Foreseeable Future Projects**

| Project Name                                  | Map ID       | Project Description                                                                                                          | Distance Within CESA (miles) | Estimated Temporary Surface Disturbance (acres) | Estimated Permanent Surface Disturbance (acres) |
|-----------------------------------------------|--------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------|-------------------------------------------------|
| <b>Reasonably Foreseeable Future Projects</b> |              |                                                                                                                              |                              |                                                 |                                                 |
| Rosebud Wind Energy Project                   | Rosebud Wind | A 100-MW wind energy project is proposed by the Rosebud Sioux Tribe approximately 2.5 miles north of Mission, South Dakota.  | NA                           | 400 <sup>7</sup>                                | 100 <sup>7</sup>                                |
| Keystone XL Pipeline Project                  | KXL          | A segment of the 1,661-mile-long, 36-inch-diameter crude oil pipeline from Hardisty, Alberta Canada to the Texas Gulf Coast. | 111.7                        | 1,489 <sup>4</sup>                              | 45 <sup>6</sup>                                 |
| <b>Subtotal</b>                               |              |                                                                                                                              |                              | <b>1,889</b>                                    | <b>145</b>                                      |
| <b>Total</b>                                  |              |                                                                                                                              |                              | <b>3,908</b>                                    | <b>331.3</b>                                    |

<sup>1</sup> Assumes a 12-foot disturbance width for an access trail within the construction ROW; excludes temporary disturbance associated with pulling and tensioning sites and construction laydown areas.

<sup>2</sup> Assumes an average span between structures of 800 feet and an average permanent disturbance area of 7.1 ft<sup>2</sup> per structure; excludes permanent disturbance associated with substation and communication sites.

<sup>3</sup> Assumes an average temporary and permanent disturbance of 15 acres.

<sup>4</sup> Assumes a construction disturbance width of 50 feet.

<sup>5</sup> Assumes permanent disturbance for mainline valves.

<sup>6</sup> Assumes a maximum disturbance of 15 acres for 3 pump stations (Pump Stations 19 through 21).

<sup>7</sup> Assumed acres of temporary and permanent disturbance.

NA – Not applicable.

Some of these projects parallel other ROWs (i.e., roadways, pipeline corridors, and existing power lines). Some of these electric transmission lines were installed along field edges or section lines to reduce the overall amount of habitat fragmentation and interference with agricultural operations. Some trees were likely removed to provide adequate clearance between the conductors and underlying vegetation. Land disturbance and vegetation clearing for the electric transmission lines and substations affected only a small fraction of the native vegetation present in the CESA. The most notable cumulative impacts associated with electric transmission lines are the additive effects to land use and visual quality.

#### Natural Gas Pipelines

Two natural gas pipelines, including the South Dakota Intrastate Pipeline (SDIP) and the NorthWestern Energy (NWE) pipeline, traverse approximately 50.5 miles within the CESA with estimated permanent surface disturbances of less than 0.2 acre.

### Wind Energy Facility

PrairieWinds, SD1, Incorporated is a wholly owned subsidiary of Basin Electric. PrairieWinds constructed the South Dakota PrairieWinds SD1 Project, a 151.5-MW capacity wind-powered generation facility, including 101, 1.5-MW wind turbine generators; electrical collector lines, collector substation, transmission line, communications system, and wind turbine service access roads. Two portions of this project, which include 26 turbines and associated access roads, occur in extreme northeastern Brule County in the eastern portion of the CESA. Total permanent surface disturbances associated with this project included 261 acres. Of this total, only 35 acres of permanent disturbance occur within the CESA.

#### **4.2.2 Present Projects**

Based on a thorough review of projects within the CESA, no electric transmission line, pipeline, or wind energy projects resulting in additional surface disturbance are currently being constructed within the CESA.

#### **4.2.3 Reasonably Foreseeable Future Projects**

Activities considered to be RFFAs were evaluated based on the criteria listed below. Information was gathered to identify potential future actions in the following ways: contacting South Dakota and county planning staff and considering other environmental impact statements/EAs recently completed for other projects in the region. The information gathered was evaluated based on the criteria to determine which of these projects are speculative due to limiting factors and which are reasonably foreseeable to occur and relevant to the cumulative impacts discussion.

- **Siting authorities/applications** – identify if an application has been submitted to a siting authority (e.g., utilities commission, Public Utilities Commission) that regulates the rates and services of a public utility, reviews and approves and/or denies applications for development of electric transmission line or wind projects with a capacity of 100 MW or more.
- **NEPA process/federal approvals** – identify if a project is under NEPA review (federal agencies are required to consider and disclose the potential environmental impacts of their “major” or “significant” proposed actions prior to decision-making, involve the public and other agencies, and document their analyses and conclusions).
- **System studies and planning analysis** – determine if a project requires preliminary analysis or an evaluation of proposal design to determine the feasibility of or difficulty in carrying out a designated task; such studies precede technical development and project implementation.

Using the above criteria, two projects have been identified as reasonably foreseeable: a proposed wind energy development project on the Rosebud Indian Reservation in Todd County, and the proposed KXL Pipeline Project, which traverses Jones, Lyman, and Tripp counties.

### Wind Energy Facility

A 100-MW wind energy project is proposed to be constructed by the Rosebud Sioux Tribe approximately 2.5 miles north of Mission, South Dakota. An estimated 100 acres of permanent surface disturbance for this wind energy development project would occur in the CESA.

### Crude Oil Pipeline

The KXL Project would consist of a 1,661-mile-long, 36-inch-diameter crude oil pipeline extending from Hardisty, Alberta, Canada to the Texas Gulf Coast. Approximately 112 miles of the proposed pipeline would traverse the CESA. An estimated 45 acres of permanent surface disturbance would occur in the CESA with the construction of three pump stations (Pump Stations 19 through 21) within the CESA. The proposed Project could potentially connect with the KXL Project if it were constructed in the future; however, the proposed Project has independent utility as discussed in Section 1.3 of this EA.

### **4.3 Analysis of Cumulative and Connected Actions**

The following sections disclose the potential cumulative effects of the proposed Project (discussed in Chapter 3.0) in consideration of the effects of past, present, and the RFFAs and potential connected actions discussed in Section 4.2.

#### **4.3.1 Jurisdiction, Land Use, and Agricultural Practices**

Past actions and RFFAs that contribute to cumulative impacts to jurisdiction, land use, and agricultural practices in the CESA include electric transmission line, pipeline, and wind energy projects. The CESA has previously been affected by past actions associated primarily with agricultural practices (59 percent of the CESA) and development associated with the cities of Hamill and Reliance, as well as utility lines and associated facilities, roads, and highways. The Project would contribute approximately 4 percent to the cumulative permanent surface disturbance of up to 345.5 acres within the CESA. The permanent loss of 345.5 acres of land represents less than 1.0 percent of the entire CESA. The overwhelming land use in the study area and the CESA is for production agriculture and rangeland, and the Project's effect to these uses would be negligible.

With the implementation of environmental protection measures, the Project, when added to past actions and RFFAs would not be expected to significantly contribute to cumulative impacts to jurisdiction, land use, and agricultural practices in the CESA.

#### **4.3.2 Geology, Minerals, Paleontological Resources, and Soils**

##### **4.3.2.1 Geology**

Incremental effects of the Project are difficult to quantify because of varying site conditions and construction. However, given appropriate design or avoidance, geologic hazards are not expected to contribute to cumulative impacts in the CESA.

##### **4.3.2.2 Minerals**

Since there are no anticipated impacts to mineral access, there are no cumulative impacts to mineral resources within the CESA.

##### **4.3.2.3 Paleontological Resources**

Since there are no anticipated impacts to paleontological resources, there are no cumulative impacts to paleontological resources.

##### **4.3.2.4 Soils**

Past actions and RFFAs that contribute to cumulative impacts to soil resources in the study area include construction of natural surface, graveled, and paved roads; electric transmission lines; pipelines; and wind energy projects. Roads and structures (e.g., transmission structures, substations, pump stations, wind turbines) would result in permanent impacts that include removal of vegetation, exposure of the soil, mixing of soil horizons, soil compaction, loss of topsoil productivity, and increased susceptibility of the soil to erosion. Approximately 345.5 acres of soils would be permanently impacted as a result of past actions, RFFAs, and construction of the Project. Pipeline and transmission line construction typically results in linear surface disturbance to soils with temporary impacts.

With the implementation of the recommended mitigation measures, the Project, when added to past actions and RFFAs, would not be expected to significantly contribute to cumulative impacts to soil resources in the CESA. Surface disturbance from these projects would be less than 0.1 percent of the entire CESA.

### 4.3.3 Vegetation and Noxious Weeds

Project-related surface disturbance, in addition to past actions and RFFAs within the CESA, would result in the cumulative permanent surface disturbance of 345.5 acres. Surface disturbance from these projects would be less than 0.1 percent of the entire CESA. Cumulative impacts to vegetation would be minimized by implementing environmental protection measures for proper handling of topsoil and spoil, preventative and remedial noxious weed management (pre- and post-construction treatments), and reclamation techniques described in **Appendix D**. With implementation of these measures, in addition to the minimal loss of vegetation in relation to the total amount of vegetative cover within the CESA, the Project contribution to cumulative impacts would be considered minimal.

### 4.3.4 Fish and Wildlife Resources

Project-related surface disturbance, in addition to past actions and RFFAs within the CESA, would result in the cumulative permanent surface disturbance of 345.5 acres. The overall region has been previously affected by at least some level of historic and current development activities and would be affected by RFFAs. Surface disturbance in the CESA primarily results from oil and gas pipelines, electrical transmission and distribution lines, and wind or other energy projects. However, other activities such as livestock grazing, agriculture, recreational activities and other types of development also contribute to cumulative impacts on wildlife and their habitats. Over 60 percent of the CESA has already been affected by past agricultural practices and development activities, which has had incremental effects to fish and wildlife habitats. However, the Project's contribution to the cumulative surface disturbance in the CESA would be less than 1 percent. Fish and wildlife populations have been negatively affected by past, present and RFFAs, either by being displaced or through additional intrusions encroaching on habitat for the local populations. The proposed project would add incrementally to those cumulative effects, although to a minor degree. The particular effect of tall structures on the landscape would incrementally increase predation risk for some species and collision risk for other species. However, environmental protection measures outlined in **Appendix D** would minimize these impacts.

### 4.3.5 Threatened and Endangered Species

Project-related surface disturbance, in addition to past actions and RFFAs within the CESA, would result in the cumulative permanent surface disturbance of 345.5 acres. The overall region has been previously affected by at least some level of historic and current development activities and would be affected by RFFAs. Surface disturbance in the CESA primarily results from oil and gas pipelines, electrical transmission and distribution lines, and wind or other energy projects. However, other activities such as livestock grazing, agriculture, recreational activities and other types of development also contribute to cumulative impacts on special status species that occur in the CESA. Over 60 percent of the CESA has already been affected by past agricultural practices and development activities, which has had incremental effects to fish and wildlife habitats. However, the Project's contribution to the cumulative surface disturbance in the CESA would be less than 1 percent. Special status species have been negatively affected by past, present and RFFAs, either by being displaced or through additional intrusions encroaching on habitat for the local populations. The proposed project would add incrementally to those cumulative effects, although to a minor degree that would not be anticipated to adversely affect the species. The particular effect of tall structures on the landscape would incrementally increase predation risk for some species and collision risk for other species. However, environmental protection measures outlined in **Appendix D** would minimize these impacts. Specific measures such as conducting pre-construction surveys to minimize or avoid impacts as well as line marking and monitoring to reduce potential collision risk for Whooping cranes would further reduce the potential for special status species to be affected by the Project.

### 4.3.6 Wetlands

Impacts to wetlands are not anticipated as a result of Project implementation; therefore, cumulative impacts are not anticipated.



#### **4.3.7 Floodplains**

Impacts to floodplains are not anticipated as a result of Project implementation; therefore, cumulative impacts are not anticipated.

#### **4.3.8 Water Quality**

Impacts to water quality are not anticipated as a result of Project implementation; therefore, cumulative impacts are not anticipated.

#### **4.3.9 Cultural Resources**

Cumulative impacts to cultural resources and Native American traditional values would result from surface disturbance, unauthorized collection, and natural erosion processes in the CESA. With the implementation of the recommended mitigation measures and avoidance, the Project, when added to past actions and RFFAs, would not be expected to significantly contribute to cumulative impacts to these resources in the CESA.

#### **4.3.10 Socioeconomics**

Past actions and RFFAs that contribute to cumulative impacts to socioeconomics in the study area include electric transmission line, pipeline, and wind energy projects. The majority of lands affected by past actions and RFFAs would be agricultural. Although the loss of agricultural productivity would affect landowners, they would be compensated for the loss of productivity. Incremental impacts within the CESA would be minimal.

#### **4.3.11 Environmental Justice**

Past actions and RFFAs that contribute to cumulative impacts to environmental justice in the study area include electric transmission line, pipeline, and wind energy projects. Despite the presence of a meaningfully greater Native American population and poverty rates that are meaningfully greater than the state average, the Project would generate income through property tax revenues and if communities supply services such as restaurants and lodging that may potentially benefit minority communities by creating the potential for limited types of economic development and possible employment opportunities. The Project, when added to past actions and RFFAs, would not be expected to significantly contribute to cumulative impacts to minority and low-income populations in the CESA.

#### **4.3.12 Aesthetics**

Past actions and RFFAs within the CESA include the existing Witten Substation, a segment of Western's existing 115-kV transmission line that is connected to the Witten Substation, a segment of the proposed TransCanada KXL Pipeline, and numerous distribution lines. Cumulative visual impacts would occur with the presence of electric transmission structures, conductors, and substations within the viewshed of residents, recreationists, and motorists travelling on roads and highways within the CESA. After reclamation has been completed, visual impacts would lessen over time with the establishment of vegetative cover. Overall, the cumulative visual impacts within the CESA from existing electrical transmission structures and facilities and other tall structures, in addition to the transmission line and substation/switchyard associated with the Project, would occur over the long term.

#### **4.3.13 Noise, Radio, and Television Interference**

Past actions and RFFAs that contribute to cumulative impacts to noise, radio, and television in the CESA include electric transmission line, pipeline, and wind energy projects. With implementation of modern transmission design, routing away from sensitive structures, and the temporary duration of construction, the Project, when added to past actions and RFFAs, would not be expected to significantly contribute to cumulative noise levels and potential for radio or television interference in the CESA.

#### **4.3.14 Air Quality**

To the extent to which construction of the Project would occur simultaneously and in the same general area as other projects, there could be minor cumulative temporary air quality impacts. Simultaneous construction activities in close proximity to one another could result in locally elevated concentrations of pollutants; however, those concentrations would not be expected to result in a degradation of local or regional air quality, or result in any exceedences of the NAAQS. It is not expected that the Project would contribute to noticeable cumulative air quality impacts.

#### **4.3.15 Transportation**

Past actions and RFFAs that contribute to cumulative impacts to transportation in the CESA include electric transmission line, pipeline, wind energy projects, and existing infrastructure development including roads. Minor traffic increases would occur on local roads in the long term as a result of operations traffic. With the implementation of environmental protection measures, the Project, when added to past actions and RFFAs, would not be expected to significantly contribute to cumulative impacts to transportation resources in the CESA.

#### **4.3.16 Human Health and Safety**

Past actions and RFFAs that contribute to cumulative impacts to human health and safety in the CESA include electric transmission line, pipeline, wind energy projects, and existing infrastructure development. As there are no anticipated long-term impacts to human health and safety, there are no long-term cumulative impacts to human health and safety in the CESA.

## 5.0 References

- AirNav. 2011. Winner Regional Airport. Internet website: <http://www.airnav.com/airport/KICR>. Accessed on October 17, 2011.
- Arwood, W. 2011. Personal communication between Mr. W. Arwood, CFM, National Flood Insurance Program Coordinator, (605) 773-3231, South Dakota Office of Emergency Management, Pierre, South Dakota, and J. Burrell, Senior Hydrologist, AECOM, concerning county floodplain managers and their roles for Lyman and Tripp counties, South Dakota. October 31, 2011.
- Ashton, D. E. and E. M. Dowd. 2008. *Fragile Legacy: Rare Animals of South Dakota*. South Dakota Department of Game, Fish and Parks Wildlife Division. Pierre, South Dakota. 50 pp.
- Avian Power Line Interaction Committee (APLIC). 2012. *Reducing Avian Collisions with Power lines: The State of the Art in 2012*. Edison Electric Institute. Washington, D.C.
- Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Best Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C., and Sacramento, California.
- Barari, A. 1976a. Ground-water Study for the Tripp Rural Water District. Open-File Report No. 13-UR. South Dakota Geological Survey, Department of Natural Resource Development, State of South Dakota. Vermillion, South Dakota.
- Barari, A. 1976b. Ground-water Study for the City of Oacoma. Open-File Report No. 10-UR. South Dakota Geological Survey, Department of Natural Resource Development. Vermillion, South Dakota.
- Boeker, E. L. and T. D. Ray. 1971. Golden Eagle Population Studies in the Southwest. *The Condor* 73:463-467.
- Bonneville Power Administration (BPA). 1996. *Electrical and Biological Effects of Transmission Lines: A Review*. Portland, Oregon. December 1996.
- British Wind Energy Association. 2000. *Noise from Wind Turbines – The Facts*. Internet website: <http://www.bwea.com/ref/noise.html>. Accessed May 22, 2009.
- Caddes, E. E. 1947. Gravel Deposits along the White River between the South Fork of the White River and South Dakota Highway 47. South Dakota Geological Survey Report of Investigations Number 55, 30 pp.
- Canadian Wildlife Service (CWS) and U.S. Fish and Wildlife Service (USFWS). 2005. *International Recovery Plan for the Whooping Crane*. Ottawa: Recovery of Nationally Endangered Wildlife (RENEW), and U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 162 pp.
- Carter, J. M. 1998. *Water Resources of Mellette and Todd Counties, South Dakota*. U.S. Geological Survey Water-Resources Investigations Report 98-4146. Prepared in cooperation with the Rosebud Sioux Tribe, Mellette County, West River Water Development District, and the South Dakota Geological Survey. Rapid City, South Dakota.
- Collins, S. G. 1960. *Geology of the Winner Quadrangle, South Dakota*. South Dakota Geological Survey, Vermillion, South Dakota.

- Cox, L. J. and R. A. Beach. 1980. Status of Mineral Resource Information for the Lower Brule Sioux Indian Reservation, South Dakota. Administrative Report BIA-74, 28 pp.
- Crandell, D. R. 1958. Geology of the Pierre Area, South Dakota. U.S. Geological Survey Professional Paper Number 307, 83 pp.
- Curtiss, R. E. and G. R. Wadell. 1951. Areal Geology of the Stephan Quadrangle. SDGS GQ62K-015, Scale 1:62,500.
- Ehrlich, P. A., D. S. Dobkin, and D. Wheye. 1988. The Birders Handbook: A Field Guide to the Natural History of North American Birds. 785 pp.
- Federal Emergency Management Agency (FEMA). 2011a. Current and Historic FEMA-Issued Flood Map Search for Lyman County, South Dakota. Internet websites: <http://www.msc.fema.gov>. Accessed on October 31, 2011.
- Federal Emergency Management Agency (FEMA). 2011b. Current and Historic FEMA-Issued Flood Map Search for Tripp County, South Dakota. Internet website: <http://www.msc.fema.gov>. Accessed October 31, 2011.
- Fenneman, N. M. 1928. Physiographic Subdivisions of the United States. Annals of American Geographers, Volume XVIII(4):261-353. December 1928.
- Fenneman, N. M. 1931. Physiography of Western United States. McGraw-Hill Book Company, New York, New York.
- Filipovic, D. 2004. Hydrogeologic Assessment of the High Plains Aquifer in Tripp and Gregory Counties, South Dakota. Open-File Report 90-UR. South Dakota Geological Survey, Department of Natural Resource Development. Vermillion, South Dakota.
- Fitzgerald, J. P., C. A. Meaney, and D. M. Armstrong. 1994. Mammals of Colorado. Denver Museum of Natural History and University Press of Colorado. pp. 332-335.
- Gries, J. P. 1942. Economic Possibilities of the Pierre Shale. South Dakota Geological Survey Report of Investigations Number 43, 84 pp.
- Hagen, S. K., P. T. Isakson, and S. R. Dyke. 2005. North Dakota Comprehensive Wildlife Conservation Strategy. North Dakota Game and Fish Department. Bismarck, North Dakota. 454 pp. Internet website: <http://gf.nd.gov/conservation/cwcs.html>.
- Haig, S. M. and J. H. Plissner. 1993. Distribution and Abundance of Piping Plovers: Results and Implications of the 1991 International Census. Published by University of California Press on behalf of the Cooper Ornithological Society. The Condor 95(1):145-156. February 1993.
- Harlow, D. L. and P. H. Bloom. 1987. Buteos and the Golden Eagle. In: Proceedings of the Western Raptor Management Symposium and Workshop. National Wildlife Federation Science and Technology Series No. 12:102-110. Washington, D.C.
- Harris, J. 2005. Little Brown Bat. California Wildlife Habitat Relationships System. California Department of Fish and Game. California Interagency Wildlife Task Group.
- Harris, Miller, Miller, and Hanson, Inc. (HMMH). 2006. Transit Noise and Vibration Impact Assessment, prepared by HMMH, Burlington, Massachusetts for Office of Planning, Federal Transit Administration, U.S. Department of Transportation, Washington, D.C. April. Internet website: [http://www.hmmh.com/cmsdocuments/FTA\\_Ch\\_12.pdf](http://www.hmmh.com/cmsdocuments/FTA_Ch_12.pdf). Accessed December 8, 2011.

- Hillman, C. N. and T. W. Clark. 1980. *Mustela nigripes*. American Society of Mammologists. Mammalian Species No. 126. 3 pp.
- Hoagstrom, C. W., G. Adams, R. M. Neumann, and D. W. Willis. 2011. Guide to the Fishes of South Dakota. Department of Wildlife and Fisheries Sciences, South Dakota State University. South Dakota Department of Game, Fish and Parks, and South Dakota Cooperative Extension Service. 70 pp.
- Hogan, E. P. and E. H. Fouberg. 1998. The Geography of South Dakota. The Center for Western Studies. Sioux Falls, South Dakota. 190 pp.
- Holbrook, H. T. and M. R. Vaughan. 1985. Influence of Roads on Turkey Mortality. *Journal of Wildlife Management* 49(3):611-614.
- Holmes, T. L., R. L. Knight, L. Stegall, and G. R. Craig. 1993. Responses of Wintering Grassland Raptors to Human Disturbance. *Wildlife Society Bulletin* 21:461-468.
- Howells, L. W. 1974. Geohydrology of Crow Creek and Lower Brule Indian Reservations, South Dakota. U.S. Geological Survey Hydrologic Investigations Atlas HA-499 (in two sheets). U.S. Geological Survey, Washington, D.C.
- Irwin, L. L. and J. M. Peek. 1983. Elk Habitat Use Relative to Forest Succession in Idaho. *Journal of Wildlife Management* 47(3):664-672.
- Kiesow, A. M. 2006. Field Guide to Amphibians and Reptiles of South Dakota. South Dakota Department of Game, Fish and Parks. 178 pp.
- Larson, S. 2013. Letter to Mr. K. Solie, Basin Electric Power Cooperative, from S. Larson, Field Supervisor, U.S. Fish and Wildlife Service South Dakota Field Office. June 19, 2013.
- Lower Brule Sioux Tribe. 2012a. Effects on Wildlife by Proposed Big Bend to Witten Transmission Line. Communication with J. Bich and S. Grassel. Department of Wildlife, Fish and Recreation. Lower Brule Sioux Tribe. January 5, 2012.
- Lower Brule Sioux Tribe. 2012b. Communication between B. Janis, S. Grassel, and C. Green and J. Barraza, AECOM. January 30, 2012.
- Martin, J. E., J. F. Sawyer, M. D. Fahrenbach, D. W. Tomhave, and L. D. Schulz. 2004. Geologic Map of South Dakota. South Dakota Geological Survey General Map 10, Scale 1:500,000.
- Molberg, J. C., J. A. Kavicky, and K. C. Picel. 2007. The Design, Construction, and Operation of Long-distance High-Voltage Electricity Transmission Technologies. Argonne National Laboratories ANL/EVS/TM/08-4.
- Molyneaux, B.L., and F. Blue Thunder. 2013. A Class III Cultural Resources Survey and a Traditional Cultural Property Survey of the Proposed Big Bend to Witten Transmission Line Corridor, Lyman and Tripp Counties, South Dakota for Basin Electric Power Cooperative. March 2013.
- National Atlas. 2011. Mapmaker Geology Map Layers. Internet website: <http://nationalatlas.gov/mapmaker>. Accessed November 1, 2011.
- National Earthquake Information Center. 2011. Earthquake Search Results. Internet website: [http://earthquake.usgs.gov/earthquakes/eqarchives/epic/epic\\_circ.php](http://earthquake.usgs.gov/earthquakes/eqarchives/epic/epic_circ.php). Accessed November 1, 2011.

- National Park Service (NPS). 1998. *Cultural Resource Management Guideline, NPS-28*. Washington, DC: U.S. Department of the Interior, National Park Service.
- Natural Resources Conservation Service (NRCS). 2011. United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for Buffalo, Lyman, and Tripp Counties, South Dakota. Internet website: <http://soildatamart.nrcs.usda.gov>. Accessed October 22, 2011.
- Natural Resources Conservation Service (NRCS). 2002. Internet website: <ftp://ftp.wcc.nrcs.usda.gov/support/climate/wetlands/nd/38025.txt>. Accessed October 17, 2010.
- Natural Resources Conservation Service (NRCS). 2000. Internet website: <ftp://ftp.wcc.nrcs.usda.gov/support/climate/wetlands/sd/46123.txt>. Accessed October 17, 2010.
- Nelson, D. L. 1998. Colorado Breeding Bird Atlas – Interior Least Tern. H. E. Kingery, Editor. Pp. 192-193.
- Ogle, K. A. 1995. Water-Resources Appraisal of the Lower Brule Indian Reservation in Central South Dakota. U.S. Geological Survey Water-Resources Investigations Report 95-4116. Prepared in cooperation with the Lower Brule Sioux Tribe. U.S. Geological Survey, Rapid City, South Dakota.
- Parker, P. L. and T. F. King. 1998. *National Register Bulletin 38: Guidelines for Evaluating and Documenting Traditional Cultural Properties*. Washington, D.C.: U.S. Department of the Interior, National Park Service.
- Parris, D. C., S. Y. Sheldon, and J. E. Martin. 2007. Introduction to the Geology and Paleontology of the Late Cretaceous Marine Deposits of the Dakotas. In J. E. Martin and D. C. Parris, Editors. *The Geology and Paleontology of the Late Cretaceous Marine Deposits of the Dakotas*; Geological Society of America Special Paper 427, pp. 1-8.
- Petersen, M. D., A. D. Frankel, S. C. Harmsen, C. S. Mueller, K. M. Haller, R. L. Wheeler, R. L. Wesson, Y. Zeng, O. S. Boyd, D. M. Perkins, N. Luco, E. H. Field, C. J. Wills, and K. S. Rukstales. 2008. Documentation for the 2008 Update of the United States National Seismic Hazard Maps. U.S. Geological Survey Open-File Report 2008-1128, 61 pp.
- Postovit, H. R. and B. C. Postovit. 1987. Impacts and Mitigation Techniques. In: *Raptor Management Techniques Manual*. National Wildlife Federation, Washington, D.C. pp 183-212.
- Radbruch-Hall, D. H., R. B. Colton, W. E. Davies, I. Lucchitta, B. A. Skipp, and D. J. Varnes. 1982. Landslide Overview Map of the Conterminous United States. U.S. Geological Survey Professional Paper 1183, scale 1:7,500,000. Internet website: <http://pubs.usgs.gov/pp/p1183/>. Accessed November 1, 2011.
- Rost, G. R. and J. A. Bailey. 1979. Distribution of Mule Deer and Elk in Relation to Roads. *Journal of Wildlife Management* 43(3):634-641.
- Rubingh, A. 2013. Letter to Mr. K. Solie, Basin Electric Power Cooperative, from A. Rubingh, Review and Compliance Archaeologist with the South Dakota State Historical Society. July 24, 2013.
- San Diego Gas and Electric. 2006. Sunrise Powerlink Project EIR, Chapter 7, Inland Valley Link Public Health and Safety Impacts. Internet website: [http://www.sdge.com/sunrisepowerlink/info/PEA/Chapter\\_7/7\\_13\\_safety.pdf#search=%22toxic%20materials%20in%20transmission%20line%20operation%20and%20maintenance%22](http://www.sdge.com/sunrisepowerlink/info/PEA/Chapter_7/7_13_safety.pdf#search=%22toxic%20materials%20in%20transmission%20line%20operation%20and%20maintenance%22). Accessed September 2, 2011.

- Sawyer H., R. M. Nielson, F. Lindzey, and L. L. McDonald. 2006. Winter Habitat Selection of Mule Deer Before and During Development of a Natural Gas Field. *Journal of Wildlife Management* 70(2):396-403.
- Schmutz, J. K. 1984. Ferruginous and Swainson's Hawks Abundance and Distribution in Relation to Land Use in Southeastern Alberta. *Journal of Wildlife Management* 48(4):1180-1187.
- Schulz, L. D. 1994. Investigation of Ground-water Resources for the Tripp County Water User District. Open-File Report 69-UR. Division of Geologic Survey, Department of Environment and Natural Resources. Vermillion, South Dakota.
- Soil Quality Institute. 2001. Rangeland Soil Quality—Wind Erosion. Natural Resources Conservation Service (NRCS, May.
- South Dakota Bat Working Group (SDBWG). 2004. South Dakota Bat Management Plan. 89 pp.
- South Dakota Department of Agriculture (SDDA). 2010. Internet website: [http://www.sdda.sd.gov/DepartmentPDF/Ag%20Brochure%202011\\_for\\_web.pdf](http://www.sdda.sd.gov/DepartmentPDF/Ag%20Brochure%202011_for_web.pdf). Accessed October 17, 2011.
- South Dakota Department of Agriculture (SDDA). 2009. State Noxious Weeds. Internet website: [http://www.sdda.sd.gov/Ag\\_Services/Plant-Protection/Weed%20and%20Pest/State-Noxious-Weeds.aspx](http://www.sdda.sd.gov/Ag_Services/Plant-Protection/Weed%20and%20Pest/State-Noxious-Weeds.aspx). Accessed October 12, 2011.
- South Dakota Department of Environment and Natural Resources (DENR). 2011a. Surface Water Quality Standards. Internet website: <http://denr.sd.gov/des/sw/swqstandards.aspx>. Accessed November 21, 2011.
- South Dakota Department of Environment and Natural Resources (DENR). 2011b. Lithologic logs for Lyman County water wells. Internet website: [http://sddenr.net/lithdb/search\\_results\\_lith.cfm?page\\_num=1&input\\_box=Lyman&Search1=3&search\\_type=simple](http://sddenr.net/lithdb/search_results_lith.cfm?page_num=1&input_box=Lyman&Search1=3&search_type=simple). Accessed November 30, 2011.
- South Dakota Department of Environment and Natural Resources (DENR). 2010. The 2010 South Dakota Integrated Report for Surface Water Quality Assessment. South Dakota Department of Environment and Natural Resources. Pierre, South Dakota.
- South Dakota Game, Fish and Parks (SDGFP). 2014. Threatened, Endangered, and Candidate Species of South Dakota. Internet website: <http://gfp.sd.gov/wildlife/threatened-endangered/threatened-species.aspx>. Accessed May 5, 2014.
- South Dakota Game, Fish and Parks (SDGFP). 2011a. Big Game. Internet website: <http://gfp.sd.gov/hunting/big-game/>. Accessed October 7, 2011.
- South Dakota Game, Fish and Parks (SDGFP). 2011b. Small Game. Internet website: <http://gfp.sd.gov/hunting/small-game/default.aspx>. Accessed October 7, 2011.
- South Dakota Game, Fish and Parks (SDGFP). 2011c. South Dakota Game, Fish and Parks Waterfowl Production. 2009 Status of Waterfowl Breeding Populations. Internet website: <http://gfp.sd.gov/hunting/waterfowl/production.aspx>. Accessed December 17, 2011.
- South Dakota Game, Fish and Parks (SDGFP). 2010. Fur Harvest Reports, winter 2009-2010 (from fur dealer records). Internet website: <http://gfp.sd.gov/hunting/trapping/fur-report.aspx>. Accessed December 28, 2011.



- South Dakota Game, Fish and Parks (SDGFP). 2006. South Dakota Comprehensive Wildlife Conservation Plan. South Dakota Department of Game, Fish, and Parks, Pierre, Wildlife Division Report 2006-08. 248 pp.
- South Dakota Game, Fish, and Parks (SDGFP). 2005. South Dakota Interior Least Tern (*Sterna Antillarum athalassos*) and Piping Plover (*Charadrius melodus*) Management Plan. South Dakota Department of Game Fish and Parks, Pierre, South Dakota. 2005 Wildlife Division Report 2005-02. 76 pp.
- South Dakota Geological Survey (SDGS) and U.S. Geological Survey (USGS). 2008. 2007 Minerals Yearbook South Dakota.
- South Dakota Natural Heritage Program (SDNHP). 2011. Natural Heritage Species Occurrence Data.
- South Dakota State Historical Society (SDSHS). 2011. Cultural Resources Class I file search (GIS shapefiles and data) provided by the SDSHS Archaeological Research Center, Rapid City, to K. Solie, Senior Environmental Analyst, Basin Electric Power Cooperative, Bismarck, North Dakota, via email, February 9, 2011.
- Stalmaster, M. V. and J. R. Newman. 1978. Behavioral Responses of Wintering Bald Eagles to Human Activity. *Journal of Wildlife Management* 42(3):506-513.
- Stokes D. W. and L. Q. Stokes. 1996. *Field Guide to Birds, Western Region*. 519 pp.
- Thompson, S. P., R. S. Johnstone, and C. D. Littlefield. 1982. Nesting History of Golden Eagles in Malheur- Harney Lakes Basin, Southeastern Oregon. *Journal of Raptor Research* 16(4):116-122.
- Topologically Integrated Geographic Encoding and Referencing System (TIGER). 2010. U.S. Census Bureau 2011. Internet website: <http://www.census.gov/geo/www/tiger/tgrshp2010/tgrshp2010.html>. Accessed October 1, 2011.
- U.S. Army Corps of Engineers (USACE). 2008. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region. Wetlands Regulatory Assistance Program ERDC/EL TR-08-12. Vicksburg, Mississippi.
- U.S. Army Corps of Engineers (USACE). 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.
- U.S. Census Bureau. 2010. State and County Quick Facts. Internet website: <http://quickfacts.census.gov/qfd/index.html>. Accessed October 17, 2011.
- U.S. Census Bureau. 2005-2009. American FactFinder. Internet website: [http://www.factfinder.census.gov/homesaff/main.html?\\_lang=en](http://www.factfinder.census.gov/homesaff/main.html?_lang=en). Accessed October 17, 2011.
- U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS). 2011. Plants Database. Internet website: <http://plants.usda.gov/>. Accessed October 13, 2011.
- U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS). 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

- U.S. Department of Agriculture (USDA), Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. Available online at: [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/planners/?cid=nrcs142p2\\_054262](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/planners/?cid=nrcs142p2_054262)
- U.S. Department of State (DoS). 2008. Final Environmental Impact Statement for the Keystone Oil Pipeline Project: Applicant for Presidential Permit: TransCanada Keystone Pipeline LP. Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2014. The Green Book Nonattainment Areas for Criteria Pollutants. As of December 05, 2013. Internet website: <http://www.epa.gov/airquality/greenbk/>. Accessed May 7, 2014.
- U.S. Environmental Protection Agency (USEPA). 2011. 2010 Waterbody reports and STORET database water quality data for the Lower White River (SD-WH-R-WHITE\_04) and Medicine (SD-MI-R-MEDICINE\_01) watersheds. Internet websites: [http://iaspub.epa.gov/tmdl\\_waters10/attains\\_waterbody.control?p\\_list\\_id=SD-WH-R-WHITE\\_04&p\\_cycle=2010&p\\_state=SD&p\\_report\\_type=T](http://iaspub.epa.gov/tmdl_waters10/attains_waterbody.control?p_list_id=SD-WH-R-WHITE_04&p_cycle=2010&p_state=SD&p_report_type=T); and [http://iaspub.epa.gov/tmdl\\_waters10/attains\\_watershed.control?p\\_huc=10140104&p\\_cycle=&p\\_report\\_type=T](http://iaspub.epa.gov/tmdl_waters10/attains_watershed.control?p_huc=10140104&p_cycle=&p_report_type=T). Accessed November 21, 2011.
- U.S. Environmental Protection Agency (USEPA). 2006. RCRA Orientation Manual. EPA-530-R-06-003, March 2006, 254 pp.
- U.S. Environmental Protection Agency (USEPA). 2004. The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, National Sediment Quality Survey: Second Edition. EPA-823-R-04-007. U.S. Environmental Protection Agency, Office of Science and Technology, Standards and Health Protection Division, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 1978. Protective Noise Levels. Condensed Version of USEPA Levels Document. USEPA 550/9-79-100. November 1978.
- U.S. Environmental Protection Agency (USEPA). 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, EPA-550/9-74-004, Washington, D.C., March. Internet website: <http://www.nonoise.org/library/levels74/levels74.htm>. Accessed December 8, 2011.
- U.S. Fish and Wildlife Service (USFWS). 2014. South Dakota Listed Species by County List. Internet website: <http://www.fws.gov/southdakotafieldoffice/SpeciesByCounty.pdf>. Accessed November 11, 2014.
- U.S. Fish and Wildlife Service (USFWS). 2011. Personal communication with S. Larson, Field Supervisor, South Dakota Field Office. April 6, 2011.
- U.S. Fish and Wildlife Service (USFWS). 2011. National Wetland Inventory (NWI). Internet website: <http://www.fws.gov/wetlands/>. Accessed October 11, 2011.
- U.S. Fish and Wildlife Service (USFWS). 2011a. South Dakota Listed Species by County List. Internet website: <http://www.fws.gov/southdakotafieldoffice/SpeciesByCounty.pdf>. Accessed October 7, 2011.
- U.S. Fish and Wildlife Service (USFWS). 2011b. Endangered Species Program. Species Status Codes. Internet website: <http://www.fws.gov/endangered/about/linstin-status-codes.html>. Accessed December 6, 2011.
- U.S. Fish and Wildlife Service (USFWS). 2011c. Personal correspondence with C. Bessken, Fish and Wildlife Biologist. Response to Data Request. September 15, 2011.

- U.S. Fish and Wildlife Service (USFWS). 2011d. Species Profile: Whooping Crane. Environmental Conservation Online System. Internet website: <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?scode=B003>. Accessed on May 5, 2011.
- U.S. Fish and Wildlife Service (USFWS). 2011e. Personal correspondence with C. Bessken, Fish and Wildlife biologist. Response to data request. November 16, 2011.
- U.S. Fish and Wildlife Service (USFWS). 2011f. Species Profile: Interior Least Tern. Environmental Conservation Online System. Internet website: <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?scode=B07N>. Accessed October 7, 2011.
- U.S. Fish and Wildlife Service (USFWS). 2011g. Personal correspondence with S. Larson, Field Supervisor, South Dakota Field Office. Response to Data Request. April 6, 2011.
- U.S. Fish and Wildlife Service (USFWS). 2011h. Species Profile: Piping Plover. Environmental Conservation Online System. Internet website: <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?scode=B079>. Accessed October 7, 2011.
- U.S. Fish and Wildlife Service (USFWS). 2011i. Endangered Species Mountain-Prairie Region: Sprague's Pipit. Internet website: [http://www.fws.gov/mountain-prairie/species/birds/sprague's\\_pipit/index.html](http://www.fws.gov/mountain-prairie/species/birds/sprague's_pipit/index.html). Accessed October 11, 2011.
- U.S. Fish and Wildlife Service (USFWS). 2011j. Personal correspondence with C. Bessken, Fish and Wildlife Biologist. Response to Data Request. April 15, 2011.
- U.S. Fish and Wildlife Service (USFWS). 2011k. Personal correspondence with C. Bessken, Fish and Wildlife Biologist. Response to Data Request. December 20, 2011.
- U.S. Fish and Wildlife Service (USFWS). 2008a. Black-footed Ferret (*Mustela nigripes*) 5-Year Status Review: Summary and Evaluation, South Dakota Field Office, Pierre, South Dakota. 38 pp.
- U.S. Fish and Wildlife Service (USFWS). 2008b. United States Central Flyway Whooping Crane Migration Corridor. Produced for Ecological Services, Grand Island, Nebraska.
- U.S. Fish and Wildlife Service (USFWS). 2007. National Bald Eagle Management Guidelines. 23 pp.
- U.S. Fish and Wildlife Service (USFWS) 2002. Piping Plover Critical Habitat: Unit 2 (South Dakota and Nebraska – Missouri River). Compiled by the U.S. Fish and Wildlife Service, Ecological Services, Bismarck, North Dakota.
- U.S. Fish and Wildlife Service (USFWS). 2002. Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances. Prepared by L. A. Romin and J. A. Muck. Utah Field Office, Salt Lake City. January 2002(update). 42 pp.
- U.S. Fish and Wildlife Service (USFWS). 2000. Memorandum from USFWS Director on *Service Interim Guidelines for Recommendations On Communications Tower Siting, Construction, Operation, and Decommissioning*. Available online at: [http://www.fws.gov/habitatconservation/com\\_tow\\_guidelines.pdf](http://www.fws.gov/habitatconservation/com_tow_guidelines.pdf). 4pp.
- U.S. Fish and Wildlife Service (USFWS). 1993. Pallid Sturgeon Recovery Plan (*Scaphirhynchus albus*). 55 pp. Prepared by the Pallid Sturgeon Recovery Team.
- U.S. Fish and Wildlife Service (USFWS). 1990. Interior Population of the Least Tern (*Sterna antillarum*) Recovery Plan. Prepared by J. G. Sidle and W. F. Harrison. 90 pp.

- U.S. Fish and Wildlife Service (USFWS). 1989. Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act. 8 pp.
- U.S. Fish and Wildlife Service (USFWS). 1988. Black-footed Ferret Recovery Plan, dated August 8, 1988, prepared for the U.S. Fish and Wildlife Service by S. C. Forrest, under contract, and D. Biggins, National Ecology Research Center.
- U.S. Geological Survey (USGS). 2011. North American Breeding Bird Atlas Explorer. Internet website: <http://www.pwrc.usgs.gov/bba/>. Accessed December 8, 2011.
- U.S. Geological Survey (USGS). 2011. National Water Information System, Surface-Water Data and Groundwater Data for South Dakota. Internet websites: <http://waterdata.usgs.gov/sd/nwis/sw>; and <http://waterdata.usgs.gov/sd/nwis/gw>. Accessed November 21, 2011.
- U.S. Geological Service (USGS). 2010. National Land Cover Gap Analysis Project Database. U.S. Geological Survey, Northern Prairie Wildlife Research Center. Internet website: [ftp://ftp.gap.uidaho.edu/outgoing/National/National\\_landcover.zip](ftp://ftp.gap.uidaho.edu/outgoing/National/National_landcover.zip). Accessed October 12, 2011.
- U.S. Geological Survey (USGS). 2006. EHP Quaternary Faults. U.S. Geological Survey Fold and Fault Database. Internet website: <http://geohazards.usgs.gov/qfaults/map.php>. Accessed November 1, 2011.
- Weary, D. J., D. H. Doctor, J. B. Epstein, and R. C. Orndorff. 2008. Characterizing Regional Karst Types under the Framework of the New National Karst Map. U.S. Geological Survey Special Investigations Report 2008-5023.
- Wetland Training Institute, Inc. (WTI). 1995. Field Guide for Wetland Delineation: 1987 Corps of Engineers Manual, WTI 95-3. Poolesville, Maryland.
- Wilson, R. 2004. Pallid Sturgeon Recovery Update. Internet website: [www.mountain-prairie.fws.gov/moriver](http://www.mountain-prairie.fws.gov/moriver). Accessed December 10, 2011.
- Woffinden, N. D. and J. R. Murphy. 1989. Decline of a Ferruginous Hawk Population: A 20-year Summary. *Journal of Wildlife Management* 53(4):1127-1132.
- World Health Organization. 2011. What Are Electromagnetic Fields? Internet website: <http://www.who.int/peh-emf/about/WhatIsEMF/en/index.html>. Accessed August 2, 2012.

## 6.0 List of Preparers and Reviewers

**Table 6-1** lists the personnel responsible for preparing this EA. AECOM is the third-party consultant to assist with the preparation of this EA.

**Table 6-1 List of Preparers**

| Name                                     | Title/Resource                                                                                                                                                                    |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rural Utilities Service</b>           |                                                                                                                                                                                   |
| Richard Fristik                          | Senior Environmental Protection Specialist                                                                                                                                        |
| Deirdre Remley                           | Environmental Protection Specialist                                                                                                                                               |
| <b>Western Area Power Administration</b> |                                                                                                                                                                                   |
| Rod O'Sullivan                           | Environmental Protection Specialist                                                                                                                                               |
| <b>Basin Electric Power Cooperative</b>  |                                                                                                                                                                                   |
| Kevin Solie                              | Senior Environmental Analyst                                                                                                                                                      |
| Scott Wiseman                            | Civil Engineering Supervisor                                                                                                                                                      |
| <b>AECOM</b>                             |                                                                                                                                                                                   |
| Melanie Martin                           | Project Manager                                                                                                                                                                   |
| Jon Alstad                               | Alternatives, Project Coordination and Development                                                                                                                                |
| Peggy Roberts                            | Public Involvement; Intentional Destructive Acts                                                                                                                                  |
| John Van Kirk                            | Corridor and Routing Analysis, Air Quality                                                                                                                                        |
| Steve Ensley                             | Corridor and Routing Analysis - GIS Specialist                                                                                                                                    |
| Todd White                               | GIS, Data Management, Impact Analysis                                                                                                                                             |
| Julie Barraza                            | Fish and Wildlife Resources; Special Status Wildlife; Biological Assessment                                                                                                       |
| Bill Berg                                | Geology, Minerals, and Paleontological Resources                                                                                                                                  |
| Jim Burrell                              | Water Quality                                                                                                                                                                     |
| Steve Graber                             | Jurisdiction, Land Use, and Agricultural Practices; Socioeconomics; Environmental Justice; Noise, Radio, and Television Interference; Transportation; and Human Health and Safety |
| Allison Grow                             | Vegetation and Noxious Weeds; Wetlands and Floodplains                                                                                                                            |
| Terra Mascarenas                         | Soils                                                                                                                                                                             |
| Kim Munson                               | Cultural Resources, Native American Traditional Values                                                                                                                            |
| Merlyn Paulson                           | Aesthetics                                                                                                                                                                        |