5 Cumulative Impacts

The CEQ regulations for implementing NEPA define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7).

5.1 METHODS

Cumulative impacts were assessed by combining the effects of past activities, present ongoing activities, and reasonably foreseeable future actions with the potential effects of the Proposed Project. Each of the resource categories were analyzed, however, differences between the two alternative sites were considered marginal for this cumulative impacts analysis of past, present and reasonably foreseeable actions and therefore both sites were addressed simultaneously.

The CEQ regulations (40 CFR 1508.7) further explain, "cumulative effects can result from individually minor but collectively significant actions taking place over a period of time." Based on these regulations, if the project does not have direct or indirect effects there can be no cumulative effects resulting from the project because there would be no impacts added to past, present, or reasonably foreseeable actions. Because the No Action Alternative has no direct or indirect effects on any resources, it would have no cumulative impacts and is not further evaluated in this chapter. Anticipated Proposed Project activities and resultant effects were described in **Chapters 1** through **4** of this DEIS. The ROI varies by resource, as described in **Chapter 3**, Affected Environment.

5.2 PAST AND PRESENT ACTIONS

Wind and other renewable sources are expected to become a larger share of the total electric generation resource in the U.S. for several reasons, primarily a desire to reduce overall GHG emissions, help increase energy security, and aid in economic stimulus efforts. Local, State and national energy policies are increasingly incorporating renewable portfolio standards, with wind as a major component, and targeting implementation of such standards by 2020 or sooner. Consequently, installation of wind and other renewable generation has increased dramatically, especially in the last 8-10 years. Between 2002 and 2006, wind generation (in thousands of kilowatt hours [kWh]) rose from approximately 10,400,000 to 26,600,000 (EIA 2008). In 2008, approximately 8,500 MW of new wind energy were installed in the U.S., representing roughly 40% of new power producing capacity, and making wind the second largest new generation source (AWEA 2009). See **Figure 5.1** for a depiction of the Midwest Independent Transmission System Operator (MISO) projects with approved interconnection agreements (which also depicts migratory flyways referenced in **Section 5.4.1**).

The Federal Production Tax Credit, recently extended through the American Recovery and Reinvestment Act of 2009, has been a major incentive for wind energy development. With the recent economic downturn, difficulties in obtaining credit reportedly have hampered the addition

of wind power capacity by some developers. Also in early 2009, the EPA declared that GHGs are a threat to human health, which may lead to additional regulatory or legislative action to reduce GHG emissions.

The Federal government has also recognized the need for improvement to the nation's transmission infrastructure and the alleviation of transmission constraints. The current administration has raised attention to this situation as it emphasizes renewable energy development. The American Reinvestment and Recovery Act granted Western $3.2 billion in budget authority "… to construct, finance, facilitate, own, plan, operate, maintain or study construction of new and/or upgraded electric power transmission lines and related facilities … for delivering or facilitating the delivery of power generated by renewable energy resources constructed or reasonably expected to be constructed" (Western 2009). The acting FERC chairman has highlighted transmission line infrastructure needs and planning, siting, and interconnection considerations for renewable energy, including development of a so-called 'smart grid' (FERC 2009).

Basin Electric alone has 214 MW generated from current renewable energy facilities, and additional total generation under construction of 630 MW, as well as a total committed in-construction and future wind projects in the Dakotas of 555 MW. These currently consume some of the transmission capacity identified as available.

Existing utility infrastructure within the Crow Lake Alternative area includes Western's existing transmission system including a 230-kV transmission line and the Wessington Springs Substation. In addition, the existing Wessington Springs Wind Project, a 51 MW wind energy generating facility (Western 2007), is located adjacent to the northeast edge of the Crow Lake Alternative. Existing utility infrastructure within the Winner Alternative area includes Western's existing transmission system, including a 115-kV transmission line and the Winner Substation.

5.3 REASONABLY FORESEEABLE FUTURE ACTIONS

Growth in wind generation is expected to slow appreciably through 2010, after having grown 50 percent in 2008 (EIA 2009). Nonetheless, the EIA forecast through 2030 indicates steady growth in wind capacity through 2012, after which capacity increases slightly, but essentially levels off, through 2030. In 2030, wind is forecast to be 2.5 percent of total generation. Also, an increase in the cost of carbon-based generation would make wind power more economical, which could drive wind development. If legislation allowed for the conversion of renewable energy credits to emissions offsets, wind development could be even more prolific (SDPUC 2009). See **Figure 5.1** for a depiction of the MISO approved interconnection projects.

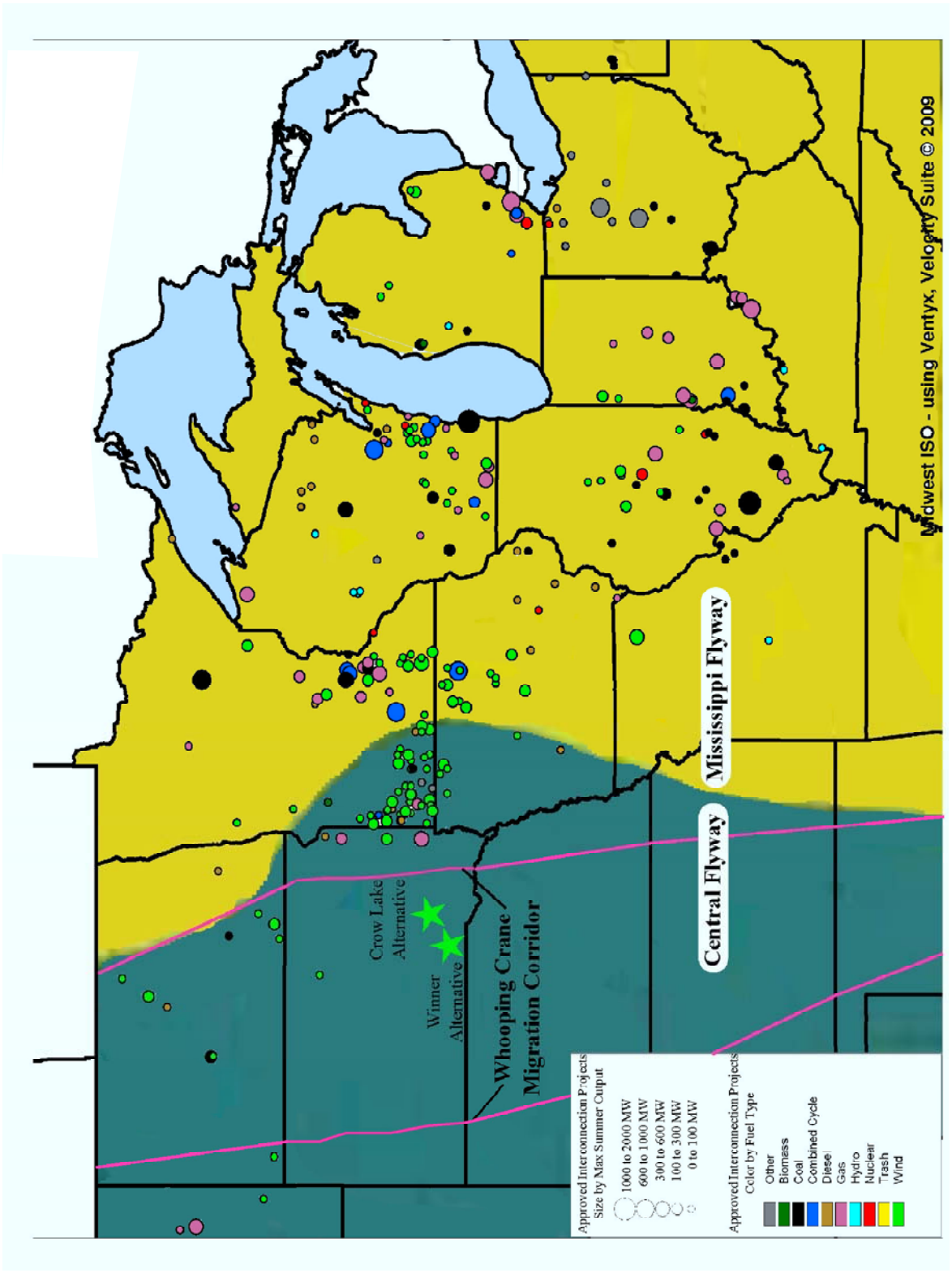


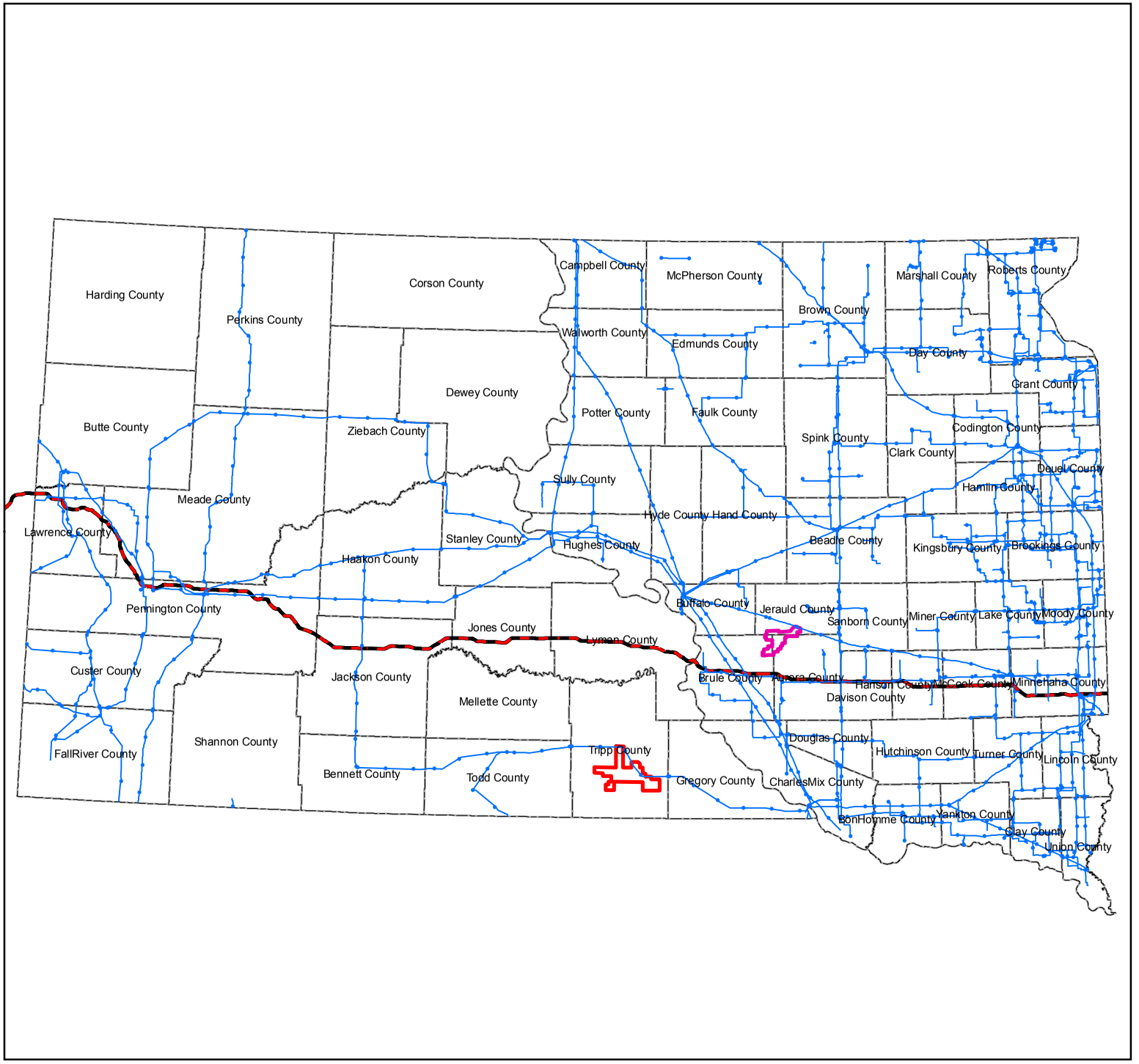
Figure 5.1 Midwest Independent System Operator Approved Interconnection Projects and Migratory Flyways

Table 5.1 Existing Wind Energy Projects in South Dakota

Name	Location	Power Capacity (MW)	Units	Turbine Mfr.	Developer	Owner	Power Purchaser	Year Online
Buffalo Ridge	Brookings County	50.4	24	Suzlon	Iberdrola Renewables	Iberdrola Renewables	NIPSCO	2009
Wessington Springs	Jerauld County	51	34	GE Energy	Babcock & Brown	Pattern Energy Group LP	Heartland Consumers Power District	2009
Tatanka Wind Project	McPherson County	88.5	59	Acciona	Acciona Energy	Acciona Energy		2008
Minn-Dakota Wind Farm	Brookings County	54	36	GE Energy	PPM Energy	PPM Energy	Xcel Energy	2007
Highmore Wind Energy Project	Highmore	40.5	27	GE Energy	FPL Energy	FPL Energy	Basin Electric	2003
Rosebud Sioux Wind Energy Project	Rosebud Sioux reservation	0.75	1	NEG Micon	Rosebud Sioux	Rosebud Sioux	Rosebud Sioux	2003
Canova	Near Carthage	0.11	1	Micon	City of Howard	City of Howard	City of Howard	2002
Gary Wind Energy Project	Gary	0.09	1	Vestas	Energy Maintenance Services-Distributed Energy Services	Energy Maintenance Services-Distributed Energy Services	Energy Maintenance Services-Distributed Energy Services	2002
Chamberlain Wind Project	Chamberlain	2.6	2	Nordex	Crown Butte Wind Power	Basin Electric	Basin Electric/East River Coop	2001
Howard Wind Energy Project	Howard	0.22	2	Micon	City of Howard	City of Howard	City of Howard	2001

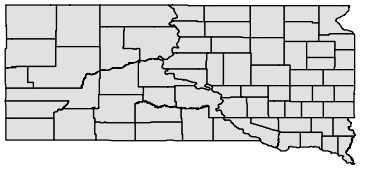
South Dakota is one of the top ranked States for potential wind development in the U.S., and has actively promoted development of wind energy. The State offers a wind energy tax credit and a reduced property tax for wind facilities; the wind energy credit was extended in March 2009. Although South Dakota has high wind potential, like many other States, it has not been fully developed because of the limited amount of installed transmission. The distance of the markets from the wind regions of South Dakota further compounds this issue.

Recognizing this, South Dakota and 4 nearby States have discussed integrated transmission development in support of wind energy that will promote regional electric transmission investment and cost sharing. The States working together are contributing to the Upper Midwest Transmission Development Initiative to identify energy generation resources, transmission projects and infrastructure needed to support those resources in a cost-effective manner. Over the next 10 months, participants will determine a reasonable allocation of costs for necessary infrastructure ultimately leading to the development of a concrete plan or tariff proposal for



Alternatives

- Crow Lake
- Winner
- Existing Utility Line
- County Boundary
- Interstate 90



N

0 40 80

Miles

SDPW Project

Figure 5.2

Date: 06.03.09	Utilities	Author: JAG

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consideration by the MISO. See **Figure 5.2** for a depiction of existing utilities across South Dakota.

Communications with planning and zoning personnel from Aurora (Vissia 2009), Brule (Westendorf 2009), Jerauld (Reindle 2009), and Tripp (Hirsh 2009) did not identify any proposed projects within these counties. Based on the excellent wind resource in South Dakota, it is likely that more renewable energy and associated transmission projects will be proposed in the near future. However, the following actions were identified through the regional research conducted, but were excluded from the cumulative impacts analysis for the stated reasons.

South Dakota State Transportation Improvement Plan Transportation Project

The 2010 to 2014 South Dakota State Transportation Improvement Plan (SDDOT 2009) identified projects associated with SR45 in Brule County and US183 in Tripp County. Both of these projects are identified as resurfacing projects and would occur during the 2011 to 2012 timeframe. These resurfacing projects have not been included in the cumulative impacts analysis because both would result in temporary impacts associated only with duration of the resurfacing project and would occur after completion of construction of the Proposed Project and, therefore, would not result in a cumulative impact.

Rosebud Sioux Tribe Wind Project

The Rosebud Sioux Tribe proposes to construct a wind project in Todd County approximately 2.5 miles north of Mission, South Dakota. The tribe currently has interconnection requests within Western's queue for 90 MW and/or 100 MW; however, system impact studies relating to these interconnection requests have not yet begun. Depending on the outcome of system impact studies, the tribe may develop the project as a 90 MW, 100 MW or 190 MW wind farm (Haukaas 2009). At this time, the Rosebud Sioux Tribe project proponents are conducting preliminary environmental studies. Because this proposed wind project is in preliminary study stages and is not sufficiently advanced in project development, it has been excluded from the cumulative impact analysis.

5.4 CUMULATIVE IMPACT ANALYSIS

Cumulative effects were evaluated for both the construction (pending approvals, anticipated to begin mid-2010 and complete construction by the end of 2010) and post-construction (operation) periods of the Proposed Project. As identified in **Chapter 4**, the Proposed Project's impacts to the following resources are anticipated to be minimal and primarily occur during construction: geology and soils, water, land use, noise, socioeconomics, environmental justice, and health and safety. Additionally, there are no other proposed projects identified within the ROI for the aforementioned resources, therefore, these resources will not be further evaluated for cumulative impacts. Where applicable, the Applicants' and Agencies' standard BMPs (see **Table 2.2)**, and Applicants' APMs (see **Table 2.3**) have been included and would be used for the Proposed Project and proposed Federal actions as appropriate, thereby reducing or eliminating the potential for incremental effects resulting from the Proposed Project.

5.4.1 CLIMATE CHANGE AND AIR QUALITY

Cumulative impact analysis for climate change includes consideration of the ROI for the project, and State and national GHG emission reduction efforts. Current national and State practices include the inventory of GHG emissions to compare the relative contribution of different emission sources and GHG emissions to climate change. According to the EPA, "a GHG inventory is an accounting of the amount of GHGs emitted to or removed from the atmosphere over a specific period of time (e.g., one year). A GHG inventory also provides information on the activities that cause emissions and removals, as well as background on the methods used to make the calculations. Policy makers use GHG inventories to track emission trends, develop strategies and policies and assess progress. Scientists use GHG inventories as inputs to atmospheric and economic models. To track the national trend in emissions and removals since 1990, EPA develops the official U.S. GHG inventory each year. The national GHG inventory is submitted to the United Nations in accordance with the Framework Convention on Climate Change. In addition to the U.S. inventory, GHG emissions can be tracked at the global, State and local levels as well as by companies and individuals."

CO_2 is one of six GHGs that contribute to climate change. CO_2 emissions represent approximately 84 percent of all GHG emissions in the U.S. The greatest advantage of wind power is electricity generation without air emissions, including CO_2. Within South Dakota, CO_2 emissions resulting from fossil fuel combustion totaled 13.78 million tons in 2007 (EPA 2009a). Of these, activities related to the generation of electric power accounted for 2.96 million tons of CO_2 emitted in South Dakota (EPA 2009a). Further, operation of the Proposed Project would offset emission sources when compared to similarly-sized electric generating facilities using carbon-based fuel sources; thus, contribute to the national and State efforts to minimize GHG emissions.

5.4.2 BIOLOGICAL RESOURCES

There are three cumulative impact analysis areas for biological resources: 1) the ROI for vegetation, mammals (excluding bats), reptiles, amphibians; 2) the Aransas-Wood Buffalo National Park migration corridor (Whooping Crane); and 3) the State of South Dakota central flyway (bats and birds, excluding Whooping Crane).

Some biological resources would be lost due to the construction and operation of the Proposed Project. Construction of the Proposed Project Components would result in the permanent loss of a small amount of native vegetation and wildlife habitat, and could result in a minor number of mammal, reptile, and amphibian mortalities. Impacts to these biological resources resulting from the Proposed Project would be minimal within the ROI, and incremental impacts would not increase cumulative impacts.

A BA is being prepared under Section 7 of the ESA for Federally-listed species. Impacts, including cumulative impacts, will be determined in the BA and findings will be summarized in the FEIS. Western and RUS will follow USFWS recommendations provided during the Section 7

consultation process. While SDCL 34A-8 does not require agency consultation for State-listed threatened and endangered species, SDGFP has been active in the preparation of this DEIS.

Operation of the Proposed Project would likely result in avian and bat mortalities (see **Sections 4.4.3.1 and 4.4.3.2**), mainly as a result of habitat fragmentation, and potential collisions with new overhead transmission lines and wind turbines. FAA marker lights would be installed on turbines taller than 200 feet and may incrementally increase cumulative effects on avian species in areas where they are highly concentrated. As discussed in Sections **5.2 Past and Present Actions** and **5.3 Reasonably Foreseeable Future Actions**, there are numerous existing and proposed transmission and wind generation projects in South Dakota that have or may have similar impacts on birds and bats. However, most of these projects are located in eastern South Dakota and considerably distant from the Proposed Project areas. Existing transmission lines and wind generation projects have negatively affected birds and bats, and, as discussed in **Sections 5.2** and **Section 5.3**, the likely need for additional wind generation facilities and transmission capacity to meet increasing demand could increase cumulative effects in areas where these facilities are concentrated, such as eastern South Dakota. Incremental impacts associated with the Proposed Project may result in increased cumulative impacts when added to other wind and transmission projects near the Proposed Project. However, the Proposed Project is geographically isolated from the majority of existing and proposed wind generation facilities and transmission lines. Therefore, bird and bat species utilizing the habitats in eastern South Dakota would not likely be incrementally impacted by the Proposed Project.

Given the current economic climate and a host of other variables, it is difficult to accurately predict the actual growth of wind energy in South Dakota and other top wind states, many of which also lie within the central flyway. However, the number of turbines and associated infrastructure is growing, and will likely continue to grow into the near future. Research on how birds and bats respond to wind turbines remains nascent, so it is difficult to predict the cumulative impacts of wind energy project development and transmission line development and disturbance within the central flyway. It can be assumed that as development and disturbance within the central flyway continues to increase, this would continue to degrade migratory and resident bird and bat habitat quality and quantity. Past activities that have affected habitat in the project area include conversion of native vegetation and CRP lands for farming, and construction of roads, transmission lines, and residences. Development of electrical power generation and transmission within the central flyway has contributed to a baseline condition that presents some level of risk to a bird and bat populations. Continued development of power generation and transmission, whether from renewable or non-renewable sources, will increase the potential for habitat fragmentation and collisions with structures.

5.4.3 CULTURAL RESOURCES

Cumulative impacts to cultural resources, such as prehistoric properties, historic properties, and cultural landscapes, cannot be determined until the results of the Class III Survey and TCP Survey are completed. A MOA is being developed among Western, RUS, SHPO, affected Federal agencies, Applicants and interested Native American Tribes. The preferred minimization

measure is to avoid identified sites; however, the MOA would provide an agreement among the parties for the treatment of the unavoidable adverse impacts. Compliance with the MOA provisions would ensure that Section 106 requirements are met, and incremental increases to cumulative cultural effects reduced.

5.4.4 TRANSPORTATION

FAA recently developed a new set of recommendations for lighting wind farms that would require fewer lights than needed under its current policy. The new recommendations suggest red or white synchronized flashing strobe lights, at most 0.5 mile apart around the perimeter of wind farms. Daytime lighting and dual lighting of the turbines were deemed unnecessary. However, the USFWS discourages the use of red flashing lights due to wildlife impacts (USFWS 2003). Prior to construction, the Applicants would consult with FAA to identify applicable lighting requirements. Based on this, the Proposed Project would not incrementally increase cumulative impacts to aviation.

5.4.5 VISUAL

Additional transmission line installation and wind energy development from the Proposed Project would incrementally increase cumulative effects on the visual landscape in the Proposed Project counties caused by the addition of man-made elements to a landscape that is primarily natural or agricultural. As the number or density of tall, man-made structures increased in the local rural counties, it is possible that viewer sensitivity would also increase. The significance of the visual changes would vary according to the location of the wind project and the perceptions of the viewers.

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