Big Blue Wind Energy Project
Avian and Bat Protection Plan

Prepared for:
Exergy Development Group

Prepared by:
Western EcoSystems Technology, Inc.

January 3, 2012

NATURAL RESOURCES ◆ SCIENTIFIC SOLUTIONS

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 Introduction and Corporate Policy

Big Blue Wind Farm, LLC (Big Blue), a subsidiary of Exergy Development Group of Idaho (Exergy) is committed to its responsibility to be a good steward of the environment and to adhere to federal, state, and local laws and ordinances. Exergy's wind project policy calls for wind projects to be designed, constructed, and operated in an environmentally sensitive manner and, either avoid or minimize potential avian and bat impacts. Exergy understands that even with diligent design, construction and operation activities, avian and bat fatalities may occur, including species that are protected under federal and state laws. As part of this commitment, Big Blue has developed an Avian and Bat Protection Plan (ABPP) for the Big Blue Wind Farm (Project). The development and application of this ABPP will ensure that:

- All Project-related actions comply with federal and state regulations;
- All Project-related actions comply with permit conditions;
- Project-specific species concerns are included in the ABPP, including avoidance and minimization measures;
- Public and private organizations are included in programs and research that minimize detrimental effects of bird and bat interactions with wind projects.
- The procedures described in this ABPP are followed;
- The Big Blue staff and all relevant subcontractors will receive the appropriate training pursuant to wildlife monitoring and reporting protocols; and,
- The documentation of bird and bat injuries and fatalities may provide the basis for future modification of the ABPP.

This ABPP continues Exergy's regulatory compliance concerning bird and bat interactions with its wind projects through a proactive approach to reducing risk to birds and bats and their habitats.

1.1 Project Description

Exergy is developing the Project entirely within private, cultivated lands in Faribault County, Minnesota (Figure 1). The overall Project area is approximately 14,700 acres (ac; 59.5 square kilometers [km^2]; 23.0 square miles [mi^2]). The Project will have a total of 18 Gemasa 2-megawatt (MW) G97 turbines with a nameplate capacity of 36 MW.

1.2 Project Siting

The Project was sited in an area offering low risk for potential environmental impacts, a good wind resource, close to available transmission capacity (i.e., no overhead transmission line required, avoid further direct impacts to wildlife), and in close proximity to the load center of Minneapolis-St. Paul. This region has also been previously disturbed through extensive agricultural cultivation, minimizing potential negative wildlife impact and corresponding to direction provided by the US Fish and Wildlife Service (USFWS) and many other wildlife agencies (i.e., site projects in previously disturbed areas). To avoid and minimize potential

impacts to a known bald eagle nest in Section 35, turbines in the southeastern project area were relocated.

1.3 Project Layout and Associated Facilities

1.3.1 General Wind Farm Construction Sequence of Activities

A typical wind farm consists of the following facilities: roads, wind turbine generator (WTG) foundations, underground electrical collection system, transmission lines, substation, operation and maintenance (O&M) building, and meteorological (met) towers.

Access roads to the construction compound are generally the first item to be built. A bulldozer and maintainer will scrape topsoil off (sub-grade) land for the access road. Water trucks and rollers then compact the sub-grade. Once the sub-grade has been prepared, dump trucks will bring in road base material which will be compacted to form the road bed.

Depending on the schedule and manpower, roads for WTG access will be built simultaneously in other Project areas following the same sequence. Generally, the base material is 8 to 12 inches thick and wide enough to accommodate a 36 foot crawler crane. The proposed Project has approximately 8 miles of road.

To allow heavy equipment access, road construction commences 2 to 4 weeks prior to pouring WTG foundations. After top soil has been removed, an excavator digs the foundation hole; size will depend on the type of foundation. Crews place rebar, the bolt cage, and concrete forms in preparation of pouring the foundation base. The base is poured using a continuous series of concrete trucks over a three to four hour period. The upper portion of the foundation, referred to as the pedestal, may be poured a few days later after the base concrete has cured and additional rebar is placed. After the pedestal has cured, an excavator, front-end loader, water trucks, and roller will backfill the foundation by compacting the soil in several layers.

After several foundations have been poured, the underground electrical system is installed between turbines and from the last turbine on the electrical circuit to the substation. A trencher is generally used to cut a two foot wide, five foot deep trench followed by a padder that places a bed of screened material, void of any rocks, at the bottom of the trench. Electric, fiber optic, and grounding cables will be placed in the trench before it is backfilled to the original ground level; topsoil is replaced.

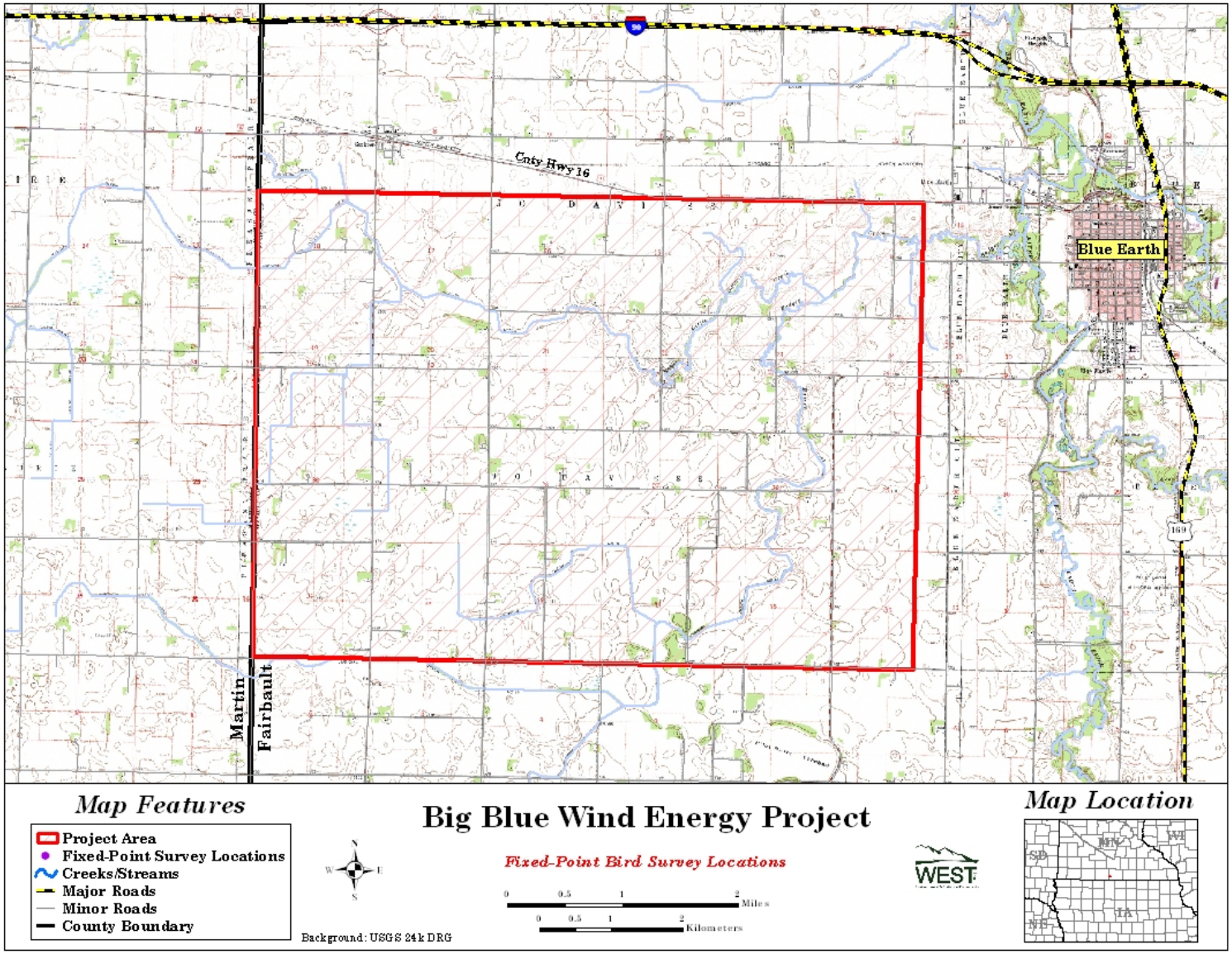

Figure 1. Big Blue Wind Energy Project Area.

Once the collection system is installed, a crane pad is constructed near the WTG base in preparation of WTG component deliveries. Components typically arrive in eight loads: three blades, hub, nacelle, and the base/mid/top sections. Because of varying weights of each type of component, several different cranes and crews are used to offload the sets. The base is set first with one crane and crew; another crane and crew assemble the rotor, consisting of three blades and the hub. Lastly, the main crawler crane will erect and assemble the remaining tower sections, the nacelle, and the rotor at a rate of one to two WTGs per day. Three to four weeks of additional work by mechanical, cleaning, and commissioning crews are required before the WTGs are operational.

During road and WTG foundation construction and WTG erection, the substation, switchyard, transmission line (if needed) and O&M building may also be under construction. Construction, installation, and commissioning for these components may take up to another three months.

1.3.2 Operations and Maintenance

Once the wind farm is commercially operational, a crew consisting of 2-5 personnel will service and maintain the WTGs. The primary responsibility of the operations crew is to perform troubleshooting and preventative maintenance. Service crews, consisting of two to three people, troubleshoot non-operational WTGs. Depending on the complexity of the issue, troubleshooting may require a few minutes or several days. Preventative maintenance will be conducted throughout the WTG lifespan at intervals of six months to a year.

1.4 Regulatory Framework and Summary of Agency Consultations

Avian, bat, and raptor surveys were begun voluntarily at the beginning of the permitting process. Initial surveys revealed the presence of an eagle nest in the southeastern portion of the project. In an effort to obtain further data concerning nesting eagles, an eagle monitoring study was conducted from May through August 2011 at the nest location to document the eagle behavior.

This ABPP was ordered as part of the Minnesota Department of Commerce Large Wind Energy Conversion System permit (Docket No: IP6851/WS-10-1238) for the Project. Specifically, the Energy Facilities Permitting (EFP) staff of the Department of Commerce states “A special condition has been included in the proposed site permit at section 13.1 to require that the Avian and Bat Protection Plan, required under section 6.7 include an Eagle Protection Plan and a minimum of one year of post-construction eagle surveys.” The EFP required the Project to prepare an ABPP in consultation with the Commission, DNR, and the USFWS. This ABPP contains specific sections related to bald eagles in accordance with the provision requiring an Eagle Protection Plan.

Exergy, EFP, USFWS, and DNR conducted conference calls in June and August, 2011, to discuss the ABPP, avian and bat surveys, raptor nest survey and eagle nest monitoring. Exergy and the USFWS met on site on May 3, 2011 to review the eagle nest location and discuss

options for addressing concerns. In addition, the DNR also provided email input on the need for a state permit if eagle prey remains are collected from under the nest and direction on modifying fatality monitoring if the objective is to locate golden eagle fatalities. These discussions have led to this ABPP. Interim Avian and Bat and Raptor Nest Surveys reports prepared in June and September 2011 were sent to the EFP, USFWS, and DNR for review.

1.5 Key Avian and Bat Regulations

1.5.1 Federal Endangered Species Act

The federal Endangered Species Act (ESA 1973) defines and lists species as "endangered" and "threatened" and provides regulatory protection for the listed species. The federal ESA provides a program for conservation and recovery of threatened and endangered species; it also ensures the conservation of designated critical habitat that the USFWS has determined is required for the survival and recovery of these listed species. Section 9 of the federal ESA prohibits the take of species listed by USFWS as threatened or endangered. Take is defined as follows: "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in such conduct." In recognition that take cannot always be avoided, Section 10(a) of the federal ESA includes provisions for take that is incidental to, but not the purpose of, otherwise lawful activities. Section 10(a)(1)(B) permits (Incidental Take Permits) may be issued if take is incidental and does not jeopardize the survival and recovery of the species.

Section 7(a)(2) of the federal ESA requires that all federal agencies, including the USFWS, evaluate projects with respect to any species proposed for listing or already listed as endangered or threatened and any proposed or designated critical habitat for the species. Federal agencies are prohibited from authorizing, funding, or carrying out any action that will jeopardize the continued existence of a listed species or destroy or modify its critical habitat. As defined in the federal ESA, individuals, organizations, states, local governments, and other non-federal entities are affected by the designation of critical habitat only if their actions occur on federal lands; require a federal permit, license, or other authorization, or involve federal funding (ESA 1973).

1.5.2 Bald and Golden Eagle Protection Act

The federal Bald and Golden Eagle Protection Act of 1940 (BGEPA; 16 USC 668–668c, as amended) is administered by the USFWS and was enacted to protect bald and golden eagles, their nests, eggs, and parts (e.g., feathers or talons). The BGEPA states that no person shall take, possess, sell, purchase, barter, offer for sale, purchase or barter, transport, export, or import any bald or golden eagle alive or dead, or any part, nest or egg without a valid permit to do so (USFWS, n.d). The BGEPA also prohibits the take of bald and golden eagles unless pursuant to regulations. Take is defined by the BGEPA as an action "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." Disturb is defined in the BGEPA as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle; (2) a decrease in its

productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior" (USFWS, n.d.). In addition to immediate impacts, this definition also covers impacts that result from human-caused alterations initiated around a previously used nest site during a time when eagles were not present. Permits are issued to Native Americans to possess eagle feathers for religious purposes, and salvaged eagle carcasses can be sent to the National Eagle Repository in Colorado where they are redistributed to Native Americans. This effort is coordinated by a local USFWS office. Although the bald eagle was removed from the Endangered Species List in June 2007, it is still federally protected under the BGEPA and Migratory Bird Treaty Act as described in the following section. In addition, the *National Bald Eagle Management Guidelines* were published in conjunction with delisting by the USFWS in May 2007 to provide provisions to continue to protect bald eagles from harmful actions and impacts.

Under the BGEPA, a final rule was published in May 2008, in the Federal Register (FR) that proposed authorization for take of bald eagles for those with existing authorization under the federal ESA where the bald eagle is covered in a Habitat Conservation Plan (HCP) or the golden eagle is covered as a non-listed species. The final rule also established a new permit category to provide expedited permits to entities authorized to take bald eagles through section 7 incidental take permits. A proposed rule will later address authorization of take of (1) disturbance-type take of bald and golden eagles due to otherwise lawful activities and (2) eagle nests in rare cases where their location poses a risk to human safety or the eagles themselves.

In 2009, the USFWS issued a final rule on new permit regulations that would allow some disturbance of eagles "in the course of conducting lawful activities" (74 FR 46836–46879). USFWS's description of its 2009 rule suggests that physical take of an eagle will only be authorized if every avoidance measure has been exhausted. Removal of nests will still generally be permitted only in cases where the nest poses a threat to human health, or where the removal would protect eagles. Explanations of the rule on USFWS's website specify that take permits may be issued when "necessary for the protection of…other interests in any particular locality" USFWS 2009). The discussion expands the definition of such public and private interests to include utility infrastructure development and maintenance. The website states that due to concerns about population declines, permits for take of golden eagles are likely to be restricted throughout the eagle's range (USFWS 2009). Considerations for issuing take permits include the health of the local and regional eagle populations, availability of suitable nesting and foraging habitat for any displaced eagles, and whether the take and associated mitigation provides a net benefit to eagles (74 FR 46836–46879, USFWS 2009). In February, 2011, USFWS issued *Draft Eagle Conservation Plan Guidance Module 1: Wind Energy Development* to address these new regulatory matters (USFWS 2011). The public comment period on this draft guidance concluded on May 19, 2011. The USFWS is currently reviewing comments and will determine how to proceed in amending and finalizing the guidance.

1.5.3 Migratory Bird Treaty Act

The MBTA makes it unlawful to pursue, capture, kill, or possess any migratory bird or part, nest, or egg of any such bird listed in wildlife protection treaties between the United States, Great Britain, Mexico, Japan, and Russia (and other countries of the former Soviet Union). Most birds (outside of introduced species and non-migratory game birds) within the US and the Project area are protected under the MBTA. The birds, occupied nests and the contents of the nest (eggs or chicks) within the Project property are afforded protection pursuant to the MBTA. Unlike ESA and BGEPA, no permits are available to authorize incidental take of birds under the MBTA. Due to the potential for resident and migratory birds within the Project, development of this ABPP was done to assist in complying with the MBTA.

1.5.4 State Threatened and Endangered Species Laws

According to the 2010 Minnesota Statutes, the Protection of Threatened and Endangered Species (Minn. Stat. 84.0895) includes the language "Notwithstanding any other law, a person may not take, import, transport, or sell any portion of an endangered species of wild animal or plant, or sell or possess with intent to sell an article made with any part of the skin, hide, or parts of an endangered species of wild animal or plant, except as provided in subdivisions 2 and 7." The Statute directs the Commissioner of the DNR to develop lists of endangered species, threatened species, and species of concern. Bald eagles are included on the state list of threatened and endangered species.

2.0 Pre-Construction Site Specific Wildlife Surveys and Risk Assessments

2.1 Vegetation Types

The Project area studied for avian use and raptor nests is about 14,700 acres (Figure 1). The Project lies within the Level IV Des Moines Lobe Ecoregion (USEPA 2006). Historically, vegetation within this ecoregion was dominated by tall-grass prairie. Today, most of this ecoregion has been converted to agricultural use with row crop production the primary activity. Trees and shrubs can be found around farmsteads, within planted shelter belts, and along creeks and drainages. Extensive wetland drainage has occurred throughout the ecoregion, including within the Project, especially for the smaller temporary and seasonal wetlands.

The approximately 4,200 acre area immediately around turbine locations (a subset of the study area used for wildlife surveys) is dominated by tilled agriculture, as is the larger avian use study area. Agriculture makes up 93.5% of the area, with small percentages of forest, grassland, shrubland, urban/developed, and wetlands (Table 1). All turbines will be placed in cultivated agricultural lands, minimizing impacts to wildlife and habitat (Figure 2).

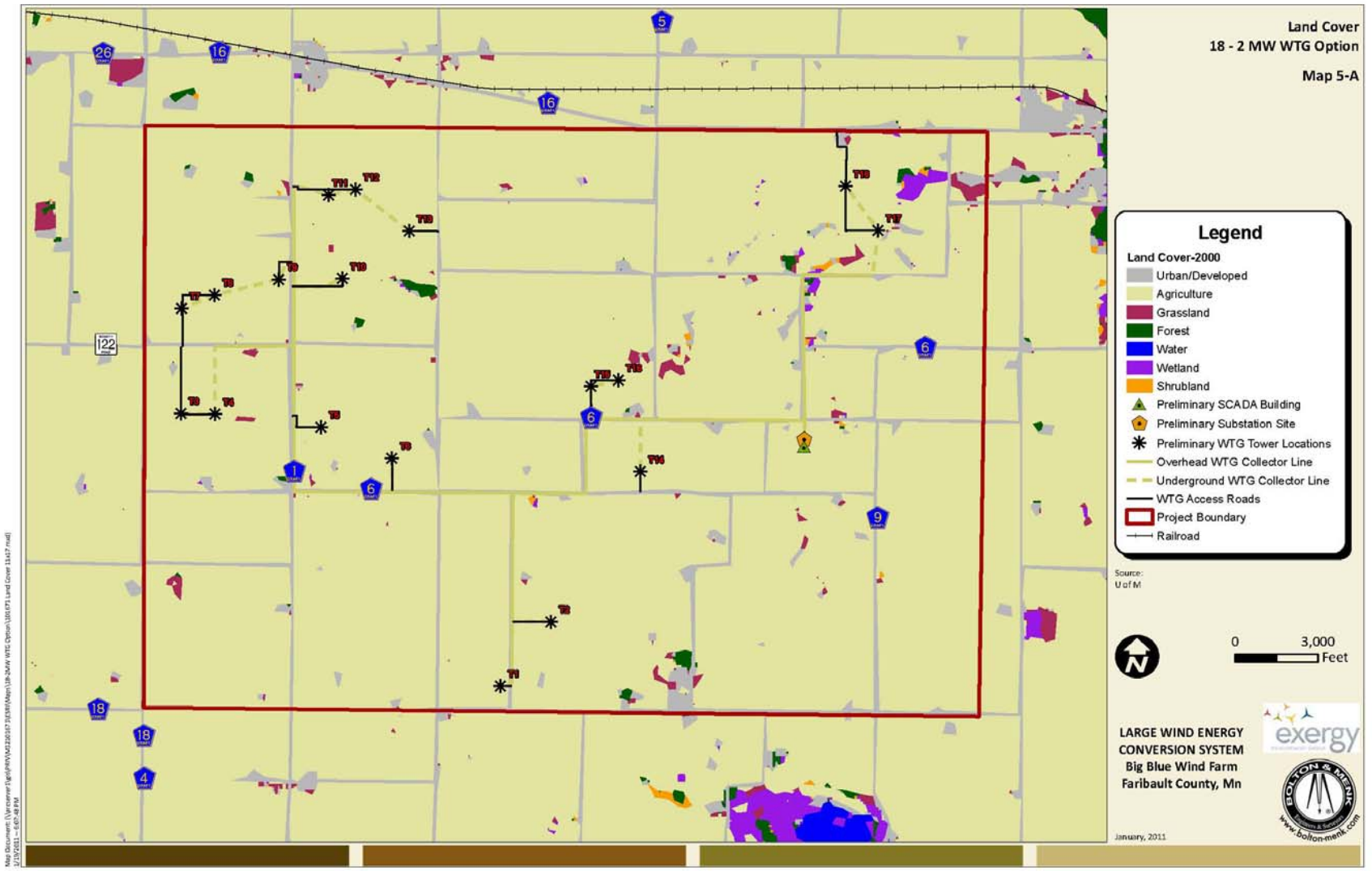

Figure 2. Vegetation Cover Types within the Big Blue Wind Energy Project.

Table 1. Vegetation cover types within the Big Blue Wind Energy Project.

Land Cover Class	Area (acres)	Percent of Project Area
Agriculture	3,960.5	93.5%
Forest	4.0	0.1%
Grassland	36.6	0.9%
Shrubland	3.2	0.1%
Urban/Developed	231.4	5.5%
Wetlands	1.5	<0.1%
Total	**4,237.3**	**100%**

2.2. Avian Use Surveys

Avian use surveys within the Project area were initiated in late November, 2010, and are scheduled to be completed in mid-November, 2011, for one full year of survey use data collection. The primary objective of the avian use study is to document use in the Project area during the year to help evaluate potential impact of the project on birds and to provide a means to compare potential impact of the Project with other local, regional, and national projects. Surveys during spring (March 15 – May 31) and fall (September 1 – November 15) migration are conducted weekly; summer (May 31 – September 1) and winter (November 15 – March 15) surveys are conducted every other week. The avian use surveys will help predict potential impacts by estimating temporal and spatial use of the general project area by raptors as well as other birds (e.g., waterfowl). This data may inform methods of avoiding and mitigating impact.

To ensure adequate representation of the Project area, eight fixed-point circular plots were established (Figure 3) along public roads near proposed turbine locations. The survey radius of the circular plots is 800 meter (m) for raptors and other large birds; so survey areas extend into the middle of sections for larger birds, except for “small birds are only analyzed within 100 m radius. Plots are surveyed for 20 minutes each.

The resulting avian use data will be compared to data collected at numerous other wind resource areas using similar protocols. Many of these wind resource areas also have post-construction fatality data, which will allow a prediction of avian mortality, based on raptor use at the proposed Project. This comparison along with a description of bird use at the Project will be included in the final monitoring report prepared after the 2011 field season.

An interim summary report was prepared after the summer 2011 season. A total of 210 20-minute fixed-point bird use surveys were conducted within the Project during 27 visits from November 23, 2010, to August 18, 2011. Fifty-eight fixed-point surveys were conducted in the winter during eight visits, 88 fixed-point surveys were conducted in the spring during 11 visits, and 64 fixed-point surveys were conducted in the summer during eight visits. Sixty-eight bird species were observed; a total of 9,118 individual birds within 901 separate groups were recorded. Information regarding specific species groups from the interim report is included below and the interim report is found in Appendix A.

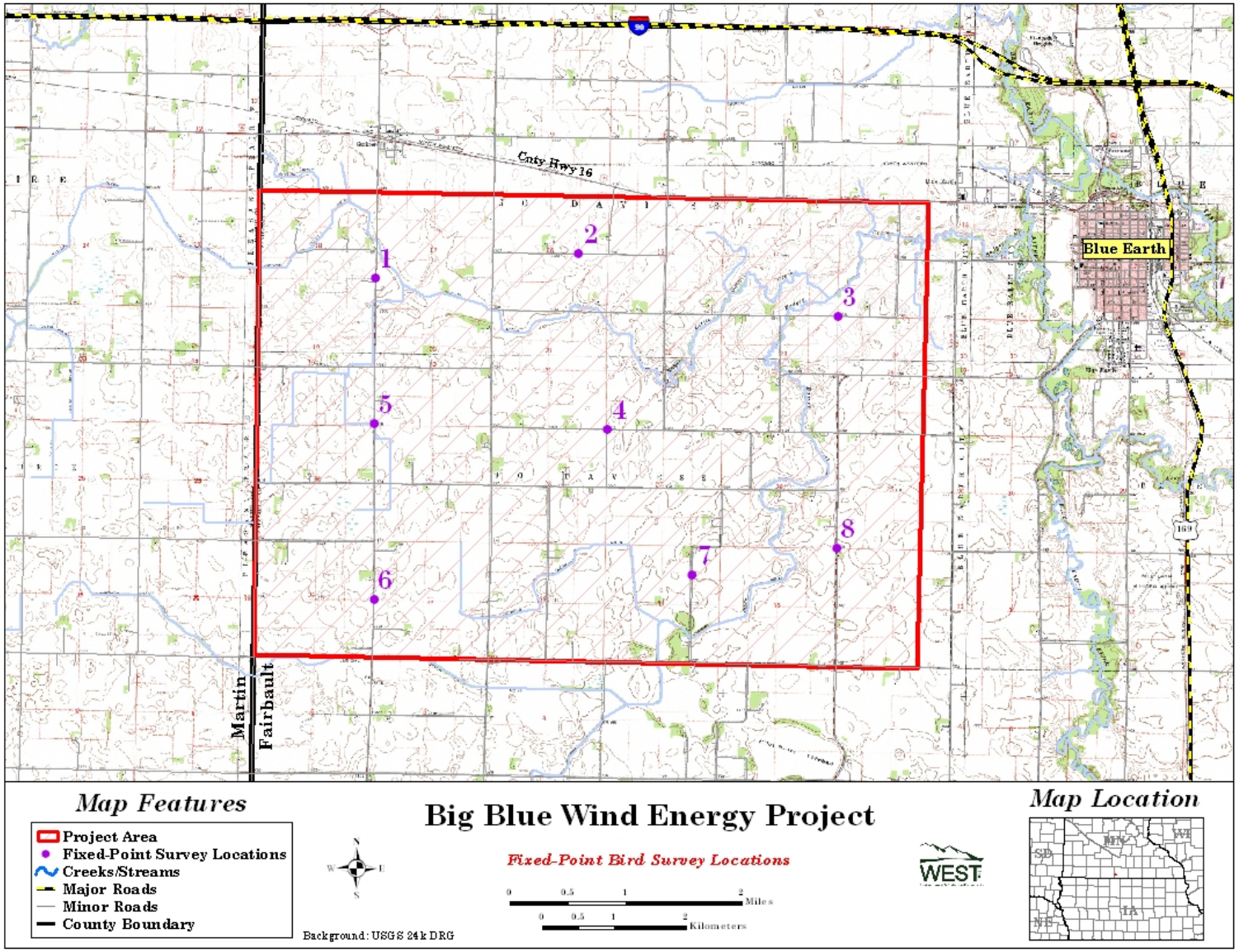

Figure 3. Avian Use Point Count Locations within the Big Blue Wind Energy Project.

2.2.1 Non-Eagle Raptors

From November 23, 2010, to August 18, 2011, the total number of individuals documented during fixed-point counts, regardless of distance from the fixed-point location, included bald eagles (30 individuals), red-tailed hawk (17), rough-legged hawk (1), northern harrier (1), American kestrel (5), and merlin (1). Based on range map information, these species could be expected to occur within the Project area at some time during winter, spring, or summer (Sibley 2000). Due to high fatality rates at Altamont Pass Wind Farm in California, raptors have received much attention (Erickson et al. 2002b). Based on the results from other wind resource areas, mean raptor use (number of diurnal raptors divided by the number of 800-m plots and the total number of surveys) in the Project during winter, spring, and summer of 2010-2011 was low (0.06 raptors/plot/20-min survey in winter, 0.39 in spring and 0.19 in summer) relative to data collected at other existing and proposed wind energy facilities with data for the same seasons (Figures 4, 5, and 6).

Based on a comparison of raptor use rates at other wind projects, anticipated raptor fatalities are expected to be similar or lower than other regional and national projects.

2.2.2 Eagles

While a total of 30 eagle observations were made during point counts, most of these observations were outside of the standard 800 m survey area used to calculate use rates (Figure 7). A total of 5 observations of eagles were made within the standard 800 m survey area, resulting in a low use rate for eagles. Eagles were observed regularly at the documented bald eagle nest in the southeastern project area but outside the 800 m survey area. Specific eagle nest observations were made in spring and summer 2011 (see Section 2.3.1).

2.2.3 Trumpeter Swans

To date no trumpeter or other swan species have been observed within or near the Project. Impact to trumpeter and other swans is expected to be minimal based on the zero observed use and overall low impact of wind facilities on waterfowl in general.

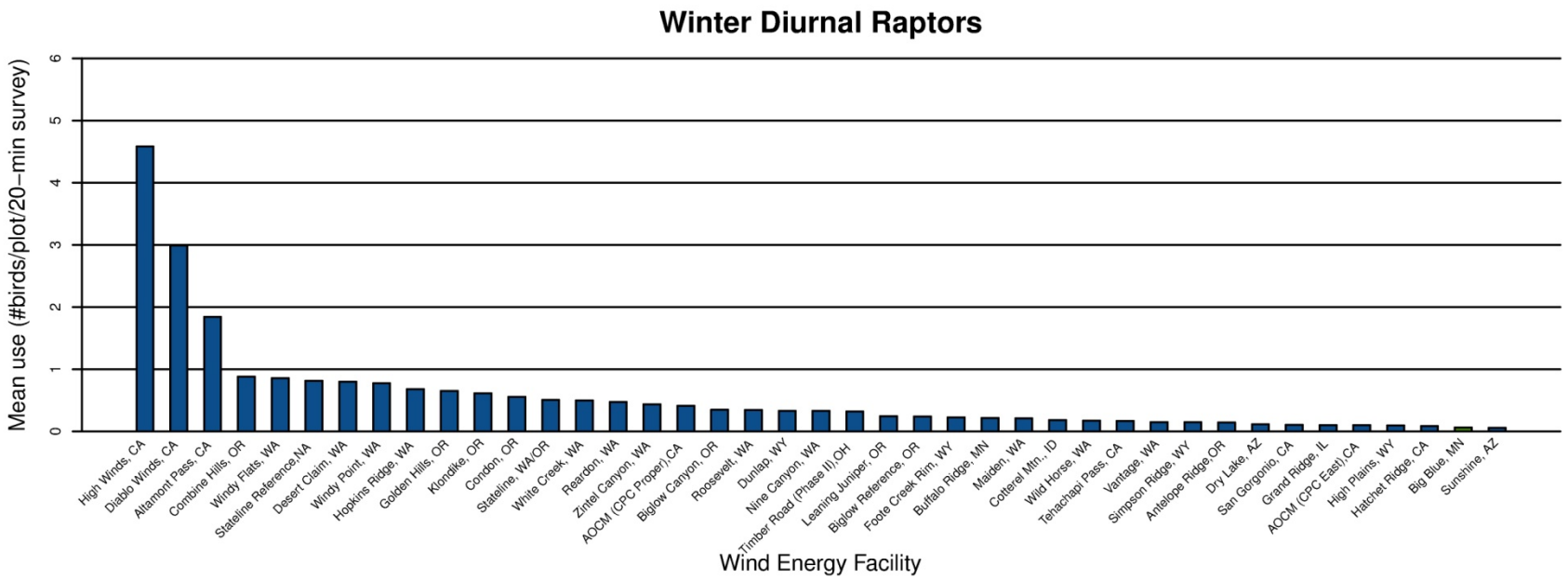

Figure 4. Comparison of winter diurnal raptor use between the Big Blue Wind Energy Project and other United States wind energy facilities.

Data from the following sources:

Wind Energy Facility	Reference	Wind Energy Facility	Reference	Wind Energy Facility	Reference
Big Blue, MN	This study.				
DNR, WA	Johnson et al. 2006b	White Creek, WA	NWC and WEST 2005	Simpson Ridge, WY	Johnson et al. 2000
Elkhorn, OR	WEST 2005a	Hopkin's Ridge, WA	Young et al. 2003a	Stateline Reference	URS et al. 2001
Diablo Winds, CA	WEST 2006a	Buffalo Ridge, MN	Erickson et al. 2002b	Hatchet Ridge, CA	Young et al. 2007a
Lower Linden, WA	Johnson et al. 2007a	Stateline, WA/OR	Erickson et al. 2002b	Biglow Canyon, OR	WEST 2005c
Hoctor Ridge, WA	Johnson et al. 2006c	Desert Claim, WA	Young et al. 2003b	Invenergy_Vantage, WA	WEST 2007
Leaning Juniper, OR	Kronner et al. 2005	Combine Hills, OR	Young et al. 2003c	Maiden, WA	Erickson et al. 2002b
Cotterel Mtn., ID	Cooper et al. 2004	Klondike, OR	Johnson et al. 2002	Nine Canyon, WA	Erickson et al. 2001
Imrie, WA	Johnson et al. 2006d	Bighorn, WA	Johnson and Erickson 2004	Zintel Canyon, WA	Erickson et al. 2002a
Roosevelt, WA	NWC and WEST 2004	Condon, OR	Erickson et al. 2002b	Biglow Reference, OR	WEST 2005c
Swauk Ridge, WA	Erickson et al. 2003b	Stateline Reference	URS et al. 2001	Simpson Ridge, WY	Johnson et al. 2000
Klickitat Co., EOZ WA	WEST and NWC 2003	Hatchet Ridge, CA	Young et al. 2007a	Wild Horse, WA	Erickson et al. 2003a
High Winds, CA	Kerlinger et al. 2005	Biglow Canyon, OR	WEST 2005c	North Valley, MT	WEST 2006b
Golden Hills, OR	Jeffrey et al. 2008	Invenergy_Vantage, WA	WEST 2007	Dry Lake, AZ	Young et al. 2007b
Foote Creek Rim, WY	Erickson et al. 2002b	Maiden, WA	Erickson et al. 2002b	Homestead, CA	WEST et al. 2007
Altamont Pass, CA	Erickson et al. 2002b	Nine Canyon, WA	Erickson et al. 2001	Tehachapi Pass, CA	Erickson et al. 2002b
Windy Flats, WA	Johnson et al. 2007b	Zintel Canyon, WA	Erickson et al. 2002a	San Gorgonio, CA	Erickson et al. 2002b

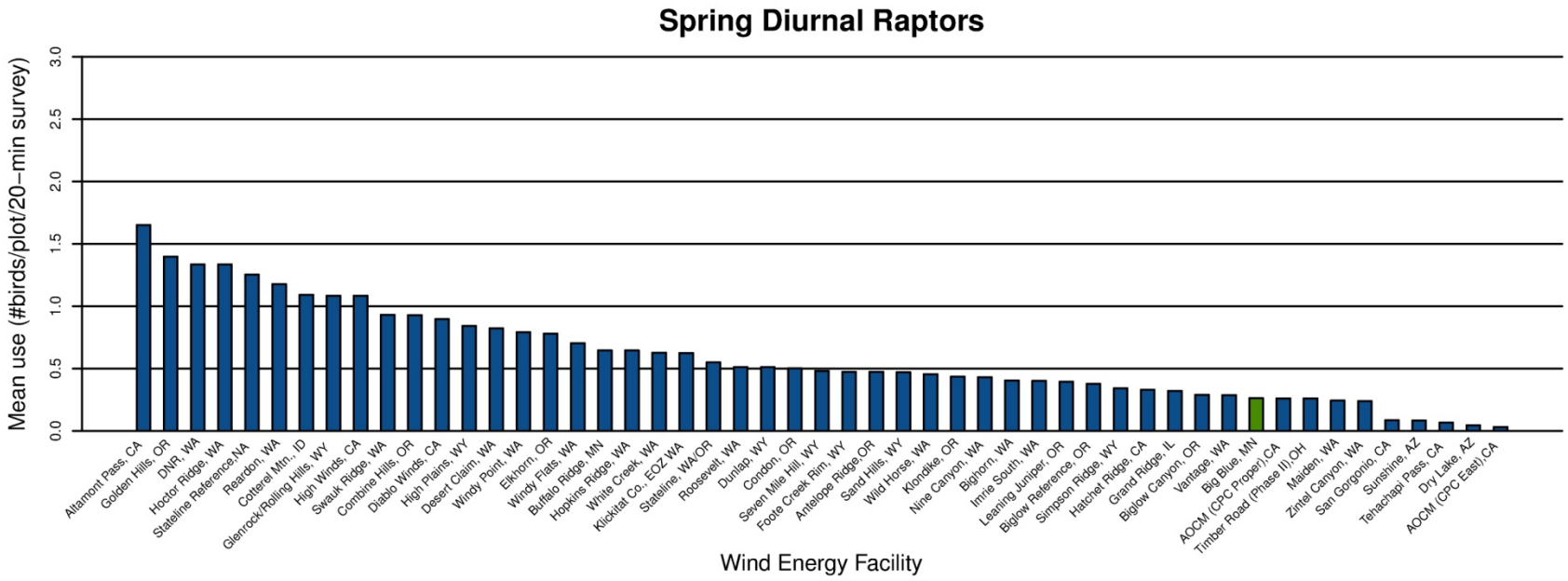

Figure 5 Comparison of spring diurnal raptor use between the Big Blue Wind Energy Project and other United States wind energy facilities.

Data from the following sources:

Wind Energy Facility	Reference	Wind Energy Facility	Reference	Wind Energy Facility	Reference
Big Blue, MN	This study.				
Diablo Winds, CA	WEST 2006a	Golden Hills, OR	Jeffrey et al. 2008	Wild Horse, WA	Erickson et al. 2003a
High Winds, CA	Kerlinger et al. 2005	Maiden, WA	Erickson et al. 2002b	Stateline, WA/OR	Erickson et al. 2002b
Altamont Pass, CA	Erickson et al. 2002b	Reardon, WA	WEST 2005b	North Valley, MT	WEST 2006b
Cotterel Mtn., ID	Cooper et al. 2004	Sand Hills, WY	Johnson et al. 2006a	Stateline Reference	URS et al. 2001
Hopkin's Ridge, WA	Young et al. 2003a	Combine Hills, OR	Young et al. 2003c	Tehachapi Pass, CA	Erickson et al. 2002b
Foote Creek Rim, WY	Erickson et al. 2002b	Homestead, CA	WEST et al. 2007	Simpson Ridge, WY	Johnson et al. 2000
Windy Flats, WA	Johnson et al. 2007b	Hatchet Ridge, CA	Young et al. 2007a	Grand Ridge, IL	Derby et al. 2009
Buffalo Ridge, MN	Erickson et al. 2002b	Leaning Juniper, OR	Kronner et al. 2005	Dry Lake, AZ	Young et al. 2007b
Elkhorn, OR	WEST 2005a	Roosevelt, WA	NWC and WEST 2004	Biglow Canyon, OR	WEST 2005c
Zintel Canyon, WA	Erickson et al. 2002a	Klondike, OR	Johnson et al. 2002	Invenergy_Vantage, WA	WEST 2007
Swauk Ridge, WA	Erickson et al. 2003b	Condon, OR	Erickson et al. 2002b	Biglow Reference, OR	WEST 2005c
Desert Claim, WA	Young et al. 2003b	Nine Canyon, WA	Erickson et al. 2001	San Gorgonio, CA	Erickson et al. 2002b
White Creek, WA	NWC and WEST 2005	Sunshine, AZ	WEST and CPRS 2006		

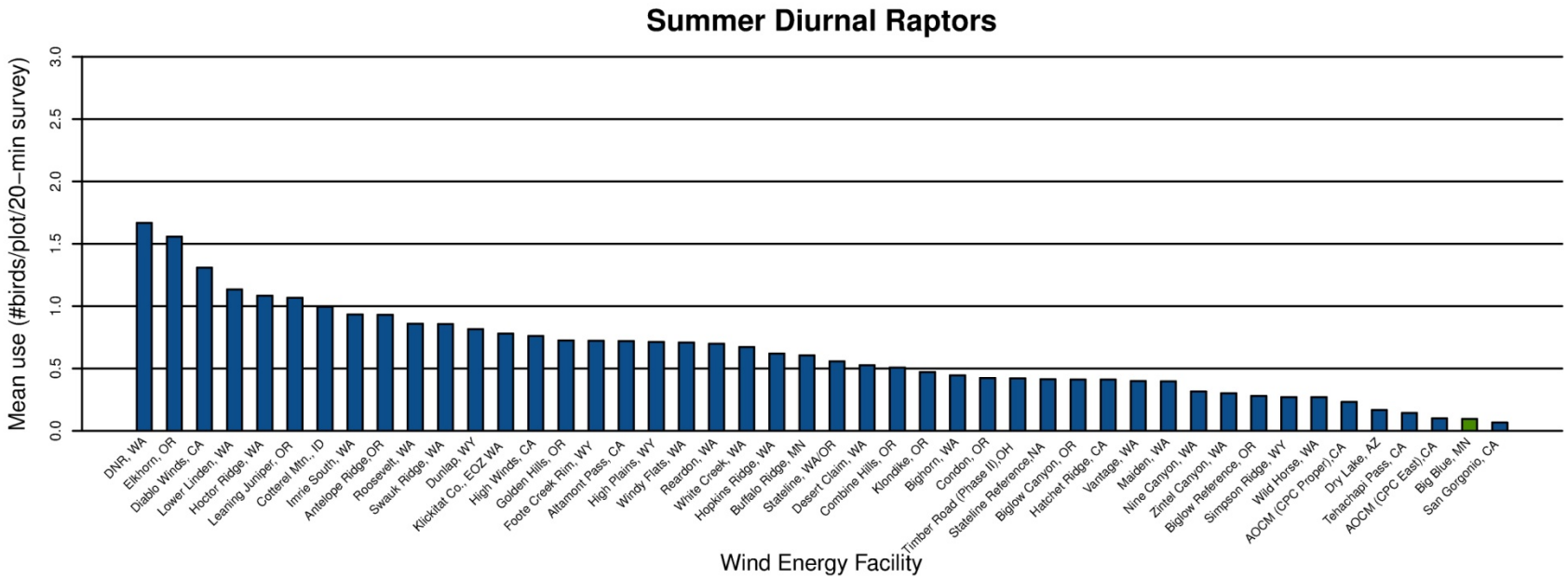

Figure 6. Comparison of summer diurnal raptor use between the Big Blue Wind Energy Project and other United States wind energy facilities.

Data from the following sources:

Wind Energy Facility	Reference	Wind Energy Facility	Reference	Wind Energy Facility	Reference
Big Blue, MN	This study.				
Diablo Winds, CA	WEST 2006a	Golden Hills, OR	Jeffrey et al. 2008	Wild Horse, WA	Erickson et al. 2003a
High Winds, CA	Kerlinger et al. 2005	Maiden, WA	Erickson et al. 2002b	Stateline, WA/OR	Erickson et al. 2002b
Altamont Pass, CA	Erickson et al. 2002b	Reardon, WA	WEST 2005b	North Valley, MT	WEST 2006b
Cotterel Mtn., ID	Cooper et al. 2004	Sand Hills, WY	Johnson et al. 2006a	Stateline Reference	URS et al. 2001
Hopkin's Ridge, WA	Young et al. 2003a	Combine Hills, OR	Young et al. 2003c	Tehachapi Pass, CA	Erickson et al. 2002b
Foote Creek Rim, WY	Erickson et al. 2002b	Homestead, CA	WEST et al. 2007	Simpson Ridge, WY	Johnson et al. 2000
Windy Flats, WA	Johnson et al. 2007b	Hatchet Ridge, CA	Young et al. 2007a	Grand Ridge, IL	Derby et al. 2009
Buffalo Ridge, MN	Erickson et al. 2002b	Leaning Juniper, OR	Kronner et al. 2005	Dry Lake, AZ	Young et al. 2007b
Elkhorn, OR	WEST 2005a	Roosevelt, WA	NWC and WEST 2004	Biglow Canyon, OR	WEST 2005c
Zintel Canyon, WA	Erickson et al. 2002a	Klondike, OR	Johnson et al. 2002	Invenergy_Vantage, WA	WEST 2007
Swauk Ridge, WA	Erickson et al. 2003b	Condon, OR	Erickson et al. 2002b	Biglow Reference, OR	WEST 2005c
Desert Claim, WA	Young et al. 2003b	Nine Canyon, WA	Erickson et al. 2001	San Gorgonio, CA	Erickson et al. 2002b
White Creek, WA	NWC and WEST 2005	Sunshine, AZ	WEST and CPRS 2006		

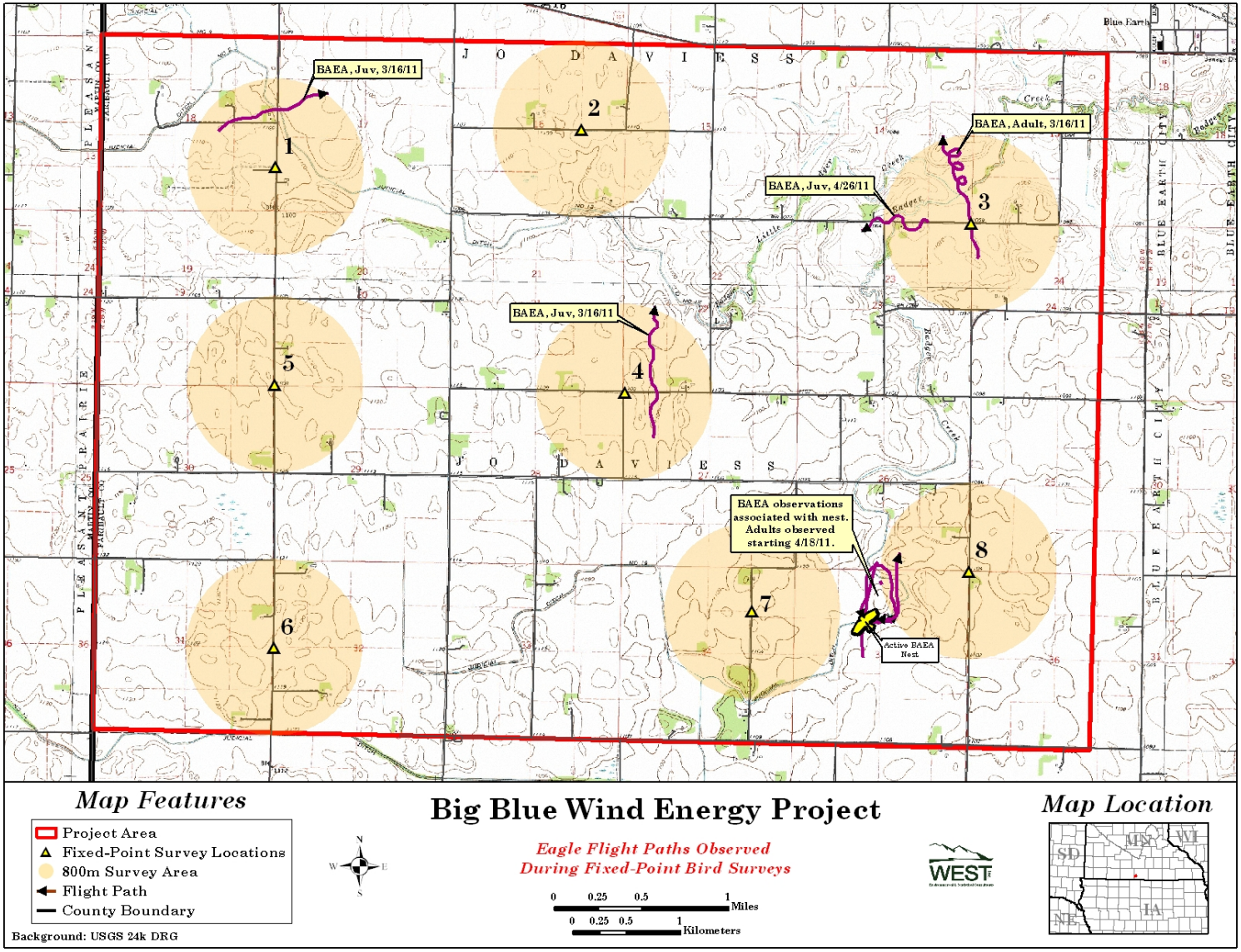

Figure 7. Bald eagle flight paths observed during avian use surveys.

2.2.4 Other Migratory Birds

Sixty-eight bird species were observed during fixed-point bird use surveys. A total of 9,118 individual birds within 901 separate groups were recorded. Passerines and waterfowl were the most abundant bird types observed, accounting for 57.8% and 33.3% of all observations respectively. Red-winged blackbirds (*Agelaius phoeniceus*) were the most abundant passerines species (1,722 individuals) while Canada goose (*Branta canadensis*) was the most abundant waterfowl species (2,296 individuals; Table 1). These two species represented only 2.9% of all species observed, yet accounted for 44.1% of total bird observations. Shorebirds were the third most common bird group; greater yellowlegs (*Tringa melanoleuca*; 169 individuals) and killdeer (*Charadrius vociferous*; 166 individuals) were the most abundant species. See the interim report in Appendix A for a complete list of species observed and numbers of groups and individuals.

Based on the species and number of individuals observed, and similarity in habitats, it is anticipated that the fatality rate of migratory birds at the Project will be similar to other projects in southern Minnesota and elsewhere in the Midwest (Table 2).

Indirect, or displacement, impact is often a concern regarding migratory birds and wind energy developments; however, the Project will be constructed within cultivated agricultural lands and displacement impact is expected to be minimal.

2.2.5 Sensitive Species

Along with the bald eagle, two other state sensitive species, American white pelican (*Pelicanus erythrorhynchos*; species of concern) and Wilson's phalarope (*Phalaropus tricolor*; threatened) were recorded. Eight individuals of each species were observed in the spring only. Because no breeding populations were documented, it is expected that direct impact to the species will be minimal.

2.3 Raptor Nest Surveys

The objective of the raptor nest surveys was to locate and record raptor nests that may be subject to disturbance and displacement effects by wind energy facility construction and operation. Surveys were focused on large, stick nest structures, and did not include searches for cavity nests (e.g., American kestrel [*Falco sparverius*] or ground nests (e.g., northern harrier [*Circus cyaneus*]. Surveys were conducted in spring 2011. Observers walked and drove along public and private roads, where accessible, before spring leaf out looking for suitable habitat (e.g., trees, power line poles, etc) within which raptor nests were likely. Potential raptor nest coordinates were recorded using GPS and on aerial photo maps; coordinates were later digitized with GIS software. Three raptor nests were observed within the Project and a 1.6 km (one mi) buffer (Figure 8). Two nests (BBRN1, active-probable red-tailed hawk and BBRN3 inactive) were outside of the Project boundary; the third (BBRN2) was an active bald eagle nest located within the Project. Overall raptor nesting density is low and impact to nesting raptors is expected to be low.

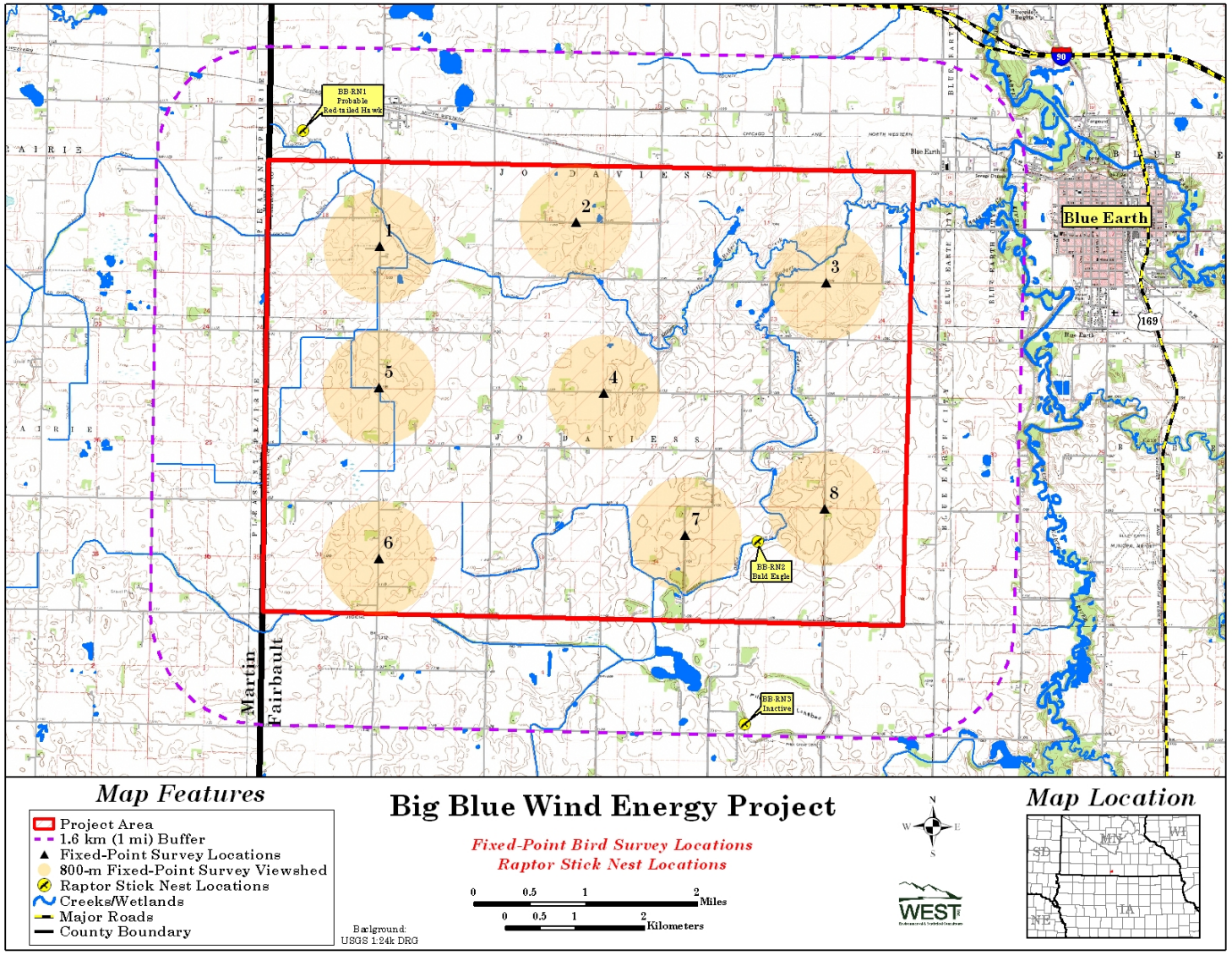

Figure 8. Raptor Nests Located during Spring 2011 raptor nest surveys within the Project Area and a 1-mile buffer.

Table 2. All publicly-available bird, raptor, and bat fatality rates at wind energy facilities in the Midwest.

Project	Bird fatality/ MW/study period	Raptor fatality/ MW/study period	Bat fatality/ MW/study period	Habitat	Reference
Buffalo Ridge, MN (Phase II; 1996)	2.19	n/a	n/a	agriculture	Johnson et al. 2000a
Buffalo Ridge, MN (Phase II; 2001)	n/a	n/a	4.35	agriculture	Johnson et al. 2003
Buffalo Ridge, MN (Phase III; 2001)	n/a	n/a	3.71	agriculture	Johnson et al. 2003
Buffalo Ridge I, SD (2010)	5.06	0.2	0.16	agriculture /grassland	Derby et al 2010b
Cedar Ridge, WI (2009)	6.55	n/a	30.61	agriculture	BHE Environmental 2010
Blue Sky Green Field, WI	7.17	0	24.57	agriculture	Gruver et al. 2009
Crescent Ridge, IL	0.87	n/a	3.27	agriculture	Kerlinger et al. 2007
Crystal Lake II, IA	n/a	n/a	7.42	agriculture	Derby et al. 2010a
Elm Creek, MN	1.55	0	1.49	agriculture	Derby et al 2010c
Grand Ridge, IL	0.48	0	2.1	agriculture	Derby et al 2010g
Kewaunee County, WI	1.95	n/a	6.45	agriculture	Howe et al. 2002
Ripley, Ont (2008)	3.09	n/a	4.67	agriculture	Jacques Whitford 2009.
Moraine II, MN	5.59	0.37	2.42	agriculture /grassland	Derby et al 2010d
NPPD Ainsworth, NE	1.63	0.06	1.16	agriculture /grassland	Derby et al. 2007
Top of Iowa, IA 2004	0.84	n/a	10.27	agriculture	Jain 2005
Wessington Springs, SD	8.25	n/a	1.48	grassland	Derby et al 2010f
Winnebago, IA	3.88	0.27	4.54	agriculture /grassland	Derby et al 2010e

2.3.1 Eagle Nest Observations

Based upon the USFWS visit at the site on May 3, 2010, it was agreed that intensive eagle nest observations would be conducted two days per week, 8 hours per day, beginning after hatching when adults were actively foraging. Once a standard flight path for the adults was identified, observations were modified to one day per week to continue documenting the flight and foraging routine. Surveys began the week of May 16 and continued to mid-August 2011 when the chicks fledged. Observations were primarily made from the county road west of the nest using binoculars and spotting scope. Data were recorded on a data sheet to document habitat,

activity, flight heights, times, etc. Flight paths were recorded on an aerial photograph. Flight path and use information will be summarized in a final report documenting use areas, flight heights, activities, and habitats used. This information will be used to determine if eagle flight paths or nesting activities change after construction.

Adults most commonly flew east, northeast, and southeast for foraging forays, returning to the nest from various directions. On one occasion an adult was observed capturing a snake along the canal near the nest and on several occasions adults were observed returning to the nest with food items. Two chicks were hatched in the nest and successfully fledge, with the first flight of the chicks observed on July 21.

While the eagle nest is within the Project area that was defined for avian use surveys, it is more than 2 miles from the nearest turbine. Eagles were not regularly observed moving in the direction of the Project area; this is corroborated by the low number of eagle observations in the Project area during summer avian use surveys (Figure 8). While a definitive food source was not located, eagles appeared to forage more to the north, east, and south of the nest, potentially in and around the Waterfowl Production Area to the south or the Blue Earth River to the east.

While possible impact to adult bald eagles during nesting cannot be ruled out, potential for impact is lower than if adults were routinely foraging within the Project or had higher use throughout the year.

2.4 Acoustic Bat Surveys

Two Anabat units were placed in the Project in May 2011 and will be retrieved in mid-October 2011. One unit is placed at an existing met tower; the other was placed along a channelized creek that may have higher bat use. To date analysis and reporting has not been completed. When the data are analyzed, the total number of bat passes, will be used as an index to bat use of the Project area. To predict potential for bat mortality (e.g., low, moderate, high), the mean number of bat passes per detector-night will be compared to existing data at other wind plants where both bat activity and mortality have been measured. An estimate of bat passes, species composition, and a comparison to other studies will be included in the monitoring report prepared once data collection is complete.

Based on the percentage of agriculture in the Project and its proximity to other existing wind facilities with post-construction monitoring results, it is expected that direct impact to bats in the Project will be similar to those at other projects in southern Minnesota and regionally in the Midwest.

2.5 Summary of Potential Adverse Impacts

The Project area is dominated by agriculture and all turbines have been sited in cultivated fields. The Project siting and placement of turbines has been recommended by the USFWS and others as one of the major methods to minimize potential impacts to wildlife.

Bird species diversity is typical of an intensive agricultural landscape with small patches of grassland, woodlands, and wetlands. Direct impact to migratory birds is anticipated to be similar to other projects in southern Minnesota and elsewhere in the Midwest. Displacement to nesting migratory birds is expected to be minimal.

Overall raptor use has been low throughout the study; therefore, direct impact to raptors is expected to be low. Bald eagles were observed within the Project and one bald eagle nest was located. All turbines have been sited a minimum of 2 miles from the eagle nest. Low eagle use around the proposed Project turbine locations, the 2-mile buffer between the nest and the nearest turbines, and the lack of foraging evidence within the Project suggest minimal potential direct impact to nesting bald eagles.

Acoustic bat surveys are ongoing. Based on the Project's location in an agricultural area, it is anticipated that direct impact to bats will be low and similar to other projects in southern Minnesota.

3.0 Construction Phase Wildlife Measures

3.1 Construction Timing

Project construction will commence in fall 2011 and be completed in 2012. The Project as planned will be entirely within agricultural lands, minimizing or eliminating most construction related wildlife impacts. Starting construction activities during fall and winter will help minimize potential direct and indirect impact.

3.2 Avoidance of Native Landscapes

The Project will not be constructed within any native landscapes (e.g., native prairie or etlands); therefore no impact to these habitats will be realized.

3.4 Eagle Nest Monitoring

Concern has been raised regarding potential impact of construction activities on the nesting bald eagles. Moving all turbines away from the nest by a minimum of two miles, is meant to minimize impact to the nesting eagles. While the nest is more than 2 miles from the nearest turbine and is immediately adjacent to lands that are tilled or otherwise worked by heavy

machinery several times per year; it is possible that construction traffic may cause the birds distress. Monitoring of the nest during construction will help determine if impact does occur.

If construction occurs between February 15 and August 15, a biological monitor will watch the eagle nest for 2 days per week, 8 hours per day, similar to monitoring in 2011. Monitors will document flight paths, flight heights, flight directions, nest attendance, hatching, and fledging to compare to 2011 pre-construction conditions.

In addition, if the biological monitor documents direct displacement of the eagles by wind facility construction, the site manager will be immediately notified and construction will be halted until the birds return to their normal nesting pattern (as determined from 2011 data and data in 2012 prior to the disturbance). Construction will be halted until normal eagle behavior is observed again or for one day, whichever is longer. The USFWS will be contacted if disturbance is documented and construction is halted. A specific plan of action for shut down and restarting will be determined in consultation with the USFWS that considers the site characteristics and construction levels at the time of disturbances. For example, if five pieces of equipment were being used and the birds were disturbed, fewer machines may be used to lower the noise and other disturbance levels.

3.5 Construction Personnel Training

All construction personnel will be trained to identify potential wildlife conflict situations and proper responses. This training will include sensitivity to nesting birds and other wildlife that may be encountered. For example, if an unknown raptor nest is encountered by construction personnel, they will be instructed to stop work in the area and contact the biological monitor. The biological monitor will assess the situation and work with construction personnel to implement a plan for continuing construction to avoid impact to the nest. If other wildlife resources are encountered, a similar course of action will be followed; construction will cease until the biological monitor can determine an appropriate plan to allow construction to continue without causing an impact.

A trained biologist will conduct the training and work with Exergy to develop the communications plan. The training and communications plan will be developed prior to any construction activities.

4.0 Operations Phase Wildlife Measures

Once the Project is constructed, monitoring will occur to determine direct impact of the facility on birds and bats. Monitoring will be designed to determine if actual fatality rates areas predicted.

4.1 Post-Construction Fatality Monitoring for Birds and Bats

Post-construction fatality monitoring for avian and bat species will be conducted to determine impact to species from the operation of the Project. These studies will provide data for

development of an adaptive management strategy. Impact to avian and bat species is anticipated to be similar to other Midwestern wind farms (see the *NWCC Fact Sheet, Wind Turbine Interactions with Birds, Bats, and their Habitats,* Spring 2010). The overall purpose of the monitoring will be to determine if the avian or bat fatality rates are lower, similar to, or higher than other regional and national studies.

Qualified biologists will conduct the post-construction fatality surveys for two years following the commercial operations date. Parameters used for the studies will be consistent with avian and bat mortality monitoring studies completed at other wind farms. Study results will be compiled into quarterly reports by biologists conducting the surveys and will be supplied to the wind farm owners, operators, USFWS, MNDNR, and MNPUC. Quarterly summary reports will also be provided to the MNPUC per permit requirements.

4.1.1 Monitoring Protocols

All 18 turbines will be monitored. Carcass searches will be conducted throughout the year, as allowed by weather conditions. Searches will be conducted on a weekly basis during spring, summer, and fall and once per month during the winter. An area extending out a minimum of 100 m from the turbine will be sampled as part of the avian and bat mortality monitoring searches. Exact survey methods will be established prior to implementation of surveys but will follow guidance from other survey efforts from the Midwest. Protocols for fatality monitoring will be provided to the USFWS prior to implementing the monitoring efforts. Any additional fatality monitoring specific to bald eagles beyond the initial bird and bat monitoring will necessitate a change in methods. A monitoring effort specific to bald eagles will result in a decrease in survey timing and transect spacing as eagles are more persistent and larger.

4.1.2 Searcher Efficiency Trials

The objective of searcher efficiency trials is to determine the percentage of carcasses found by searchers. Results of these trials are used to adjust annual fatality rate estimates for detection bias. These trials will be conducted throughout the year. A minimum of 75 carcasses will be used for each year of trials. Carcasses will be randomly placed on turbine plots. Placement of carcasses will be recorded with a handheld GPS unit and will be discretely marked (e.g., with thread tied around one leg) to ensure that the carcass can be identified as part of the efficiency trial. Carcasses will include both large and small birds to best represent species that may be encountered in the field.

4.1.3 Carcass Removal Trials

The objective of carcass removal trails is to estimate the average length of time a carcass remains in the study area and is available for detection; results of these trials will be used to adjust estimates of annual fatality rates for removal bias. Removal trials will occur throughout the year and a minimum of 75 bird and bat carcasses will be used during each monitoring year. Carcasses will be placed in random positions under turbines and checked on a daily basis for

the first four days after placement then on day 7, 10, 14, 21, 30, and 40. At the end of each trial all remains will be removed.

4.1.4 Reporting

Complete reporting of avian and bat fatality monitoring and estimated fatality rates will occur at the end of each monitoring year. The reports will include turbine specific information on found causalities along with an estimated fatality rate for birds and bats. Fatality estimates will be calculated for bats, all birds, small birds, large birds, and raptors. Seasonal estimates for both birds and bats will also be reported. Estimated fatality rates will be calculated using the total number of carcasses found along with data from searcher efficiency and carcass removal trials. Per the MNPUC permit, quarterly reports on the actual number of carcasses found will be submitted on the 15th of January, April, July, and October. Operations personnel will submit these reports for the life of the permit.

In addition to two annual fatality reports and the quarterly reports for the life of permit, the MNPUC, USFWS, and DNR will be notified within twenty-four (24) hours of the discovery of any of the following:

(a) five or more dead or injured non-listed avian or bat species within a reporting period; or

(b) one or more dead or injured state threatened, endangered, or species of special concern; or

(c) one or more dead or injured federally listed species; or

(d) one or more dead or injured bald or golden eagles.

4.2 Post-Construction Bird and Bat Use Monitoring

Avian use and acoustic bat surveys were conducted at the Project area during the pre-construction period. The survey efforts implemented to date have followed the same general protocol used at many other wind energy facilities in the Midwest and around the country, see Section 2.0 for a general description of the survey efforts. Surveys constructed pre-construction help in estimate potential impacts. To follow-up on these estimates, post-construction use surveys will occur for a minimum of one year after the project is fully construction and restoration efforts have been completed. Surveys will include avian use surveys, bat acoustic surveys, and raptor nest surveys in the same fashion as those surveys conducted in 2010-2011. Results will help determine if the project is causing displacement of birds or bats. Protocols for each survey effort will be provided to the USFWS prior to post-construction use monitoring efforts.

4.3 Post-Construction Eagle Nest and Use Monitoring

Eagle nest and use monitoring will occur for two years post construction utilizing third party contractor biologists. For the first two years, monitoring efforts will continue as described in Section 2.2 and 2.3. In general, nest monitoring will occur throughout the Project and one mile buffer. Any eagle nest located will be monitored a minimum of 2 days per week, 8 hours per day, until a pattern is established for the adult flight and feeding schedule. Surveys will continue from the time an occupied nest is discovered until the chicks fledge. Data recorded will be similar as data recorded in 2011 and will include flight paths, flight heights, times of observations, habitats used, number of chicks, etc. These data will track post-construction eagle use and help determine if they are using areas within the Project for foraging or other activities. If bald eagle use patterns significantly change so that they are utilizing areas within the wind farm itself, appropriate actions will be taken as outlined in Section 4.5.

After the two years of nest surveys and monitoring, operations personnel will continue to survey for bald eagle nests for the life of the permit. If a new bald eagle nest is located, appropriate monitoring and other actions will be implemented per the discussion in Section 4.5.

4.4 Operations Personnel Training

Similar to construction personnel, all operations personnel will be trained to identify potential wildlife conflicts and the proper response. This training will include sensitivity to birds and terrestrial wildlife. For operations, Exergy will develop an incidental reporting process by which operations personnel document bird or bat casualties during routine maintenance work and at other times that they are within the Project. Incidentally found wildlife will be reported quarterly to the MNPUC on the 15th of January, April, July, and October for the life of the permit.

In addition to the quarterly reports, for the life of the permit, the MNPUC, USFWS, and DNR will be notified within twenty-four (24) hours of the discovery of any of the following:

(a) five or more dead or injured non-listed avian or bat species within a reporting period; or

(b) one or more dead or injured state threatened, endangered, or species of special concern; or

(c) one or more dead or injured federally listed species; or

(d) one or more dead or injured bald or golden eagle.

In addition to incidental fatality reporting, operations personnel will be trained to identify bald eagles and to be sensitive to relative use rates of bald eagles and to look for eagle casualties during driving between turbines and conducting turbine maintenance. This information will be used for the life of the permit to continually maintain a relative sense of bald eagle use in the Project area so that modifications can be implemented as necessary (see Section 4.5)

4.5 Adaptive Management - Identification and Minimization of Impacts

Based on Project siting (tilled agriculture landscape), response to pre-construction monitoring actions (turbines sited greater than two miles from bald eagle nest), and results to date of overall biological monitoring (e.g., low raptor use rates), the anticipated impact from the Project on birds and bats is expected to be low, consistent with most other projects in the region. As such, the Project is avoiding and minimizing impacts to birds and bats in general through siting. To confirm predicted impacts, Exergy will implement post-construction use and fatality monitoring for two years after the Project becomes operational utilizing trained biologists and for the life of the permit utilizing trained operations personnel.

This section outlines what the responses may be if post-construction efforts determine that impact to wildlife is greater than anticipated. The main focus for adaptive management during operations will be for bald eagles.

During operations, biologists, for two years, and operations personnel, for the life of permit, will survey for new bald eagle nests. If a new nest is located a biologist will be contacted to monitor the nest for two days per week, 8 hours per day, until an established foraging area is identified or until it is determined that the adults are not using the Project area extensively. This monitoring is similar to that done in 2011 when the known nest was located.

If, during operations, the biologist or operations personnel document increased bald eagle use from the current nesting birds or from new nesting birds within the Project, the following actions will be implemented:

1) Immediately contact the USFWS's Twin Cities Field Office of the increased use and plans to implement monitoring activities.
2) Document use locations of the bald eagles. Are the eagles flying through the area, are the eagle foraging within the Project, are the eagles roosting within the Project, etc.?
3) If bald eagles are found to be foraging within the Project, the source of the prey base will be located and removed if possible. This could include working with local farmers to cover or remove dead livestock, development of a road kill management plan to remove road kill quickly, removal of fish if trapped in low level lakes/ponds, or other such actions.
4) Use monitoring will continue to document that the bald eagles discontinue using the Project area.

The above is an example of how biological monitoring or operations monitoring will document use and what the responses to that information will be. There may be other scenarios, finding a roost location, for example, that dictate a need for individual turbines to be monitored more closely for use and fatalities. The intent of monitoring is to document changes in use (e.g., higher use) in a timely manner such that management changes (e.g., removal of prey sources) or operations changes (e.g., curtailment) can be implemented and potential impact to bald eagles and other wildlife continues to be minimized.

The USFWS has indicated that Exergy may apply for an eagle take permit at any time during operations, as long as an eagle or ESA listed species has not been taken. Exergy will consider application of an eagle take permit during project operations if changes in use or nesting dictate that a permit is required. This effort will be closely coordinated with the USFWS prior to and during application of any permit.

While this adaptive management section focuses primarily on bald eagles, the same general concepts will apply if there is significantly higher than expected bird or bat fatalities or if current or future listed species are observed in the project area. This includes identification of the issue or problem, notification to the USFWS, development of a specific plan or course of action dictated by the circumstances, implementation of the actions, and monitoring to confirm that actions are sufficiently avoiding or minimizing the potential or realized impacts.

5.0 References

Leuders, J. Schneider, L. Backus, P. Becker, and N. Flagg. 2000. Avian Monitoring and Risk Assessment at Tehachapi Pass and San Gorgonio Pass Wind Resource Areas, California: Phase 1 Preliminary Results. *In*: Proceedings of the National AvianWind Power Planning Meeting III (PNAWPPM-III), May 1998, San Diego, California. National Wind Coordinating Collaborative (NWCC)/RESOLVE, Washington, D.C. Pp 31-46.

Bald and Golden Eagle Protection Act (BGEPA). 1940. 16 United States Code (USC) § 668-668d. June 8, 1940.

BHE Environmental, Inc. (BHE). 2010. Post-Construction Bird and Bat Mortality Study: Cedar Ridge Wind Farm, Fond Du Lac County, Wisconsin. Interim Report prepared for Wisconsin Power and Light, Madison, Wisconsin. Prepared by BHE Environmental, Inc. Cincinnati, Ohio. February 2010.

Bureau of Land Management (BLM). 2006. Final Environmental Impact Statement for the Proposed Cotterel Wind Power Project and Proposed Resource Management Plan Amendment. FES 06-07. Serial No. IDI-33676. Prepared for the US Department of the Interior (USDOI), BLM, Twin Falls District, Burley Field Office, Cassia County, Idaho, on behalf of Windland, Inc., Boise, Idaho, and Shell WindEnergy Inc., Houston, Texas. March 2006.

Chatfield, A., W.P. Erickson, and K. Bay. 2010. Baseline Avian Studies at the Sun Creek Wind Resource Area Kern County, California. Final Report: May 2009 - May 2010. Prepared for CH2M HILL, Oakland, California. Prepared by Western EcoSystems Technology, Inc., Cheyenne, Wyoming.

Endangered Species Act (ESA). 1973. 16 United States Code (USC) § 1531-1544, Public Law (PL) 93-205, December 28, 1973, as amended, PL 100-478 [16 USC 1531 *et seq.*]; 50 Code of Federal Regulations (CFR) 402.

Derby, C., K. Bay, and J. Ritzert. 2009. Bird Use Monitoring, Grand Ridge Wind Resource Area, La Salle County, Illinois. Year One Final Report, March 2008 - February 2009. Prepared for Grand Ridge Energy LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 29, 2009.

Derby, C., K. Chodachek, and K. Bay. 2010a. Post-Construction Bat and Bird Fatality Study Crystal Lake II Wind Energy Center, Hancock and Winnebago Counties, Iowa. Final Report: April 2009-October 2009. Prepared for NextEra Energy Resources, Juno Beach, Florida. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. June 2, 2010.

Derby, C., K. Chodachek, K. Bay, and A. Merrill. 2010b. Post-Construction Fatality Survey for the Buffalo Ridge I Wind Project. May 2009 - May 2010. Prepared for Iberdrola Renewables, Inc., Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota.

Derby, C., K. Chodachek, K. Bay, and A. Merrill. 2010c. Post-Construction Fatality Surveys for the Elm Creek Wind Project: March 2009- February 2010. Prepared for Iberdrola Renewables, Inc. (IRI), Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota.

Derby, C., K. Chodachek, K. Bay, and A. Merrill. 2010d. Post-Construction Fatality Surveys for the Moraine II Wind Project: March - December 2009. Prepared for Iberdrola Renewables, Inc. (IRI), Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota.

Derby, C., K. Chodachek, K. Bay, and A. Merrill. 2010e. Post-Construction Fatality Surveys for the Winnebago Wind Project: March 2009- February 2010. Prepared for Iberdrola Renewables, Inc. (IRI), Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota.

Derby, C., A. Dahl, W. Erickson, K. Bay, and J. Hoban. 2007. Post-Construction Monitoring Report for Avian and Bat Mortality at the NPPD Ainsworth Wind Farm. Unpublished report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, for the Nebraska Public Power District.

Derby, C., A. Dahl, A. Merrill, and K. Bay. 2010f. 2009 Post-Construction Monitoring Results for the Wessington Springs Wind-Energy Facility, South Dakota. Final Report. Prepared for Wessington Wind Energy Center, LLC, Juno Beach, Florida. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. August 19, 2010.

Derby, C., J. Ritzert, and K. Bay. 2010g. Bird and Bat Fatality Study, Grand Ridge Wind Resource Area, Lasalle County, Illinois. January 2009 - January 2010. Prepared for Grand Ridge Energy LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. July 13, 2010. Revised January 2011.

Erickson, W.P., J. Jeffrey, D.P. Young, Jr., K. Bay, R. Good, K. Sernka, and K. Kronner. 2003a. Wildlife Baseline Study for the Kittitas Valley Wind Project: Summary of Results from 2002 Wildlife Surveys. Final Report February 2002– November 2002. Prepared for Zilkha Renewable Energy, Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. January 2003.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2003b. Stateline Wind Project Wildlife Monitoring Annual Report, Results for the Period July 2001 - December 2002. Technical report submitted to FPL Energy, the Oregon Office of Energy, and the Stateline Technical Advisory Committee. Western EcoSystems Technology, Inc., Cheyenne, Wyoming. May 2003.

Erickson, W.P., G.D. Johnson, K. Bay, and K. Kronner. 2002a. Ecological Baseline Study for the Zintel Canyon Wind Project. Final Report April 2001 – June 2002. Technical report prepared for Energy Northwest. Prepared for Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. June 2002.

Erickson, W.P., G.D. Johnson, D.P. Young, Jr., D. Strickland, R. Good, M. Bourassa, K. Bay, and K. Sernka. 2002b. Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments. Technical report prepared for Bonneville Power Administration, Portland, Oregon by WEST, Inc., Cheyenne, Wyoming. December 2002. http://www.bpa.gov/Power/pgc/wind/Avian_and_Bat_Study_12-2002.pdf

Erickson, W.P., K. Kronner, and R. Gritski. 2003c. Nine Canyon Wind Power Project Avian and Bat Monitoring Report. September 2002 – August 2003. Prepared for the Nine Canyon Technical Advisory Committee and Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants (NWC), Pendleton, Oregon. October 2003. http://www.west-inc.com/reports/nine_canyon_monitoring_final.pdf

Erickson, W.P., E. Lack, M. Bourassa, K. Sernka, and K. Kronner. 2001. Wildlife Baseline Study for the Nine Canyon Wind Project, Final Report May 2000-October 2001 Technical report prepared for Energy Northwest, Richland, Washington.

Erickson, W.P., D.P. Young, G. Johnson, J. Jeffrey, K. Bay, R. Good, and H. Sawyer. 2003d. Wildlife Baseline Study for the Wild Horse Wind Project. Summary of Results from 2002-2003 Wildlife Surveys May 10, 2002- May 22, 2003. Draft report prepared for Zilkha Renewable Energy, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. November 2003.

Good, R.E., M. Ritzert, and K. Bay. 2010. Wildlife Baseline Studies for the Timber Road Phase II Wind Resource Area, Paulding County, Ohio. Final Report: September 2, 2008 - August 19, 2009. Prepared for Horizon Wind Energy, Houston, Texas. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. April 28, 2010.

Gruver, J., M. Sonnenburg, K. Bay, and W. Erickson. 2009. Post-Construction Bat and Bird Fatality Study at the Blue Sky Green Field Wind Energy Center, Fond Du Lac County, Wisconsin July 21 - October 31, 2008 and March 15 - June 4, 2009. Unpublished report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. December 17, 2009.

Howe, R.W., W. Evans, and A.T. Wolf. 2002. Effects of Wind Turbines on Birds and Bats in Northeastern Wisconsin. Prepared by University of Wisconsin-Green Bay, for Wisconsin Public Service Corporation and Madison Gas and Electric Company, Madison, Wisconsin. November 21, 2002. 104 pp.

Jacques Whitford Stantec Limited (Jacques Whitford). 2009. Ripley Wind Power Project Postconstruction Monitoring Report. Project No. 1037529.01. Report to Suncor Energy Products Inc., Calgary, Alberta, and Acciona Energy Products Inc., Calgary, Alberta. Prepared for the Ripley Wind Power Project Post-Construction Monitoring Program. Prepared by Jacques Whitford, Markham, Ontario. April 30, 2009. www.jacqueswhitford.com

Jain, A. 2005. Bird and Bat Behavior and Mortality at a Northern Iowa Windfarm. M.S. Thesis. Iowa State University, Ames, Iowa.

Jeffrey, J.D., W.P. Erickson, K.J. Bay, V.K. Poulton, W.L. Tidhar, and J.E. Baker. 2008. Wildlife Baseline Studies for the Golden Hills Wind Resource Area, Sherman County, Oregon. Final Report May 2006 – October 2007. Prepared for BP Alternative Energy North America Inc., Houston, Texas, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D., J. Baker, and K. Bay. 2007a. Baseline Ecological Studies for the Lower Linden Ranch Wind Energy Project, Klickitat County, Washington. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, for Northwest Wind Partners, LLC, Goldendale, Washington. July 18, 2007.

Johnson, G.D., K. Bay, and J. Eddy. 2009a. Wildlife Baseline Studies for the Dunlap Ranch Wind Resource Area, Carbon and Albany Counties, Wyoming. June 4, 2008 - May 27, 2009. Prepared for CH2MHILL, Englewood, Colorado. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D., K. Bay, and J. Eddy. 2009b. Wildlife Baseline Studies for the High Plains Wind Resource Area, Carbon and Albany Counties, Wyoming. Prepared for CH2MHILL. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D., K. Bay, J. Eddy, and T. Rintz. 2008a. Wildlife Baseline Studies for the Glenrock Wind Resource Area, Converse County, Wyoming. Prepared for CH2MHILL. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D., J. Eddy, and K. Bay. 2006a. Baseline Avian Use of the Sand Hills Wind Energy Project, Albany County, Wyoming. Summer Breeding Season and Fall Migration 2006. Draft interim report prepared for CH2MHILL, Englewood, Colorado, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. November 6, 2006.

Johnson, G.D., J. Eddy, K. Bay, and A. Chatfield. 2008b. Wildlife Baseline Studies for the Seven Mile Hill Wind Resource Area, Carbon County, Wyoming: April 30 - November 15, 2007. Prepared for CH2MHILL, Englewood, Colorado. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D. and W.P. Erickson. 2004. Analysis of Potential Wildlife/Wind Plant Interactions, Bighorn Site, Klickitat County, Washington. Prepared for CH2MHILL, Portland, Oregon by WEST, Inc., Cheyenne, Wyoming. August 2004.

Johnson, G.D., W.P. Erickson, K. Bay, and K. Kronner. 2002. Baseline Ecological Studies for the Klondike Wind Project, Sherman County, Oregon. Final report prepared for Northwestern Wind Power, Goldendale, Washington, by Western EcoSystems Technology, Inc. (WEST) Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. May 29, 2002.

Johnson, G.D., W.P. Erickson, and J.D. Jeffrey. 2006b. Analysis of Potential Wildlife Impacts from the Windy Point Wind Energy Project, Klickitat County, Washington. Unpublished report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. February 3, 2006.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, and D.A. Shepherd. 2000a. Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-Year Study. Final report prepared for Northern States Power Company, Minneapolis, Minnesota, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. September 22, 2000. 212 pp. http://www.west-inc.com

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2003. Mortality of Bats at a Large-Scale Wind Power Development at Buffalo Ridge, Minnesota. The American Midland Naturalist 150: 332-342.

Johnson, G.D., J. Jeffrey, J. Baker, and K. Bay. 2007b. Baseline Avian Studies for the Windy Flats Wind Energy Project, Klickitat County, Washington. Prepared for Windy Point Partners, LLC., by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. May 29, 2007.

Johnson, G.D., J. Jeffrey, V. Poulton, and K. Bay. 2006c. Baseline Ecological Studies for the DNR Wind Energy Project, Klickitat County, Washington. Prepared for Windtricity Ventures, LLC, Goldendale, Washington, by WEST, Inc., Cheyenne, Wyoming. September 5, 2006.

Johnson, G.D., J. Jeffrey, V. Poulton, and K. Bay. 2006d. Baseline Ecological Studies for the Hoctor Ridge Wind Energy Project, Klickitat County, Washington. Prepared for Windtricity Ventures, LLC., Goldendale, Washington by WEST, Inc., Cheyenne, Wyoming. September 5, 2006.

Johnson, G.D., J. Jeffrey, V. Poulton, and K. Bay. 2006e. Baseline Ecological Studies for the Imrie Ranch South Wind Energy Project, Klickitat County, Washington. Prepared for Windtricity Ventures, LLC, by WEST, Inc., Cheyenne, Wyoming. September 5, 2006.

Johnson, G.D., D.P. Young, W.P. Erickson, C.E. Derby, M.D. Strickland, and R.E. Good. 2000b. Wildlife Monitoring Studies, Seawest Windpower Plant, Carbon County, Wyoming, 1995-1999. Final report prepared for SeaWest Energy Corporation, San Diego, California, and the Bureau of Land Management, Rawlins, Wyoming, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. August 9, 2000. http://www.west-inc.com/reports/fcr_final_baseline.pdf

Kerlinger, P., L. Culp, and R. Curry. 2005. Post-Construction Avian Monitoring Study for the High Winds Wind Power Project, Solano County, California. Year One Report. Prepared for High Winds, LLC and FPL Energy.

Kerlinger, P., R. Curry, A. Hasch, and J. Guarnaccia. 2007. Migratory Bird and Bat Monitoring Study at the Crescent Ridge Wind Power Project, Bureau County, Illinois: September 2005 - August 2006. Final draft prepared for Orrick Herrington and Sutcliffe, LLP. May 2007.

Kronner, K., B. Gritski, J. Baker, V. Marr, G.D. Johnson, and K.Bay. 2005. Wildlife Baseline Study for the Leaning Juniper Wind Power Project, Gilliam County, Oregon. Prepared for PPM Energy, Portland, Oregon and CH2MHILL, Portland, Oregon by NWC, Pendleton, Oregon, and WEST, Inc., Cheyenne, Wyoming. November 3, 2005.

Migratory Bird Treaty Act (MBTA). 1918. 16 United States Code (USC) § 703-712. July 13, 1918.

Minnesota Statutes (MN ST). 1981. Protection of Threatened and Endangered Species. MN ST § 84.0895, 84.944, 97A.245, 97A.501.

National Wind Coordinating Collaborative (NWCC). 2010. Wind Turbine Interactions with Birds, Bats, and Their Habitats: A Summary of Research Results and Priority Questions. NWCC c/o RESOLVE, Washington, D.C. Available online at: http://www.nationalwind.org//publications/bbfactsheet.aspx

Northwest Wildlife Consultants, Inc. (NWC) and Western Ecosystems Technology, Inc. (WEST). 2004. Ecological Baseline Studies for the Roosevelt Wind Project, Klickitat County, Washington. Final Report. Prepared by NWC, Pendleton, Oregon, and WEST, Inc., Cheyenne, Wyoming. September 2004

Northwest Wildlife Consultants, Inc. (NWC) and Western Ecosystems Technology, Inc. (WEST). 2005. Ecological Baseline Studies and Wildlife Impact Assessment for the White Creek Wind Power Project, Klickitat County, Washington. Prepared for Last Mile Electric Cooperative, Goldendale, Washington, by Northwest Wildlife Consultants, Inc., Goldendale, Washington, and Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. January 12, 2005.

Orloff, S. and A. Flannery. 1992. Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991. Final Report P700-92-001 to Alameda, Contra Costa, and Solano Counties, and the California Energy Commission, Sacramento, California, by Biosystems Analysis, Inc., Tiburon, California. March 1992.

Sibley, D.A. 2000. The Sibley Guide to Birds. Alfred A. Knopf, Inc., New York.

URS Corporation, Western EcoSystems Technology, Inc. (WEST), and Northwest Wildlife Consultants, Inc. (NWC). 2001. Avian Baseline Study for the Stateline Project. Prepared for FPL Energy Vansycle, LLC, Juno Beach, Florida.

US Environmental Protection Agency (USEPA). 2006. Ecoregions of Minnesota USEPA, Corvallis, Oregon.

US Fish and Wildlife Service (USFWS). n.d. Federal Endangered Species Act. Available online at: http://www.fws.gov/Endangered/pdfs/esaall.pdf

US Fish and Wildlife Service (USFWS). n.d. "Bald Eagle Management Guidelines and Conservation Measures: Bald and Golden Eagle Protection Act." Available online at: http://www.fws.gov/midwest/Eagle/guidelines/bgepa.html

US Fish and Wildlife Service (USFWS). 2007. National Bald Eagle Management Guidelines. May 2007. Available online at: http://www.fws.gov/pacific/eagle /NationalBaldEagleManagement Guidelines.pdf

US Fish and Wildlife Service (USFWS). 2009. United States Fish and Wildlife Service, Department of the Interior. 50 CFR 13 and 22. Eagle Permits; Take Necessary to Protect Interests in Particular Localities. 74 FR 46836. September 11, 2009.

US Fish and Wildlife Service (USFWS). 2011. Draft Eagle Conservation Plan Guidance. January 2011. Available online at: http://www.fws.gov/windenergy/docs/ECP_draft_guidance_ 2_10_final_clean_omb.pdf

Western Ecosystems Technology, Inc. (WEST). 2005a. Ecological Baseline Study at the Elkhorn Wind Power Project. Exhibit A. Final report prepared for Zilkha Renewable Energy, LLC., Portland, Oregon, by WEST, Cheyenne, Wyoming. June 2005.

Western EcoSystems Technology, Inc. (WEST). 2005b. Ecological Baseline Study for the Proposed Reardan Wind Project, Lincoln County, Washington. Draft Final Report. Prepared for Energy Northwest, Richland, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. June 2005.

Western EcoSystems Technology, Inc. (WEST). 2005c. Wildlife and Habitat Baseline Study for the Proposed Biglow Canyon Wind Power Project, Sherman County, Oregon. March 2004 - August 2005. Prepared for Orion Energy LLC., Oakland, California. WEST, Cheyenne, Wyoming. October, 2005.

Western EcoSystems Technology, Inc. (WEST). 2006. Diablo Winds Wildlife Monitoring Progress Report, March 2005 - February 2006. Technical report submitted to FPL Energy and Alameda County California. WEST. Cheyenne, Wyoming.

Western EcoSystems Technology, Inc. (WEST). 2007. Wildlife and Habitat Baseline Study for the Vantage Wind Power Project, Kittitas County, Washington. Draft report prepared for Invenergy by Western EcoSystems Technology, Inc. (WEST), Cheyenne Wyoming and Walla Walla, Washington. June 2007.

Western EcoSystems Technology, Inc. (WEST). 2009. Wildlife Baseline Studies for the Antelope Ridge Wind Resource Area, Union County, Oregon. August 28, 2008 - August 12, 2009. Draft final report prepared for Horizon Wind Energy, Houston, Texas. Prepared by WEST, Cheyenne, Wyoming.

Western EcoSystems Technology, Inc. (WEST) and Colorado Plateau Research Station (CPRS). 2006. Avian Studies for the Proposed Sunshine Wind Park, Coconino County, Arizona. Prepared for Sunshine Arizona Wind Energy, LLC., Flagstaff, Arizona, by WEST, Cheyenne, Wyoming, and the CPRS, Northern Arizona University, Flagstaff, Arizona. May 2006.

Western EcoSystems Technology, Inc. (WEST) and Northwest Wildlife Consultants, Inc. (NWC). 2003. Analysis of Potential Avian/Wind Plant Interactions in Klickitat County, Washington. Supplement to the Klickitat County Programmatic Environmental Impact Statement. Prepared for the Resource Development Department, Klickitat County, Goldendale, Washington, by WEST, Cheyenne, Wyoming, and NWC, Pendleton, Oregon. May 2003.

Young, D.P. Jr., W.P. Erickson, K. Bay, and R. Good. 2002. Baseline Avian Studies for the Proposed Maiden Wind Farm, Yakima and Benton Counties, Washington. Final Report, April 2001-April 2002. Prepared for Bonneville Power Administration, Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. November 20, 2002.

Young, D.P. Jr., W.P. Erickson, K. Bay, J. Jeffrey, E.G. Lack, R.E. Good, and H.H. Sawyer. 2003a. Baseline Avian Studies for the Proposed Hopkins Ridge Wind Project, Columbia County, Washington. Final Report, March 2002 - March 2003. Prepared for RES North America, LLC., Portland, Oregon, by Western EcoSystems Technology, Inc.(WEST), Cheyenne, Wyoming. April 30, 2003.

Young, D.P. Jr., W.P. Erickson, K. Bay, J. Jeffrey, E.G. Lack, and H.H. Sawyer. 2003b. Baseline Avian Studies for the Proposed Desert Claim Wind Power Project, Kittitas County, Washington. Final Report. Prepared for Desert Claim Wind Power, LLC, Ellensburg, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 2003.

Young, D.P. Jr., W.P. Erickson, J. Jeffrey, K. Bay, R.E. Good, and E.G. Lack. 2003c. Avian and Sensitive Species Baseline Study Plan and Final Report. Eurus Combine Hills Turbine Ranch, Umatilla County, Oregon. Technical report prepared for Eurus Energy America Corporation, San Diego, California and Aeropower Services, Inc., Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. March 10, 2003.

Young, D.P. Jr., G.D. Johnson, V.K. Poulton, and K. Bay. 2007a. Ecological Baseline Studies for the Hatchet Ridge Wind Energy Project, Shasta County, California. Prepared for Hatchet Ridge Wind, LLC, Portland, Oregon by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. August 31, 2007. http://www.co.shasta.ca.us/Departments/Resourcemgmt/drm/Hatchet%20Ridge/DEIR/App_C-1.pdf

Young, D.P. Jr., V.K. Poulton, and K. Bay. 2007b. Ecological Baseline Studies Report. Proposed Dry Lake Wind Project, Navajo County, Arizona. Prepared for PPM Energy, Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 1, 2007.

Appendix A. Winter, Spring, and Summer Interim Report

Wildlife Baseline Studies for the Big Blue Wind Energy Project Faribault County, Minnesota

Interim Report
November 2010 – August 2011

Prepared for:

Pinnacle Engineering, Inc.
11541 95th Ave. North.
Maple Grove, Minnesota 55369

Prepared by:

Clayton Derby, Terri Thorn, and Kimberly Bay

Western EcoSystems Technology, Inc.
4007 State St., Suite 109
Bismarck, North Dakota

September 16, 2011

WEST Inc.
Environmental & Statistical Consultants

NATURAL RESOURCES ◆ SCIENTIFIC SOLUTIONS

EXECUTIVE SUMMARY

Western EcoSystems Technology, Inc. initiated surveys and monitoring of wildlife resources in November 2010 at the Big Blue Wind Energy Project in Faribault County, Minnesota. Seasonal interim reports are designed to provide an early warning of high wildlife use or if sensitive species are observed within the study area. The scope of the winter, spring, and summer 2010/2011 wildlife studies included fixed-point bird use surveys, incidental wildlife observations, and raptor nest surveys; this report presents data from these surveys and observations.

A total of 210 20 minute fixed-point bird use surveys were conducted within the Big Blue Wind Energy Project during 27 visits from November 23, 2010 to August 18, 2011. Fifty-eight fixed-point surveys were conducted in the winter during eight visits, 88 fixed-point surveys were conducted in the spring during 11 visits, and 64 fixed-point surveys were conducted in the summer during eight visits. Sixty-eight unique bird species were observed; a total of 9,118 individual birds within 901 separate groups were recorded.

Passerines and waterfowl were the most abundant bird types observed, accounting for 57.8% and 33.3% of all observations respectively. Red-winged blackbirds and Canada geese were the most abundant species within these birds groups respectively. Diurnal raptors accounted for 0.6% of all observations, with bald eagles and red-tailed hawks being the most commonly observed raptor species (30 and 17 individual observation, respectively). During the time period of this report, mean raptor use at the Big Blue Wind Energy Project was low (0.06-winter, 0.39 spring, and 0.19-summer raptors/plot/20-minute survey) relative to the other wind resource areas with winter or spring data.

The bald eagle (protected by the Bald and Golden Eagle Protection Act and a state species of concern) was recorded within the proposed project area during spring and summer surveys. The summer observations were associated with an active nest within the project boundary. Two other state sensitive species, American white pelican (threatened) and Wilson's phalarope (species of concern) were recorded in small numbers (eight individuals each) during spring surveys.

Eight unique bird species were recorded incidentally at the Big Blue Wind Energy Project. All eight of these species were also observed during fixed-point bird surveys. One mammal (white-tailed deer) and one amphibian (unidentified frog) were also observed incidentally.

Three raptor stick nests were documented as occurring in the Project or within 1.6 kilometers (one mile) of the Project's boundary. The one nest within the project boundary was an active bald eagle nest. One of the two outside of the project's boundary was active and probably that of a red-tailed hawk.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

STUDY PARTICIPANTS

Western EcoSystems Technology

Clayton Derby	Project Manager
Kimberly Bay	Data Analyst and Report Manager
Andy Merrill	Statistician
Terri Thorn	GIS Technician
Terri Thorn	Report Compiler
Carly Welch	Field Technician
Jen Vandermeer	Field Technician

REPORT REFERENCE

Derby, C., T. Thorn, and K Bay. 2011. Wildlife Baseline Studies for the Big Blue Wind Energy Project, Fairbault County, Minnesota. Interim Report November 2010 – August 2011. Prepared for Pinnacle Engineering. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota.

INTRODUCTION

The Big Blue Wind Energy Project (BBWEP) is proposed for development in Faribault County, Minnesota. Pinnacle Engineering contracted Western EcoSystems Technology, Inc. (WEST) to develop and implement a standardized protocol for baseline wildlife studies in the BBWEP to estimate impacts of the proposed wind energy facility on wildlife and to assist with siting turbines to minimize impacts to wildlife resources. The protocols for the baseline studies are similar to those used at other wind energy facilities across the nation, and follow the guidance of the National Wind Coordinating Collaborative (Anderson et al. 1999). The protocols have been developed based on WEST's experience studying wildlife at proposed wind energy facilities throughout the US and were designed to help predict potential impacts to bird species (particularly diurnal raptors).

The purpose of the following interim report is to bring attention to items of biological interest, such as high/low seasonal diurnal raptor use and the presence of sensitive species. This interim report presents results of fixed-point bird use surveys, raptor stick nest surveys, eagle flight paths recorded during fixed-point surveys, and incidental wildlife observations from November 2010 through August 2011. Data includes the number of bird observations by species and type, as well as sensitive species observations, eagle flight paths at fixed-point survey locations, and raptor stick nest locations. The final report will include results for all data collected for these efforts as well as bat acoustic surveys which started in spring 2011.

STUDY AREA

The BBWEP including for this study is about 14,700 acres (ac; 59.5 square kilometers [km^2]; 23.0 square miles [mi^2]) and is located in southern Minnesota, more specifically southwest Faribault County approximately 2.1 kilometers (km; 1.3 miles [mi]) west of Blue Earth (Figure 1). The BBWEP lies within the Level IV Des Moines Lobe Ecoregion (USEPA 2006). Historically, vegetation within this ecoregion was dominated by tall-grass prairie. Today, most of this ecoregion has been converted to agricultural use with row crop production the primary activity. Trees and shrubs can be found around farmsteads, within planted shelter belts, and along creeks and drainages. Extensive wetland drainage has occurred throughout the ecoregion, including within the BBWEP, especially for the smaller temporary and seasonal wetlands.

Landscape of the BBWEP is flat to gently rolling with an elevation range of 320 - 348 meters (m; 1,050 – 1,142 feet [ft]) above sea level. Soils are typical of historical grassland ecosystems (Mollisols soil order) and derived mainly from glacial till. All land within the BBWEP is privately owned except for approximately 102 ac of state land occurring in several parcels in the northeast part of the project. There may also be other conservation program enrollments (e.g., Conservation Reserve Program, USFWS grassland or wetland easements) within the project area.

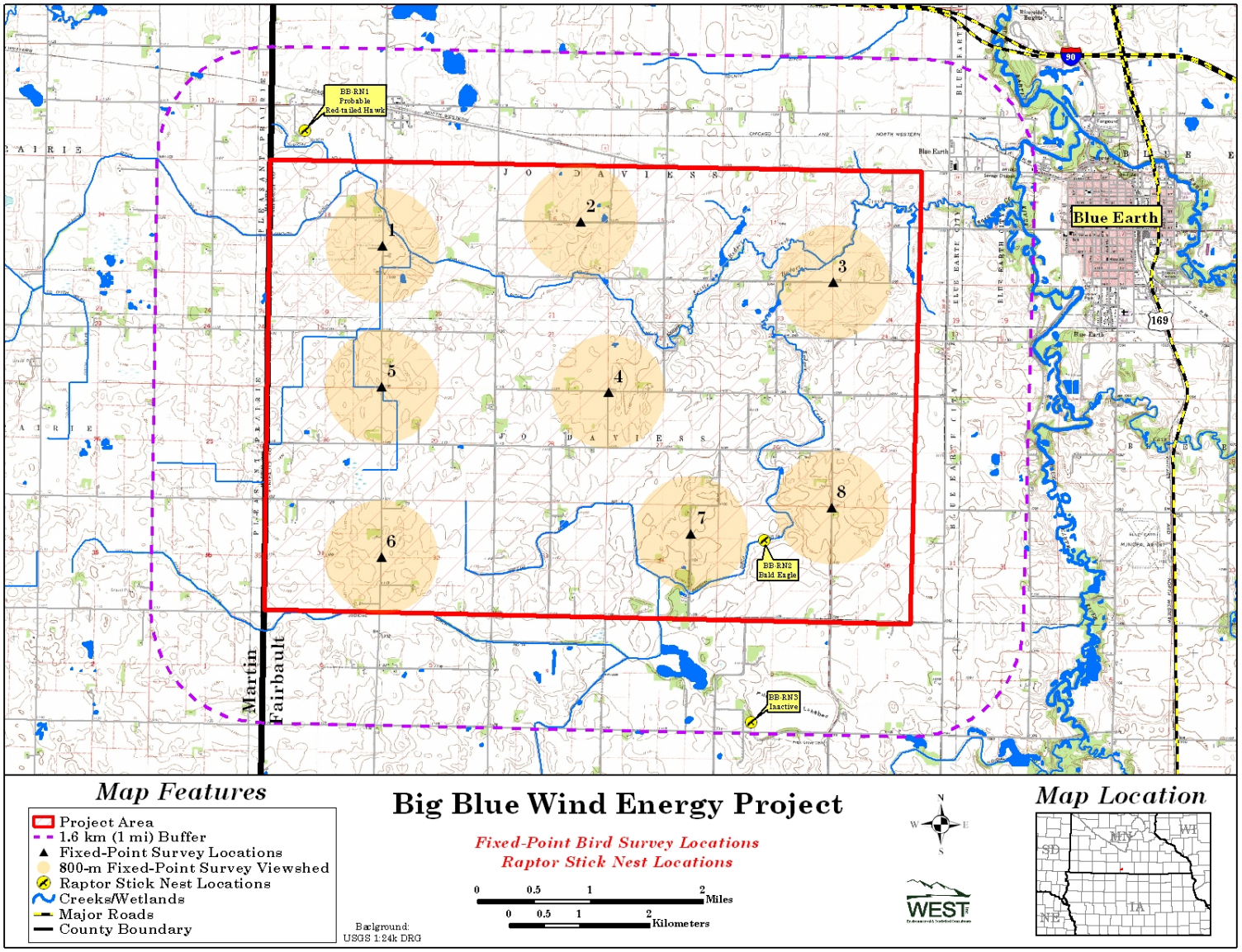

Figure 1. Study area, fixed-point bird survey locations, and raptor stick nest locations for the Big Blue Wind Energy Project.

METHODS

Fixed-Point Bird Use Surveys

The objective of the fixed-point bird use surveys was to estimate the seasonal and spatial use of the study area by birds, particularly diurnal raptors (defined here as kites, accipiters, buteos, harriers, eagles, falcons, or ospreys). Fixed-point surveys (variable circular plots) were conducted using methods described by Reynolds et al. (1980).

Survey Plots

Eight points were selected to survey representative habitats and topography of the BBWEP, while achieving relatively even coverage the study area (Figure 1). Each survey plot was an 800 m (2,625 ft) radius circle centered on the point.

Survey Methods

While the focus of the survey is for large birds, all species of birds observed during each 20 minute (min) fixed-point bird use survey were recorded. Observations of large birds beyond the 800 m (2,625 ft) radius were recorded, but were not included in the statistical analyses; for small birds, observations beyond a 100 m (328 ft) radius were excluded from analysis. Large birds include waterbirds, waterfowl, rails/coots, shorebirds, diurnal raptors, owls, vultures, upland game birds, doves/pigeons, and large corvids (e.g., ravens, magpies, and some crows). Passerines (excluding large corvids), swifts/hummingbirds, woodpeckers, and cuckoos are considered small birds.

The date, start and end time of the survey period, and weather information (e.g., temperature, wind speed, wind direction, and cloud cover) were recorded for each survey. Species or best possible identification, number of individuals, sex and age class (if possible), distance from plot center when first observed, closest distance, altitude above ground, activity (behavior), and habitat(s) were recorded for each observation. Behavior and habitat type were recorded based on the point of first observation. Approximate flight height and distance from plot center at first observation were recorded to the nearest five m (16 ft) interval. For large birds, their flight path was recorded on topographical maps from initial sighting until a general flight direction was determined or they left the survey plot. These flight paths were digitized with geographic information system (GIS) software. Other information recorded included whether or not the observation was auditory only and the 10 min interval of the 20 min survey in which the observation was initially noted.

Observation Schedule

Sampling intensity was designed to document bird use and behavior by habitat and season within the study area. Surveys were conducted approximately every two weeks during the winter (November 23, 2010 to March 15, 2011) and summer (June 1, 2011 to August 18, 2011) and weekly during the spring (March 16, 2011 to April 31, 2011). Surveys were conducted during

daylight hours, and survey periods varied to approximately cover all daylight hours during a season. To the extent practical, each point was surveyed about the same number of times.

Incidental wildlife observations provide records of wildlife seen outside of the standardized surveys. All raptors, unusual or unique birds, sensitive species, mammals, reptiles, and amphibians were recorded in a similar fashion to standardized surveys. The locations of sensitive species were recorded using a hand-held Global Positioning System (GPS) unit and/or distance descriptions from known landmarks.

Raptor Nest Surveys

The objective of the raptor nest surveys was to locate and record raptor nests that may be subject to disturbance and/or displacement effects by wind-energy facility construction and/or operation. Surveys were focused on large, stick nest structures, and did not include searches for cavity nests or nests on the ground. Surveys were completed by driving and walking along public roads and accessible private roads during leaf-off conditions and looking for raptor nest structures within areas of suitable habitat (trees, powerline poles, etc). Potential raptor nests were recorded on aerial photo maps and digitized with GIS software. Other information recorded included nest status, nest height, and nest material.

RESULTS

This interim report presents the results of the fixed-point bird use surveys conducted during winter 2010/2011 and spring/summer 2011 as well as incidental wildlife observations and raptor nest surveys.

Fixed-Point Bird Use Surveys

A total of 210 20-min fixed-point bird use surveys were conducted within BBWEP during 27 visits from November 23, 2010 to August 18, 2011. Fifty-eight fixed-point surveys were conducted in the winter during eight visits, 88 fixed-point surveys were conducted in the spring during 11 visits, and 64 fixed-point surveys were conducted in the summer during eight visits. During one winter visit only two surveys were conducted due to blizzard conditions.

Sixty-eight unique bird species were observed during fixed-point bird use surveys. A total of 9,118 individual birds within 901 separate groups were recorded (Table 1). Passerines and waterfowl were the most abundant bird types observed, accounting for 57.8% and 33.3% of all observations respectively. Red-winged blackbirds (*Agelaius phoeniceus*) were the most abundant (1,722 individuals) passerines species while the Canada goose (*Branta canadensis*) was the most abundant (2,296 individuals) waterfowl species (Table 1). These two species represented only 2.9% of all species observed, yet accounted for 44.1% of the total bird observations. Shorebirds were the third most common bird group with greater yellowlegs (*Tringa melanoleuca*; 169 individuals) and killdeer (*Charadrius vociferous*; 166 individuals) being the most abundant species (Table 1). A total of 55 individual diurnal raptors were recorded, accounting for 0.6% of all observations. Bald eagle (*Haliaeetus leucocephalus*) and

red-tailed hawk (*Buteo jamaicensis*) and were the most commonly observed raptor species (30 and 17 individuals, respectively; Table 1).

The bald eagle is protected under the federal Bald and Golden Eagle Act (BGEPA 1940, MSU 2010) and was recorded within the proposed BBWEP during fixed-point bird use surveys (Table 2). The bald eagle is also a species of concern in Minnesota (MNDNR 2007). Both adult and juvenile bald eagles were observed within the BBWEP but the bulk of these observations were associated with the active bald eagle nest in the southeastern part of the study area (Figure 2). Bald eagles were observed at three other fixed-point survey locations not associated with the active nest and three of the four observations at these points were on March 16, 2011 (Figure 2). Flight paths and perch for these bald eagle observations are shown in Figure 2. Note that nearly all of the observations are included in the one "dot" indicating a perch near the nest location or the nest location itself, both of which are outside of the 800 m analysis area around the point. Two other state sensitive species; the threatened Wilson's phalarope (*Phalaropus tricolor*) and a species of concern, the American white pelican (*Pelecanus erythrorhynchos*) were observed during fixed-point surveys (Table 2).

Eight unique bird species, one mammal species, and one amphibian species were observed incidentally (Table 3). Three individual bald eagles in three separate groups were recorded as incidental observations (Table 3). All eight unique bird species were also observed during fixed-point surveys.

Table 1. Total[a] number of individuals and groups for each bird type and species, by season and overall, during the fixed-point bird use surveys at the Big Blue Wind Energy Project, November 23, 2010 - August 18, 2011.

		Winter		Spring		Summer		Total	
Species/Type	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
Loons/Grebes		**0**	**0**	**2**	**4**	**0**	**0**	**2**	**4**
pied-billed grebe	*Podilymbus podiceps*	0	0	2	4	0	0	2	4
Waterbirds		**0**	**0**	**2**	**10**	**3**	**5**	**5**	**15**
American white pelican	*Pelecanus erythrorhynchos*	0	0	1	8	0	0	1	8
double-crested cormorant	*Phalacrocorax auritus*	0	0	0	0	1	1	1	1
great blue heron	*Ardea herodias*	0	0	1	2	1	3	2	5
great egret	*Ardea alba*	0	0	0	0	1	1	1	1
Waterfowl		**0**	**0**	**66**	**3,029**	**3**	**6**	**69**	**3,035**
American wigeon	*Anas americana*	0	0	1	20	0	0	1	20
blue-winged teal	*Anas discors*	0	0	13	281	0	0	13	281
Canada goose	*Branta canadensis*	0	0	17	2,296	0	0	17	2,296
canvasback	*Aythya valisineria*	0	0	1	25	0	0	1	25
lesser scaup	*Aythya affinis*	0	0	1	30	0	0	1	30
mallard	*Anas platyrhynchos*	0	0	11	56	3	6	14	62
northern shoveler	*Anas clypeata*	0	0	10	170	0	0	10	170
redhead	*Aythya americana*	0	0	1	17	0	0	1	17
ring-necked duck	*Aythya collaris*	0	0	2	92	0	0	2	92
unidentified duck		0	0	5	22	0	0	5	22
wood duck	*Aix sponsa*	0	0	4	20	0	0	4	20
Shorebirds		**0**	**0**	**74**	**468**	**16**	**30**	**90**	**498**
Common snipe	*Gallinago gallinago*	0	0	2	21	0	0	2	21
greater yellowlegs	*Tringa melanoleuca*	0	0	7	169	0	0	7	169
killdeer	*Charadrius vociferus*	0	0	59	136	16	30	75	166
least sandpiper	*Calidris minutilla*	0	0	1	20	0	0	1	20
lesser yellowlegs	*Tringa flavipes*	0	0	1	11	0	0	1	11

Table 1. Total[a] number of individuals and groups for each bird type and species, by season and overall, during the fixed-point bird use surveys at the Big Blue Wind Energy Project, November 23, 2010 - August 18, 2011.

		Winter		Spring		Summer		Total	
Species/Type	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
pectoral sandpiper	*Calidris melanotos*	0	0	1	3	0	0	1	3
semipalmated sandpiper	*Calidris pusilla*	0	0	1	100	0	0	1	100
Wilson's phalarope	*Phalaropus tricolor*	0	0	2	8	0	0	2	8
Gulls/Terns		**0**	**0**	**2**	**9**	**0**	**0**	**2**	**9**
ring-billed gull	*Larus delawarensis*	0	0	2	9	0	0	2	9
Rails/Coots		**0**	**0**	**2**	**11**	**0**	**0**	**2**	**11**
American coot	*Fulica americana*	0	0	2	11	0	0	2	11
Diurnal Raptors		**3**	**4**	**33**	**37**	**9**	**14**	**45**	**55**
Buteos		*2*	*3*	*12*	*13*	*2*	*2*	*16*	*18*
red-tailed hawk	*Buteo jamaicensis*	2	3	11	12	2	2	15	17
rough-legged hawk	*Buteo lagopus*	0	0	1	1	0	0	1	1
Northern Harrier		*0*	*0*	*1*	*1*	*0*	*0*	*1*	*1*
northern harrier	*Circus cyaneus*	0	0	1	1	0	0	1	1
Eagles		*0*	*0*	*16*	*19*	*6*	*11*	*22*	*30*
bald eagle	*Haliaeetus leucocephalus*	0	0	16	19	6	11	22	30
Falcons		*1*	*1*	*4*	*4*	*1*	*1*	*6*	*6*
American kestrel	*Falco sparverius*	0	0	4	4	1	1	5	5
merlin	*Falco columbarius*	1	1	0	0	0	0	1	1
Owls		**0**	**0**	**1**	**2**	**0**	**0**	**1**	**2**
great horned owl	*Bubo virginianus*	0	0	1	2	0	0	1	2
Vultures		**0**	**0**	**2**	**2**	**3**	**3**	**5**	**5**
turkey vulture	*Cathartes aura*	0	0	2	2	3	3	5	5
Upland Game Birds		**0**	**0**	**12**	**12**	**5**	**6**	**17**	**18**
ring-necked pheasant	*Phasianus colchicus*	0	0	12	12	5	6	17	18
Doves/Pigeons		**1**	**4**	**14**	**20**	**23**	**44**	**38**	**68**
mourning dove	*Zenaida macroura*	0	0	12	18	18	28	30	46

Table 1. Total[a] number of individuals and groups for each bird type and species, by season and overall, during the fixed-point bird use surveys at the Big Blue Wind Energy Project, November 23, 2010 - August 18, 2011.

		Winter		Spring		Summer		Total	
Species/Type	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
rock pigeon	*Columba livia*	1	4	2	2	5	16	8	22
Large Corvids		**11**	**16**	**38**	**71**	**14**	**30**	**63**	**117**
American crow	*Corvus brachyrhynchos*	11	16	38	71	14	30	63	117
Passerines		**15**	**449**	**309**	**3,574**	**231**	**1,250**	**555**	**5,273**
American goldfinch	*Carduelis tristis*	1	1	5	16	6	6	12	23
American redstart	*Setophaga ruticilla*	0	0	0	0	1	5	1	5
American robin	*Turdus migratorius*	0	0	42	117	13	23	55	140
Baltimore oriole	*Icterus galbula*	0	0	1	1	1	1	2	2
barn swallow	*Hirundo rustica*	0	0	16	144	59	303	75	447
blue jay	*Cyanocitta cristata*	1	1	10	14	3	4	14	19
Brewer's blackbird	*Euphagus cyanocephalus*	0	0	4	89	0	0	4	89
brown-headed cowbird	*Molothrus ater*	0	0	25	95	14	98	39	193
brown thrasher	*Toxostoma rufum*	0	0	3	3	2	3	5	6
chipping sparrow	*Spizella passerina*	0	0	0	0	1	2	1	2
common grackle	*Quiscalus quiscula*	0	0	41	596	21	247	62	843
dickcissel	*Spiza americana*	0	0	0	0	1	1	1	1
eastern kingbird	*Tyrannus tyrannus*	0	0	3	4	2	2	5	6
European starling	*Sturnus vulgaris*	0	0	7	266	14	88	21	354
field sparrow	*Spizella pusilla*	0	0	0	0	23	49	23	49
horned lark	*Eremophila alpestris*	3	19	31	45	4	5	38	69
house sparrow	*Passer domesticus*	2	3	2	2	0	0	4	5
house wren	*Troglodytes aedon*	0	0	0	0	2	2	2	2
indigo bunting	*Passerina cyanea*	0	0	9	11	5	5	14	16
Lapland longspur	*Calcarius lapponicus*	1	75	0	0	0	0	1	75
northern cardinal	*Cardinalis cardinalis*	0	0	7	9	0	0	7	9
red-winged blackbird	*Agelaius phoeniceus*	0	0	61	1,521	24	201	85	1,722

Table 1. Total[a] number of individuals and groups for each bird type and species, by season and overall, during the fixed-point bird use surveys at the Big Blue Wind Energy Project, November 23, 2010 - August 18, 2011.

		Winter		Spring		Summer		Total	
Species/Type	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
rusty blackbird	*Euphagus carolinus*	0	0	1	1	0	0	1	1
savannah sparrow	*Passerculus sandwichensis*	0	0	2	351	0	0	2	351
snow bunting	*Plectrophenax nivalis*	7	350	0	0	0	0	7	350
song sparrow	*Melospiza melodia*	0	0	27	50	6	8	33	58
tree swallow	*Tachycineta bicolor*	0	0	3	81	6	98	9	179
unidentified passerine		0	0	0	0	18	94	18	94
unidentified sparrow		0	0	1	50	0	0	1	50
unidentified warbler		0	0	1	100	0	0	1	100
vesper sparrow	*Pooecetes gramineus*	0	0	2	2	4	4	6	6
western meadowlark	*Sturnella neglecta*	0	0	4	4	1	1	5	5
yellow-rumped warbler	*Dendroica coronata*	0	0	1	2	0	0	1	2
Woodpeckers		**0**	**0**	**5**	**6**	**1**	**1**	**6**	**7**
northern flicker	*Colaptes auratus*	0	0	4	5	0	0	4	5
unidentified woodpecker		0	0	1	1	1	1	2	2
Unidentified Birds		**0**	**0**	**0**	**0**	**1**	**1**	**1**	**1**
unidentified bird (small)		0	0	0	0	1	1	1	1
Overall		**30**	**473**	**562**	**7,255**	**309**	**1,390**	**901**	**9,118**

[a] Regardless of distance from the observer

Table 2. Summary of sensitive species (number of groups [# grps] and number of individuals [# obs]) observed at the Big Blue Wind Energy Project during fixed-point bird use surveys, November 23, 2010 to August 18, 2011.

Species	Scientific Name	Status	# of grps	# of obs
bald eagle	*Haliaeetus leucocephalus*	SSC, EA	25	33
American white pelican	*Pelecanus erythrorhynchos*	SSC	1	8
Wilson's phalarope	*Phalaropus tricolor*	T	2	8
Total	**3 species**		**28**	**49**

T-Threatened species as designated by the state of Minnesota (MNDNR 2007)
SSC-Species of special concern in Minnesota (MNDNR 2007)
EA – Federal Bald and Golden Eagle Act (BGEPA 1940, MSU 2010).

Table 3. Summary of incidental wildlife observations by groups (grps) and as individuals (obs) within the Big Blue Wind Energy Project, November 23, 2010 to August 18, 2011.

Common name	Scientific name	grps	Obs
American kestrel	*Falco sparverius*	8	8
bald eagle	*Haliaeetus leucocephalus*	3	3
great blue heron	*Ardea herodias*	1	2
great egret	*Ardea alba*	1	6
mallard	*Anas platyrhynchos*	1	4
merlin	*Falco columbarius*	1	1
red-tailed hawk	*Buteo jamaicensis*	18	24
turkey vulture	*Cathartes aura*	4	4
unidentified gull		1	6
unidentified hawk		1	1
Bird Subtotal	**8 species**	**39**	**59**
white-tailed deer	*Odocoileus virginianus*	1	1
Mammal Subtotal	**1 species**	**1**	**1**
American bullfrog	*Rana catasbeiana*	1	30
Amphibian Subtotal	**1 species**	**1**	**30**
Total	**10 species**	**41**	**90**

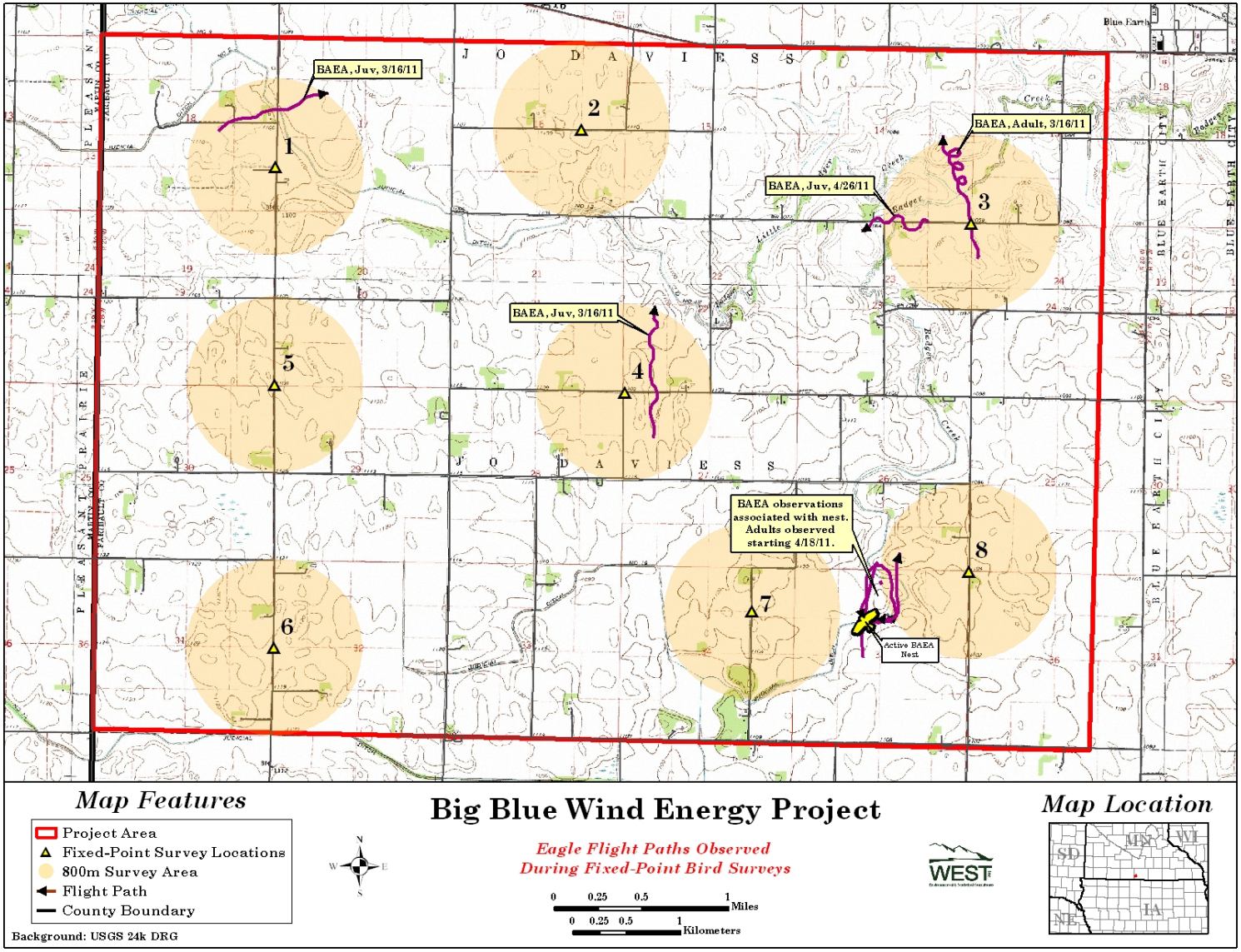

Figure 2. Flight paths for bald eagles observed during fixed-point bird surveys at the Big Blue Wind Energy Project.

Raptor Nest Surveys

A total of three raptor nests were observed in or within 1.6 km (one mi) of the BBWEP (Figure 1). Two nests (BBRN1, active-probable red-tailed hawk and BBRN3 inactive) were outside of the project boundary while one nest (BBRN2) was an active bald eagle nest located within the study area (Figure 1).

DISCUSSION

The surveys reported here from the BBWEP are part of a larger study effort that will last one full year. Seasonal interim reports are designed to give project developers an early warning if high wildlife use is documented during surveys or if sensitive species are observed.

Bird Use Surveys

Species diversity of birds observed is typical of what would be expected in an intensive agricultural landscape with small patches of grassland, woodlands and wetlands. As would be expected for a location in the northern latitudes, the total number of unique bird species and observations recorded during winter (10 species: 473 individuals) was drastically lower than those observed in the spring (58 species: 7,255 individuals) and summer (36 species: 1,390 individuals). The spring season had three more visits than the summer and winter seasons which would inflate the spring's total observations but the general trend would still be evident. Three species, snow bunting (*Plectrophenax nivalis*), Lapland longspur (*Calcarius lapponicus*), and merlin (*Falco columbarius*) were recorded only during winter surveys, suggesting these species are only winter residents or early migrates through the BBWEP. The only other diurnal raptor observed during the winter surveys was the red-tailed hawk. This species was observed during both spring and summer and is probably a year-around resident of the site. It would appear that the fixed-point surveys captured the variety of bird species utilizing the BBWEP since all species observed incidentally were also observed during fixed-point surveys.

Sensitive Species

No federal threatened or endangered species were observed. However, the bald eagle was recorded within the proposed project area during spring and summer surveys. These observations along with the presence of an active bald eagle nest within the project boundary demonstrate that the BBWEP would be utilized by bald eagles during the migration and breeding seasons. The bald eagle is protected under the Bald and Golden Eagle Protection Act (BGEPA 1940, MSU 2010) and is a species of concern in the state of Minnesota (MNDNR 2007). Two other state sensitive species, American white pelican (species of concern) and Wilson's phalarope (threatened) were also recorded. Both species were observed only in the spring and in small numbers (eight individuals each).

Raptor Nest Survey

The only raptor stick nest observed within the BBWEP was the active bald eagle nest. Two other nests where observed within 1.6 km (one mi) of the project boundary with one of these active (probable red-tailed hawk). Given the relatively small size of the project and the type of landscape in which the projects lies (intensive row crop production), the few raptor stick nest observed would be expected. Although grassland habitat is limited in and around the project, there is the potential for the ground nesting northern harrier (*Circus cyaneus*) to utilize these habitats.

Comparison of Seasonal Diurnal Raptor Use

Diurnal raptors have received much attention due to high rates of fatalities at the Altamont Pass wind energy facility in California which has the highest recorded overall diurnal raptor fatality rate of any wind energy facility (Erickson et al. 2002b). Based on the results from other wind resource areas, mean diurnal raptor use (number of diurnal raptors divided by the number of 800-m plots and the total number of surveys) in the BBWEP during the winter, spring, and summer of 2010/2011 was low (0.06, 0.39, and 0.19 diurnal raptors/plot/20-min survey, respectively) relative to data collected at other existing and proposed wind energy facilities with data for winter, spring or summer seasons (Figures 3, 4, and 5).

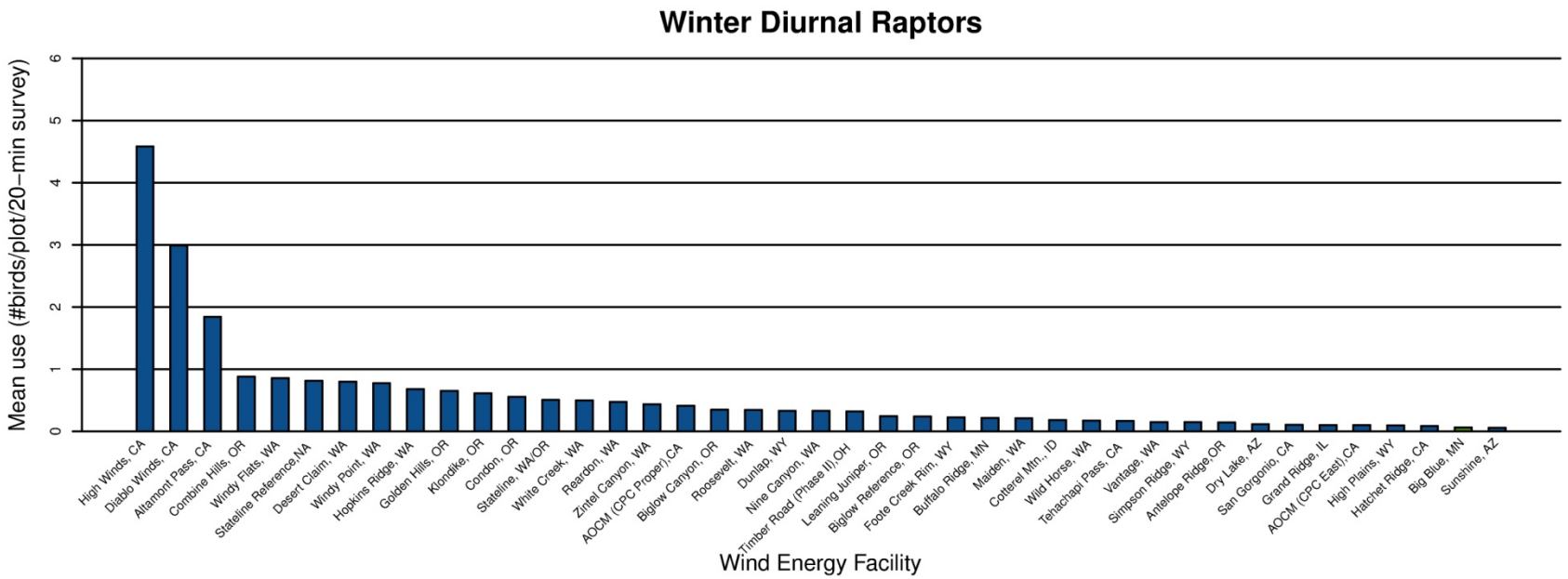

Figure 3. Comparison of winter 2010 and 2011 diurnal raptor use between the Big Blue Wind Energy Project and other United States wind energy facilities.

Data from the following sources:

Wind Energy Facility	Reference	Wind Energy Facility	Reference	Wind Energy Facility	Reference
Big Blue, MN	This study.				
DNR, WA	Johnson et al. 2006b	White Creek, WA	NWC and WEST 2005	Simpson Ridge, WY	Johnson et al. 2000
Elkhorn, OR	WEST 2005a	Hopkin's Ridge, WA	Young et al. 2003a	Stateline Reference	URS et al. 2001
Diablo Winds, CA	WEST 2006a	Buffalo Ridge, MN	Erickson et al. 2002b	Hatchet Ridge, CA	Young et al. 2007a
Lower Linden, WA	Johnson et al. 2007a	Stateline, WA/OR	Erickson et al. 2002b	Biglow Canyon, OR	WEST 2005c
Hoctor Ridge, WA	Johnson et al. 2006c	Desert Claim, WA	Young et al. 2003b	Invenergy_Vantage, WA	WEST 2007
Leaning Juniper, OR	Kronner et al. 2005	Combine Hills, OR	Young et al. 2003c	Maiden, WA	Erickson et al. 2002b
Cotterel Mtn., ID	Cooper et al. 2004	Klondike, OR	Johnson et al. 2002	Nine Canyon, WA	Erickson et al. 2001
Imrie, WA	Johnson et al. 2006d	Bighorn, WA	Johnson and Erickson 2004	Zintel Canyon, WA	Erickson et al. 2002a
Roosevelt, WA	NWC and WEST 2004	Condon, OR	Erickson et al. 2002b	Biglow Reference, OR	WEST 2005c
Swauk Ridge, WA	Erickson et al. 2003b	Stateline Reference	URS et al. 2001	Simpson Ridge, WY	Johnson et al. 2000
Klickitat Co., EOZ WA	WEST and NWC 2003	Hatchet Ridge, CA	Young et al. 2007a	Wild Horse, WA	Erickson et al. 2003a
High Winds, CA	Kerlinger et al. 2005	Biglow Canyon, OR	WEST 2005c	North Valley, MT	WEST 2006b
Golden Hills, OR	Jeffrey et al. 2008	Invenergy_Vantage, WA	WEST 2007	Dry Lake, AZ	Young et al. 2007b
Foote Creek Rim, WY	Erickson et al. 2002b	Maiden, WA	Erickson et al. 2002b	Homestead, CA	WEST et al. 2007
Altamont Pass, CA	Erickson et al. 2002b	Nine Canyon, WA	Erickson et al. 2001	Tehachapi Pass, CA	Erickson et al. 2002b
Windy Flats, WA	Johnson et al. 2007b	Zintel Canyon, WA	Erickson et al. 2002a	San Gorgonio, CA	Erickson et al. 2002b

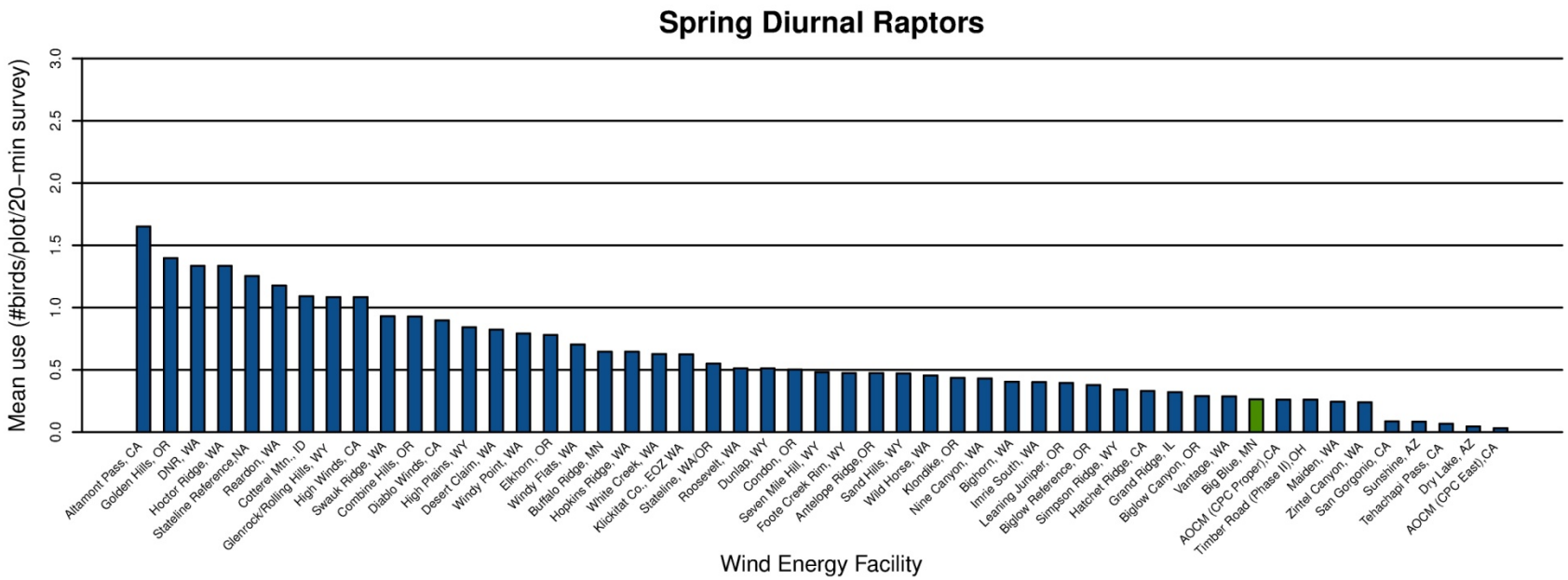

Figure 4. Comparison of spring 2011 diurnal raptor use between the Big Blue Wind Energy Project and other United States wind energy facilities.

Data from the following sources:

Wind Energy Facility	Reference	Wind Energy Facility	Reference	Wind Energy Facility	Reference
Big Blue, MN	This study.				
Diablo Winds, CA	WEST 2006a	Golden Hills, OR	Jeffrey et al. 2008	Wild Horse, WA	Erickson et al. 2003a
High Winds, CA	Kerlinger et al. 2005	Maiden, WA	Erickson et al. 2002b	Stateline, WA/OR	Erickson et al. 2002b
Altamont Pass, CA	Erickson et al. 2002b	Reardon, WA	WEST 2005b	North Valley, MT	WEST 2006b
Cotterel Mtn., ID	Cooper et al. 2004	Sand Hills, WY	Johnson et al. 2006a	Stateline Reference	URS et al. 2001
Hopkin's Ridge, WA	Young et al. 2003a	Combine Hills, OR	Young et al. 2003c	Tehachapi Pass, CA	Erickson et al. 2002b
Foote Creek Rim, WY	Erickson et al. 2002b	Homestead, CA	WEST et al. 2007	Simpson Ridge, WY	Johnson et al. 2000
Windy Flats, WA	Johnson et al. 2007b	Hatchet Ridge, CA	Young et al. 2007a	Grand Ridge, IL	Derby et al. 2009
Buffalo Ridge, MN	Erickson et al. 2002b	Leaning Juniper, OR	Kronner et al. 2005	Dry Lake, AZ	Young et al. 2007b
Elkhorn, OR	WEST 2005a	Roosevelt, WA	NWC and WEST 2004	Biglow Canyon, OR	WEST 2005c
Zintel Canyon, WA	Erickson et al. 2002a	Klondike, OR	Johnson et al. 2002	Invenergy_Vantage, WA	WEST 2007
Swauk Ridge, WA	Erickson et al. 2003b	Condon, OR	Erickson et al. 2002b	Biglow Reference, OR	WEST 2005c
Desert Claim, WA	Young et al. 2003b	Nine Canyon, WA	Erickson et al. 2001	San Gorgonio, CA	Erickson et al. 2002b
White Creek, WA	NWC and WEST 2005	Sunshine, AZ	WEST and CPRS 2006		

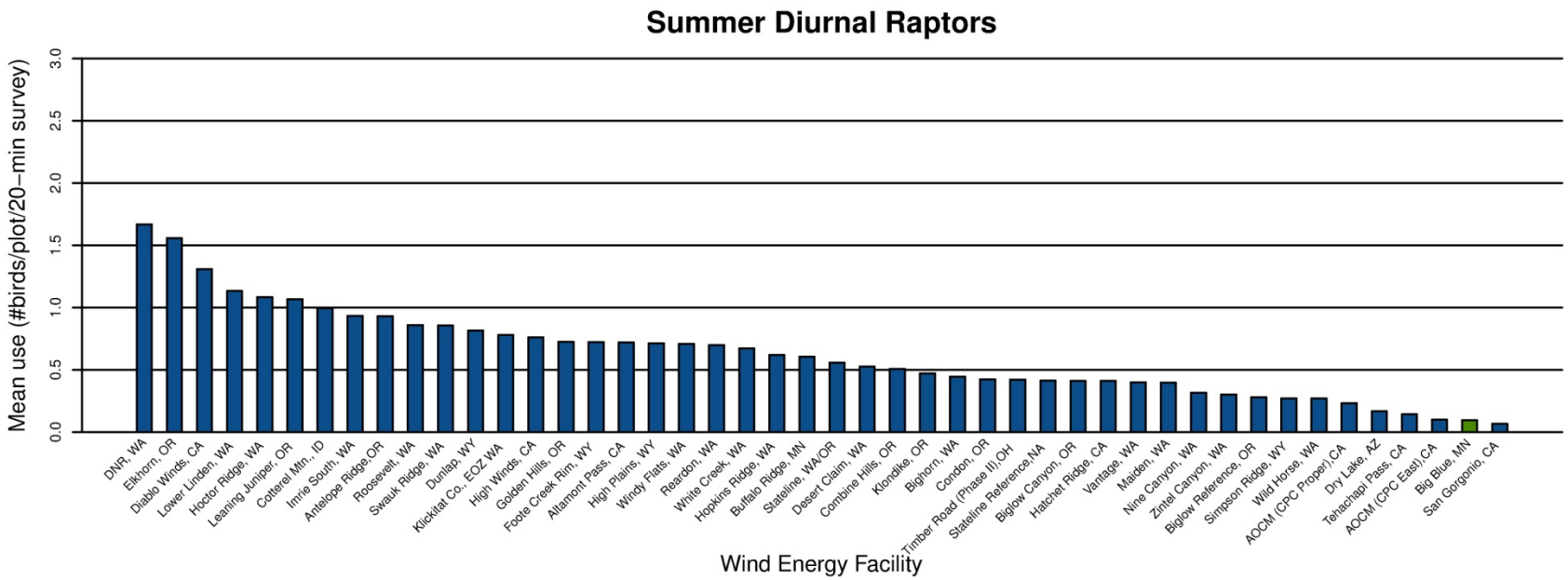

Figure 5. Comparison of summer 2011 diurnal raptor use between the Big Blue Wind Energy Project and other United States wind energy facilities.

Data from the following sources:

Wind Energy Facility	Reference	Wind Energy Facility	Reference	Wind Energy Facility	Reference
Big Blue, MN	This study.				
Diablo Winds, CA	WEST 2006a	Golden Hills, OR	Jeffrey et al. 2008	Wild Horse, WA	Erickson et al. 2003a
High Winds, CA	Kerlinger et al. 2005	Maiden, WA	Erickson et al. 2002b	Stateline, WA/OR	Erickson et al. 2002b
Altamont Pass, CA	Erickson et al. 2002b	Reardon, WA	WEST 2005b	North Valley, MT	WEST 2006b
Cotterel Mtn., ID	Cooper et al. 2004	Sand Hills, WY	Johnson et al. 2006a	Stateline Reference	URS et al. 2001
Hopkin's Ridge, WA	Young et al. 2003a	Combine Hills, OR	Young et al. 2003c	Tehachapi Pass, CA	Erickson et al. 2002b
Foote Creek Rim, WY	Erickson et al. 2002b	Homestead, CA	WEST et al. 2007	Simpson Ridge, WY	Johnson et al. 2000
Windy Flats, WA	Johnson et al. 2007b	Hatchet Ridge, CA	Young et al. 2007a	Grand Ridge, IL	Derby et al. 2009
Buffalo Ridge, MN	Erickson et al. 2002b	Leaning Juniper, OR	Kronner et al. 2005	Dry Lake, AZ	Young et al. 2007b
Elkhorn, OR	WEST 2005a	Roosevelt, WA	NWC and WEST 2004	Biglow Canyon, OR	WEST 2005c
Zintel Canyon, WA	Erickson et al. 2002a	Klondike, OR	Johnson et al. 2002	Invenergy_Vantage, WA	WEST 2007
Swauk Ridge, WA	Erickson et al. 2003b	Condon, OR	Erickson et al. 2002b	Biglow Reference, OR	WEST 2005c
Desert Claim, WA	Young et al. 2003b	Nine Canyon, WA	Erickson et al. 2001	San Gorgonio, CA	Erickson et al. 2002b
White Creek, WA	NWC and WEST 2005	Sunshine, AZ	WEST and CPRS 2006		

REFERENCES

Anderson, R., M. Morrison, K. Sinclair, and D. Strickland. 1999. Studying Wind Energy/Bird Interactions: A Guidance Document. Metrics and Methods for Determining or Monitoring Potential Impacts on Birds at Existing and Proposed Wind Energy Sites. Prepared for the Avian Subcommittee and National Wind Coordinating Committee (NWCC). December 1999. National Wind Coordinating Committee/RESOLVE. Washington, D.C. 87 pp.

Bald and Golden Eagle Protection Act (BGEPA). 1940. 16 United States Code § 668-668d. June 8, 1940.

Cooper, B.A., R.J. Blaha, T.J. Mabee, and J.H. Plissner. 2004. A Radar Study of Nocturnal Bird Migration at the Proposed Cotterel Mountain Wind Energy Facility, Idaho, Fall 2003. Technical report prepared for Windland, Inc., Boise, Idaho, by ABR, Inc., Forest Grove, Oregon. January 2004.

Derby, C., K. Bay, and J. Ritzert. 2009. Bird Use Monitoring, Grand Ridge Wind Resource Area, La Salle County, Illinois. Year One Final Report, March 2008 - February 2009. Prepared for Grand Ridge Energy LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 29, 2009.

Erickson, W.P., D.P. Young, Jr., G. Johnson, J. Jeffrey, K. Bay, R. Good, and H. Sawyer. 2003a. Wildlife Baseline Study for the Wild Horse Wind Project. Summary of Results from 2002-2003 Wildlife Surveys May 10, 2002- May 22, 2003. Draft report prepared for Zilkha Renewable Energy, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. November 2003.

Erickson, W.P., J. Jeffrey, D.P. Young, Jr., K. Bay, R. Good, K. Sernka, and K. Kronner. 2003b. Wildlife Baseline Study for the Kittitas Valley Wind Project: Summary of Results from 2002 Wildlife Surveys. Final Report February 2002– November 2002. Prepared for Zilkha Renewable Energy, Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. January 2003.

Erickson, W.P., G.D. Johnson, K. Bay, and K. Kronner. 2002a. Ecological Baseline Study for the Zintel Canyon Wind Project. Final Report April 2001 – June 2002. Technical report prepared for Energy Northwest. Prepared for Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. June 2002.

Erickson, W.P., G.D. Johnson, D.P. Young, Jr., D. Strickland, R. Good, M. Bourassa, K. Bay, and K. Sernka. 2002b. Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments. Technical report prepared for Bonneville Power Administration, Portland, Oregon by WEST, Inc., Cheyenne, Wyoming. December 2002. http://www.bpa.gov/Power/pgc/wind/Avian_and_Bat_Study_12-2002.pdf

Erickson, W.P., E. Lack, M. Bourassa, K. Sernka, and K. Kronner. 2001. Wildlife Baseline Study for the Nine Canyon Wind Project, Final Report May 2000-October 2001 Technical report prepared for Energy Northwest, Richland, Washington.

Jeffrey, J.D., W.P. Erickson, K.J. Bay, V.K. Poulton, W.L. Tidhar, and J.E. Baker. 2008. Wildlife Baseline Studies for the Golden Hills Wind Resource Area, Sherman County, Oregon. Final Report May 2006 – October 2007. Prepared for BP Alternative Energy North America Inc., Houston, Texas, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D., J. Baker, and K. Bay. 2007a. Baseline Ecological Studies for the Lower Linden Ranch Wind Energy Project, Klickitat County, Washington. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, for Northwest Wind Partners, LLC, Goldendale, Washington. July 18, 2007.

Johnson, G.D., J. Jeffrey, J. Baker, and K. Bay. 2007b. Baseline Avian Studies for the Windy Flats Wind Energy Project, Klickitat County, Washington. Prepared for Windy Point Partners, LLC., by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. May 29, 2007.

Johnson, G.D., J. Eddy, and K. Bay. 2006a. Baseline Avian Use of the Sand Hills Wind Energy Project, Albany County, Wyoming. Summer Breeding Season and Fall Migration 2006. Draft interim report prepared for CH2M Hill, Englewood, Colorado, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. November 6, 2006.

Johnson, G.D., J. Jeffrey, V. Poulton, and K. Bay. 2006b. Baseline Ecological Studies for the DNR Wind Energy Project, Klickitat County, Washington. Prepared for Windtricity Ventures, LLC, Goldendale, Washington, by WEST, Inc., Cheyenne, Wyoming. September 5, 2006.

Johnson, G.D., J. Jeffrey, V. Poulton, and K. Bay. 2006c. Baseline Ecological Studies for the Hoctor Ridge Wind Energy Project, Klickitat County, Washington. Prepared for Windtricity Ventures, LLC., Goldendale, Washington by WEST, Inc., Cheyenne, Wyoming. September 5, 2006.

Johnson, G.D., J. Jeffrey, V. Poulton, and K. Bay. 2006d. Baseline Ecological Studies for the Imrie Ranch South Wind Energy Project, Klickitat County, Washington. Prepared for Windtricity Ventures, LLC, by WEST, Inc., Cheyenne, Wyoming. September 5, 2006.

Johnson, G.D. and W.P. Erickson. 2004. Analysis of Potential Wildlife/Wind Plant Interactions, Bighorn Site, Klickitat County, Washington. Prepared for CH2M HILL, Portland, Oregon by WEST, Inc., Cheyenne, Wyoming. August 2004.

Johnson, G.D., W.P. Erickson, K. Bay, and K. Kronner. 2002. Baseline Ecological Studies for the Klondike Wind Project, Sherman County, Oregon. Final report prepared for Northwestern Wind Power, Goldendale, Washington, by Western EcoSystems Technology, Inc. (WEST) Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. May 29, 2002.

Johnson, G.D., D.P. Young, W.P. Erickson, C.E. Derby, M.D. Strickland, and R.E. Good. 2000. Wildlife Monitoring Studies, SeaWest Windpower Plant, Carbon County, Wyoming, 1995-1999. Final report prepared for SeaWest Energy Corporation, San Diego, California, and the Bureau of Land Management, Rawlins, Wyoming, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. August 9, 2000. http://www.west-inc.com and http://www.west-inc.com/reports/fcr_final_baseline.pdf

Kerlinger, P., L. Culp, and R. Curry. 2005. Post-Construction Avian Monitoring Study for the High Winds Wind Power Project, Solano County, California. Year One Report. Prepared for High Winds, LLC and FPL Energy.

Kronner, K., B. Gritske, J. Baker, V. Marr, G.D. Johnson, and K.Bay. 2005. Wildlife Baseline Study for the Leaning Juniper Wind Power Project, Gilliam County, Oregon. Prepared for PPM Energy, Portland, Oregon and CH2M HILL, Portland, Oregon by NWC, Pendleton, Oregon, and WEST, Inc., Cheyenne, Wyoming. November 3, 2005.

Minnesota Department of Natural Resources (MNDNR). 2007. Minnesota's List of Endangered, Threatened, and Special Concern Species. Updated 11/13/07. http://files.dnr.state.mn.us/natural_resources/ets/endlist.pdf

Michigan State University (MSU). Accessed 2010. Msu College of Law. United States Code (Usc) Annotated Currentness. Title 16. Conservation. Chapter 5a. Protection and Conservation of Wildlife. Subchapter II. Protection of Bald and Golden Eagles. 16 Usc § 668a-D Available online at http://www.animallaw.info/statutes/stus16usc668.htm

Northwest Wildlife Consultants, Inc. (NWC) and Western Ecosystems Technology, Inc. (WEST). 2005. Ecological Baseline Studies and Wildlife Impact Assessment for the White Creek Wind Power Project, Klickitat County, Washington. Prepared for Last Mile Electric Cooperative, Goldendale, Washington, by Northwest Wildlife Consultants, Inc., Goldendale, Washington, and Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. January 12, 2005.

Northwest Wildlife Consultants, Inc. (NWC) and Western Ecosystems Technology, Inc. (WEST). 2004. Ecological Baseline Studies for the Roosevelt Wind Project, Klickitat County, Washington. Final Report. Prepared by NWC, Pendleton, Oregon, and WEST, Inc., Cheyenne, Wyoming. September 2004

Reynolds, R.T., J.M. Scott, and R.A. Nussbaum. 1980. A Variable Circular-Plot Method for Estimating Bird Numbers. Condor 82(3): 309-313.

URS Corporation, Western EcoSystems Technology, Inc. (WEST), and Northwest Wildlife Consultants, Inc. (NWC). 2001. Avian Baseline Study for the Stateline Project. Prepared for FPL Energy Vansycle, LLC, Juno Beach, Florida.

US Environmental Protection Agency (USEPA). 2006. Level II and Level IV Ecoregions of Minnesota. Environmental Protection Agency, Corvallis, OR.

Western EcoSystems Technology, Inc. (WEST). 2007. Wildlife and Habitat Baseline Study for the Vantage Wind Power Project, Kittitas County, Washington. Draft report prepared for Invenergy by Western EcoSystems Technology, Inc. (WEST), Cheyenne Wyoming and Walla Walla, Washington. June 2007.

Western EcoSystems Technology, Inc. (WEST). 2006a. Diablo Winds Wildlife Monitoring Progress Report, March 2005 - February 2006. Technical report submitted to FPL Energy and Alameda County California. WEST. Cheyenne, Wyoming.

Western EcoSystems Technology, Inc. (WEST). 2006b. Wildlife Baseline Study for the North Valley County Wind Project: Summary of Results from 2006 Wildlife Surveys. Prepared for POWER Engineers, Boise, Idaho, and Wind Hunter, LLC., Grapevine, Texas. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. December 8, 2006.

Western Ecosystems Technology, Inc. (WEST). 2005a. Ecological Baseline Study at the Elkhorn Wind Power Project. Exhibit A. Final report prepared for Zilkha Renewable Energy, LLC., Portland, Oregon, by WEST, Cheyenne, Wyoming. June 2005.

Western EcoSystems Technology, Inc. (WEST). 2005b. Ecological Baseline Study for the Proposed Reardon Wind Project, Lincoln County, Washington. Draft Final Report. Prepared for Energy Northwest, Richland, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. June 2005.

Western EcoSystems Technology, Inc. (WEST). 2005c. Wildlife and Habitat Baseline Study for the Proposed Biglow Canyon Wind Power Project, Sherman County, Oregon. March 2004 - August 2005. Prepared for Orion Energy LLC., Oakland, California. October, 2005. WEST. Cheyenne, Wyoming.

Western EcoSystems Technology, Inc. (WEST), EDAW, Inc., and Bloom Biological, Inc. 2007. Baseline Avian Use and Risk Assessment for the Homestead Wind Energy Project, Kern County, California. 2005 – 2006. Prepared for Horizon Wind Energy by Western EcoSystems Technology, Inc. (WEST), EDAW, Inc., San Diego, California, and Bloom Biological, Inc., Santa Anna, California. April 19, 2007.

Western EcoSystems Technology, Inc. (WEST) and Colorado Plateau Research Station (CPRS). 2006. Avian Studies for the Proposed Sunshine Wind Park, Coconino County, Arizona. Prepared for Sunshine Arizona Wind Energy, LLC., Flagstaff, Arizona, by WEST, Cheyenne, Wyoming, and the CPRS, Northern Arizona University, Flagstaff, Arizona. May 2006.

Western EcoSystems Technology, Inc. (WEST) and Northwest Wildlife Consultants, Inc. (NWC). 2003. Analysis of Potential Avian/Wind Plant Interactions in Klickitat County, Washington. Supplement to the Klickitat County Programmatic Environmental Impact Statement. Prepared for the Resource Development Department, Klickitat County, Goldendale, Washington, by WEST, Cheyenne, Wyoming, and NWC, Pendleton, Oregon. May 2003.

Young, D.P. Jr., G.D. Johnson, V.K. Poulton, and K. Bay. 2007a. Ecological Baseline Studies for the Hatchet Ridge Wind Energy Project, Shasta County, California. Prepared for Hatchet Ridge Wind, LLC, Portland, Oregon by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. August 31, 2007. http://www.co.shasta.ca.us/Departments/Resourcemgmt/drm/Hatchet%20Ridge/DEIR/App_C-1.pdf

Young, D.P. Jr., V.K. Poulton, and K. Bay. 2007b. Ecological Baseline Studies Report. Proposed Dry Lake Wind Project, Navajo County, Arizona. Prepared for PPM Energy, Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 1, 2007.

Young, D.P. Jr., W.P. Erickson, K. Bay, J. Jeffrey, E.G. Lack, R.E. Good, and H.H. Sawyer. 2003a. Baseline Avian Studies for the Proposed Hopkins Ridge Wind Project, Columbia County, Washington. Final Report, March 2002 - March 2003. Prepared for RES North America, LLC., Portland, Oregon, by Western EcoSystems Technology, Inc.(WEST), Cheyenne, Wyoming. April 30, 2003.

Young, D.P. Jr., W.P. Erickson, K. Bay, J. Jeffrey, E.G. Lack, and H.H. Sawyer. 2003b. Baseline Avian Studies for the Proposed Desert Claim Wind Power Project, Kittitas County,

Washington. Final Report. Prepared for Desert Claim Wind Power, LLC, Ellensburg, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 2003.

Young, D.P. Jr., W.P. Erickson, J. Jeffrey, K. Bay, R.E. Good, and E.G. Lack. 2003c. Avian and Sensitive Species Baseline Study Plan and Final Report. Eurus Combine Hills Turbine Ranch, Umatilla County, Oregon. Technical report prepared for Eurus Energy America Corporation, San Diego, California and Aeropower Services, Inc., Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. March 10, 2003.